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Philosophical Logic and Philosophy of Logic

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Philosophical Logic and Philosophy of Logic

Introductory Readings

1. Priest, Graham. 2000. *Logic: A Very Short Introduction*. New York: Oxford University Press.
"This book is an introduction to logic, as contemporary logicians now understand the subject. It does not attempt to be a textbook, however.
There are numerous such books currently available. The point of this one is to explore the roots of logic, which sink deep into philosophy.
Some formal logic will be explained along the way.
In each of the main chapters, I start by taking up some particular philosophical problem or logical puzzle. I then explain one approach to it. Often this is a fairly standard one; but in some of the areas there is no standard answer: logicians still disagree. In such cases, I have just chosen one that is interesting. Nearly all the approaches, whether standard or not, may be challenged. I finish each chapter with some problems for the approach that I have explained. Sometimes these problems are standard; sometimes they are not. Sometimes they may have easy answers; sometimes they may not. The aim is to challenge you to figure out what you make of the matter.
Modern logic is a highly mathematical subject. I have tried to write the material in such a way as to avoid nearly all mathematics. The most that is required is a little high-school algebra in the last few chapters. It is true that you will need the determination to master some symbolism that may be new to you; but this is a lot less than is required to have a basic grasp of any new language. And the perspicuity that the symbolism gives to difficult questions makes any trouble one may have in mastering it well worth it. One warning, though: reading a book on logic or philosophy is not like reading a novel. There will be times when you will have to

read slowly and carefully. Sometimes you may have to stop and think about things; and you should be prepared to go back and reread a paragraph if necessary.
The final chapter of the book is on the development of logic. In this, I have tried to put some of the issues that the book deals with in an historical perspective, to show that logic is a living subject, which has always evolved, and which will continue to do so. The chapter also contains suggestions for further reading.
There are two appendices. The first contains a glossary of terms and symbols. You may consult this if you forget the meaning of a word or symbol. The second appendix contains a question relevant to each chapter, with which you can test your understanding of its main ideas." (from the Preface).

2. Hurley, Patrick J. 2008. *A Concise Introduction to Logic*. Belmont: Thomson / Wadsworth.
Tenth revised edition (First edition 1982).
Brief Contents: Part I. Informal Logic. 1. Basic Concepts 1; 2. Language: Meaning and Definition 74; 3. Informal Fallacies 113; Part II. Formal Logic. 4. Categorical Propositions 189; 5. Categorical Syllogisms 244; 6. Propositional Logic 290; 7. Natural Deduction in Propositional Logic 350; 8. Predicate Logic 406; Part II. Inductive Logic. 9. Analogy and Legal and Moral Reasoning 468; 10. Causality and Mill's Methods 487; 11. Probability 510; 12. Statistical Reasoning 526; 13. Hypothetical/Scientific Reasoning 546; 14. Science and Superstition 568; Appendix Logic and Graduate-Level Admissions tests 595; Answers to selected Exercises 605; Glossary/index 672.
"The most immediate benefit derived from the study of logic is the skill needed to construct sound arguments of one's own and to evaluate the arguments of others. In accomplishing this goal, logic instills a sensitivity for the formal component in language, a thorough command of which is indispensable to clear, effective, and meaningful communication. On a broader scale, by focusing attention on the requirement for reasons or evidence to support our views, logic provides a fundamental defense against the prejudiced and uncivilized attitudes that threaten the foundations of our democratic society. Finally, through its attention to inconsistency as a fatal flaw in any theory or point of view, logic proves a useful device in disclosing ill-conceived policies in the political sphere and, ultimately, in distinguishing the rational from the irrational, the sane from the insane.
To realize the benefits offered by the study of logic, one must thoroughly understand the central concepts of the subject and be able to apply them in actual situations. To promote the achievement of these goals, this text presents the central concepts of logic clearly and simply. Examples arc used extensively, key terms are introduced in boldface type and defined in the glossary/index, and major points are illustrated in graphic boxes. Furthermore, to ensure sufficient practice in applying the basic principles, the book includes over 2,000 exercises selected to illustrate the main points and guard against the most typical mistakes. In most cases, every third exercise is answered in the back of the book.
New to This Edition.
In this Tenth Edition, the coverage of Inductive Logic in Part III has been broken up into six separate chapters to allow for greater flexibility in using the text in class. This change also facilitates customization through our Custom program, which lets you select course materials to create an affordable text that matches your syllabus.
Also new in this edition, thirteen pages devoted to "Eminent Logicians" highlight the contributions of key logicians in history. The inclusion of these features should help to humanize logic and make it more interesting by connecting it with historical figures who devoted much of their lives to advancing the science of logic.
A new method for testing sorites has been introduced into Section 5.7. This method, which resembles the rules method for syllogisms, is often simpler to apply because it does not require that intermediate conclusions be drawn.
In Section 8.6 the restriction on universal generalization for arguments involving relational predicates and overlapping quantifiers has been replaced by a slightly

stricter version. To my considerable surprise, a very good logician came up with an invalid argument that got past the earlier formulation of this restriction.
Also, in Chapter 14 (formerly Section 9.6) more treatment is accorded Ockham's razor in connection with explanations.
The "Logic and Graduate-Level Admissions Tests" appendix, which draws a connection between logic and earning a good score on tests such as the LSAT, GMAT, and MCAT, has been completely rewritten and expanded, paying greater attention to logical strategies." (pp. XVII-XVIII).

3. Govier, Trudy. 2010. *A Practical Study of Argument*. Belmont: Wadsworth. Seventh revised edition (First edition 1985).
Contents: Preface X-XIII; 1. What Is an Argument? (And What Is Not) 1; 2. Pinning Down Argument Structure 22; 3. Looking at Language 57; 4. Good Arguments: An Introduction 87; 5. Premises: What to Accept and Why 116; 6. Working on Relevance 148; 7. Deductive Arguments: Categorical Logic 178; 8. 8. Deductive Arguments: Propositional Logic 216; 9. An Introduction to Inductive Arguments 255; 10. Causal Inductive Arguments 286; 11. Analogies: Reasoning from Case to Case 318; 12. Conductive Arguments and Counter-considerations 352; Appendix: Summary of Fallacies 378; Answers to Selected Exercises 386; Index 414.
"This book is written for all those interested in arguments and arguing-and especially for students enrolled in courses designed to improve their critical thinking abilities. My goal in this work is to present enough theory to explain why certain kinds of argument are good or bad and enough illustrations and examples to show how that theory can be applied.
The book includes lively illustrations from contemporary debates and issues and ample student exercises. Responses to some exercises are provided within the book, while the remainder are answered in a manual available to instructors. A central new feature of the seventh edition is that for most of the exercises in the text, on-line supplementations are available. These developments have been made possible by the sustained and energetic efforts of Dr. Jim Freeman of Hunter College, New York. The on-line material includes fill-in-the-blank, true-false, and multiple choice examples; all are machine gradable. Students get immediate feedback on whether their answers are correct, and instructors get reports of the percentage of correct examples the students completed, for each exercise assigned.
I present an integrated treatment of cogent argument and fallacies and of formal and informal strategics for analysis and evaluation. In addition to the highly significant feature of Dr. Freeman's exercise material, this seventh edition includes updated examples; a reordering of some early material on language, clarity and argument; compression of exposition at some points; and a strengthened discussion of inductive reasoning. In recognition of students' increased used of Internet materials for personal and academic research, relevant pointers on evaluating information from the Internet are included.
My interest in the theory and practice of argument stems from an occasion many years ago when I was asked to review a manuscript on informal Slacks. At the time, I was teaching an elementary course on banal logic to a large group of students who were not too keen on the subject. The greater practicality of the informal logic and the lively interest of the examples in that manuscript led to my own fascination with practical argumentation. I began to study texts in that field and developed my own course on practical reasoning. From that work, this text was generated. Along with many other people, I have done further research on the philosophy of argument since that time, and I have tried to take account of new developments here. Some themes relatively unexplored in the field of argument analysis when this book was first written remain of great interest to theorists today. The topics of conductive argument and analogical arguments are two examples.
This book combines a detailed nonformal treatment of good and bad arguments with a solid treatment of two central areas of formal logic: categorical logic and propositional logic. In addition to the interpretation and evaluation of arguments, the book also explores issues relevant to their construction. The first edition, written

between 1982 and 1984, was novel in its combination of discussions of cogent and fallacious arguments, its synthesis of informal and formal approaches, and its sustained effort to present a coherent general theory of argument. Since the early 1980s other authors have adopted a similar approach; thus the combination of topics is less unusual than it was previously. The second edition of this text was written in 1986, the third in 1990, the fourth in 1995, the fifth in 1999, and the sixth in 2003. This current edition, the seventh, was prepared in the summer of 2008.
The importance of cogent argumentation is a persistent theme in this work. The types of arguments treated in this book are integral to the development of many areas including law; philosophy; physical, biological, and social science; literature; and history." (pp. X-XI).

4. Gensler, Harry J. 2010. *Introduction to Logic*. New York: Routledge.
Second revised edition (First edition 2002).
Contents: Preface IX-X; 1. Introduction 1; Part One: Syllogistic, Informal, and Inductive Logic. 2. Syllogistic Logic 7; 3. Meaning and definitions 34; 4. Fallacies and Argumentation 55; 5. Inductive Reasoning 80; Part Two: Classical Symbolic Logic 6. Basic Propositional Logic 118; 7. Propositional Proofs 153; 8. Basic Quantificational Logic 182; 9. Relations and Identity 205; Part Three: Advanced Symbolic Systems. 10. Basic Modal Logic 228: 11. Further Modal Systems 248; 12. Deontic and Imperative Systems 267: 13. Belief Logic 290; 14. A Formalized Ethical Theory 313: Part Four: Further Vistas. 15. Metalogic 336; 16 History of Logic 351; 17. Deviant Logics 363; 18. Philosophy of Logics 373; Appendix: For Further Reading 383; Answers to Selected Problems 384; index 415.
"This is a comprehensive *Introduction to Logic.* It covers:
syllogisms;
informal aspects of reasoning (like meaning and fallacies);
inductive reasoning;
propositional and quantificational logic;
modal, deontic, and belief logic;
the formalization of an ethical theory about the golden rule;
and metalogic, history of logic, deviant logic, and philosophy of logic.
Because of its broad scope, this book can be used for basic logic courses (where teachers can choose from a variety of topics) or more advanced ones (including graduate courses). The teacher manual and the end of Chapter 1 both talk about which chapters are suitable for which type of course.
The first Routledge edition came out in 2002. Key features included: (a) clear, direct, concise writing; (b) interesting examples and arguments, often from everyday life or great philosophers; (c) simpler ways to test arguments, including the star test for syllogisms and an easier way to do proofs and refutations; (d) wide scope of materials (likely the widest of any logic text); (e) suitability for self-study and preparation for tests like the LAST; (f) reasonable price (a third of the cost of some competitors); and (g) the companion LogiCola instructional program (which randomly generates problems, gives feedback on answers, provides help and explanations, and records progress). I'm happy with how the first edition has been received, often with lavish praise.
I have made many improvements to this second edition. I have arranged the chapters in a more logical way; so they now go, roughly, from easier to harder material. I added new chapters on history of logic, deviant logic, and philosophy of logic; so the book is even broader in scope than before. I beefed up informal fallacies, added inference to the best explanation, and corrected some typos. I overhauled three difficult sections: on relational translations, belief-logic proofs, and completeness. I did much tweaking of explanations (for example, see the sections on the star test, Venn diagrams, and proofs). I tweaked some exercises. I added an appendix on suggested further readings. I added a real index (previously there was only an index of names); so now it's easier to research a topic. And I added a convenient list of rules to the inside covers." (pp. IX-X).

5. Guttenplan, Samuel. 1997. *The Languages of Logic. An Introduction to Formal Logic*. Malden: Blackwell.
Second edition (First edition 1986).

6. Kelley, David. 1998. *The Art of Reasoning*. New York: W. W. Norton.
Third revised edition (first edition 1988; second expanded edition 1994).

7. Smullyan, Raymond. 1968. *First-Order Logic*. New York: Springer-Verlag.
Reprinted New York, Dover, 1995.

8. McCulloch, Gregory. 1989. *The Game of the Name. Introducing Logic, Language, and Mind*. Oxford: Clarendon Press.

9. Kalish, Donald, Montague, Richard, and Mar, Gary. 1980. *Logic. Techniques of Formal Reasoning*. New York: Hartcourt Brace.
First edition 1964; Second revised edition 1980; from 1992 distributed by Oxford University Press.
Contents: Chapter I. 'NOT' and 'IF' p. 1; Chapter II. 'AND', 'OR', 'IF AND ONLY IF' p. 50; Chapter III: 'ALL' and 'SOME' p. 117; Chpater IV. 'ALL' and 'SOME' *continued* p. 201; Chapter V. 'IS' (in one sense) p. 263; Chapter VI. 'THE' 306; Chapter VII. Additional derivational procedures p. 346; Chapter VIII. 'THE' again: A Russellian theory of descriptions p. 392; Chapter IX. Automatic procedures p. 411; Chapter X. Definitions: formal theories p. 438; Chapter XI. Variable-bindings operators p. 475; Bibliography p. 509; Index of proper names p. 515; Index of subjects p. 517.
"This edition, like the preceding one, is an introduction to logic, requiring no prior knowledge of philosophy or mathematics. It does not aim at communicating or justifying results about logical systems but instead at imparting a skill-the ability to recognize and construct correct deductions and refutations. Metamathematical results are sometimes mentioned, but only incidentally and as an aid to understanding.
The subjects treated are the same as in the first edition; they are the sentential calculus, the quantifier calculus, the identity calculus, the description calculus, some automatic proof procedures, and a detailed development of a familiar mathematical theory. The treatment of the latter two subjects remains unchanged, except for the placement of the chapter on automatic procedures. In the present edition, as in the earlier one, the four systems of logic are developed by the simple and intuitive techniques of natural deduction; but here the development is continuous and initially unsupplemented.
(...)
Symbolic rather than English arguments are the central subject matter of our text, as its title suggests. But here as in the earlier edition arguments of English play a motivating role. We say that an English argument is *valid* (in a particular branch of logic) if and only if it has (within that branch) a valid symbolization. In the earlier edition, in sections titled 'Paradoxical inferences', some intuitively invalid English arguments that appear to have valid symbolizations were considered. Then it was claimed that these English arguments cannot be symbolized and hence do not constitute fallacies, for their symbolizations are blocked by subtle restrictions imposed on the notion of a scheme of abbreviation. This attempt to preserve the adequacy of the characterization of *validity* of English arguments was a step beyond that taken by most, if not all, introductions to classical logic. And it was the point of departure for the profound investigations of the structure of ordinary language by our late colleague Professor Richard Montague (see Montague *Formal philosophy: selected papers by Richard Montague,* edited and with an introduction by R. H. Thomason, New Haven and London, 1974 and Barbara H. Partee (editor), *Montague grammar,* New York, 1976)." (from the preface to the Second Edition).

10. Hintikka, Jaakko, and Bachman, James. 1991. *What If...? Toward Excellence in Reasoning*. London: Mayfield.
Contents: Preface XI-XIV; Part One: Introduction to the interrogative model of reasoning p. 1; 1. Inquiry as inquiry p. 3; 2. Interrogative games: the structure of the

reasoning process p. 29; 3. Interrogative argument analysis p. 48; 4. Argument construction and argumentative essays p. 68; Part Two: Logical inference in detail p. 81; 5. Deductive logic and its role in reasoning p. 83; 6. Representing statements p. 101; 7. Statement logic and the table method p. 117; 8. Complex conclusions in statement logic p. 134; 9. Statement logic in everyday English p. 144; Part Three: Interrogative moves in detail p. 159; 11. Three further aspects of interrogative moves p. 183; 12. Strategies for reasoning with uncertain answers p. 207; 13. Strategies for evaluating oracles p. 220; Part Four: Advanced topics in interrogative reasoning p. 235; 15. First-order predicate logic in English p. 267; 16. Presuppositions of "Wh-" questions p. 277; 17. Advanced strategies in reasoning p. 285; 18. Strategic parallels between deduction and interrogation p. 306; 19. Models of scientific reasoning p. 323; 20. Definition and identification p. 334; Conclusion: p. 359; 21. Argument analysis and evaluation p. 361; Appendixes, Glossary and Index. Appendix A: Argument sketches for exercises in argument analysis, construction, and evaluation p. 375; Appendix B: Recreational questioning games p. 407; Appendix C: Puzzles, problems and mistakes in inquiry p. 411; Glossary p. 429; Clues and solutions for selected exercises p. 437; Index p. 460-465.
"Many college and university courses aim at improving students' reasoning. The recorded history of recommendations for achieving this goal stretches back to Aristotle. We venture adding to this history because for several years Jaakko Hintikka and various associates have been developing a comprehensive theory for understanding the nature of reasoning that sheds new light on how students may be encouraged and enabled to achieve creatively disciplined reasoning skills. This theory, the interrogative approach to inquiry, makes it possible to integrate deductive logic and informal reasoning into a unified whole. Its core is what is known as the interrogative model of reasoning.
The interrogative model, which is used consistently throughout the book, offers a uniform framework for studying and teaching both formal logic and argumentation theory, including the analysis, evaluation, and construction of arguments in ordinary English. As in the old Socratic method, reasoning is cast in the form of a sequence of questions and answers, interspersed with logical (i.e., deductive) inferences.
The interrogative model distinguishes *definitory rules,* which are concerned with reasoning correctly, from *strategic rules,* which tell how to reason effectively. The former define what is admissible in reasoning, while the latter show students how to make creative use of what is allowed by the definitory rules. Strategic rules thus serve as signposts on the way to excellence in reasoning. By stressing strategic rules this text stays focused on the pursuit of excellence in reasoning.
In the interrogative model all inferences are required to be deductive. This eliminates the problem that an *inference* might introduce an element of uncertainty. Thus all inferences are strictly truth preserving.
The effect is to locate problems with uncertainty in the process of discovering and gathering information rather than in the inference process. The interrogative model can then deploy many different insights to develop strategies for coping with uncertainty about the information available to the reasoner. The Instructor's Manual directs interested readers to a Bibliography of the original research on the interrogative model." (from the Preface).

11. Sommers, Fred, and Englebretsen, George. 2000. *An Invitation to Formal Reasoning. The Logic of Terms*. Aldershot: Ashgate.
Contents: Preface p. X; Chapter 1. Reasoning 1; Chapter 2. Picturing propositions 25; Chapter 3. The language of logic (I) p. 49; Chapter 4. The language of logic (II) p. 77; Chapter 5. Syllogistic 109; Chapter 6. Relational syllogisms p. 139; Chapter 7. Statement logic p. 163; Chapter 8. Modern predicate logic p. 213; Rules, laws and principles p. 253; A note of further reading p. 259-260.
"It seems to be a fairly widely held belief among contemporary teachers of logic that one must introduce logic via the propositional, and then predicate, calculus. In particular, one would not, even if he or she believed otherwise, properly or fairly serve novice students by offering them instead something like syllogistic logic.

Nonetheless, we intend to do just that here: introduce the subject of formal logic by way of a system that is 'like syllogistic logic'. Our system, like old-fashioned, traditional syllogistic, is a term logic. Our version of logic ('term-functor logic', TFL) shares with Aristotle's syllogistic the insight that the logical forms of statements that are involved in inferences as premises or conclusions can be construed as the result of connecting pairs of terms by means of a logical copula (functor). This insight contrasts markedly with that which informs today's standard formal logic ('modem predicate logic', MPL). That version of logic is due to the work of the great nineteenth century innovator in logic, Gottlob Frege. (...) Today the hegemony of MPL is almost complete. Still, there is a price to be paid. MPL is indeed powerful, but it is not simple and the logical forms which it ascribes to statements are remote from their natural language forms. Traditional formal logic lacked the scope enjoyed by MPL by not being able to analyze a number of types of inference. Yet it did at least enjoy the double advantage of (i) being simple to learn and use and (ii) construing the logical forms of statements as close to their natural language forms. Clearly a system of formal logic which has the power of MPL and the simplicity and naturalness of traditional logic would provide the best of both logical worlds.
Beginning in the late 1960s Fred Sommers set himself the task of developing a system of formal logic (viz., TFL) that was powerful natural and simple. The challenge faced by Sommers in accomplishing this was threefold. The first was to extend the power of term logic by incorporating into it the kinds of inferences beyond the powers of traditional logic. Those inferences were of three types: inferences involving statements with relational expressions, inferences involving statements with singular terms, and inferences involving unanalyzed statements. The second challenge was to offer a theory of logical form, or syntax, that was natural in the way that the syntax of MPL was not. The third challenge was to provide a symbolic algorithm (a system of symbols along with rules for manipulating them) much simpler than the one employed by MPL (viz., 'the first-order predicate calculus with identity'). During the past three decades Sommers has perfected just such a system of formal logic. TFL is at least as powerful as MPL, and it is far simpler and more natural." (from the Preface).

Philosophy of Logic and Philosophical Logic

1. Irvine, Andrew D. 1996. "Philosophy of Logic." In *Routledge History of Philosophy. Volume Ix: Philosophy of Science, Logic and Mathematics in the Twentieth Century*, edited by Kearney, Richard, 9-49. New York: Routledge.
2. Putnam, Hilary. 1971. *Philosophy of Logic*. New York: Harper & Row.
3. Quine, Willard van Orman. 1970. *Philosophy of Logic*. Harvard: Harvard University Press.
4. Fisher, Jennifer. 2008. *On the Philosophy of Logic*. Belmont: Thomson Wadsworth.
5. Haack, Susan. 1978. *Philosophy of Logics*. Cambridge: Cambridge University Press.
   Contents: Preface XI, Notation and abbreviations XV; 1. 'Philosophy of logics' 1; 2. Validity 11; 3. Sentence connectives 28; 4. Quantifiers 39; 5. Singular terms; 56; 6. Sentences, statements, propositions 74; 7. Theories of truth 86; 8. Paradoxes 135; 9. Logic and logics152; 10. Modal logic 170; 11. Many-valued logic 204; 12. Some metaphysical and epistemological questions about logic 221; Glossary 243; Advice on reading 253, Bibliography 255; Index 267.
   "My concern, in this book, is with the philosophy, rather than the history, of logic. But my strategy has been devised with an eye to the history of the interplay of formal and philosophical issues which I have just sketched. I begin with a

consideration of some problems raised by the standard logical apparatus - the interpretation of sentence connectives, sentence letters, quantifiers, variables, individual constants, the concepts of validity, truth, logical truth; I turn, from chapter 9 onwards, to a consideration of the way some of these problems motivate formal innovations, 'extended' and 'deviant' logics, and to the ways in which these new formalisms lead, in turn, to a reevaluation of the philosophical issues; and I conclude, in the final chapter, with some questions - and rather fewer answers - about the metaphysical and epistemological status of logic, the relations between formal and natural languages, and the relevance of logic to reasoning.
And two recurring themes of the book also reflect this historical perspective. What seem to me to be the vital philosophical issues in logic are focussed by consideration (i) of the plurality of logical systems and (ii) of the ways in which formal calculi bear on the assessment of informal argument. More specifically, I shall be urging that, in view of the existence of alternative logics, prudence demands a reasonably radical stance on the question of the epistemological status of logic, and that the interpretation of formal results is a delicate task in which judicious attention to the purposes of formalisation is highly desirable.
I have tried to produce a book which will be useful as an introduction to the philosophical problems which logic raises, which will be intelligible to students with a grasp of elementary formal logic and some acquaintance with philosophical issues, but no previous knowledge of the philosophy of logic. But I haven't offered simple answers, or even simple questions; for the interesting issues in philosophy of logic are complex and difficult. I have tried instead to begin at the beginning, to explain technicalities, and to illustrate highly general problems with specific case studies. To this end I have supplied, for those new to the subject, a glossary of possibly unfamiliar terms used in the text, and some advice on finding one's way about the literature; while, for those anxious to go further, I have included a generous (but I hope not intimidating) Bibliography." (from the Preface).

6. Grayling, Anthony. 1997. *An Introduction to Philosophical Logic*. Oxford: Blackwell.
Third revised edition (First edition 1982; second edition 1990).
Contents: Preface V, 1. Philosophical logic, the philosophy of logic, philosophy and logic 1; 2. The proposition 12; 3. Necessity, analiticity, and the a priori 33; 4. Existence, presuppositions and descriptions 88; 5. Truth: the pragmatic, coherence and correspondence theories 122; 6. Truth: semantics, deflation, indefinability and evaluation 147; 7. Meaning, reference, verification and use 188; 8. Truth, meaning, realism and anti-realism 234; 9. Realism, anti-realism, idealism, relativism 285; Bibliography 324; Index 336.
"The topics to be discussed are: the proposition, analyticity, necessity, existence, identity, truth, meaning and reference. These, at least, are the topics mentioned in chapter headings. In fact the list is more extensive, for in the course of these chapters there are also discussions of possible worlds, realisms of related sorts, anti-realism, and other questions. It is not possible to give an overview of philosophical logic without ranging widely in this way, but it will be clear that because each topic invites, and indeed commands, whole volumes to itself, the discussions I give do not pretend to be more than prefaces to the detailed treatments found in the original literature.
These topics are collected under the unifying label 'philosophical logic' for three principal reasons. It marks their interrelatedness, for a good understanding of any of them requires an understanding of the others. It marks their central importance in all serious philosophical discussion. And it reflects the influence of developments in logic since the late nineteenth century, which have afforded an access of power in dealing with many philosophical problems afresh, not only because we have become technically better equipped for the task, but also because developments in logical machinery have promoted and facilitated a certain methodological style which has proved extraordinarily fruitful in philosophy. That methodological style is analysis.

The invention of symbolic calculi would not have impelled philosophical developments by itself had it not been for the fact, quickly spotted by Frege and Russell, that they immediately prompt a range of philosophical questions, centrally among them questions about the nature of meaning and truth - which is in short to say, language; and language vitally interests philosophers because it provides our route to a philosophical understanding of thought and the world. The greatest single impetus to current preoccupations with philosophical logic comes indeed from interest in language, to understand which we need progress in this area. (pp. 1-2).

7. Hausman, Alan, Kahane, Howard, and Tidman, Paul. 2009. *Logic and Philosophy. A Modern Introduction*. Boston: Wadsworth.
Eleventh edition (First edition 1969).

8. Engel, Pascal. 1992. *The Norm of Truth. An Introduction to the Philosophy of Logic*. Toronto: Toronto University Press.
Contents: Acknowledgements VIII; List of logical symbols XII; Introduction 1;
Part 1. Elementary structures 13
1. Propositions 15; 2. The meaning of propositional connectives 35; 3. Subject and predicate 56; 4. Varieties of quantification 68;
Part 2. Truth and meaning 93
5. Theories of truth 95; 6. Truth, meaning and realism 118;
Part 3. Limits of extensionality 143
7. Modalities, possibles and essences 145; 8. Reference and propositional attitudes 161; 9. Identity 183; 10. Vagueness 199;
Part 4. The domain of logic 217
11. The province of logic 219; 12. Logical necessity 254; 13. Logic and rationality 291; Conclusion 321; Notes 324; Bibliography 356; Glossary-Index 371; Name Index 379.
"This book is an introduction to the philosophy of logic. But 'philosophy of logic' is an umbrella term which covers a variety of different questions and styles of enquiry. I do not think that there is a single, well established, conception of the subject, and the one offered in this book does not pretend to represent them all. Although I shall not attempt to give a precise definition, it will be useful to indicate where my own treatment and choice of topics differs from other approaches.
By 'logic' I shall mean, in the usual sense, the theory of inferences that are valid in virtue of their form. It is in general admitted that this definition applies only to *deductive* logic, and that the theory of *inductive* inferences does not belong to 'formal logic' in the ordinary sense. (...)
Our present use of the term 'philosophical logic' is mostly post-Fregean and post-Russellian. Frege called 'logic' not only his own formal system, but also his reflections about the nature of his formalism and about meaning and truth in general. Although Frege himself does not use the term 'philosophical logic', it is clear that these reflections are close to our contemporary understanding of that term. His insistence on the fact that 'logic' in the wide sense is concerned with language in general and should be kept separate from both psychology and the theory of knowledge justifies Dummett's claim that Frege's inquiries belong also to the philosophy of language and that this discipline holds for him the position of a primary philosophy. Russell proposed explicitly the term philosophical logic for a general enquiry into the nature of 'logical forms'. By this he did not mean only a study of the structure of logical languages, but also of the logical structures of natural languages, which would have both epistemological and ontological consequences.'
Our present conceptions of philosophical logic bear strongly their Fregean and Russellian heritages. Philosophical logic is taken to be continuous with the philosophy of language, and to use logic as a tool for the analysis of thought. But there are two main versions of what philosophical logic is, which differ in the respective weight or authority that is granted to logical analysis. One of them assigns precise limits to this authority, and can be called *informal philosophical*

logic, whereas the other aims at contorting and extending this authority, and can be called *formal philosophical logic.*" (from the Introduction).

9. Wolfram, Sybil. 1989. *Philosophical Logic. An Introduction*. London: Routledge.
Contents: Preface XIII; 1. Introduction 1. 2. Reference and truth 26; 3. Necessary truth and the analytic-synthetic distinction 80; 4. Aspects of truth 129; 5. Negation 162; 6. Existence and identity 191; 7. Aspects of meaning 229; Appendix: Examination questions 252; Bibliography of works referred to 263; Glossary 270; Index 278.
"Logic may be said to be the study of correct and incorrect reasoning. This includes the study of what makes arguments consistent or inconsistent, valid or invalid, sound or unsound (on these terms see 1.2.1). It has two branches, known as *formal* (or *symbolic)* logic and *philosophical* logic.
One of the branches of logic, *formal logic,* codifies arguments and supplies tests of consistency and validity, starting from axioms, that is, from definitions and rules for assessing the consistency and validity of arguments.' At the present time there are two main systems of formal logic, usually known as the *propositional calculus* and the *predicate calculus.* The propositional calculus concerns relations of what it terms 'propositions' to each other. The predicate calculus codifies inferences which may be drawn on account of certain features of the content of 'propositions'.
The other branch of logic, *philosophical logic,* which is my concern here, is very much more difficult to delimit and define. It can be said to study arguments, meaning, truth. Its subject matter is closely related to that of formal logic but its objects are different. Rather than setting out to codify valid arguments and to supply axioms and notations allowing the assessment of increasingly complex arguments, it examines the bricks and mortar from which such systems are built. Although it aims, among other things, to illuminate or sometimes question the formalization of arguments into systems with axioms which have been effected, it is not restricted to a study of arguments which formal logic has codified." (pp. 1-2).

10. Lambert, Karel, and Fraasen, Bas C.van. 1972. *Derivation and Counterexample. An Introduction to Philosophical Logic*. Encino: Dickenson.
"Since there are already many elementary logic texts in existence, and since logic is taught today at many levels, we shall explain, first, the specific purposes to which we think this text is suited, and second, how this text differs from other similar texts.
In many philosophy departments today a distinction is drawn between the following topics in undergraduate logic teaching:
(a) general introduction,
(b) techniques of deductive logic,
(c) metalogic,
(d) philosophical uses of logic.
In addition there are texts and courses devoted to advanced work in mathematical logic for students wishing to specialize.
We conceive the present text to be usable in the teaching of (b)-(d), to students who either have had a general introduction to logic or who are allowed (and this is frequent enough) to begin symbolic logic without such an introduction. Topics that we would normally expect to have been covered on the introductory level include the nature of arguments and validity, the use/mention distinction, the nature of definition, and perhaps the use of Venn diagrams and truth-tables. A good example of a book designed especially for this general introductory level is Wesley Salmon's *Logic* (Prentice-Hall, 1963).
After the introductory level, the instructor generally has a choice (or the student is offered a choice) whether to emphasize the philosophical side or the mathematical side of logic. Here our text is designed specifically for those whose interest is in philosophical aspects and uses of logic.
With this aim in mind, we have introduced a number of innovations into the exposition, *but at the same time have made sure that the standard body of elementary symbolic logic is covered.*

(...)
Our main innovations, however, are in the third part, which covers the logic of singular terms. Here we *extend the language of classical logic* by admitting singular terms, and extend our rules so as to license inferences involving such terms. The resulting extensions of classical logic are called *free logic* and *free description theory.* We take care to discuss explicitly the philosophical basis of such notions as possible worlds, domains of discourse, existence, reference and description, utilized in the first three parts, and to compare our approach with historical precedents. This is done, to some extent, as these notions are introduced, and also to some extent in Parts Four and Five.
Although there are today many good treatments of metalogic available, they are generally aimed at more advanced levels of instruction. We have aimed to make our presentation of metalogic more elementary than is usual. First of all, as soon as the student is able to use deductive techniques, he is also in a position to prove the admissibility of further deductive rules. By placing such admissibility proofs in Parts One and Two, a certain amount of proof theory is taught along with the deductive techniques. Part Four is devoted to semantics, that is, to a scrutiny of the adequacy of the logical system developed in the first three parts. Since the book is aimed specifically at the philosophy student, we treat only the finite cases; we believe that in this way the student will be able to master the main theoretical concepts and methods without the use of sophisticated mathematical techniques. It must be noted that here the previous parallel development of the tableau rules greatly simplifies the presentation.
In Part Five, we discuss the philosophical basis of the logic of existence and description theory, with special reference to the question of extensionality. In addition, we discuss the philosophical uses of free logic in connection with set theory, intentional dosicourse, thought and perception, modal concepts, and the concept of truth. The term "philosophical logic" is used increasingly to designated a specific discipline (indeed, the newly created Journal of Philosophical Logic will be entirely devoted to it), and we hope that Part Five will provide a useful introduction to some of its main areas of research." (from the Preface IX-XI).

11. Burgess, John P. 2009. *Philosophical Logic*. Princeton: Princeton University Press.

12. Read, Stephen. 1995. *Thinking About Logic. An Introduction to the Philosophy of Logic*. New York: Oxford University Press.
Contents: Introduction 1; 1. Truth, pure and simple: language and the world 5; 2. The power of logic: logical consequence 35; 3. To think but of an If: theories of conditionals 64; 4. The incredulous stare: possible worlds 96; 5. Plato's beard: on what there is and what there isn't 121; 6. Well, I'll be hanged! The semantic paradoxes 148; 7. Bald men forever: the sorites paradoxes 173; 8. Whose line is it anyway? The constructivist challenge 203; Select Bibliography 241; Glossary 248; Index 253.
"This book is an introduction to the philosophy of logic. We often see an area of philosophy marked out as the philosophy of logic and language; and there are indeed close connections between logical themes and themes in the analysis of language. But they are also quite distinct. In the philosophy of language the focus is on meaning and reference, on what are known as the semantic connections between language and the world.
In contrast, the central topic of the philosophy of logic is inference, that is, logical consequence, or what follows correctly from what. What conclusions may legitimately be inferred from what sets of premisses? One answer to this question makes play with the notion of truth-preservation: valid arguments are those in which truth is preserved, where the truth of the premisses guarantees the truth of the conclusion. Since truth itself is arguably the third member of a closely knit trio comprising meaning, reference, and truth, the connection with philosophy of language is immediately secured. (...)
It is with these issues of truth and correct inference that we are to engage in this book; and central to that engagement, we will find, is paradox. Paradox is the

philosophers' enchantment, their fetish. It fascinates them, as a light does a moth. But at the same time, it cannot be endured. Every force available must be brought to bear to remove it. The philosopher is the shaman, whose task is to save us and rid us of the evil demon.

Paradox can arise in many places, but here we concentrate on two in particular, one set united by semantic issues, the other by a fuzziness inherent in certain concepts. In both cases the puzzle arises because natural, simple, and what seem clearly reasonable assumptions lead one very quickly to contradiction, confusion, and embarrassment. There is something awful and fascinating about their transparency, there is an enjoyment in surveying their variety, the rich diversity of examples. But their real philosophical value lies in the purging of the unfounded and uncritical assumptions which led to them. They demand resolution, and in their resolution we learn more about the nature of truth, the nature of consequence, and the nature of reality, than any extended survey of basic principles can give. Only when those seemingly innocent principles meet the challenge of paradox and come under a gaze tutored by realization of what will follow, do we really see the troubles that lie latent within them.

We start, therefore, at the heart of philosophy of logic, with the concept of truth, examining those basic principles which seem compelling in how language measures up to the world. But I eschew a simple catalogue of positions held by the great and the good. That could be very dull, and perhaps not really instructive either. Rather, I try to weave a narrative, to show how natural conceptions arise, how they may be articulated, and how they can come unstuck. I hope that the puzzles themselves will capture the readers' imaginations, and tempt them onwards to further, more detailed reading, as indicated in the summary to each chapter. The idea is to paint a continuous picture of a network of ideas treated in their own right and in their own intimate relationships, largely divorced from historical or technical detail." pp. 1-3 (from the Introduction).

13. Sainsbury, Mark. 2001. *Logical Forms. An Introduction to Philosophical Logic*. Oxford: Blackwell.

Second revised edition (First edition 1991).

Contents: Preface to the first edition VI; Preface to the second edition VII; Introduction 1; 1. Validity 5; 2. Truth functionality 54; 3. Conditionals and probabilities 122; 4. Quantification 153; 5. Necessity 257; 6. The project of formalization 339; Glossary 392; List of symbols 403; Bibliography 406; Index 419.

"This book is an introduction to philosophical logic. It is primarily intended for people who have some acquaintance with deductive methods in elementary formal logic, but who have yet to study associated philosophical problems. However, I do not presuppose knowledge of deductive methods, so the book could be used as a way of embarking on philosophical logic from scratch.

Russell coined the phrase 'philosophical logic' to describe a programme in philosophy: that of tackling philosophical problems by formalizing problematic sentences in what appeared to Russell to be *the* language of logic: the formal language of *Principia Mathematica.* My use of the term 'philosophical logic' is close to Russell's. Most of this book is devoted to discussions of problems of formalizing English in formal logical languages.

I take validity to be the central concept in logic. In the first chapter I raise the question of why logicians study this property in connection with artificial languages, which no one speaks, rather than in connection with some natural language like English. In chapters 2-5 I indicate some of the possibilities and problems for formalizing English in three artificial logical languages: that of propositional logic (chapter 2), of first order quantificational logic (chapter 4) and of modal logic (chapter 5). The final chapter takes up the purely philosophical discussion, and, using what has been learned on the way, addresses such questions as whether there was any point in those efforts at formalizing, what can be meant by *the* logical form of an English sentence, what is the domain of logic, and what is a logical constant.

In this approach, one inevitably encounters not only questions in the philosophy of logic, but also questions in the philosophy of language, as when one considers how best to formalize English sentences containing empty names, or definite descriptions, or adverbs, or verbs of propositional attitude." (pp. 1-2).

14. Englebretsen, George, and Sayward, Charles. 2011. *Philosophical Logic. An Introduction to Advanced Topics*. New York: Continuum.
Contents: List of Symbols X; 1. Introduction 1; 2. Sentential Logic 13; 3. Quantificational Logic 52; 4. Sententia Modal Logic 74; 5. Quantification and Modality 93; 6. Set Theory 103; 7. Incompleteness 130; 8. An Introduction to Term Logic 139; 9. The Elements of a Modal term Logic 166; References 176; Rules, Axioms, and Principles 177; Glossary 184; Index 195-198.
"Post-Fregean mathematical logic began with a concern for foundational issues in mathematics. However, by the 1930s philosophers had not only contributed to the building and refinement of various formal systems, but they had also begun an exploitation of them for primarily philosophical ends. While many schools of philosophy today eschew any kind of technical, logical work, an ability to use (or at least a familiarity with) the tools provided by formal logic systems is still taken as essential by most of those who consider themselves analytic philosophers. Moreover, recent years have witnessed a growing interest in formal logic among philosophers who stand on friendly terms with computer theory, cognitive psychology, game theory, linguistics, economics, law, and so on. At the same time, techniques developed in formal logic continue to shed light on both traditional and contemporary issues in epistemology, metaphysics, philosophy of mind, philosophy of science, philosophy of language, and so forth.
In what follows, students who have already learned something of classical mathematical logic are introduced to some other ways of doing formal logic: classical logic rests on the concepts of truth and falsity, whereas constructivists logic accounts for inference in terms of defense and refutation; classical logic usually makes use of a semantic theory based on models, whereas the alternative introduced here is based on the idea of truth sets; classical logic tends to interpret quantification objectually, whereas this alternative allows for a substitutional interpretation of quantifiers. As well, a radically different approach, fundamentally different from any version of mathematical logic, is also introduced. It is one that harkens back to the earliest stages in the history of formal logic but is equipped with the resources demanded of any formal logic today." (pp. 1-2).

Advanced Readings

1. Sher, Gila. 1991. *The Bounds of Logic. A Generalized Viewpoint*. Cambridge: MIT Press.
2. Sider, Theodore. 2010. *Logic for Philosophy*. New York: Oxford University Press.
3. Mason, Richard. 2000. *Before Logic*. Albany: State University of New York Press.
4. Hanna, Robert. 2006. *Rationality and Logic*. Cambridge: MIT Press.
5. Gibson, Martha I. 2004. *From Naming to Saying. The Unity of the Proposition*. Malden: Blackwell.
6. McGinn, Colin. 2000. *Logical Properties. Identity, Existence, Predication, Necessity, Truth*. Oxford: Clarendon Press.
7. Malatesta, Michele. 1997. *The Primary Logic. Instruments for a Dialogue between the Two Cultures*. Leominster: Gracewing.
Contents: Foreword 13; Chapter I. Philosophy of language and elements of semiotics 15; Chapter II. Elements of metalogic 31; Chapter III. From formal logic to symbolic logic 51; Chapter IV. Sentence logic or the logic of sentences. Truth

tables 75; Chapter V. Symbolic languages 103; Chapter Vi. Well-formed and badly formed formulae evaluation 121; Chapter VII. Tautologies, schemes and rules of inference 139; Chapter VIII. Polyadic connectives 165; Bibliography 191-204.
"In our day there are excellent introductions and first-class manuals, compendia and treatises on mathematical logic, or symbolic logic, or logistic, as it should be called with greater precision.
The present work differs from more widely diffused and better-known ones because of the generous space devoted to the philosophical problems of language. Without an adequate understanding of these problems, there is a risk of losing sight of the value - and at the same time of the utility - of a technique which, far from being an end in itself, has proved to be an irreplaceable instrument for approaching the most difficult philosophical questions. Anyone who follows any review of analytical philosophy or indeed of philosophical logic, will be well aware of this. For an initial orientation in the use of logistical proceedings in extra-mathematical contexts, the reader should refer to the excellent volumes: *Logico-philosophical Studies* edited by Albert Menne - Reidel, Dordrecht 1962 - and *Intentionality, Mind and Language* edited by Ausonio Marras - University of Illinois Press, Urbana, Chicago, London 1972 -where it is possible to see, *de facto,* how the Platonists, empiricists, conventionalists, nominalists, phenomenists, phenomenologists and neo-Scholastics all meet around the same problems and use the same rigorous instruments.
A second point in which the present work differs from others is that it introduces the reader not only to standard symbology and those of the *Principia Mathematica* and of Hilbert, but also to the symbology of Jan Lukasiewicz, thus putting the student in a position to tackle the reading of basic texts such as those of Prior, or the Polish logicians on dialectics - texts which are absolutely unintelligible to those who have not mastered symbolic language, at first sight so strange and far removed, in terms of grammatical rules, from natural languages.
A third and final point in which the present work differs from others is in its rich documentation of logical sources, both ancient and mediaeval. Problems which seem to have been conceived in the 1970s to 1990s are found to have existed already in the time of the ancients, or the men of mediaeval times. The constant reference to the past not only constitutes an indirect contribution to the history of logic, and hence to the history of philosophy and culture in general, of which logic is an essential part, but it also allows us to understand humanity better today. From the comparison between the men of yesterday and those of today, we can better understand the men of all times, provided that the problems are not flattened out and points of view are not superimposed or perspectives confused."(from the Foreword).

8. Davies, Martin. 1981. *Meaning, Quantification, Necessity: Themes in Philosophical Logic*. London: Routledge.

9. Rescher, Nicholas. 1969. *Topics in Philosophical Logic*. Dordrecht: Reidel.

Dictionaries of Logic

1. Detlefsen, Michael, McCarty, David Charles, and Bacon, John B., eds. 1999. *Logic from a to Z*. New York: Routledge.
Routledge Encyclopedia of Philosophy Glossary of Logical and Mathematical Terms.

2. Williamson, Jon, and Russo, Federica, eds. 2010. *Key Terms in Logic*. New York: Continuum.
"This volume sets out to provide a reference for students starting out in philosophy, as well as those in other disciplines - such as computing, mathematics, psychology and law - in which logic features prominently.
Logic can be thought of in a variety of ways. It is sometimes viewed as the study of consistency, concerned with asking when statements are consistent and when they

are inconsistent. But logic is more often conceived of as the study of consequence - what follows from what. Thus deductive logic studies valid consequence (situations in which the truth of the premisses of an argument forces the truth of its conclusion) while inductive logic studies plausible or probable consequence (situations in which the premisses render the conclusion more probable or sufficiently probable).
Important goals of logic include characterizing interesting consequence relationships (e.g., deductive consequence, inductive consequence) and providing practical methods for answering questions about these consequence relationships (e.g., truth tables, semantic trees and proof are three ways of determining whether a conclusion follows from given premisses in deductive logic).
Logic is sometimes held to be the theory of reasoning. While it certainly leaches us a lot about how we can and ought to reason, logics are occasionally applied to tasks that do not obviously concern reasoning, such as to the modelling of hardware in computer science, and so some philosophers view logic and reasoning as somewhat different. Logic is often also distinguished from decision-making: logic is thought to be about theoretical relationships between statements while decision-making is apparently guided by pragmatic considerations such as the utilities or values attached to actions. On the other hand, logics (in particular inductive logics) are sometimes justified by appealing to pragmatic goals such as the goal of minimizing loss and it is clear that the relationship between logic and decision-making is rather subtle.
There is no need to decide these subtle questions in order to study and enjoy logic -- at the very least, logic studies consequence and this is enough to make logic crucial to philosophy and to other disciplines concerned with cogent argument. But bewildering terminology can delay the study and enjoyment of logic; it is hoped that this volume will help the reader to understand some of the key jargon. The volume is organized in three parts: Key Terms, Key Thinkers and Key Texts (divided into Textbooks and Classics). Entries are arranged alphabetically in each part and a list of symbols used in the book is in the front of the volume.
The volume is a collaborative effort, with entries provided by a multitude of authors. Each entry is initialled and the authors are listed in the front of the volume." (pp. 1-2).

3. Cook, Roy T. 2009. *A Dictionary of Philosophical Logic*. Edinburgh: Edinburgh University Press.
4. Feys, Robert, and Fitch, Frederic Brenton. 1969. *Dictionary of Symbols of Mathematical Logic*. Dordrecht: North-Holland.
5. Marciszewski, Witold, ed. 1981. *Dictionary of Logic as Applied in the Study of Language: Concepts, Methods, Theories*. The Hague: Martinus Nijhoff.
6. Gensler, Harry J. 2006. *Historical Dictionary of Logic*. Lanham: Scarecow Press.
7. Gabbay, Dov M., and Woods, John, eds. 2009. *The International Directory of Logicians. Who's Who in Logic*. London: Kind's College Publications.

Collections of Essays

1. Heijenoort, Jean van, ed. 1967. *From Frege to Gödel. A Source Book in Mathematical Logic, 1879-1931*. Cambridge: Harvard University Press.
2. Strawson, Peter Frederick. 1967. *Philosophical Logic*. New York: Oxford University Press.
Contents: Introduction 1; 1. The thought: a logical inquiry by Gottlob Frege 17; 2. Meaning by H. P. Grice 59; 3. Truth by Michael Dummett 49; 4. Singular terms and predication by P. F. Strawson 69; 5. Proper names by John R. Searle 89; 6. Is existence a predicate? (1) by D. F. Pears 97 (2) by James Thomson 103; 7. The *a*

priori and the analytic by Anthony Quinton 107; 8. The meaning of logical connectives (1) The runabout inference ticket by A. N. Prior 129 (2) Tonk, plonk and plink by Nuel D. Belnap 132; 9. Types and ontology by Fred Sommers 138; Notes on the contributors 170; Bibliography 171; Index of names 176.
"Wittgenstein, in the *Tractatus* [5.49] , seems to suggest that the whole of formal logic-or at least the calculus of truth-functions and the predicate-calculus-is really implicit in the single idea of a proposition in general, that it could in principle be excogitated by pure reflection on this idea alone.' Wittgenstein's suggestion does not itself belong to formal logic. It belongs to philosophical logic. For it is, or may be, the beginning of an answer to some typical questions asked in philosophical logic: viz., What is really distinctive of the forms and constants of logic? or, What general elucidatory account can be given of the notion of a logical particle?
Each of the notions so far introduced forms the topic of a similar question asked in philosophical logic. What, exactly, is *a proposition?* What is meant by saying that a proposition is *true?* What, in general, is the nature of that relation which holds between propositions when one *follows from,* or is *deducible from,* another? The attempt to find satisfying answers to these questions forces the philosopher to ask many others, about the nature and functioning of language and of linguistic expressions of many types. For propositions cannot be a subject of study unless they are expressed; and formal logic would have none but a purely mathematical interest unless it were related to actual discourse. So many questions concerning modes of actual discourse, the theory of meaning, the nature and conditions of linguistic communication, come within the scope of the philosophical logician's inquiries." (from the Introduction).

3. *Philosophical Logic*. 1967. The Hague: Martinus Nijhoff.
Tulane Studies in Philosophy. Vol. XVI.

4. Davis, J.W., Hockney, D.J., and Wilson, W.K., eds. 1969. *Philosophical Logic*. Dordrecht: Reidel.

5. Lambert, Karel, ed. 1970. *Philosophical Problems in Logic. Some Recent Developments*. Dordrecht: Reidel.

6. Körner, Stephan, ed. 1976. *Philosophy of Logic. Papers and Discussions*. Berkely: University of California Press.

7. Copi, Irving, and Gould, James, eds. 1978. *Contemporary Philosophical Logic*. New York: St. Martin's Press.

8. Agazzi, Evandro, ed. 1981. *Modern Logic. A Survey*. Dordrecht: Reidel.
Historical, Philosophical, and Mathematical Aspects of Modern Logic and its Applications.

9. Hughes, R.I.G., ed. 1993. *A Philosophical Companion to First-Order Logic*. Indianapolis: Hackett.

10. Wolenski, Jan, ed. 1993. *Philosophical Logic in Poland*. Dordrecht: Reidel.

11. Smiley, Timothy John, ed. 1998. *Philosophical Logic*. Oxford: Oxford University Press for the British Academy.

12. Goble, Lou, ed. 2001. *The Blackwell Guide to Philosophical Logic*. Oxford: Blackwell.
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"What is philosophical logic? Philosophical logic is philosophy that is logic, and logic that is philosophy. It is where philosophy and logic come together and become one. Philosophical logic is not a special kind of logic, some species distinct from mathematical logic, symbolic logic, formal logic, informal logic, modern logic, ancient logic, or logic with any other familiar modifier. There is only logic. Logic is the theory of consequence relations, of valid inferences. As such, it can be investigated and presented in many ways, although the mathematical methods of modern formal or symbolic logic have proved extraordinarily fruitful.

Within logic so construed, there are still, of course, many different sorts - as witnessed by the variety of chapters of this volume. Philosophical logic comprises the sorts of logic that hold greatest interest for philosophers. Philosophical logic develops formal systems and structures to be applied to the analysis of concepts and arguments that are central to philosophical inquiry. So, for example, such traditional philosophical concepts as necessity, knowledge, obligation, time and existence, not to mention reasoning itself, are usefully investigated through modal logic, epistemic logic, deontic logic, temporal logic, free logic, probability logic, nonmonotonic logic, etc. Similarly, logical investigation has contributed immeasurably to our understanding of the structure of language, including the languages of our normal use as well as the formal languages of logic itself, and this resounds throughout philosophy. By the same token, many of the developments within philosophical logic have been motivated by broad philosophical concerns. Intuitionistic logic reflects a particular perspective on the nature of judgment and truth. Many-valued logic grew out of Lukasiewicz's effort to construct a logic that could avoid the conclusions of fatalism or determinism. Other developments within philosophical logic were driven by philosophical concern regarding logic itself. Relevant logic sprang from a critique of the classical consequence relation; so did free logic." (from the Introduction).

13. Jacquette, Dale, ed. 2002. *A Companion to Philosophical Logic*. Oxford: Blackwell.

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1. Ancient Greek philosophical logic: Robin Smith; 2. History of logic: medieval: B.G. Sundholm and E.P. Bos; 3. The rise of modern logic: Rolf George and James Van Evra;

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4. Language, logic, and form: Kent Bach; 5. Puzzles about intensionality: Nathan Salmon; 6. Symbolic logic and natural language: Emma Borg and Ernest Lepore;

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14. ———, ed. 2002. *Philosophy of Logic. An Anthology*. Oxford: Blackwell.
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20. What are possible worlds?: John E. Nolt 275; 21. Quantifiers and propositional attitudes: W. V. Quine 285; 22. Counterpart theory and quantified modal logic: David Lewis 292; 23. Interpretation of quantifiers: Dagfin Follesdal 301; 24. A backward look at Quine's animadversions of modalities: Ruth Barcan Marcus 308; 25. Quantifying in: David Kaplan 318; 26. Substitutivity and the quantifying in: Graeme Forbes 338; 27. The intensionality of ontological commitment: Michael Jubien 356
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"The essays in this anthology include some of the most important recent scholarship in philosophy of logic. I have deliberately avoided republishing papers that are readily available in other anthologies, or that are more closely related to philosophy of language or philosophy of mathematics, regardless of their influence in contemporary work in logic. My intention has been to make this volume a more unique distinctive resource that will complement rather than duplicate other selections of readings currently available. Although some of the papers are more technical than others, all are intended for and can be read with good understanding by beginning students in philosophy who have completed a first course in symbolic logic.
My choice of papers has been guided by a sense of major issues in philosophy of logic that have shaped recent discussion and contributed to ongoing research programs in theoretical and applied philosophical logic. To this end, I have organized the papers thematically rather than chronologically, to give the best overview of philosophical issues connected with logical analysis and the development of formal systems of symbolic logic. The papers range from general topics in classical logic to specialized investigations of the concept of meaning and truth, the interpretation of quantifiers in predicate logic, the theory of valid inference and logical entailment, and problems of alethic modality, intensionality, and propositional attitude. These are undoubtedly among the central problems of philosophical logic reflecting some of the most intriguing new directions in the field, but they by no means exhaust the possibilities." (from the Preface).

15. Bottani, Andrea, and Davies, Richard, eds. 2006. *Modes of Existence. Papers in Ontology and Philosophical Logic*. Frankfurt: Ontos Verlag.

16. Jacquette, Dale, ed. 2007. *Philosophy of Logic*. Amsterdam: North-Holland.

17. Shapiro, Stewart. 2007. *The Oxford Handbook of Philosophy of Mathematics and Logic*. New York: Oxford University Press.

18. Gabbay, Dov M., and Guenthner, Franz, eds. 1983. *Handbook of Philosophical Logic*. Dordrecht: Kluwer.
First edition in 4 volumes (1983-1989).
Second edition in 16 volumes (2001-2010).

Natural Language and Logic

1. Lepore, Ernest. 2001. *Meaning and Argument. An Introduction to Logic through Language*. Malden: Blackwell.

2. McCawley, Jamed D. 1981. *Everything That Linguists Have Always Wanted to Know About Logic**

but Were Ashamed to Ask. Oxford: Basil Blackwell.

3. Cannon, Douglas. 2003. *Deductive Logic in Natural Language*. California Road: Broadview Press.
4. Sommers, Fred. 1982. *The Logic of Natural Language*. Oxford: Oxford University Press.
5. Gardies, Jean-Louis. 1985. *Rational Grammar*. München: Philosophia Verlag. Translation of: *Esquisse d'une Grammaire Pure*, Paris, Vrin, 1975, by Kevin Mulligan.

Philosophy of Modalities

1. Garson, James W. 2006. *Modal Logic for Philosophers*. Cambridge: Cambridge University Press.
2. Girle, Rod. 2009. *Modal Logics and Philosophy*. Montreal: McGill-Queen's University Press.
   Second edition (First edition 2001).
3. Forbes, Graeme. 1985. *The Metaphysics of Modality*. Oxford: Clarendon Press.
4. ———. 1989. *Languages of Possibility. An Essay in Philosophical Logic*. Oxford: Blackwell.

Non-Classical Logics

1. Priest, Graham. 2008. *An Introduction to Non-Classical Logic. From If to Is*. Cambridge: Cambridge University Press.
   Second edition (First edition 2004).
   Contents: Preface to the First Edition XVII; Preface to the Second Edition XXI; Mathematical Prolegomenon p. XXVII-XXXII; Part I. Propositional Logic. 1. Classical Logic and the Material Conditional p. 1; 2. Basic Modal Logic p. 20; 3. Normal Modal Logics p. 36; 4. Non-normal Modal Logics; Strict Conditionals p. 60; 5. Conditional Logics 82; 6. Intuitionistic Logic p. 103, 7. Many-valued Logics p. 120; 8. First Degree Entailment p. 142; 9. Logic with Gaps, Gluts and Worlds p. 163; 10. Relevant Logics p. 188; 11. Fuzzy Logics p. 221; 11a. Appendix: Many-valued Modal Logics 241; PostScript: An Historical Perspective on Conditionals 259; Part II. Quantification and Identity 261; 12. Classical First-order Logic 263; 13. Free Logics 290; 14. Constant Domain Modal Logics 309; 15. Variable Domain Modal Logics 329; 16. Necessary Identity in Modal Logic 349; 17. Contingent Identity in Modal Logic 367; 18. Non-normal Modal Logics 384; 19. Conditional Logics 399; 20. Intuitionist Logic 421; 21. . Many-valued Logics p. 456; 22. First Degree Entailment p. 476; 23. Logic with Gaps, Gluts and Worlds p. 504; 24. Relevant Logics 535; 26. Fuzzy Logics 564; Postscript: A Methodological Coda 584; References p. 587; Index of Names p. 603; Index of Subjects p. 607-613..
   "Around the turn of the twentieth century, a major revolution occurred in logic. Mathematical techniques of a quite novel kind were applied to the subject, and a new theory of what is logically correct was developed by Gottlob Frege, Bertrand Russell and others. This theory has now come to be called 'classical logic'. (...) Despite this, many of the most interesting developments in logic in the last forty years, especially in philosophy, have occurred in quite different areas: intuitionism, conditional logics, relevant logics, paraconsistent logics, free logics, quantum logics, fuzzy logics, and so on. These are all logics which are intended either to

supplement classical logic, or else to replace it where it goes wrong. The logics are now usually grouped under the title 'non-classical logics'; and this book is an introduction to them.
The subject of non-classical logic is now far too big to permit the writing of a comprehensive textbook, so I have had to place some restrictions on what is covered. For a start, the book is restricted to propositional logic. This is not because there are no non-classical logics that are essentially first-order (there are: free logic), but because the major interest in non-classical logics is *usually* at the propositional level. (Often, the quantifier extensions of these logics are relatively straightforward.) Within propositional logics, I have also restricted the logics considered here to ones which are relevant to the debate about conditionals ('if ... then ...' sentences). Again, this is not because this exhausts non-classical propositional logics (there is quantum logic, for example), but because taking the topic of conditionals as *a leitmotiv* gives the material a coherence that it might otherwise lack. And, of course, conditionals are about as central to logic as one can get.
The major semantical technique in non-classical logics is possible-world semantics. Most non-classical logics have such semantics. This is therefore the major semantical technique that I use in the book. In many ways, the book could be thought of as a set of variations on the theme of possible-world semantics. It should be mentioned that many of the systems discussed in the book have semantics other than possible-world semantics - notably, algebraic semantics of some form or other. Those, however, are an appropriate topic for a different book." (from the Preface to the First Edition, XVII-XVIII)
"The first edition of Introduction to *Non-Classical Logic* deals with just propositional logics. In 2004, Cambridge University Press and I decided to produce a second volume dealing with quantification and identity in non- classical logics. Late in the piece, it was decided to put the old and the new volumes together, and simply bring out one omnibus volume. The practical decision caused a theoretical problem. Was it the same book as the old *Introduction* or a different one? The answer -- as befits a book on non-classical logic -- was, of course, both. So the name of the book had to be the same and different. We decided to achieve this seeming impossibility by adding an appropriate sub-title to the book, 'From If to Is'. Though there are many propositional operators and connectives, the conditional, 'if', is perhaps the most vexed. It is, at any rate, the focus around which the old *Introduction* moves. Whether or not 'if' is univocal is a contentious matter; but 'is' is certainly said in many ways. There is the 'is' of predication (Ponting is Australian'), the 'is' of existence ('There is a spider in the bathtub', 'Socrates no longer is'), and the 'is' of identity ('2 plus 2 is 4'). All of these are in play in first-order logic; they provide the focus around which the new part of the book moves." (from the Preface to the Second Edition, XXI).

2. Bremer, Manuel. 2005. *An Introduction to Paraconsistent Logics*. Bern: Peter Lang.
3. Haack, Susan. 1996. *Deviant Logic, Fuzzy Logic. Beyond the Formalism*. Chicago: University of Chicago Press.
   First edition with the title *Deviant Logic*, 1974.
4. Mares, Edwin D. 2004. *Relevant Logic. A Philosophical Interpretation*. Cambridge: Cambridge University Press.
5. Restall, Greg. 2000. *An Introduction to Substructurals Logics*. New York: Routledge.
6. Benthem, Johann van. 1987. *A Manual of Intensional Logic*. Stanford: CSLI.
   Second edition revised and expanded (first edition 1984).
7. Schurz, Gerhard. 1997. *The Is-Ought Problem. An Investigation in Philosophical Logic*. Dordrecht: Kluwer.