Review of “A Philosophical Companion to First-Order Logic”

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This *Philosophical Companion* collects sixteen papers organized by theme and sequence to follow the broad outline of a generic course in the logic of first-order quantification. The papers range from 5-34 pages in length and vary widely in degree of technical difficulty. Most of the papers have previously appeared, and only one – the editor’s contribution—was written specifically for the volume. With the publication of this excellent little book, Hughes therefore provides a useful template for the instructor who wants to instill a deeper appreciation of the philosophical side of the discipline in his or her students and fills the gap created when older anthologies such as Copi and Gould’s *Readings on Logic* or Strawson’s *Philosophical Logic* went out of print. While similar to each of these classic volumes, the present text is unique in its focus on first order logic; Copi and Gould emphasized topics better suited to an introductory level course (including some discussion of the history of logic and categorical logic) while the Strawson text covers topics which are on the one hand slightly more advanced and on the other marked by their historical context.

The text opens with two well known introductory essays, each offering a distinct vision of what logic is and how it relates to language and the processes of human reasoning. The first is the classic introductory chapter to Quine’s *Methods of Logic* which emphasizes the Quinean view that logic is the science of articulating those fundamental, yet ultimately revisable, truths entrenched at the core of our linguistically constituted conceptual schemes. The second introduction is from Strawson’s *Introduction to Logical Theory*. Here Strawson articulates the view that logic is one axis along which human discourse can significantly be evaluated and that the discourse of logic is a specialized second-order discourse for evaluating other discourses. Both introductions emphasize the centrality of implication relations and consistency to logic generally, but they differ insofar as the first introduction treats logic as a descriptive science while the second pays more attention to the normative, albeit conventionally normative, aspects of logic.

These papers are followed by a series of four papers that address issues related to propositional logic (PL). The first three papers focus on broadly semantic topics with one examining the nature of proof in PL. The discussion of PL semantics begins with two papers addressing topics that almost always arise in an introductory logic course: the paradoxes of material implication and issues about translation between ordinary language and symbolic logic. In “Do Conditionals have Truth Conditions?,” Dorothy Edgington extends and develops worries about the nature of the conditional, arguing against both truth-functional and non-truth-functional accounts of the conditional, for more or less epistemic reasons. In “What do ‘Q’ and ‘R’ Stand for, Anyway?” Richard Grandy addresses the question “What are the objects of logic?”
arguing for the thesis that the objects of logic are essentially linguistic, rather than immaterial propositions or thoughts. In the third essay here, Paul Horwich offers a more broadly philosophical overview of “Theories of Truth.” Of special interest in this essay are the final two sections that speak directly to the role of truth in logic and meaning. The examination of PL concludes with Susan Haack’s well known article “The Justification of Deduction,” which raises a problem for deduction analogous to Hume’s problem of induction. The broad question of the status of deduction is developed further in the next section. Here two papers offer metalogical reflections on the relationship between truth and proof. The first of these two articles is John Corcoran’s “Meaning and Implication,” which outlines and discusses 12 distinct uses of the term “implies” while also commenting on the ways in which these different notions of implication might be confused or conflated. Readers may take special note of Corcoran’s analysis of Russell’s truth-functional account of “implication” and its historical function as logical consequence, as well as Corcoran’s discussion of Bolzano’s previously obscure and rarely mentioned notion of “relative implication.” Alfred Tarski’s piece, “Truth and Proof,” offers a restatement of Tarski’s often cited theory of truth, while also discussing its relation to the axiomatic method of proof procedures in mathematics. The final result, Tarski demonstrates, is that “in no domain of mathematics is the notion of provability a perfect substitute for the notion of truth.”

The real core of the *Philosophical Companion* is made up of six papers addressing quantificational logic [QL]. The first three papers again look into semantic questions. The fourth focuses on description theory. The remaining two papers look at the nature of proof in QL, emphasizing the work of Gentzen. The papers addressing semantic issues in QL all focus in one way or another on the nature and significance of quantification. In “Kant, Malcolm, and the Ontological Argument,” Jonathan Bennett raises the question of how to think about existence in the context of Kant’s response to the ontological argument, denying the possibility of necessary existence. Michael Dummett’s “Quantifiers” discusses Frege’s development of the apparatus of quantification and predication. Quine’s well known ontological perspective on quantification is represented by “Existence and Quantification.” The fourth paper in this section “The Significance of ‘On Denoting’,” by Peter Hylton provides a useful historical account of Russell’s theory of descriptions as a means of explaining the origins and significance of identity and descriptions as extensions of QL. Two papers by Dag Prawitz “Gentzen’s Analysis of First-Order Proofs” and “On the Idea of a General Proof Theory” offer detailed technical discussions of proof theory focusing upon Gentzen’s use of natural deduction systems to formalize the structure of proofs in first-order QL. The focus on Gentzen’s work in this section will no doubt please those who work extensively with such systems, but the papers are fairly technical and are perhaps the most likely to be omitted by those teaching to non-specialists.

The text concludes with two wide-ranging essays. The first is Ian Hacking’s “What is Logic,” in which Hacking offers a “general theory about logic” in what he calls the “logicist” tradition. Hacking’s paper is no doubt the most challenging in the volume. In the preface, the editor writes of it that it is “one of the richest and most provocative studies of classical logic in recent years,” deserving of extended study and consideration. It seems unfair to comment upon it further. The final essay is the editor’s contribution “On First-Order Logic.” In this essay Hughes offers a synoptic overview of the development of first-order logic that seeks to explain how the themes and figures discussed in the rest of the volume relate to each other and to other broader themes in the development of logic.

If any genuine criticism of this collection is warranted, it could come from anyone whose favorite topic received less discussion than one would have liked to see. For example, there are no essays offering
detailed discussion of axiomatic approaches, though some mention of them is to be found. Perhaps such a topic crosses the line from first-order logic to metalogic too easily, or perhaps such omissions are the price of currency. No doubt the editor could have doubled the size of the volume and still been the target of such charges. Nevertheless, one omission was notable; there is no editor’s introduction. Instead, the editor offers only a brief preface and the closing essay described above. No doubt, there was some worry about possible overlap in the coverage of such an introduction with the editor’s essay, but the price of the omission is that there is no rapid way to assess the content of the individual essays, if any are unfamiliar to the reader. There is only a limited discussion of how the essays were chosen and no clear expression of the editor’s thematic goals for the volume. We would have liked to see these principles and goals more clearly stated, but this is a matter of slight importance only. The text does include a bibliography integrating references from each essay and a global index that permits easy cross-referencing of topics.

It is (all but) a fundamental truth of logic that no two students learn logic in the same way or at the same pace. Further, many logic texts tend to not to dwell on the explanation of examples or upon the broader philosophical significance of the notions they contain. Any attempt to broaden the range of pedagogical options is therefore always welcome. With this volume of readings on logic, R.I.G. Hughes offers instructors and students alike a way of breaking out of the austere confines of traditional logic courses by transforming them into opportunities for philosophical discussion. Because the mastery of any discipline is partially a mastery of its concepts and vocabulary, the pairing of philosophically interesting readings with more direct practical instruction promises to enrich the educational setting both for students who are less formally inclined and for instructors who are more philosophically inclined. The existence of such a book opens up possibilities for those who wish to take the time to explore the philosophical side of first-order logic in their courses. At the same time this book gives students an alternative means to engage a topic with an undeserved reputation for difficulty and sterility.

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