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Introduction

Peirce once complained about the existence of nearly a hundred different definitions of logic. That was 1901—before the publication of the *Principia* and all that followed; before the tremendous growth of non-classical logics in the second half of this century and before the impressive development of logical calculi in various areas of computer science. If there were a hundred definitions then, today there are a hundred different theories, each of which stems from a different way of answering the question: What is logic?

The existence of a variety of logical theories raises deep philosophical issues that go far beyond a simple pragmatic dispute. For what higher tribunal than logic itself (as Quine once put it) could be invoked to settle the issue? If the discrepancy between two competing theories is not merely a matter of notational or orthographic conventions (if the two theories are not shown to be equivalent upon translating one into the other), what criteria could be invoked to adjudicate the competition? Are the two theories about the same subject? If they disagree on the laws governing certain logical words or operations, are they still agreeing on what those logical words or operations are? Such matters are not easily settled by relativizing the choice of logic to this or that domain of application. Perhaps the opposition between, say, classical logic and quantum logic is one of a familiar kind: just as different physical theories apply to microscopic than to mesoscopic phenomena, so do different logics. The very notion of an “orthodox” logic would then dissolve under the pressure of different pictures of what the world is or could be. (Or perhaps it is the integration of different logics that *together* would yield the one and true logic.) But how do things get

settled with respect to each domain? What tribunal could be invoked to settle the local issues?

The philosophical map is more intricate than that, too. You and I may both agree on the same logical theory—we may both be classical logicians, say—and yet disagree deeply with regard to the nature or distinctive character of logic. One may take logic to be concerned with truth, hence with a semantic property, a characteristic of sentences (statements, propositions); the other may take logic to be concerned with deduction, an eminently syntactic property, a characteristic of arguments expressing transitions from sentences to sentences (statements, propositions). The two approaches need not disagree on what counts as a valid sentence or argument, and we may indeed view a completeness theorem as establishing precisely the equivalence between a semantic and a syntactic approach. Yet they certainly express different ways of answering the question: What is logic? From this point of view, Peirce's concern was deeper than any concern we may have about the proliferation of logics available today. If you and I have a different conception of the nature of logic, then the interesting questions concern these different conceptions, whether or not we agree on treating the same class of statements as logically true, the same class of arguments as logically valid.

Nor is the semantic/syntactic opposition the only way we may dissent on the nature of logic while agreeing on its content. We may, for instance, agree on each and every bit of the classical quantification theory with identity, and yet disagree on the logical status of identity. One of us may insist that identity theory is a part of logic on account of its universality and topic neutrality; the other may subscribe to identity theory and yet insist on the kinship between identity and other predicates, such as parthood or membership, treating all as extralogical. We may, in fact, have a different view on what does and what does not belong to logic proper even if we then agree on everything else *as a matter of fact*. We may disagree on what makes logic a subject of its own, separate from (and in the background of) the concerns of other disciplines. We may even disagree on whether there are any objective grounds at all for a distinction between the logical and the extralogical.

And even if we agree on all that—even if we draw exactly the same boundaries and settle on the same laws—we may still dissent on the rea-

sons. We may dissent on *what it is* for an expression to be a logical constant. We may dissent on *why* identity is to be ranked with the logical or with the extralogical apparatus, as the case may be. We may, so to speak, agree on the extension of all logical notions, but not on their intension.

This long list of worries is barely indicative of the importance of serious philosophical reflection on logic. It may indeed be surprising—if one looks at the recent philosophical literature—that the wealth of technical developments in all areas of logic has been accompanied by relatively few systematic attempts to analyze the underlying assumptions and philosophical motivations. Compared to the first half of the century, or even to the 70's and early 80's, there is a growing gap between the logician's work and the philosopher's need to understand the nature of that work. The aim of this collection is to fill in that gap, at least in part. All the essays seek to provide material toward answering the above questions, as well as to raise new issues and pose new challenges. Some essays have a speculative, programmatic flavor; others put forward or defend articulated views; others still concern themselves with the link between technical aspects and philosophical issues. But all share a common concern for the heart of the problem and stem from a common desire to clarify the nature of the logician's enterprise. Together, the collection offers a vivid, up-to-date, and I believe most exciting indication of where the debate on the nature of logic is—and of some directions along which it is likely to yield fruitful developments.

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