THOMAS ANDERSON GOUDGE AND THE INTRODUCTION OF SYMBOLIC LOGIC AT THE UNIVERSITY OF TORONTO

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Prefatory. Thomas Anderson Goudge was the first member of the philosophy department faculty to teach a course in modern mathematical logic at the University of Toronto. We provide here a brief discussion of the origin of Goudge's interest in logic and of how he came to introduce symbolic logic courses into the philosophy department curriculum at the University of Toronto. Much of the information presented here is based upon John G. Slater's three-page essay "Thomas Anderson Goudge" prefacing the Thoemmes Antiquarian Books' catalogue #68, "Books from the Working Library of Professor Thomas A. Goudge". We also provide a brief sample of the titles in logic that formed part of Goudge's working library.

Curriculum vitæ. Thomas Anderson Goudge is best known to philosophers for his work on the philosophy of Charles Peirce and for his work in philosophy of science, especially philosophy of biology. Nevertheless, he also made an important contribution to mathematical logic by being the first to introduce courses on symbolic logic into the curriculum of the philosophy department of the University of Toronto and to teach them.

Goudge was born in Halifax, Nova Scotia, Canada, on 19 January 1910. He received his B.A. and M.A. in philosophy from Dalhousie University in 1931 and 1932 respectively. His principal teacher at Dalhousie was Herbert Stewart, who had received his training at Lincoln College, Oxford and whose primary interests were ancient philosophy and British empiricism. From Dalhousie, Goudge in 1932 entered the doctoral program of the philosophy department at the University of Toronto. The program at

that time was dominated by George Sydney Brett, who was both head of the philosophy department and dean of the Graduate College. Thanks to Brett, a specialist in history of psychology, all of the graduate courses taught at Toronto were in history of philosophy, and the most recent works studied at Toronto were authored by the British idealists. On Brett's recommendation, Goudge read J. H. Muirhead's *The Platonic Tradition in Anglo-Saxon Thought* (1931). Although an idealist who espoused neo-Hegelianism, Muirhead in this book took into account the criticisms of Hegelianism in order to arrive at and defend a stronger variant of neo-Hegelianism. It was through Muirhead's book that Goudge learned about Charles Peirce and took an interest in Peirce's thought.

Goudge's interest in Peirce led him to decide to write his doctoral dissertation on Peirce. And because so little of Peirce's writings were published or generally available, Goudge determined to spend a year at Harvard University in order to examine the Peirce *Nachlaß* and to study his unpublished writings. In the spring of 1936, Goudge was awarded a Royal Society of Canada grant that enabled him to spend the academic year 1936-37 at Harvard in order to work on his dissertation, *The Theory of Knowledge of Charles S. Peirce*. His thesis supervisor at Toronto was Brett; his supervisor at Harvard was Clarence Irving Lewis (1883 – 1964). Willard Van Orman Quine ([*1985*, 83]) retrospectively described the department as it was in 1931 and that Goudge was to be visiting in a few years time as as one which "American philosophers associated . . . with logic because of Whitehead, Sheffer, Lewis, and the shades of Peirce and Royce."

In addition to researching the Peirce papers for his dissertation, Goudge attended two of Alfred North Whitehead's lecture courses, including "The Function of Reason", Lewis's seminar on theory of meaning, and courses in symbolic logic taught by Henry Maurice Sheffer (1882 – 1964) and Henry S. Leonard, the latter having received his doctorate from Harvard in 1932 for his thesis on *Singular Terms*.

Both before and after his academic year at Harvard, for the academic years 1935-36 and 1937-38, Goudge held a Fellowship at Queen's University, after which he was called to the University of Toronto to join the faculty as Lecturer in Philosophy. The appointment, made by Brett, may have been the result of the advise of Bertrand Russell to Brett, who had visited Toronto on a lecture tour in the 1930s. Brett met with Russell at that time, and asked Russell's advice on teaching symbolic logic, and in particular whether the University of Toronto ought to offer a symbolic logic course. Russell's response was in the affirmative, but with the proviso that someone competent to teach the course could be found. Subsequently, Brett tendered Goudge the invitation to join the Toronto faculty. In the three years

since joining the Toronto faculty and until he left for service in World War II, Goudge offered a graduate course in symbolic logic, along with a graduate course on "Pragmatism and Logical Positivism".

While Goudge was on leave, Brett died and was succeeded in the departmental chairmanship by Fulton Anderson, who was opposed to the teaching of modern mathematical logic. Anderson reportedly told one member of the department's staff "to teach logic to undergraduates without 'dots and dashes'." Goudge, however, had enough seniority to continue to teach his graduate symbolic logic course, and overcame Anderson's fiat against teaching symbolic logic to undergraduates by the expedient of incorporating lectures on introductory symbolic logic into his course on the philosophy of Leibniz. (It is interesting to note in this regard that both Bertrand Russell in England and Louis Couturat in France similarly used their university lectures on Leibniz at the turn of the century as a vehicle to introduce mathematical logic to their students; the significant difference between Goudge on the one hand and Russell and Couturat on the other was that their lectures on Leibniz led each to publish an important book on Leibniz treating Leibniz's philosophical system as a development from [their respective interpretations of] the Leibnizian conception and system of logic.) There is detectable nevertheless both a strong Russellian tinge to Goudge's views on logic and a strong Russellian influence on his philosophy of logic

In 1950 Goudge's book *The Thought of C. S. Peirce* was published. There ([Goudge *1950*, 55–67]), Goudge referred to Peirce's 1867 work at axiomatizing arithmetic by way of Boolean algebra in "Upon the Logic of Algebra" as evidence that Peirce espoused logicism at that time and he placed Peirce in the same tradition as Frege and Russell. While this interpretation has been subject to challenge and debate by Peircean scholars and historians and philosophers of logic such as Paul Shields (e.g. [*1981*]) Susan Haack (e.g. [*1993*]), and Nathan Houser [e.g. *1993*]), it undoubtedly reflected the Russellian perspective that was typical among the Harvard logicians in the 1930s and that Goudge most surely acquired at that time. Goudge's Harvard advisor Lewis, for example, regarded the system of *Principia Mathematica* as an extension of, and superior to, the "Boole-Schröder Algebra" and the "Peirce-Schröder symbolic logic" as the inferior forerunner of the *Principia*. Lewis voiced the view regarding the issue of logicism the relation between the *Principia* and the "Peirce-Schröder symbolic logic" is likely to be obscured because "the Boole-Schröder Algebra and its applications . . . is likely to seem quite unrelated to . . . the logisitic development of mathematics" (see [Lewis *1960*, 280]). Sheffer likewise in those days was evidently strongly inclined to logicism and

towards regard of the *Principia* as the last work on the subject of symbolic logic, for Quine, who studied logic with Sheffer in preparation for his Master degree of 1931 recalls ([Quine *1985*, 82]) that Sheffer rejected Hilbert's formalism with the words "I am not a marksian, but only a symbol-minded logician." Quine's own effort at simplifying the system of *Principia*, *A System of Logisitic* (and use it to develop a logisitic system and support an ontological structure) appeared in 1934 and Henry Leonard's [*1935-36*] review of it had just recently appeared, so we may readily surmise that Goudge would have been likely to become familiar at that time with Quine's work in logic as well as with the *Principia*. We know from Quine (*1985*, 82] that the graduate logic course taught by Sheffer in this period included discussions primarily of papers by Oswald Veblen and Edward V. Huntington, and especially the *Principia*.

In the 1950s Goudge turned his attention to the philosophy of biology, and it is his work on evolutionary biology in particular that he is recognized by the philosophical community. He also served for six years, from 1963 to 1969, as chairman of the philosophy department at Toronto, helping during his tenure as chairman to build it into one of the largest philosophy departments in North America.

Logic books in Goudge's library. The "working library" of Goudge that Thoemmes acquired is comprised of books that Goudge used for his learning, teaching and research. I shall take note only of those books that either pertain directly to Goudge's contributions to logic in Canada through his introduction and development of symbolic logic courses at the University of Toronto or which are most likely to be of direct interest to historians and philosophers of logic and mathematics.

(a) *Logic textbooks*. Among the logic textbooks dating from the 1930s that were owned by Goudge (and purchased by Thoemmes) were the first edition of *An Introduction to Logic and Scientific Method* (1934) by Morris Raphael Cohen (1880 – 1947) and Ernest Nagel (1901 – 1985), the first edition of the *Symbolic Logic* (1932) by Lewis and Cooper Harold Langford (1895 – 1964), and the *Logic in Practice* (1934) of Lizzie Susan Stebbing (1885 – 1945), and we may surmise, but with the possible exception of the Lewis and Langford textbook, can not be even remotely confident, that each of these may have been used as textbooks for the logic courses taken by Goudge at Harvard. Also present among mathematics and logic titles dating from the 1930s in Goudge's library are the second (1935) edition of volume I of Whitehead and Russell's *Principia* and John Wesley

Young's (1879 – 1932) posthumously published *Lectures on Fundamental Concepts of Algebra and Geometry* (1936), edited by W. W. Denton, both of which we may again surmise, but again can not be certain, were purchased by Goudge during his stay at Harvard and possibly used for the logic courses which he took while there. (Young, we may note, belonged to the same "school" of American postulate theorists as Veblem, and in 1910 set out with Veblem to develop an axiomatic system of geometry, in the two-volume *Pojective Geometry* which they co-authored — although Young's actual contributions were limited to the first volume.) While it is likely that Goudge would have become familiar while at Harvard with Quine's work in logic, we fail to find Quine's *System* listed among the works in Goudge's library; but we do find there a strong presence of later logic textbooks authored by Quine.

In addition to the textbooks of Cohen and Nagel, Lewis and Langford, and Stebbing which we have already mentioned, we find E. Dimnet's *The Art of Thinking*, published by Simon & Schuster in 1929, which may have been the textbook from which Goudge first studied logic while an undergraduate at Dalhousie. Also worth noting are Harold H. Joachim's *Logical Studies* (1948) and the Dover edition of 1958 of Jevons's *The Principles of Science: A Treatise on Logic and Scientific Method.* Of the more familiar textbooks from which Goudge doubtlessly taught his logic courses at Toronto, we have — in chronological order of publication date — Quine's *Mathematical Logic* (1940), the first edition of Quine's *Methods of Logic* (1972), Arthur *Prior's Formal Logic* (1962), G. E. Hughes and D. G. Londey's *The Elements of Formal Logic* (1965), and the third edition of Quine's *Methods of Logic* (1972). Joachim was a member of Merton College at Oxford University and an advocate of British neo-Hegelian idealism; his attitude towards logic can be gauged by the advice which he gave to Bertrand Russell (in a letter of uncertain date, but surmised to have been written some time in September of 1892 or June 1893) regarding what to read in logic. The authors recommended for reading were, in the order of the suggestions, John Stuart Mill — referring to *A System of Logic* (1848), Francis Herbert Bradley — referring to *The Principles of Logic* (1883), Bernard Bosanquet — referring to *Logic or the Morphology of Logic* (1888), and Hermann Lotze — presumably referring to the second (1880) edition of the *Logik.* Also recommended for reading, last, and in this instance, least, is William Stanley Jevons's *Principles of Science* — referring presumably to the third (1879) edition — which, however, Joachim cautions "isn't really logic" (see [Giffin *1987-88*, 122]). (Joachim, it will also be remembered, was a party with Russell in a lengthy published debate on the nature of

truth.)

(b) *History of logic.* Among the logic books in that library that exhibit an interest in the history of logic, we find the 1942 Oxford University Press edition of Aristotle's *Logic*, which is volume I of the *Student's Oxford Aristotle*, comprising the texts of *De Categoriæ*, *De Interpretatione*, *Analytica Prior*, and *Analytica Posteriora*, along with Lukasiewicz's *Aristotle's Syllogistic from the Standpoint of Modern Formal Logic*, the Dover edition of Boole's *An Investigation of the Laws of Thought*, the J. L. Austin translation of Frege's *The Foundations of Arithmetic* (1950), the D. S. Robinson collection *Royce's Logical Essays* (1951), and Robert C. Marsh's edition of Russell's *Logic and Knowledge, Essays 1901 – 1950* (1956). William and Martha Kneale's *The Development of Logic* (1960) provide a general overview of the history of logic.

The nineteenth-century Hegelian idealistic style of logic which was so much a part of the picture in Goudge's undergraduate education is represented by newer editions of Bradley's *The Principles of Logic* (1967), as well as by the English translation of Hegel's *Science of Logic* (Allen & Unwin, 1951) by W. H. Johnston and L. G. Struthers and of the the *Logic*, from the Encyclopædia (Clarendon, 1931) by William Wallace, and by G. R. G. Mure's exposition *A Study of Hegel's Logic* (Clarendon, 1950), as well as several related works by Hegel.

(c) *Set theory; Philosophy of logic and foundations.* Did Goudge's courses in symbolic logic include the teaching of set theory? Or does the presence of works on set theory show a desire on Goudge's part to enhance his own comprehension of foundations of mathematics? In either case, we find a copy of the 1955 Dover publication of E. V. Huntington's *The Continuum, and Other Types of Serial Order, with an Introduction to Cantor's Transfinite Numbers* and the revised (1969) edition of Quine's *Set Theory and Its Logic.*

(d) *Philosophy of logic.* In the realm of philosophy of logic, we find John Dewey's *Logic – The Theory of Inquiry* (1938), Morris Cohen's *A Preface to Logic* (1944), Rudolf Carnap's *The Logical Syntax of Language* (1949), Peter F. Strawson's *Introduction to Logical Theory* (1952), Quine's *The Way of Paradox and Other Essays* (1966), Susan Haack's *Philosophy of Logics* (1978), Quine's *Philosophy of Logic* (1970), Robert Charles Marsh's (1956) collection of Russell's papers *Logic and*

Knowledge: Essays, 1901–1950, which certainly contains papers which would have philosophical import, and Douglas Hofstadter's paean to incompleteness in its manifestations in mathematics, art, and music, *Gödel, Escher, Bach* (1980). The latter in particular would support a contention that Goudge must have been aware of the philosophical and foundational issues raised by set theory and logic.

There are also books which can be classified in the following categories:

(e) *Philosophy of mathematics*;

(f) *Probability and inductive logic*;

(g) *Miscellaneous mathematics*.

Conclusion. Thomas Goudge was clearly not himself a logician. But one hardly encountered "professional" logicians in Goudge's youth and student days. Instead, one encountered philosophers, such as Russell, or mathematicians, such as Gödel, who *worked in* logic. Nor was Goudge a "professional" logician, in the sense that Russell or Gödel could be identified as *contributors to research* in logic. Nor did he ever write a logic textbook of his own, as Ernest Nagel and Morris Raphael Cohen had done during the same time frame, to win a place in the history of pedagogy of logic. Goudge remains nonetheless critical to the history of logic essentialy and exclusively from the perspective of pedagogy, as the first person to teach an introductory course in "Symbolic Logic" at a major Canadian university's philosophy department.

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