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IN MEMORIAM: WILLARD VAN ORMAN QUINE
1908–2000

W. V. Quine, one of the most eminent philosophers and logicians of the twentieth century, died December 25, 2000 at the age of 92. He was Edgar Pierce Professor of Philosophy, Emeritus, at Harvard University, an institution with which he was affiliated for seventy years. He was a founding member of the Association for Symbolic Logic and served as its Vice President from 1938 through 1940 and President from 1953 through 1955.

Quine was born June 25, 1908, in Akron, Ohio. The name "Quine" is Manx; his paternal grandfather had emigrated from the Isle of Man. Possibly this aspect of his ancestry stimulated Quine's lifelong interest in languages. He grew up in Akron and attended Oberlin College, where he received the A. B. in mathematics in 1930. He was already interested in logic and philosophy and had studied Whitehead and Russell's ***Principia Mathematica*** (hereafter PM). He completed the Ph. D. at Harvard University in two years. Up to this time he was largely self-taught in logic.[1] He spent 1932–33 in Europe and encountered the Vienna Circle, Carnap in Prague, and Tarski in Warsaw. These encounters were decisive for his future work. That with Carnap was more important for his philosophy, but his own account indicates that for logic the visit to Warsaw was the most significant. In 1933 he was elected a Junior Fellow of the new Society of Fellows at Harvard. He was Faculty Instructor in Philosophy at Harvard from 1936 to 1941, associate professor from 1941 to 1948, professor from 1948 to 1956, and Edgar Pierce Professor from 1956 until his retirement in 1978. During World War II he worked in a Navy unit that decoded, translated, and analyzed coded messages from the German submarine fleet.

In his earlier years Quine's research and writing were mainly in mathematical logic. His 1932 dissertation reformulated the theory of relations of PM so that the object language could talk of relations of any number of arguments, but the object language itself is formulated more precisely than in PM, and the simple theory of types is adopted. He already aimed at greater ontological clarity. Throughout the 1930s Quine worked on the program of developing a comprehensive system of logic that could develop mathematics. Several papers proposed different axiomatizations, in general aiming at simplifying the theory of types.

[1]On this subject see Dreben [1990].

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It was this work that led to what is probably his most important contribution to mathematical logic, the set theory NF of his paper *New foundations for mathematical logic* [1937]. This was a first-order theory with an axiom schema of set comprehension restricted to *stratified* formulae, i.e., those in which indices can be assigned to the variables so that in any formula of form $x \in y$, the index of y is one greater than the index of x. Although NF was pursued as a vehicle for constructing mathematics,[2] it was soon found to have interesting and anomalous properties. Metamathematical research on NF has continued up to the present day.[3] However, no one has either proved it inconsistent or proved it consistent relative to some version of standard set theory.

Quine's book ***Mathematical Logic*** ([1940], revised 1951) completes this phase of his work. He found it technically preferable to use an expansion of NF with proper classes, although the theory called ML is that of the revised edition, after Rosser showed the original version inconsistent, and the most adequate repair was made by Hao Wang. Quine developed a very elegant and precise way of presenting formal proofs, presented an axiomatization of first-order logic in which free variable reasoning is not used, and in the last chapter proves Gödel's incompleteness theorem for a language based on concatenation.[4] But the book is less read than Quine's other mature writings, probably first of all because developing a comprehensive system of logic with the proofs presented in formal detail was ceasing to interest logicians.

Quine made many other contributions to logic. Worth mentioning are his work on the problem of simplifying truth-functions, which interested computer scientists, and his development of the idea behind combinatory logic in order to give a formulation without variables of first-order logic. Many of his papers are expository, and much of his work in logic was done in tandem with his teaching. Quine [1966] is a selection of papers giving a good overview.

Quine's masterful elementary textbook ***Methods of Logic*** [1950] is also a work of philosophy. Quine strove for elegance of presentation and a twofold economy: the methods should be economically presented and economical to use. The book also has ingenious and entertaining exercises, which incidentally show Quine's linguistic sophistication. The philosophy is presented in an unobtrusive way but is distinctively Quine's. He avoids the notions of proposition, judgment, and property, staples of the logical tradition often

[2] See in particular Rosser [1953]. Rosser also pioneered the metamathematical investigation of NF.

[3] See the survey Forster [1997] as well as the web site `http://math.boisestate.edu/~holmes/holmes/nf.html`.

[4] Later, in Quine [1946], he developed a theory based on concatenation equivalent to first-order arithmetic.

taken uncritically to this day. He is careful to distinguish use and mention and variables proper, ranging over a domain of objects, from schematic letters, dummies that replace expressions of different syntactic categories. Quine's aim was in part to insulate the student against the traditional idea that predicates or general terms designate properties in something like the way in which names designate their bearers.

Quine's logical work was philosophically motivated from the beginning. Clarity about ontology and ontological economy are aims of ***Methods*** also articulated in early philosophical writings, such as [1934] and [1948]. The latter contains his much discussed criterion of ontological commitment and argues against the idea that questions about what there is can be dismissed as "metaphysical". But although Quine experimented with nominalism about mathematics [1947], he did not adopt that position. That mathematical objects, sets in particular, are necessary for science was a pillar of his philosophy of mathematics.

Another main theme that arose early in Quine's work and grew to become his main contribution to philosophy was his skepticism about meaning and other related notions, such as analyticity and modality. This skepticism grew into a major revamping of previous philosophical views on communication and the relation of language to the world. Early expressions are Quine [1936], criticizing the idea that elementary logic is true by convention, and papers beginning in the 1940s criticizing modal notions and especially quantification into modal contexts. But the criticism of meaning and related notions only began to reach its full generality in the famous *Two dogmas of empiricism* [1951], which criticizes the analytic-synthetic distinction and at the end sketches Quine's holistic picture of meaning and evidence.

This view is worked out systematically in Quine [1960], which develops his naturalistic point of view, according to which philosophy is continuous with science and is entitled to use what is known in science but cannot set itself up as "first philosophy" prior to science. The book, which is Quine's central work, is probably best known for the highly controversial thesis of the indeterminacy of translation defended in chapter 2. This is derived from fundamental ideas about the public nature of language. What we perceive and what we take others to perceive plays a crucial role in language learning and language use; semantics and epistemology are intertwined. A key problem is to get insight into what others perceive without imputing to them our own view of the world and ontology. Quine's solution at the time was to develop behavioristic substitutes for notions concerning meaning. This proved highly controversial and was modified in later years by Quine himself. But the problem set an agenda for a great deal of later philosophy. A consequence Quine drew from this line of thought is the indeterminacy or inscrutability of reference, first set forth in [1968].

The holistic view of meaning and evidence clearly extends to mathematics, so that mathematics is epistemologically continuous with empirical science. This makes Quine's philosophy of mathematics broadly empiricist. But it also means that he does not require any very direct empirical anchor for mathematics, in particular its existence assumptions. In fact, his understanding of the concept of set reflects the logicist tradition in which he had begun: he thought of sets as extensions of predicates. This contributed to his being somewhat out of step with the understanding of set theory that came to prevail in the 1960s. His late book ***Set Theory and its Logic*** ([1963], revised 1969), in spite of its elegant presentation and careful logical analysis, was not well received by set theorists.

More should be said about Quine's contributions to the philosophy of logic. His criticism of modality and in particular of quantification into modal contexts posed a challenge that could be met only by abandoning widely held previous views. The first formal arguments for the collapse of modal distinctions were published in Church [1943] and Gödel [1944], but it was Quine who analyzed the situation most thoroughly. Three features of later work in the philosophy of modal logic were at least in part responses to Quine's criticisms: the understanding of necessity as something quite distinct from analyticity, the role of rigid designation, and the acceptance of different forms of essentialism.

Quine's critical attitude toward intensional notions also produced major contributions to the study of propositional attitudes. In one of his most elegant articles, [1956], he revived the de dicto-de re distinction and surveyed a number of issues in the logic of the attitudes. This was another case where Quine's contribution was thoroughly exploited by others more sympathetic to intensions than he was.

Quine's view of logic itself is difficult to characterize. He did not directly give it a special epistemic status, but its character as "potentially obvious" gave it a central place in Quine's view of translation. He continued to defend first-order logic as the part of logic most deserving the name. His mature views on logic and truth are presented in [1970].

Quine wrote in a brilliant style, lively, often playful, and always sparklingly clear. When it was possible he could do this even in technical logic. He had a lighter side that enters into his logical and philosophical writings but also led to some extra-curricular writings: reviews of atlases and works on language, the entertaining ***Quiddities*** [1987], and his autobiographical writing.

Quine continued to be active as a philosopher into advanced old age; the books [1990] and [1995] continue to revise his positions. He received many honors, including seventeen honorary degrees. In 1993 he received the first Rolf Schock Prize in Logic and Philosophy in Stockholm and in 1996 the prestigious Kyoto prize.

A significant part of the philosophy of the last half century builds on Quine's work. In particular that is true of the philosophy of logic and mathematics. Already during his lifetime that work became the subject of a large secondary literature. Quine commented on a significant part of it either in symposia concerning his work or in other writings.[5] Among Quine's students were were Donald Davidson, Hao Wang, Hugues Leblanc, Henry Hiz, John Myhill, William Craig, Burton Dreben, Joseph Ullian, Gilbert Harman, David Lewis, and the undersigned.

REFERENCES

Writings of W. V. Quine:

1934 *Ontological remarks on the propositional calculus*, ***Mind, N. S.***, vol. 43, pp. 472–476. Reprinted in Quine [1966a].

1936 *Truth by convention*. In ***Philosophical Essays for Alfred North Whitehead***, pp. 90–124. London and New York: Longmans, Green. Reprinted in Quine [1966a].

1937 *New foundations for mathematical logic*. ***American Mathematical Monthly***, vol. 44, pp. 70–80. Reprinted in Quine [1953].

1940 ***Mathematical Logic***. New York: W. W. Norton & Co. Revised edition, Cambridge, Mass.: Harvard University Press, 1951.

1946 *Concatenation as a basis for arithmetic*. ***The Journal of Symbolic Logic***, vol. 11, pp. 105–114. Reprinted in Quine [1966].

1947 (With Nelson Goodman.) *Steps toward a constructive nominalism*. ***The Journal of Symbolic Logic***, vol. 12, pp. 97–122. Reprinted in Goodman, ***Problems and Projects*** (Indianapolis: Bobbs-Merrill, 1972).

1948 *On what there is*. ***Review of Metaphysics***, vol. 2, pp. 21–38. Reprinted in Quine [1953].

1950 ***Methods of Logic***. New York: Henry Holt. 2nd ed. 1959, 3rd ed. 1972. 4th ed., Cambridge, Mass.: Harvard University Press, 1982.

1951 *Two dogmas of empiricism*. ***Philosophical Review***, vol. 60, pp. 20–43. Reprinted in Quine [1953].

1953 ***From a Logical Point of View. 9 Logico-Philosophical Essays***. Cambridge, Mass.: Harvard University Press. 2nd ed., 1961.

1956 *Quantifiers and propositional attitudes*. ***The Journal of Philosophy***, vol. 53, pp. 177–187. Reprinted in Quine [1966a].

1960 ***Word and Object***. Cambridge, Mass.: Technology Press, and New York: John Wiley and Sons.

1963 ***Set Theory and its Logic***. Cambridge, Mass.: Harvard University Press. Revised ed. 1969.

1966 ***Selected Logic Papers***. New York: Random House. Expanded ed., Cambridge, Mass.: Harvard University Press, 1995.

1966a ***The Ways of Paradox and Other Essays***. New York: Random House. 2nd ed., expanded, Cambridge, Mass.: Harvard University Press, 1976.

1968 *Ontological relativity*. ***The Journal of Philosophy***, vol. 65, pp. 185–212. Reprinted in Quine [1969].

1969 ***Ontological Relativity and Other Essays***. New York: Columbia University Press.

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[5]Hahn and Schilpp [1986] and [1998] contain bibliographies of Quine's writings, complete up to the time of their publication. Links to bibliographies and other material on Quine can be found at the web site `http://www.wvquine.org/`.

1970 ***Philosophy of Logic***. Englewood Cliffs, N. J.: Prentice-Hall. 2nd ed., Cambridge, Mass.: Harvard University Press, 1986.
1987 ***Quiddities: An Intermittently Philosophical Dictionary***. Cambridge, Mass.: Harvard University Press.
1990 ***Pursuit of Truth***. Cambridge, Mass.: Harvard University Press. 2nd ed. 1992.
1995 ***From Stimulus to Science***. Cambridge, Mass.: Harvard University Press.

Other writings:

Church, Alonzo, 1943. *Carnap's introduction to semantics*. ***Philosophical Review***, vol. 52, pp. 298–304.
Dreben, Burton, 1990. *Quine*. In Robert B. Barrett and Roger Gibson (eds.), ***Perspectives on Quine***, pp. 81–95. Oxford: Blackwell.
Forster, Thomas, 1997. *Quine's NF 60 years on*. ***American Mathematical Monthly***, vol. 104, pp. 838–845.
Gödel, Kurt, 1944. *Russell's mathematical logic*. In P. A. Schilpp (ed.), ***The Philosophy of Bertrand Russell***, pp. 123–153. Evanston: Northwestern University. Reprinted in ***Collected Works, volume II: Publications 1938–1974***, Solomon Feferman et al., eds. (Oxford University Press, 1990).
Hahn, Lewis Edwin, and Paul Arthur Schilpp (eds.), 1986. ***The Philosophy of W. V. Quine***. The Library of Living Philosophers, volume 18. La Salle, Ill.: Open Court.
Hahn, Lewis Edwin, and Paul Arthur Schilpp (eds.), 1998. Revised edition of Hahn and Schilpp [1986].
Rosser, J. Barkley, 1953. ***Logic for Mathematicians***. New York: McGraw-Hill. 2nd ed. New York: Chelsea, 1978.

DAGFINN FØLLESDAL and CHARLES PARSONS