

## IN MEMORIAM

## GARRETT BIRKHOFF

GARRETT BIRKHOFF, former professor of pure and applied mathematics at Harvard University, died on Friday, 22 November 1996 at his home in Water Mill, New York, where he had moved from Cambridge, Massachusetts about a year ago. Birkhoff retired in 1981 as George Putnam Professor Emeritus. He held the chair since 1969.

Born in Princeton, New Jersey on 10 January 1911, the son of eminent Harvard mathematician George David Birkhoff, he received his mathematical education from his father and his father's Harvard associates.

Birkhoff will be best known for his work in algebra, especially lattice theory, and quantum logic, the latter represented by his joint work with John von Neumann, "The Logic of Quantum Mechanics," (*Annals of Mathematics* 37 (1936), 823–843). His book *Lattice Theory*, first published in 1940 by the American Mathematical Society, went through three editions (1948, 1973) and remains a classic to this day, as does *A Survey of Modern Algebra*, his joint textbook effort with Saunders Mac Lane. In recounting his work in the early 1930s, Birkhoff wrote that "I had dreamed up lattices while in England . . . , plucking them out of semithin air as a generalization of the Boolean algebra . . ." (p. 57, "The Rise of Modern Algebra to 1936," in J. D. Tarwater, J. T. White & J. D. Miller (editors), *Men and Institutions in American Mathematics* (Lubbock, Texas Tech University Press, 1976), 41–63).

In *Die Entstehung der Verbandstheorie* (Hildesheim, Gerstenberg Verlag, 1979, pp. 36–37), Herbert Mehrstens notes that Whitehead incorporated the axiomatics of Schröder's *Der Operationskreis des Logikkalküls* (1877) into his own *Treatise on Universal Algebra* (1898). Whitehead treated the algebra of logic as a special case of his general concept of an algebra and gave the algebra of logic as the "only known member of the non-numerical genus of Universal Algebra". Mehrstens indicates that the title of Whitehead's book suggests the question of its relationship to modern universal algebra and of its very close connection with lattice theory. The answer Mehrstens adds, is that Birkhoff borrowed the name of "universal algebra" from Whitehead's book. Saunders Mac Lane wrote that "the first real paper on universal algebra [was written by] Garrett Birkhoff (1935)," that is, Birkhoff's paper "On the Structure of Abstract Algebras" (*Pro-*