

Henry David Block

February 22, 1920 — October 6, 1978

Henry David Block, professor of applied mathematics, suffered a heart attack in early October, 1978, and died in Tompkins County Hospital less than a week later. He was in the midst of preparations for a four-month visit to Japan, at the invitation of the Japan Society for the Promotion of Science; he had been invited also to spend the 1979 Easter term as a visiting scholar at Corpus Christi College, Cambridge. Several hundred people attended a memorial service for David held in Anabel Taylor Hall a few days after his death. His warm, expansive, humorous presence, his wisdom and discernment are keenly missed by his family, his students and colleagues, and his many friends.

David Block was born in New York City, the son of Isaac Block, a businessman, office worker for the I.R.S., and, in the depths of the Depression, gasoline-station manager; and of Cecilia Gottschall Block, who worked as a nurse with the Godmothers' League, an association caring for abandoned children. At the encouragement of his teachers, he took a city-wide competitive entrance examination and was admitted to Townsend Harris Hall, a special high school for gifted students. The first member of his family to attend university, he went on to City College, where in 1940 he was granted the B.S. in literature and psychology. As that degree elicited no offers of jobs, he first worked as a nighttime accountant for a bonding company, then returned to City College to take a second degree in civil engineering (B.C.E., 1943). During the war he worked as a flight test engineer for Goodyear Aircraft in Akron, Ohio, and developed a lasting mistrust of airplanes. In Akron he met Phoebe T. Goggin, a British physician trained in Edinburgh; they were married in May 1946. When Dr. Goggin was offered a position at Iowa State University, David accompanied her to Ames, and more or less by accident (to judge by his own lighthearted account) undertook graduate studies in mathematics. But that accident was bound to happen: David's deep-seated feeling that learning is more fun than anything had led him to the bulletin boards of the mathematics department where, surveying the semester's course offerings, he was spotted, interviewed, and, as it were, conscripted by the chairman. He took his M.S. in 1947, his Ph.D. in 1949, and stayed at Iowa State for four years as an assistant professor. He taught for two years at the University of Minnesota and in 1955 came to Cornell where, after two years in the Department of Mathematics, he joined the Department of Theoretical and Applied Mechanics, in which he served until his death.

David Block was the author of a much-admired book on tensor analysis, a mathematical subject of basic importance in mechanics; he published some forty papers in mathematics and several adjacent fields. He was the holder of coveted fellowships (including a Guggenheim) and of visiting professorships which honored both him and Cornell; a member of numerous honor societies and learned associations. Those facts do little to suggest the range and variety of his knowledge, the freshness, originality, playful seriousness, and lucidity of his thought, or his deep irreverence for learned pretension and the compartmentalizing of disciplines. His earliest investigations bore mainly on classes of nonlinear integral equations and the properties of mappings on Banach spaces. In 1956-57 he was coauthor of two papers on chemical reactors which, as a colleague has recently written, “give the earliest sign of what was to emerge: Block, the mathematician by training, taking a significant contribution to a field of application at its earliest stages, using no more mathematics than would be understandable to the practitioners: i.e., a true applied mathematician.” Thus in 1959 he Published, with L. Hurwicz and K. Arrow (a Nobel Prize-winning Economist), a paper on the stability of markets out of equilibrium, which specialists in the field consider to be a fundamental contribution, indeed a landmark in economic theory; a widely known article on differential equations with hysteresis, published in 1960 in a journal of electrical engineering, provides an application of the very theoretical subject of functional analysis.

In more recent years, David’s work was focused on problems of learning, Pattern recognition, artificial intelligence, self-reproducing machines and, later, the design of robots capable of acquiring natural language. He collaborated with Frank Rosenblatt, the builder of the “Perceptron,” a self-organizing learning machine which provides a deliberately simplified model of the human brain; David derived mathematical statements analyzing the machine’s behavior, and proved theorems about the convergence of learning algorithms. He published numerous papers on related subjects. Some are highly technical and mathematically demanding (for example, his masterful review of Minsky and Papert’s *Perceptrons*); others, equally rigorous and elegant, are accessible to readers having virtually no mathematical culture. His work was often based on reasoning about machines, but he was very much a theoretician, more at home with the logic of what’s possible than with tools or elaborate engines; one typical Block machine, which exhibits a starting ability to learn, consists of twelve paper cups and some numbered chips of cardboard. He devised and taught a comprehensive course on bionics and robots, which over the years was taken by large numbers of students from all quarters of Cornell. Demanding, generous, endlessly patient, he proved to be a superbly effective teacher of mathematics for students in fields such as biology and engineering. He was coauthor of a mathematics textbook for engineering students which has been used in mimeographed form at Cornell for some fifteen years, but unfortunately never published; those in the field feel that the book might have

set the accepted style for all such teaching. In his last years, he directed a research group of students and colleagues studying neural networks and perceptual problems related to vision. His influence on the intellectual growth of his many graduate students was deep, rich, and emancipating. In his Cornell years he went on avidly studying; he attended courses and seminars in economics, biological sciences, environmental management, linguistics, and (his first love) literature, reading widely and well, sharpening discussion by the pertinence of his remarks, encouraging other participants by his attentive acknowledgement of their points of view.

For all his exceptional intelligence and accomplishments, David Block was a deeply modest, indeed, humble person, tolerant of everything save smugness. He had a genius for talk, and in his wonderfully funny stories would portray himself as a naive, somewhat anxious figure of no particular consequence, fussed and helpless in the face of circumstance; listening and laughing, one felt better about oneself, somehow. In conversation he always behaved as though his interlocutor, and not he himself, was the interesting, remarkable person. He took a special interest in young minds, and his learned papers contain mock-pedantic footnotes citing his friends' children as subjects or authorities; the conceptual apparatus includes monsters, fairy godmothers, dismal swamps, and baby robots. He was a prudent, frugal man, meticulous and hardworking, but always quick to say that work, as a lesser form of play, is not to be taken too seriously. He was beset by misgivings about those who put colleges, departments, or government contracts ahead of human values. Authority, as David saw it, is seldom beneficent, and tends to corrupt. With fine comic detachment, he would represent (a part of) himself as outraged by commands like "Use Other Door": by what right was somebody ordering him around? His own charming way with people was all gentle concern, respect, and compassion. Concern for others, and scrupulous insistence on doing things right, could distract David from concern with his own well-being; it is characteristic that at the onset of his illness he was engaged in the writing of an elaborate grant proposal intended to procure financial support for friends and associates. David Block is survived by his wife, Phoebe, of Ithaca; his son, David Lee, of Charlestown, Oregon; his sister, Florence (Mrs. Edwin L. Pool), a nephew, and two nieces, all of Middlebury, Vermont.

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