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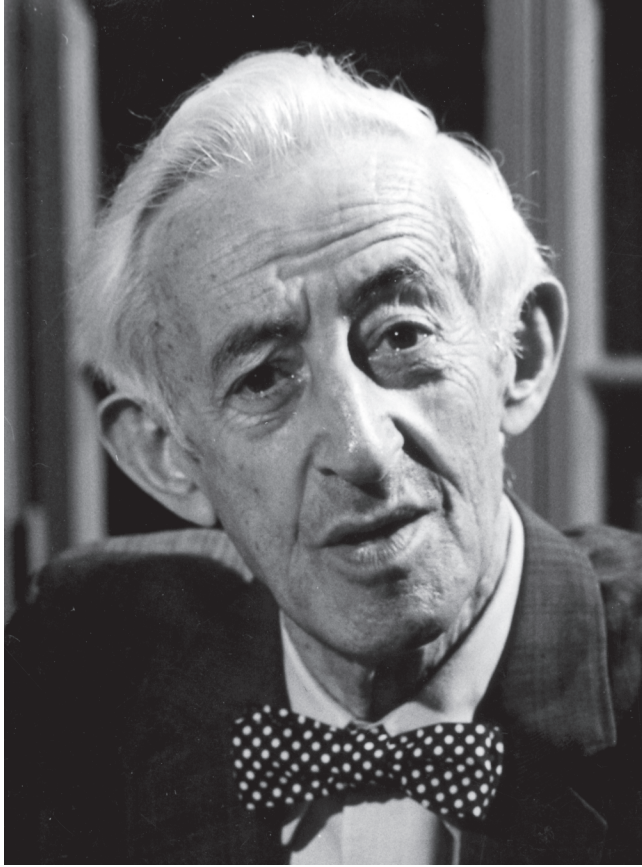
ABEL WOLMAN
1892–1989

A Biographical Memoir by
M. GORDON WOLMAN

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Biographical Memoirs, VOLUME 83

PUBLISHED 2003 BY
THE NATIONAL ACADEMIES PRESS
WASHINGTON, D.C.



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June 10, 1892–February 22, 1989

BY M. GORDON WOLMAN

IN THEIR PAPER PUBLISHED in 1919 Abel Wolman and Linn Enslow, employees of the Maryland Department of Public Health, demonstrated a method for controlled chlorination of drinking water supplies that transformed water treatment, providing safe drinking water throughout the world. A founding member of the Water Pollution Control Federation (now the Water Environment Federation), president of the American Water Works Association, and president of the American Public Health Association, Abel Wolman was a major contributor not only in the science and engineering of sanitation, pollution control, and water resources but also in policy formulation in the broad area of natural resources. His contributions in public health ranged from provision of water and wastewater treatment and urban and regional planning to protection of the public in the production of atomic power, and in the use of radioactive materials in medicine and industrial processes. As a professor of sanitary engineering and founder of departments in engineering and in the School of Public Health at Johns Hopkins University, Wolman taught a host of graduate and undergraduate students from around the world. He served as a consultant on water supply and water resource manage-

ment throughout the United States and the developing world with the World Health Organization and independently with countries in the Middle East, Latin America, and Asia. An engineer and professor, he was equally comfortable with and similarly a teacher of students, plumbers, and politicians.

My friendship with my father, that I can recall, began when I was about four. Some months before he died he reminded me as we watched Charles Street traffic from his home that we used to “count cars” together from the third-floor window at Eutaw Place and Whitelock street in a row house in Baltimore. We counted separately Packards, LaSalles, Chevys, Pierce Arrows, and others. Then too we walked—and talked—to Druid Park Lake Drive and back. The talk did not stop until he died on February 22, 1989. My father and I worked together, traveled together, and reviewed each other’s manuscripts. Perhaps the best-organized person I’ve ever known, he was not rushed and had plenty of time for me and the full life he and my mother shared. It is in part from this vantage point that I write this memoir.

Abel Wolman was born in Baltimore, Maryland, on June 10, 1892. His parents, Louis and Rose (Wachsman) Wolman, and his eldest brother had emigrated from Poland and settled in the ghetto of east Baltimore. He and his five siblings were educated in the public schools. Wolman, a pre-med major, received his B.A. degree from Johns Hopkins University in 1913. In that year the university announced the opening of the Engineering School, and he joined the first class in civil engineering, receiving his bachelor’s degree in engineering in 1915. The story has it that his mother declared that he should become an engineer, inasmuch as there was already one doctor in the family, his oldest brother Samuel. He married Anna Gordon in 1919, and they had one child.

Wolman's professional career began as a sanitary engineer with the Maryland State Department of Public Health in 1914 after one year with the U.S. Public Health Service sampling water in a study of water quality on the Potomac River. The position with the health department primarily involved inspection of water and wastewater treatment plants. Nonetheless, under the tutelage of his boss, Robert B. Morse, he was encouraged to pursue research and publication. A singular bulletin of the department (Morse, 1921) includes 10 papers reprinted from journals published between 1919 and 1921; all are authored or coauthored by Abel Wolman. One of these papers (1919), coauthored with Linn Enslow, a chemist in the department, developed a test for chlorine absorption, which established a controlled method for chlorination of municipal water supplies. The method, assuring safe drinking water, was adopted worldwide, perhaps the most important contribution to public health in the twentieth century.

Focusing on a combination of engineering science and practice, Wolman published on the principles of rapid sand filtration, on the probabilistic approaches to the assessment of drinking-water supply quality, and on all phases of the behavior of water and wastewater systems from raw water quality to the financing of infrastructure. In addition to publishing over several hundred papers, he edited the *Journal of the American Water Works Association* (1921-37) and was associate editor of the *American Journal of Public Health* (1923-27) and editor of *Municipal Sanitation* (1929-35). Although a contemporary colleague of some, Wolman was among the second generation of engineers in the "sanitary revolution" that began in the nineteenth century, succeeding major figures in the United States such as Sedgwick, Fuller, Winslow, Whipple, and Hazen.

In 1922 he became chief engineer of the Maryland State Department of Health. In maintaining the close association of sanitary engineering and public health and in the development of his career he was aided by Dr. William H. Welch, one of the four leading figures in the establishment of the Johns Hopkins Medical School and founder of the School of Hygiene and Public Health. During the same period he worked very closely with George W. Fuller, at one time director of the Lawrence Experiment Station, site of original work on filtration, chlorination, and water quality. Fuller was perhaps the leading consulting sanitary engineer in the field at the time. Wolman's association with him included a trip to review water and wastewater practices and research in leading centers in Europe. Responsible for environmental regulation of the waters of Maryland, Wolman helped to develop water quality standards, and, reflecting his interest in water resources planning and management, he was instrumental in establishing regional water and wastewater systems as well as the Interstate Commission on the Potomac River in the Washington and Baltimore metropolitan regions. Early on, much of his job required convincing cities and towns to install water treatment and wastewater systems, a task he said was initially made easier by the extraordinarily high typhoid fever rates experienced early in the century. Growing evidence that provision of clean water remarkably reduced the incidence of typhoid fever and convinced legislators to appropriate funds for water and wastewater treatment plants.

While he grew impatient with what he considered misguided and sometimes excessive regulatory zeal in the last quarter of the century—"the bulk of my criticism is of speed and ignorance" (Hollander, 1981, p. 633)—he was a strong administrator who did not blanch at forcing an industry desiring to locate a plant in Maryland during the depth of the depression to meet attainable ambient water-quality

standards even at the risk of losing jobs should the industry choose to locate elsewhere. The industry complied.

First as a government officer and later as a consultant, Wolman served every mayor of Baltimore (nine in all) from 1914 until he died in 1989. Beginning in 1931 and until his death he was a consulting engineer on water supply, sewerage, refuse disposal, and management to the Baltimore City Department of Public Works. The municipal building in Baltimore is named the Abel Wolman Building. The building is about five blocks from the east Baltimore "ghetto" in which he grew up, a fact he noted during the dedication ceremony.

Over time Wolman's work in planning and development encompassed not only water and sewerage but also solid waste, transportation, and natural resources. He served as chairman of the Maryland State Planning Commission and was the author of many studies dealing with management of natural resources and urban infrastructure.

Wolman became chairman of the Water Resources Planning Committee of the National Resources Planning Board (1935-41) during the Roosevelt era. In addition to overseeing the preparation of planning studies for the major river basins in the United States, the committee exercised some oversight over water projects proposed by the Corps of Engineers and the Bureau of Reclamation. Although the chief of engineers of the corps declared that prioritizing their projects as proposed by the committee was impossible, at the committee's insistence the corps complied. The committee initiated a number of studies of specialized topics involving hydrology, hydraulics, and public works. Of particular significance was the beginning of studies that led to the first procedure for benefit-cost analysis of water projects completed in 1950 by a different body.

In his role as chairman of the Water Resources Planning Committee and spokesman for engineers and health pro-

professionals in national organizations Wolman became increasingly involved in national policy issues. As his published papers indicate he espoused the importance of the development of a national water policy. Described as a pragmatist, he was also a planner who grew leery of grand plans. This transformation is captured in several observations: “Well, I did it, and it doesn’t work” (Hollander, 1981, p. 439), and more comprehensively: “Does our country want a planning agency at the Federal level? The answer throughout our history . . . is that it does not want such an agency” (*op. cit.* p. 435).

Abel Wolman was among the first to call attention to public health issues associated with the development of atomic energy. Against the initial opposition of distinguished members of the atomic energy fraternity descended from the Manhattan Project, he insisted that public health officers in the states and the broader community of public health professionals become involved in the debate over development of atomic energy and the location of nuclear power plants. Although not an opponent of nuclear power development—he became a member of the first Reactor Safeguards Committee—he pushed for recognition of the importance of the disposal of atomic wastes. He also stressed the necessity for thorough characterization of the geologic, hydrologic, meteorologic, and demographic conditions of prospective sites for nuclear power plants. In helping to bring into the decision-making process a broad spectrum of professionals from beyond the federal perspective—from the Manhattan Project and the early Atomic Energy Commission—Wolman was part of an emerging movement expanding both the number and the professionalism of diverse interests involved in making public decisions (Balogh, 1991).

Wolman was an active participant in the international scene. Simultaneously with the establishment of the State

of Israel he began service as chairman of the consulting committee on the development of the water system for the State of Israel (in 1945), remaining in that position until his death. He was an advisor to nations in Southeast Asia, including India, Ceylon, and Thailand, to many countries in Latin America and Africa, in all to about 50 foreign nations. As a member of the first U.S. delegation to the world assembly at the founding of the World Health Organization, he led the effort to include within WHO a program focused upon water supply and wastewater, a mission omitted from the initial design that focused on the role of medicine in achieving health. He returned regularly to Geneva as an advisor to the program to urge development of urban water systems, early on insisting that even the very poor in villages would pay for good water, a view then much contested but now accepted.

Abel Wolman had a particularly long and close relationship with colleagues in Latin America and in the Pan American Health Organization. He was a founder and honorary president of AIDIS, the Interamerican Association of Sanitary Engineering and Environmental Sciences, an organization devoted to the education of sanitary engineers through provision of texts, development of educational programs, and encouragement of students and faculty in the field. Many of the participants were former students. A new headquarters established in 1998 in São Paulo, Brazil, was named for him when AIDIS celebrated its fiftieth anniversary.

Charles ReVelle (1997), a colleague of Wolman's on the faculty in environmental engineering, notes that "in a speech to a lay audience in 1983, he explained his personal goals for WHO in water supply. 'I want water for people to drink and water for people to wash and children that survive. Too many children are still dying.'" His commitment and pleasure in seeing occasional success in the developing world was

evident in a large well-known WHO photograph of a young girl in Africa using her hands to drink from a tap. The picture hung on the wall in the entrance hall to his home.

Wolman's work abroad with mayors, governors, or heads of state mirrored his interest and style in this country. He stressed what he called the "M's": motivation, money, management, and manpower, maintaining a conviction that people would do much for themselves if given the opportunity. "I know of no people who given the opportunity would not wash themselves" (ReVelle, 1997). He placed reliance upon elected officials and civil servants and was unenthusiastic about hyperbole in public rhetoric and hysteria in public decision. At the same time, he participated in many a public brouhaha, including an appearance before a hostile Kansas state legislature, following a devastating flood, defending a plan of the consulting board of which he was a member; the plan included construction of a number of reservoirs, one of which would flood an old cemetery. Similarly he enjoyed recounting how he attempted to defend a proposed private leasing of oyster beds to a group of oystermen on the eastern shore of Maryland while preparing an escape through a window when the crowd grew unruly. A lifelong student of politics and participant in public decision making, my father enjoyed the company of politicians, observing, "I have always been an amateur student of political relationships" (Hollander, 1981, p. 963).

This aspect of my father's career is captured by Gilbert White (1969, p. x), who observed,

Probably Wolman's most pervasive influence is in the genre of thought and presentation that shines only partly on the printed page. Rare is the national organization or conference touching on water and environmental engineering that has not felt the charm of his analysis of an issue of policy and responsibility. Usually extemporaneous, always felicitous in expression, and punctuated with gentle wit and a soft-spoken sarcasm, the typical Wolman

talk sums up the problems in a lucid framework and sends his audience away smiling, a bit puzzled by some of the generalizations, and refreshed by a train a thought that leads to a new perspective. A gift for asking the pertinent but disarming question and for illuminating it in a sharp and faintly ludicrous light has given both direction and relief to countless administrative sessions, and has enlivened seminars and consulting boards. Technical precision and insight blend with cultured urbanity.

Indefatigable, he returned to urge passage of legislation on bond issues in support of public works, sometimes a decade after initial proposals had been rejected. Not one to joust at windmills, he remained both an optimist and a realist, remarking on one occasion that one of the things he liked about working in India was that “graft included provision for those who swept the floor as well as those at successive levels to the top.”

Throughout his life my father was a teacher. Beginning in 1922 he taught part-time in the Johns Hopkins School of Engineering and in the School of Hygiene and Public Health, and in 1937 he became chairman of the Department of Sanitary Engineering in the engineering school and chair of the Department of Environmental Health Engineering in the School of Hygiene and Public Health. The joint appointment reflected his view that the environmental engineer should have a deep understanding of the field of public health that encompassed fields such as epidemiology, toxicology, and microbiology. Many in engineering do not accept this view, but in the history of the School of Public Health, Fee (1987, p. 151) concludes that at the university Wolman successfully pushed a reluctant faculty in the School of Hygiene and Public Health to accept engineers in their courses and physicians and health professionals were subjected to engineering courses in water supply and wastewater, with salutary results..

A popular lecturer to large classes at the School of Public Health, in addition to graduate courses in sanitary engi-

neering, Wolman taught a course on the social, economic, and financial aspects of engineering each year to senior civil engineers; the course perhaps best reflected his view of the broad role and responsibility of an engineer. He formally retired as professor at Johns Hopkins in 1965, but maintained his office at the university, continuing in his professional activities and periodically giving lectures and seminars. He had been scheduled to give a seminar two days after he died. Because of his faithful attendance at the department's weekly seminars into his ninety-sixth year, outside speakers occasionally found, as they were criticizing a work done 60 years before, that the author was not only still alive but was sitting in the room prepared to offer a question. Professor ReVelle again captured his role as a teacher (1997): "He assisted and advised students for over half a century. He always made himself available for career counsel and for encouragement. . . . To see him required only a knock on the door. Although he was incisive and critical in technical matters, I cannot recall his offering personal criticism of anyone."

In 1968 the departments of geography and of environmental engineering science joined to become the Department of Geography and Environmental Engineering. I became chairman of the new department in 1970, thereby making my father a faculty member in my department. The following exchange of letters reveals a sense of humor not captured in the recitation of accomplishments and awards.

September 24, 1976
Dean Owen
Homewood House

My Dear Dean Owen:

The new circular of the Johns Hopkins University dated June 1976 indicates on page 320 that Abel Wolman D. Eng. is Professor Emeritus of Mathematics, and Sanitary Engineering and Water Resources. While it is important for the University to recognize the contributions of distinguished faculty, as a member of the Academic Council over a period of years, I do not recall having approved the appointment of Dr. Abel Wolman as Professor of Mathematics (Emeritus or otherwise).

No doubt Dr. Wolman's contributions in Mathematics are not inconsiderable. However, I find no Teval records of his teaching performance in Calculus 1, nor record of current student evaluations of his teaching at the time of his appointment as Professor Emeritus of Mathematics. May I ask, have the procedural requirements been met in this case?

Inflation of the apparent number of full Professors in the Department of Mathematics at an earlier time could of course provide the basis for a claim of restitution. Is the Department of Mathematics interested in Sanitary Mathematics?

Thanks for your consideration.

Very truly yours,

M. Gordon Wolman
B. Howell Griswold
Professor of Geography

September 27, 1976

Dr. M. Gordon Wolman
B. Howell Griswold, Jr. Professor of
Geography and International Affairs
The Johns Hopkins University
513 Ames Hall
Baltimore, MD 21218

Dear Sir:

I have a copy of your strange letter to Dean Owen on my qualifications as Professor Emeritus of Mathematics and other exotic subjects.

I have at last realized how King Lear must have felt when his children turned upon him – “sharper than a serpent’s tooth” or something like that!

In any event, the appointment gives me much gratification, when I have just about mastered calculating with a slide rule.

The typesetter, who made this appointment, had an unusual awareness that Johnny Hoskins U. could well stand a couple of professors who know nothing about their subjects. He has a surprising acquaintance with the modern “free university”.

It would be expecting too much, I suppose, to have you make a public retraction of your complaint, especially so close to the November election.

Sadly, your one-time father

Abel Wolman
Professor Emeritus of Too Many Things

A member of the National Academy of Sciences and the National Academy of Engineering, Wolman was the recipient of numerous awards including the Sedgwick Medal of the American Public Health Association, a special award of the Lasker Foundation, the Tyler Ecology Prize, the Health for All Medal of WHO, the Horton Medal of the American

Geophysical Union, and the U.S. Medal of Science. They reflect his scientific and engineering contributions as well as his leadership in a lifelong effort to satisfy the aspirations of human societies while protecting and enhancing the environment on which society depends. At the turn of the twenty-first century the *Baltimore Sun* newspaper declared Abel Wolman to be the Marylander of the Century.

On the day my father died the university was holding its commemoration day exercises at which I was to present a candidate, a former student of his, for an honorary doctorate. After a brief early morning conversation he said to me, "Go do what you have to do!" I did see him again but at the moment neither he nor I knew I would.

I AM indebted to Walter Hollander, Jr., now deceased, author of the oral history of Abel Wolman; to Gilbert F. White, editor of selected papers of Abel Wolman; and to professors John Boland and Charles ReVelle for help in preparing this memoir.

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