

# **Boston Society of Civil Engineers**

## **John R. Freeman Fund**

### **Brief History**

(Note: Portions of the biographical and historical data that follow have been copied verbatim from “Hydraulics in the United States, 1776-1976” by Hunter Rouse, 1976, Institute of Hydraulic Research, University of Iowa, Iowa City, Iowa.)

- 1925 John R. Freeman, a past president of the society, sent a letter dated March 18, 1925 to the society offering to establish the Freeman Fund.
- 1925 At a meeting of the society on March 25, the President read the letter from Freeman offering to give the Society securities valued at about \$25,000 with a present annual income of \$1,700, for the establishment of the “Freeman Fund”, the income of which would be used for the encouragement and assistance of young engineers. The President announced that he had appointed a committee consisting of George F. Swain (Chairman), Richard A. Hale, and Dugal C. Jackson, to prepare resolutions acknowledging this gift, and that they had presented the following resolutions:
- 1927 The first Freeman scholarship was awarded to Kenneth Cass Reynolds (born 1897) for study at laboratories at Danzig and Karlsruhe from July 1927 to June 1929. He was from Boston and MIT and returned to MIT where he developed a small river-hydraulics laboratory and obtained a doctorate. He remained at MIT, becoming a professor, and in the 1930s constructed a tidal model of the Cape Cod Canal, which featured electronic control and registration of continuously changing water levels (developed by Harold L. Hazen of the MIT EE Department). He left MIT for Cooper Union in 1944 and was replaced at MIT by Arthur Ippen (later a President of BSCE).
- 1928 The second Freeman Scholarship was given to Samuel Shilits (born 1902) to work at translating Armin Schoklitsch’s “Der Wasserbau” (Hydraulic Structures) from July 1928 to June 1930 while stationed in the author’s city of Brunn, Czechoslovakia. The translation was later completed by Lorenz George Straub (who had been a 1927-1928 ASCE Freeman Scholar) and published in 1937 by the ASME as a two-volume set. Shulits thereafter served with the Corps of Engineers, the Bureau of Reclamation and several universities, among them Penn State.
- 1930 The third scholarship went to Clifford Proctor Kittredge (born 1906) for work towards doctorate with Thoma at Munich from July 1930 to June 1932. From Massachusetts and MIT, it was he who finally prepared Freeman’s pipe flow data for publication, well after Freeman’s death. The measurements were made in 1892 for the purpose of studying the flow in pipes supplying automatic sprinklers. They were of an accuracy seldom exceeded in the next 80 years, extended to Reynolds numbers of nearly 900,000, and were exceptionally innovative (for example, they used artificial roughness). Kittredge later taught at Illinois and Princeton.
- 1932 The fourth Freeman scholarship was awarded to Lawrence Lamont DeFabritis (1908-1943) for study in Europe from July 1932 to June 1933. Of Connecticut and MIT, he was on the original staff of the National Hydraulics Laboratory in the Bureau of Standards of the Department of Commerce, established May 14, 1930. Freeman had a major influence on the design of the laboratory.
- 1934 The fifth scholarship for the period July 1934 to June 1936 was awarded to Leslie James Hooper (born 1903) for an inspection of hydraulic laboratories in the United States and Canada. He was a protégé of “Prof” (Charles M.) Allen, a professor at WPI and original member of the Freeman Fund Committee. Hooper succeeded Allen in the directorship of the Alden Laboratory (serving in that role from 1950 to 1968) and as a member of the Freeman Fund Committee. He reported on his inspection tour in the Journal, Vol. 25, No. 1, Sec 2, 1938 - “Representative Hydraulic Laboratories in the United States and Canada.” Under his direction the Alden Lab during World War II conducted numerous water entry and exit tests on model projectiles for the Navy’s Bureau of Ordnance, using Edgerton’s strobe lights for photography.

- 1937 The sixth scholarship was given to Martin Alexander Mason (born 1907) for a traveling fellowship in Europe, including Grenoble, under Pierre Danel from July 1937 to June 1938. From Washington, D.C., he had previously served for six years on the staff of the National Hydraulics Laboratory and he returned there for several years before joining the Corps of Engineers Beach Erosion Board in 1940. In 1957 he left the Board to become dean of engineering at George Washington University. The interruption of World War II would make this the last scholarship for more than ten years.
- 1941 Grants were made to Harvard Graduate School of Engineering for investigation of sedimentation and suspension of granular particles within the critical range of Reynolds numbers; to MIT for further study and reports on the transition between laminar and turbulent flow; and to Alden Lab for further research on the effect of turbulence of water.
- 1948 The Freeman Scholarship was resumed after a ten-year interruption. The seventh scholarship, for the period October 1948 to September 1949, was awarded to Ralph S. Archibald for research on radioactive tracers in flow tests. Archibald completed his research while a student in the Sanitary Engineering Department in the Harvard Graduate School of Engineering under the direction of Prof. Harold A. Thomas. Archibald was a Civil Engineering graduate of Tufts University in 1945 and received a Master of Science from Harvard in 1947 followed by a Master of Engineering, also from Harvard, in 1950. His paper on this research was published in the Journal, Vol. 37, Jan. 1950. He also published his work in the Transactions of the ASCE as the paper "Longitudinal Mixing Measured by Radioactive Tracers" by Harold A. Thomas and Ralph S. Archibald (Vol. 117, pages 839-850, 1952). In 1954, Thomas and Archibald were awarded the ASCE's Rudolph Hering Medal, an annual prize for the paper providing the most significant contribution in sanitary engineering. At the time the ASCE paper was awarded, Archibald was an engineer with the Pipe Founders Sale Company of Boston and he subsequently became owner and manager until 1993. Mr. Archibald also was an adjunct professor of engineering at Boston University and Northeastern University. He is a lifelong member of BSCES and a Life Member of ASCE.
- 1948 The eighth scholarship went to Carroll T. Newton of Melrose, Massachusetts for study from July 1949 to June 1950. His paper "An Experimental Investigation of Bed Degradation in an Open Channel" was published in the Journal, Vol. 38, Jan. 1951. Newton was a graduate of MIT, receiving a BS in Architectural Engineering in 1933 and MS in Civil Engineering in 1940. The Freeman scholarship supported research at the St. Anthony Falls Hydraulic Laboratory at the University of Minnesota while Newton was a Lt. Colonel with the U.S. Army Corps of Engineers. He went on to become a Colonel in the Corps, where he worked for the remainder of his career. Col. Newton was chief engineer of the Los Angeles District of the Corps during two of the most important projects in the district's history: the LA County flood control project and the construction of Vandenberg Air Force Base.
- 1949 The BSCE Freeman Fund Committee met with its Freeman Fund counterparts from the ASCE and ASME. The ASCE and ASME Committees had requested the meeting to explore issuing combined scholarships to increase the monetary amount and therefore prestige of the awards. The committees proposed a plan to act as a joint award committee and rotate the scholarship among the three societies. The BSCE Committee chose to remain independent and this plan was never implemented.
- 1950 The Freeman Fund supported a series of "Lectures in Applied Hydraulic Design." The twelve lectures were given on Mondays from November 20, 1950 to February 19, 1951 in the Society rooms and open only to Society members. An average of 90 members attended each lecture. Printed notes were given to all attendees and were available for purchase. The lectures included the following:  
 "Fundamentals of the Hydraulic Problem" by Arthur T. Ippen, Professor of Hydraulics at MIT, November 20, 1950  
 "Open Channels" (two lectures) also by Arthur T. Ippen, December 18, 1950 and January 8, 1951  
 "Closed Conduits" (two lectures) by Karl R. Kennison, Consulting Civil and Hydraulic Engineer,

- November 27 and December 4, 1950  
 "Piping Networks" by Harold A. Thomas, Jr., Associated Professor of Civil Engineering, Harvard University, probably given on January 22, 1951  
 "River Hydraulics" by Howard M. Turner, Consulting Engineer, January 15, 1951  
 "Hydraulics of Sewers" by Thomas R. Camp, Consulting Engineer, January 22, 1951  
 "Applied Hydraulic Design of Treatment Plants" (two lectures) also by Thomas R. Camp, January 29 and February 5, 1951 (These lectures were published by the Society ten years later in "Seminar Papers on Waste Water Treatment and Disposal," which is further discussed below.)  
 "Selection of Centrifugal Pumps" by James W. Daily, Professor of Hydraulics at MIT, February 12, 1951  
 "Water Hammer Control" by S. Logan Kerr, Consulting Engineer, probably on February 19, 1951.
- 1951 The Committee report describes the success of the 1950 lecture series. They cite being able to fund this type of local activity as good justification for the committee's decision to keep funds separate from the ASCE and ASME funds.
- 1952 A long-held grant of \$800, awarded in 1941 to Professor K.C. Reynolds of MIT, was utilized with the Committee's approval. Reports from the study were received in November 1953: "Effect of Baffle Piers on the Hydraulic Jump" by James B. Newman, III and Frank A. LaBoon, and "The Direct Measurement of Forces on Baffle Piers in the Hydraulic Jump" by David T. Higgins. The first report is listed in the MIT library catalog as Newman's MS thesis in 1953, while the second is listed at Higgin's MS thesis in 1954.
- 1953 In the spring, the Committee announced a scholarship of \$3,000 for a single man and \$3,600 for a married man to cover a year's study in the U.S. or abroad.
- 1954 The ninth Freeman scholarship was awarded to Lawrence Canton Neale (born 1918) of Alden Lab, WPI for an inspection of European hydraulic laboratories. Mr. Neale began his tour in December 1955 and ended it in December 1956, visiting sixty-six hydraulic laboratories in England, Scotland, France, Italy, Switzerland, Austria, Germany, Belgium, the Netherlands, Sweden, and Norway. His investigation was reported in the Journal, Vol. 44, Oct. 1957, "Hydraulic Laboratories in Europe." He returned to Alden Lab, became its director, became a member of the Freeman Fund Committee, and resigned from the Lab in 1975 and joined Chas. T. Main, Inc. In 1974 he was among the participants in an exchange visit to Japan organized by Donald Harleman on the topic of waste heat disposal.
- 1957 The Freeman Committee provided support for a "Seminar in Waste Water Treatment" during the winter and spring of 1957. The seminar consisted of twelve lectures delivered by eminent engineers. It was sponsored by the Sanitary Section of the BSCE as well as the Massachusetts Section of the ASCE and the Eastern Massachusetts Association of Professional Engineers and Land Surveyors. The lectures included the following:  
 "Concepts and Functional Outline of Treatment Processes" by Gordon M. Fair, Professor of Sanitary Engineering at Harvard University  
 "Racks, Screens, Grit Chambers, Pre-aeration, Flocculation, Flotation and Sedimentation" by Frank L. Flood of Metcalf & Eddy  
 "The Dissolved Oxygen Balance in Streams" by Harold A. Thomas, Jr., Professor of Civil and Sanitary Engineering at Harvard University  
 "Chlorination of Sewage" by Rolf Eliassen, Professor of Sanitary Engineering at MIT  
 "Pumps, Measuring Devices and Hydraulic Controls" by Allen J. Burdoin of Metcalf & Eddy  
 "The Industrial Wastes of New England" by Edward W. Moore, Lecturer on Sanitary Chemistry at Harvard University  
 "Microbiology and Biochemistry of Waste Water Treatment" by Ross E. McKinney, Associate Professor of Sanitary Engineering at MIT  
 "The Design of Trickling Filters and Activated Sludge Processes" also by Ross E. McKinney  
 "Hydraulic Problems of Ocean Disposal" by Frank L. Heaney, a senior engineer at Fay, Spofford

- & Thorndike, Inc.  
 “Water Pollution Control Practice in an Expanding Economy” by Edward J. Cleary, the Executive Director and Chief Engineer of the Ohio River Valley Water Sanitation Commission  
 The seminar papers were edited by George M. Fleece and published by the BSCE as “Seminar Papers on Waste Water Treatment and Disposal” in April 1961. The publication also included two previously unpublished papers on “Applied Hydraulic Design of Treatment Plants” by Thomas R. Camp delivered during the 1950 Freeman Fund “Lectures in Applied Hydraulic Design.”
- 1958 The tenth Freeman scholarship was awarded to Robert G. Dean of Belmont, Massachusetts for research on floating breakwaters including experimental work in the hydraulics laboratory. A graduate of the University of California, Berkeley, with masters degree at Texas A & M, he was working for his doctorate at MIT. There was no Journal publication of his results. Dean went on to receive his Sc.D. from MIT in 1959 and had a distinguished career in academia and consulting. He taught coastal engineering at MIT, the University of Washington, the University of Delaware, and finally the University of Florida. Dean was elected to the National Academy of Engineering in 1980 and has been awarded the Department of the Army Outstanding Civilian Service Medal, the ASCE John G. Moffatt-Frank E. Nichol Harbor and Coastal Engineering Award, and the ASCE Award for Significant Contributions in Coastal Engineering and Wave Hydrodynamics. He retired from the University of Florida in June 2003.
- 1963 In the spring, the committee announced it was offering a scholarship “with a stipend of \$6,000 for a single man and \$7,500 for a married man.”
- 1963 The eleventh Freeman scholarship was awarded to Edward R. Holley, Jr. of Arlington, Massachusetts for research at MIT on the general problem of hydraulic effects on the oxygen balance in rivers and estuaries. He reports that “being interviewed by Camp as part of the evaluation for the Freeman Fund Fellowship was one of the highlights of my studies at MIT (and also a humbling experience).” Mr. Holley provided a report of his work to the committee in 1965, but this was not subsequently published in the Journal. Holley completed his Sc.D. at MIT in 1965. While working on his ScD, Holley began his teaching career as a part-time Instructor for fluid mechanics at the Lowell Institute School (1960-62). He was on the faculty at the University of Illinois at Urbana-Champaign (1964-79). During that time, he took leaves for a Ford Foundation Faculty Residency in Engineering Practice at the U. S. Bureau of Reclamation in Denver (1966-67), a NATO Postdoctoral Fellowship at the Delft Hydraulics Laboratory in The Netherlands (1970-71), and the Invited Webster Fellowship at the University of Queensland, Brisbane, Australia (1974-75). He was on the faculty at the University of Texas at Austin from 1979 until his retirement in 2002. He held the Stanley P. Finch Centennial Professorship at Texas (1984-2002). He and his student co-authors received the ASCE Karl Emil Hilgard Hydraulics Prize in 1971 and 1980.
- 1963 The Freeman Fund sponsored thirteen John H. Freeman Lectures on “Fundamental Hydraulic Processes in Water Resources Engineering” from September 24 to December 17. The lectures were organized by a special committee from the Hydraulics Section consisting of K.P. Devenis, J.B. McAleer, J.W. Daily, and R. F. Dutting. Attendance varied from 56 to 155 and averaged over 100. Printed notes were given to all attendees and were available for purchase. Speakers and their lectures included the following:  
 September 24 – “Introduction” by Arthur T. Ippen, Professor of Civil Engineering, MIT  
 October 1 and 8 – “Fundamentals Parts I and II” by Peter S. Eagleson, Associate Professor of Civil Engineering at MIT (published in the Journal Vol. 52, No. 1, pp. 1-53, Jan. 1965)  
 October 15 – “Prototype Simulation” by Ronald T. McLaughlin, Assistant Professor of Civil Engineering at MIT (published in the Journal, Vol. 51, No. 2, pp. 155-173, April 1964)  
 October 22 – “Measurement and Data Processing” by Lawrence C. Neale, Associate Professor of Mechanical Engineering and Assistant Director of the Alden Hydraulic Laboratory, Worcester Polytechnic Institute (published in the Journal Vol. 51, No. 4, pp. 354-381, Oct. 1964)  
 October 29 – “Stratified Flow” by Donald R.F. Harleman, Professor of Civil Engineering at MIT

- (published in the Journal Vol. 53, No. 1, pp. 6-22, Jan. 1966)
- November 5 – “Diffusion and Mixing” by William E. Dobbins, Professor of Civil Engineering at New York University (published in the Journal Vol. 52, No. 2, pp. 108-128, April 1965)
- November 12 – “Cavitation Phenomena in Hydraulic Systems” by James W. Daily, Professor of Civil Engineering at MIT (published in the Journal Vol. 52, No. 3, pp. 195-221, July 1965)
- November 19 – “Sedimentation in Natural Channels” by John F. Kennedy, Assistant Professor of Hydraulics at MIT (published in the Journal Vol. 52, No. 4, pp. 247-266, Oct. 1965)
- November 26 – “Suspension in Shear Flows” by James W. Daily, Professor of Civil Engineering at MIT (published in the Journal Vol. 53, No. 1, pp. 23-48, Jan. 1966)
- December 3 – “Flow Through Porous Media” by Ralph R. Rumer, Associate Professor of Civil Engineering at the State University of New York at Buffalo (published in the Journal Vol. 52, No. 4, pp. 267-283, Oct. 1965)
- December 10 – “Tidal Hydraulics and Waves” by Arthur T. Ippen, Professor of Civil Engineering, MIT (published in the Journal Vol. 53, No. 2, pp. 158-181, April 1966)
- December 17 – “Tidal Hydraulics and Beach Erosion” by Joseph M. Caldwell, Chief of the Research Division of the U.S. Army Coastal Engineering Research Center, Washington, D.C. (published in the Journal Vol. 53, No. 2, pp. 142-157, April 1966)
- 1966 The Freeman Fund inaugurated an annual lecture series with the intention to invite distinguished investigators in the field of fluid mechanics and hydraulics. Hunter Rouse of the University of Iowa presented the first John H. Freeman Memorial Lecture, “Jet Diffusion and Cavitation,” on January 26, 1966 (Journal Vol. 53, July 1966).
- 1967 Hans Gerber of the Federal Institute of Technology in Zurich presented the second Freeman Memorial Lecture, “European Experience with the Thermodynamic Method” (of flow measurement) (Journal Vol. 55, Jan. 1968).
- 1968 John Parmakian presented the third Freeman Memorial Lecture, “Unusual Aspects of Hydraulic Transients in Pumping Plants” (Journal Vol. 55, Jan. 1968).
- 1968 The Committee awarded the twelfth Freeman Scholarship to Michael Collins, a doctoral graduate student at MIT under Professors Harleman and Gelhar. From Georgia Tech, Union Carbide, and Camp Dresser & McKee, he performed theoretical analysis and experimental verification of “Dispersion in Gravity-Induced Flows in Porous Media” with major funding in excess of Freeman funds from a federal source. His work was subsequently published as the paper “Hele-Shaw Model of Long Island Aquifer System,” by Michael A. Collins, Lynn W. Gelhar and John L. Wilson, III in the ASCE Journal of the Hydraulics Division, Vol. 98, No. HY9, September 1972, pp. 1701-1714. Collins went on to become a Professor of Civil Engineering at Southern Methodist University in Dallas, Texas and followed with a second career in consulting.
- 1969 Thomas R. Camp presented the fourth Memorial Lecture, “Hydraulics of Mixing Tanks” (Journal Vol. 56, Jan. 1969).
- 1970 Klas Cederwall presented the fifth Memorial Lecture, “Dispersion Phenomena in Coastal Environments” (Journal Vol. 57, Jan, 1970).
- 1971 Arthur T. Ippen, Professor at MIT, presented the sixth Memorial Lecture, “A New Look at Sediment Transport in Turbulent Streams” (Journal Vol. 58, July 1971).
- 1972 Ven Te Chow, Professor at the University of Illinois, presented the seventh Memorial Lecture - “Hydrologic Modeling” (Journal Vol. 59, Jan. 1972).
- 1973 Harry Headland, London, England, presented the eighth Memorial Lecture, “Hydroelectric Pumped Storage—Some Aspects of the Western European Scene” (Journal Vol. 60, April 1975).
- 1974 Donald R. F. Harleman, Professor of Civil Engineering at MIT, presented the ninth Memorial Lecture on April 3 to an audience of 55 at the Boston Public Library. His topic was “Heat Disposal in the Water Environment” and the paper was subsequently published in the Journal (Vol. 61, July 1974) and the ASCE Journal of the Hydraulics Division (Vol. 101, No. HY9, pp.

- 1117-1138, September 1975).
- 1974 In October, the committee announced a new Freeman Hydraulics Prize of \$2000 for exceptionally useful papers in the field of Hydraulic Engineering.
- 1975 At the Committee's May 14 meeting, the committee voted that it viewed use of Freeman Fund income to meet Section expenses (as proposed in the address of the retiring President) as contrary to Freeman's bequest.
- 1975 The Committee on July 22 wrote the President recommending against a merger of the BSCE and ASCE Freeman Funds. It pointed out that that would be contrary to Freeman's wishes since he could have left \$50,000 to ASCE instead of \$25,000 to each society. It also noted that the amount of ASCE's biannual award implied that the fund had diminished to about one third of BSCE's. It concluded that BSCE should welcome an exchange of ideas with ASCE.
- 1975 At the November 13 meeting of the Committee, it voted to award Hunter Rouse the first Freeman Hydraulics Prize for his book "Hydraulics in the United States, 1776-1976." The book was published by the University of Iowa Press in 1976 and in the BSCE Journal, Vol. 63, Numbers 1 through 4, April 1976 through January 1977. Jonathan A. French received an Honorable Mention citation from the Committee for his paper submitted for the Freeman Hydraulics Prize, "Flow Approaching Filter Wastewater Troughs," which was published in the Journal Vol. 62, Jan. 1975 and in the ASCE Journal of the Environmental Engineering Division, Vol. 107, No. EE2, Pp. 359-377, April 1981.
- 1977 Peter S. Eagleson presented the tenth Memorial Lecture as a series of five lectures in April and May at MIT on "The Annual Water Balance, An Introduction to New and Powerful Methods of Hydrology." A discussion by Eagleson of the principal concepts of the lectures appears in the Journal Vol. 66, Spring 1979, and the ASCE Journal of the Hydraulics Division, Vol. 105, No. 8, August 1979, pp. 921-941. Printed notes were provided at the lectures. Registered attendance was 170.
- 1979 The Freeman Hydraulics Prize was increased to \$2500. The Committee suggested various ways to increase the number of papers available for the Journal and offered to support constructive measures to improve the Journal.
- 1980 The committee covered the expenses of John Paul Tullis (Professor at Utah State University, Logan, Utah) who spoke to a Hydraulics Group meeting on January 23, 1980 on "Cavitation and Damage in Piping Systems."
- 1981 The Committee sponsored a special issue of the BSCE Journal entitled "Boston's Charles River Basin - An Engineering Landmark" (Vol. 67, No. 4, Summer 1981). The issue was published in time for a November 5, 1981 ceremony at the Museum of Science at which the basin was dedicated as a National Historic Civil Engineering Landmark. The special journal issue included a historical account of John Freeman's work by Deborah A. Cozort, former archivist at MIT; a previously unpublished manuscript by Freeman entitled "Some Problems of the Charles River Dam;" a reprint of the 1903 report by the Committee on Charles River Dam including Freeman's report to the committee in his role as chief engineer; and a report by seniors in the MIT Civil Engineering Department Class of 1980. The MIT Seniors worked with Dr. Eric Adams and Professor Donald Harleman in completing an assessment of the environmental impacts of the proposed new Charles River Dam. By the time of the Committee's report in 1983 about 100 copies of the issue had been sold.
- 1981 Gerhard H. Jirka, Associate Professor of Civil Engineering at Cornell University and formerly of MIT was awarded the Freeman Hydraulics Prize for his paper "Multiport Diffusers for Heat Disposal—A Summary" (Journal Vol. 68, Spring 1982, and Journal of the Hydraulics Division, ASCE, Vol. 108, No. HY12, December 1982).
- 1982 Professor Jirka delivered his paper "Multiport Diffusers for Heat Disposal—A Summary" as the eleventh Freeman Memorial Lecture on April 21 at MIT.

- 1982 After a 14-year hiatus in awarding scholarships, the Committee awarded Leslie J. Blythe the thirteenth Freeman Scholarship on April 30. Ms. Blythe was then a Cornell graduate working at Stone & Webster and planning to pursue graduate work at MIT. This was the first Freeman Scholarship awarded to a woman by the committee, which advertised the award in 1963 as different amounts for a “single man” and “married man.” A summary of Ms. Blythe’s M.S. thesis “Computerized Monitoring for Leakage Detection” was published in the Journal Vol. 71, 1985. Ms. Blythe went on to a career as a consulting engineer and is currently president of B & G Environmental in Atlanta, Georgia.
- 1982 The activities of the prior year, including the special Charles River issue of the BSCE Journal, had required unusually high expenditures and the Freeman Committee decided to limit expenditures until the fund was replenished to its original value adjusted for inflation. Concern for the financial status of the fund continued until 1986, when the fund once again reached a level commensurate with the original bequest adjusted for inflation.
- 1983 The committee covered the expenses of Robert R. Faddick (Professor at Colorado School of Mines) who spoke to a joint meeting of the Hydraulics and Waterways Groups and the Boston ASME Chapter on “Technology of Movement of Solids and Slurries in Pipelines – State of the Art” (Journal Vol. 71, 1985).
- 1984 The Committee voted affirmatively to assist the BSCES in defraying costs of the Journal, which was then starting to be published in a new form as Civil Engineering Practice. The Committee agreed to limit its support to the areas of hydraulics and hydrology by providing \$1000 stipends to authors contributing articles in these fields.
- 1985 The Committee announced to the civil engineering departments of 28 New England colleges and universities the availability of support for students to attend national conferences in order to present technical papers. One acknowledgement was received—from Harvard—but there were no takers for the grants.
- 1986 The Committee announced the Freeman Fellowship in Hydraulics and Hydrology offering a stipend of \$5000 to the young engineer applicant who intended to use it for the worthiest purpose.
- 1986 The Committee accepted Rafael Bras’s offer, on behalf of MIT’s Ralph M. Parsons Laboratory, to take initiative to renew the annual John R. Freeman Lecture, which had not been delivered since 1982. Since then, the annual lecture has been cosponsored by the Parsons Laboratory and the Freeman Fund. The lecture has been delivered annually ever since, with the exception of 1997 when prevented by a major snowstorm on the scheduled day.
- 1987 The first Freeman Fellowship in Hydraulics and Hydrology was awarded to Richard M. Vogel, Assistant Professor at Tufts University, and David I. Hellstrom of Arthur D. Little on January 28, 1987 for an investigation of the concept of “safe yield” using a stochastic streamflow model. The model was applied to the reservoirs that supply Boston’s drinking water. The study was subsequently published as “Long-Range Surface Water Supply Planning,” in Civil Engineering Practice, Vol. 3, No. 1, Spring 1988.
- 1987 George F. Pinder, Professor and Chairman of the Civil Engineering Department at Princeton University, presented the twelfth Memorial Freeman Lecture on “The Tragedy of Woburn—A Study of Groundwater Simulation and Litigation” on February 4 at MIT.
- 1987 The John R. Freeman Reporter Award, with stipend unspecified, was announced. The award covers expenses of travel and living while obtaining information not readily available to BSCE members, but important to them, and preparing a paper on same for the Journal.
- 1988 The Thirteenth Memorial Freeman Lecture was a symposium on “Boston Harbor: Engineering and Technical Issues” and was presented on April 7 at MIT. Speakers were: Prof. Norman Brooks of the California Institute of Technology, “The Experience with Ocean Outfalls to Dispose of Primary and Secondary Treated Sewage”; Cecil Lue-Hing of the Chicago Metropolitan Sanitary District, “Dealing with Combined Sewer Overflows: The Chicago Experience”; Richard Fox of

- the Massachusetts Water Resources Authority, “Priorities in Boston Harbor Cleanup Efforts”; Jonathan French of Camp Dresser & McKee, “Siting the Ocean Outfall”; and Prof. Donald R. F. Harleman of MIT, “Is Secondary Treatment Necessary?” Prof. Harleman’s lecture was published in *Civil Engineering Practice*, Vol. 4, No. 1, Spring 1989.
- 1988 The Committee pledged a Freeman Reporter Award of \$4250 to support travel by George E. Hecker to China to report on Chinese hydraulic laboratories. The trip was reported in *Civil Engineering Practice*, Vol. 6, No. 1, Spring 1991.
- 1988 The Committee appealed to the National Research Council’s Water Science and Technology Board to undertake a study of wastewater management for urban coastal areas in order to help clarify (with particular reference to Boston Harbor) what constitutes sound and efficient environmental policy and management. The Committee pledged \$10,000 in support of a WSTB study and up to \$10,000 additional in the future should that prove necessary for the study to be successfully completed. The additional \$10,000 was given in 1991.
- 1989 The Fourteenth Memorial Freeman Lecture held on April 10 at MIT was entitled “Climate, Hydrology and Water Supply.” Speakers were Richard Wetherald, “Changes of Hydrology Caused by an Increase of Carbon Dioxide as Obtained from a General Circulation Model of the Atmosphere”; Charles W. Stockton, “The Use of Paleo-environmental Indicators in Hydroclimatology and Hydrology”; and Peter Gleick, “Analysis and Implications of Climate Change on Water Supplies.” The lecture was reported in *Civil Engineering Practice*, Volume 5, Number 1, Spring 1990.
- 1989 Board of Government expressed concern that the Freeman Fund Committee was not going through formality of obtaining formal Board concurrence in its actions and expenditures. A useful meeting with the Board seemed to have satisfactorily resolved the Board’s concerns.
- 1990 The fifteenth Memorial Freeman Lecture held on April 2 at MIT was entitled “Water Supply Planning – A Tale of Two Cities.” Speakers were Ed Scheader, the Deputy Director of New York City’s Department of Environmental Protection, Bureau of Water Supply, and Paul Levy and Marcis Kempe of the Massachusetts Water Resources Authority. Scheader’s lecture was reported in *Civil Engineering Practice*, Volume 6, Number 2, Fall 1991.
- 1990 The fund provided \$825 to sponsor the attendance of three BSCES members at the International Conference on Physical Modeling of Transport and Dispersion held at MIT on August 7-10. The fund also supported the publication of the *Journal* with \$5000.
- 1991 The committee provided a grant to Prof. David Westerling of Merrimack College in North Andover to attend the Urban Drainage Conference in Dubrovnik, Yugoslavia, in June 1991 and to visit civil engineering projects in Eastern Europe. The trip was reported in *Civil Engineering Practice*, Vol. 7, No. 2, Fall 1992.
- 1991 The Committee awarded Freeman Grants to Alan S. Weiner of Northeastern University, Sourav K. Bhunia of MIT, and Chris M. Erikson and David A. Schoenwolf of Haley & Aldrich. Weiner was awarded \$1,275 to evaluate the effectiveness of ultrafiltration for removing edible oils from wastewater, with an additional \$1,000 upon submission of a paper for *Journal* publication. Weiner subsequently returned his grant. Bhunia was granted \$1,500 for an initial investigation of jet cutting technology with an additional \$1,500 upon submission of a paper to the *Journal*. Mr. Bhunia received his Ph.D. in Mechanical Engineering for MIT in 1993. He submitted his paper to the committee in September 1998 and it was forwarded to the *Journal* but never published. Erikson and Schoenwolf were awarded \$1,700 to evaluate the ground-water response to construction of the Post Office Square Garage in Boston with an additional \$500 upon submission of an article. They published their work in the *Journal* in 1993.
- 1991 The sixteenth Memorial Freeman Lecture held on April 22 at MIT was entitled “Combined Sewer Overflows in Metropolitan Boston: structural and operational controls.” Speakers were Gene Suhr of CH2M-Hill, Eric Adams of MIT, and Wolfgang Schiller of the Swiss Federal Institute for

- Environmental Science and Technology (EAWAG). The lecture was reported in Civil Engineering Practice, Volume 7, Number 2, Fall 1992.
- 1992 In February, the Committee reissued its announcement inviting applications for grants to sponsor master's level graduate programs, research, travel, and meritorious publications.
- 1992 The committee provided funding to the Tufts ASCE Student Chapter to attend the International Concrete Canoe Competition on May 29-30, 1992 at the Delft University of Technology in the Netherlands and to visit the Delft Hydraulics Laboratories and the Eastern Scheldt storm surge barrier. Prof. Lin Brown led a group of eight students on the trip. The trip was reported in Civil Engineering Practice, Vol. 7, No. 2, Fall 1992.
- 1992 The seventeenth Memorial Freeman Lecture on May 21 featured Prof. John Wilson of the New Mexico Institute of Mining and Technology. His topic was "Why are we failing in our approach to cleaning up contaminated groundwater?"
- 1992 The committee provided \$6,000 to support the Society's journal.
- 1992 In July, the Committee awarded \$5,000 to Jennifer Zemach to support her research on chemically enhanced primary treatment of municipal wastewater as part of her Master's degree at MIT. Ms. Zemach (now Jay) went on to complete her masters and doctorate at MIT and is an Assistant Professor of Civil and Environmental Engineering at UCLA.
- 1993 The Committee provided a \$500 award to Chris M. Erikson and David A. Schoenwolf for their paper "Predictions and Observations of Groundwater Conditions during a Deep Excavation in Boston" published in Civil Engineering Practice, Volume 8, Number 2, Fall 1993.
- 1993 The eighteenth Memorial Freeman Lecture on April 26 at MIT examined "Disposal of Contaminated Marine Sediments." Speakers were Angelos Findikakis of Bechtel Corp., Tom Fredette of the Army Corps of Engineers, and Henry Bokuniewicz of the State University of New York at Stony Brook.
- 1993 The Committee provided funds for John J. Boland to present findings of the National Research Council's study on "Managing Wastewater in Urban Coastal Areas." Boland was a Professor of Geography and Environmental Engineering at The Johns Hopkins University and the chair of National Research Council Committee on Wastewater Management in Coastal Urban Areas. He spoke to a joint meeting of the Environmental and Hydraulics/Water Resources Sections.
- 1993 The Fund provided \$5200 to support publication of the Journal.
- 1994 A special issue of Civil Engineering Practice devoted to the Boston Harbor Cleanup Project was published as Volume 9, Number 1, Spring/Summer 1994. The issue was edited by Freeman Fund Committee member Dominique Brocard. The Committee provided \$9,910 to the Society to support the publication of Civil Engineering Practice. An award of \$2,000 from the Committee to Dr. Brocard was graciously declined.
- 1994 The nineteenth Memorial Freeman Lecture was given at MIT on April 25 by Dominic DiToro of Manhattan College and HydroQual, Inc. and was entitled "Estuaries in Peril? Case studies of Chesapeake Bay, New York Harbor, Long Island Sound, and Massachusetts/Cape Cod Bays."
- 1995 The twentieth Memorial Freeman Lecture was given at MIT by Harry Hemond and William Thilly of MIT on April 24 and was entitled "Wells G & H Revisited: Evaluation of Route and Amounts of Community Exposure to Toxic Metals via Municipal Water Supply." Approximately 100 people attended the lecture.
- 1996 The Committee awarded a grant of \$2,500 in two equal installments to the Civil and Environmental Engineering Department at Tufts to support a group of students entering the 6<sup>th</sup> Annual Environmental Design Contest of the Waste-management Education and Research Consortium to develop a scheme to remediate radioactive vegetation waste. The initial installment would support travel to the competition at the New Mexico State University in Las

- Cruces, New Mexico, with the balance to be issued upon receipt of a report for publication in the journal.
- 1996 The twenty-first Memorial Freeman Lecture was held April 16 at MIT and was entitled “The Big Dam Debate: Are Multi-purpose Dams Environmentally Sustainable?” Speakers were Robert Goddard of the World Bank, Dai Qing, the author of *Yangtze! Yangtze!*, and Phillip Williams of the International Rivers Network. The Committee also provided \$4,000 support to Susan Murcott of MIT to edit the material for the journal. Ms. Murcott’s report appears in *Civil Engineering Practice*, Volume 12, Number 1, Spring/Summer 1997.
- 1997 In April, the Committee awarded \$1,500 to Kuang-Wei “Stone” Chen of the MWRA to deliver a paper at the Joint Canadian Society of Civil Engineers/ASCE Environmental Engineering Conference in Edmonton in July. The paper was entitled “Advanced Chemical Oxidation of 2,4,6-Trichlorophenol by Using Fenton’s Reagent – Dechlorination and Toxicity Reduction.”
- 1997 In July, the Committee approved a grant of \$4,000 to fund two undergraduate students, Laura Sandler and Michael Rojo, working with Prof. Harold F. Hemond at MIT. Ms. Sandler’s research concerned the chemical behavior of iron and arsenic in Upper Mystic Lake while Mr. Rojo’s research assessed the role of manganese oxides in degradation of phenylphenols in the Hall’s Brook Holding Area in the upper Aberjona River Valley. The Committee also provided \$5,200 to support the Journal.
- 1997 The April Fool’s Day Storm brought 24 record-breaking inches of snow to Boston and prevented the Freeman Lecture from being held on April 1.
- 1998 The twenty-second Memorial Freeman Lecture, postponed by the snowstorm in 1997, was given on March 17 by David Schindler of the University of Alberta. His topic was “Interactions Among Climate Warming, Acid Rain and Stratospheric Ozone.” Dr. Schindler was the first recipient of the Stockholm Water Prize in 1991 for his ground-breaking work in lake eutrophication.
- 1999 The twenty-third Memorial Freeman Lecture was given on April 5 by Jorg Imberger of the University of Western Australia. His topic was “Mixing and Transport in Lakes: Consequences for Water Quality Management.”
- 2000 The twenty-fourth Memorial Freeman Lecture was given on April 18 at MIT by Douglas MacDonald, the Executive Director of the Massachusetts Water Resources Authority. His topic was “What does the future hold for greater Boston’s water supply?”
- 1999 In July, the committee awarded a grant to Erin Mosely, P.E., of CH2M-Hill in Boston, for attendance at a WEFTEACH Seminar in New Orleans in October 1999. Ms. Mosely drew on her experience at the seminar to draft a paper on the value to the civil engineering profession of community outreach, particularly to young people. She provided the manuscript to the committee in 2001.
- 2001 In March the Committee provided \$5000 to support the journal.
- 2001 The topic of the twenty-fifth Memorial Freeman Lecture, held April 3 at MIT, was “Water Supply in Palestine.” Speakers were Sava Nedic of Metcalf & Eddy and Henning Moe of Camp Dresser & McKee.
- 2001 In May 2001, the committee awarded \$4,500, the second half of a \$9,000 grant, to MIT in support of student travel to Brazil and Nepal as part of the Master of Engineering Program, following receipt of their trip reports. The student’s account of their work was published in two articles in *Civil Engineering Practice*, Vol. 17, No. 1, Spring/Summer 2002. The committee also awarded the first half of an \$1800 grant to Jean Malafronte for travel expenses to study rural water supplies in Ghana during March 2002. Ms. Malafronte was a MS candidate in environmental engineering at the University of Massachusetts in Amherst.
- 2002 Frederick Laskey of MWRA and Kevin Reilly of EPA addressed “Security of Metro-Boston’s Water Supply” in the twenty-sixth Memorial Freeman Lecture on April 22 at MIT.

- 2003 The twenty-seventh Memorial Freeman Lecture was delivered May 5 at MIT by Charles Harvey of MIT. The title was “The Arsenic Crisis in Bangladesh.” Harvey’s research on arsenic in Bangladesh was later published in the journal *Science* (Harvey, C. F., C. H. Swartz, A. B. M. Badruzzaman, N. Keon-Blute, W. Yu, M. A. Ali, J. Jay, R. Beckie, V. Niedan, D. Brabander, P. M. Oates, K. N. Ashfaque, S. Islam, H. F. Hemond, and M. F. Ahmed, 2002. “Arsenic Mobility and Groundwater Extraction in Bangladesh.” *Science*. Vol. 298, Pg. 1602-1606. November 22, 2002.)
- 2003 A scholarship of \$900 was awarded to Jean A. Malafronte as the second installment of a \$1800 grant to support travel and laboratory expenses for a trip to Ghana to study rural water supplies in a developing area.
- 2004 The twenty-eighth Memorial Freeman Lecture was held April 6 at MIT. Speakers Donald Harleman and Rafael Bras, both MIT professors, spoke on “Saving Venice from High Tides: The Case for Mobile Gates.” It was the most heavily attended Memorial Lecture in anyone’s memory. By then an octogenarian, Prof. Harleman was delivering his third Freeman Lecture, having previously given the ninth and thirteenth lectures.
- 2004 A scholarship of \$4,000 was awarded to Ana Martha Fernandes, a master’s degree student at Tufts, with additional \$1,500 upon submittal of a paper. The scholarship covered expenses for field data collection in Jamaica during the summer of 2004 when Ms. Fernandes evaluated septage management and infrastructure.
- 2005 The twenty-ninth Memorial Freeman Lecture was delivered April 14 at MIT by Peter Rogers, the Gordon McKay Professor of Environmental Engineering and Professor of City Planning at Harvard University. He gave his lecture, “Global Water Crisis: Myth or Reality?,” to an audience of nearly 200. For the first time, the Freeman Lecture was videotaped for future dissemination of the lecture on the Committee’s web site.
- 2005 In May, the Committee awarded a scholarship of \$3800 to Brian Robinson and Pragnya Alekal, two recent graduates of the Master of Engineering program at MIT, to support travel to Mozambique to participate in a community-based water and sanitation project in Maputo.
- 2006 In January, the Freeman Fund awarded a grant of \$3000 to the Northeastern University chapter of Engineers without Borders to assist in defraying costs for their proposed project to upgrade the water-distribution system in El Tecuan, Honduras. Five students and a professional mentor prepared a system design and traveled to Honduras in April to implement the design. Their project was completed in conjunction with a volunteer medical organization, Americans Teaching and Sharing.
- 2006 Eugene Z. Stakhiv of the U.S. Army Corps of Engineers delivered the thirtieth Memorial Freeman Lecture on March 7 at MIT. The lecture, entitled “Integrated Water Resources Management in the Midst of Chaos and Caducity: Lessons from Hurricane Katrina” raised challenging issues concerning the nation’s management of water resources. About 135 were in attendance.
- 2007 The thirty-first Memorial Freeman Lecture was delivered April 9 at MIT by Denis LeBlanc of the U.S. Geological Survey to an audience of about 170. His lecture was “Cape Cod’s Billion Dollar Ground-Water Cleanup: The Hydrologic Story.”
- 2007 In June, the Fund provided a scholarship of \$4000 to Derek Etkin, an MS candidate in Civil and Environmental Engineering at Tufts. His research addressed the need for innovative techniques to reduce the vulnerability of water systems in West Africa with respect to hydrologic variability made worse by climate change. The focus of the project was a decision support tool (DST) that used seasonal forecasts to optimize reservoir management for multiple objectives in the Comoe River Basin in Burkina Faso. Etkin’s work was subsequently presented at the ASCE World Environmental and Water Resources Congress 2008, May 12-16, 2008 in Honolulu, Hawaii.
- 2008 Dr. Brendan M. Harley of CDM Inc. delivered the thirty-second Memorial Freeman Lecture at MIT on April 14, 2008. The topic was: “Singapore’s Marina Barrage – Design, evolution and

- construction of a Multipurpose Urban Reservoir.” The lecture was attended by about 100.
- 2009 Paul V. Rush, P.E. of the New York City Department of Environmental Protection delivered the thirty-third Memorial Freeman Lecture at MIT on April 14, 2009, The lecture was entitled “Big City, Big Aqueduct, Big Challenge: Planning Repairs of NYC’s Leaking Delaware Aqueduct” and was attended by approximately 90.
- 2010 Steven C. Chapra, Ph.D., Professor and Berger Chair in Civil & Environmental Engineering at Tufts University delivered the thirty-fourth Memorial Freeman Lecture at MIT on April 28, 2010. His topic was “Rubbish, Stink and Death: The Historical Evolution, Present State and Future Direction of Water-Quality Management and Modeling.”
- 2010 In May the Freeman Fund awarded a \$2000 scholarship to Claudia Maritza Espinoza, a student at MIT, for her proposed project “Evaluating a Proposed Clay Filter Design for Ghana” and a grant of \$2000 to Engineers Without Borders at MIT for a project to develop a water-supply system for Ddegeya, Uganda.
- 2011 Vladimir Novotny, Ph.D., P.E., D.E.E., Professor of Civil and Environmental Engineering at Northeastern University delivered the thirty-fifth Memorial Freeman Lecture at MIT on April 11, 2011. Prof. Novotny’s lecture was “Closing the Water Cycle, Recovering Energy and Resources in Future Sustainable Communities.”
- 2011 In August, the Freeman Fund awarded a grant of \$2,000 to the “Let’s Talk about Water” program at Northeastern University and a scholarship of \$2000 to Jeffrey Bates, A candidate for the degree of Master of Science in Civil and Environmental Engineering at Tufts University. The goal of his research was to increase the integration of information technology and water management systems to improve the efficiency of water distribution and consumption.
- 2012 The thirty-sixth Memorial Freeman Lecture was delivered at MIT on April 23, 2012 by Dr. Richard N. Palmer, Department Head and Professor of Civil and Environmental Engineering at the University of Massachusetts, Amherst. The lecture was entitled “Climate Change and Water Resources: Characterizing Uncertainties for Decision Makers” and was attended by approximately 80.
- 2012 In May, the Freeman Fund awarded a grant of \$2000 to the Merrimack College ASCE Student Chapter for a trip to Haiti to lay the groundwork for a water resources project to provide clean water to Casse, a small town in the central region of Haiti that had recently been suffering from cholera.
- 2013 On April 18, 2013, Lawrence J. Murphy, P.E. of CDM-Smith and Michael Bachand, P.E. of the U.S. Army Corps of Engineers delivered the thirty-seventh Memorial Freeman Lecture at MIT. The lecture title was “Hurricane Storm Barrier Design and Operation” and was attended by about 90.
- 2013 A scholarship of \$2500 scholarship was awarded in August to Vanya Britto, an undergraduate student at MIT, for a summer project researching the effects of high underwater CO2 pressure on microbial growth. In addition, \$2500 was granted to the Engineers Without Borders chapter at Northeastern University for a team of students to start the implementation of a water-distribution system in Bbanda, Uganda.
- 2014 On April 8, Professor Emeritus Perry L. McCarty of Stanford University delivered the thirty-eighth Memorial Freeman Lecture at MIT. His topic “Capturing Domestic Wastewater’s Resource Potentials” was based on a long and distinguished career in environmental engineering that began when he was a student at MIT. Over 90 people attended.
- 2015 On April 9, Distinguished Professor Emeritus John Cherry, Ph.D., P.E., of University of Waterloo in Ontario, Canada delivered thirty-ninth Memorial Freeman Lecture at MIT. His topic was

“Shale Gas Development: A Big Environmental Experiment?” and the lecture was attended by roughly 125.