ORIGIN/DESTINATION

75 YEARS OF
THE NEW ENGLAND
WATER ENVIRONMENT
ASSOCIATION
1929/2004

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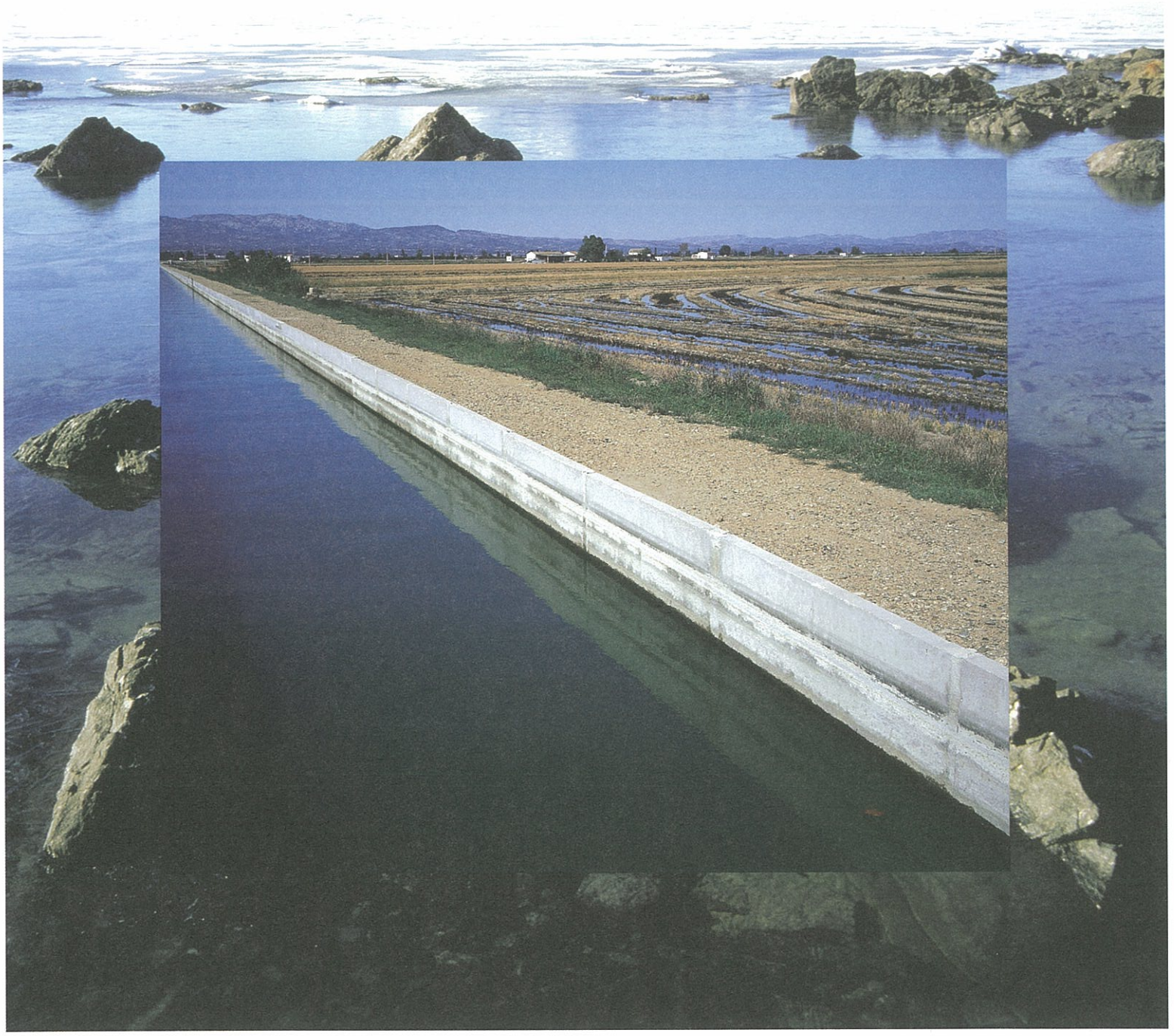
ORIGIN/DESTINATION

When you drink the water, remember the spring. (Chinese Proverb)

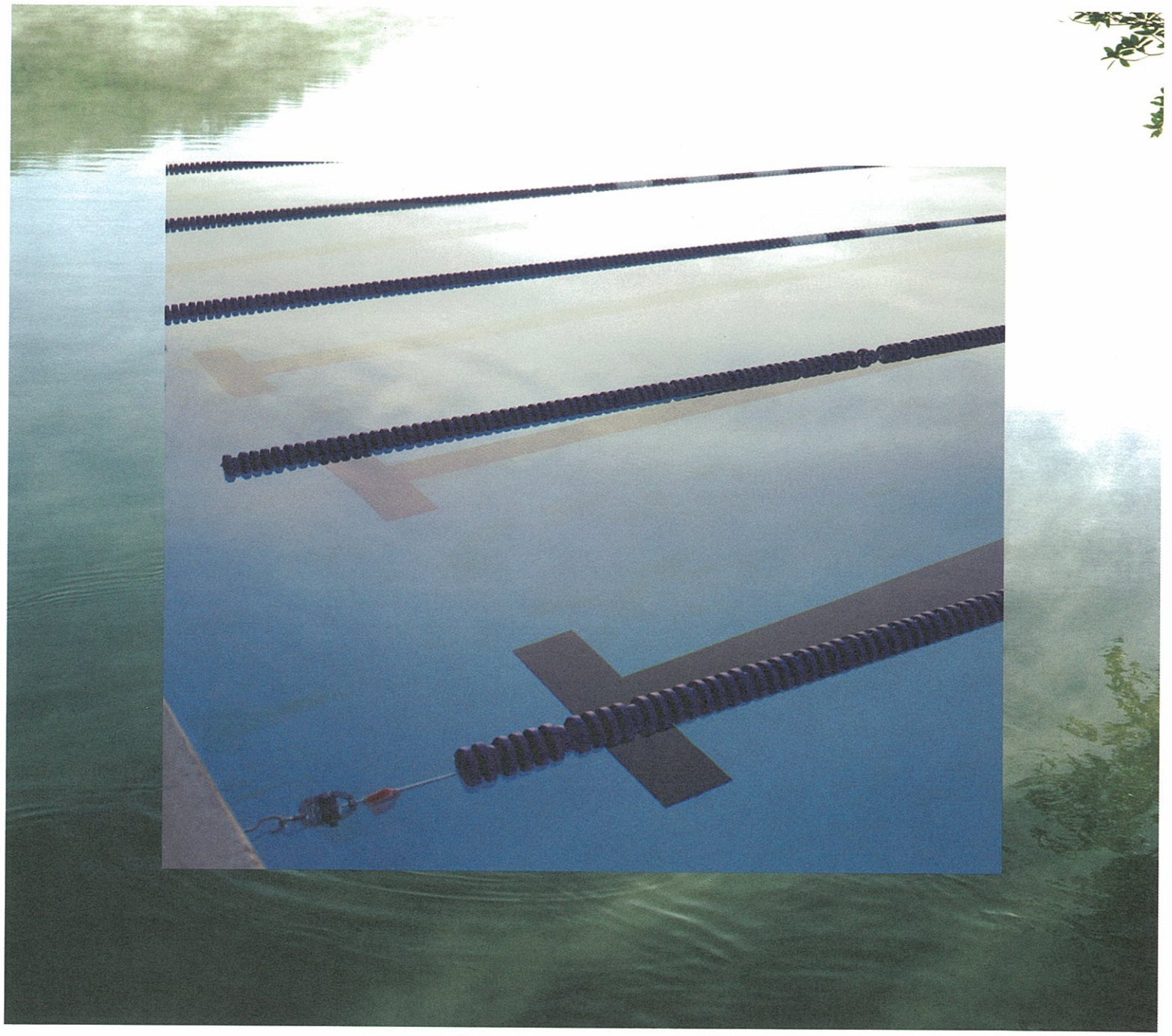
This book is about a journey. It is about the journey of water from source to destination, from ground and sky to fountain and faucet, from well to waste and back. It is about the journey of the New England Water Environment Association from idea to institution. It is the same journey.

The journey of water is one of contradictions. It traverses the divergent yet cyclical paths of creation and destruction, of evaporation and rain, of beginning and ending, of birth and death, of the physical and the metaphysical. The journey of water, like the journey of each of us, passes through rites of cleansing, initiation, purification. Even as water symbolizes our salvation, it must be saved. The journey of NEWEA, too, is one of contradictions. It traverses the divergent yet cyclical paths from

contamination to clarification, from refuse to re-use, from commerce to clean-up, from run-off to reclamation. The journey of NEWEA, like the journey of each of us, passes through rites of recognition, responsibility, rectification. NEWEA symbolizes our power to save. It must save. This journey also is our journey. It traverses the divergent paths between youth and old age, between work and family, between awareness and ignorance, between activism and complacency. Our journey, like the journey of NEWEA, comprises



rites of passage — maturation, realization, participation. We can see and do nothing, or we can contribute. We can wait to be saved, or we can save. We may not be able to fully determine our journey. But we can influence it along the way. We may not be able to discern the importance of our journey; but like NEWEA, we can recognize ourselves as parts of a greater whole. We may not be able to comprehend the condition of the environment in which we journey, but we can count the cost and the consequences of ignoring it.



Because of our human nature, it seems we must attach numbers to the things that are of value to us before we begin to protect them. We often have to quantify before we can qualify. And so we shall. The world is a collection of watersheds, lakes, rivers, and aquifers. Given the cyclical nature of water's journey, the world's supply of fres hwater remains constant — approximately two-and-a-half percent of all water — and finite. Almost two-thirds of that water is inaccessible, comprising ice caps and glaciers. The use of that

water is expanding to meet the needs of industry, agriculture, and a global population that is projected to be nine billion by the year 2050. In March of 2000, at an international water conference in The Hague, water ministers from 115 countries declined to agree on how to address the problem of water scarcity. Do the math. Our journey hangs in the equation. On this shared journey of contradictions – in our contemplation of the origins and destinations of water, of NEWEA, and of ourselves – our relationship with water

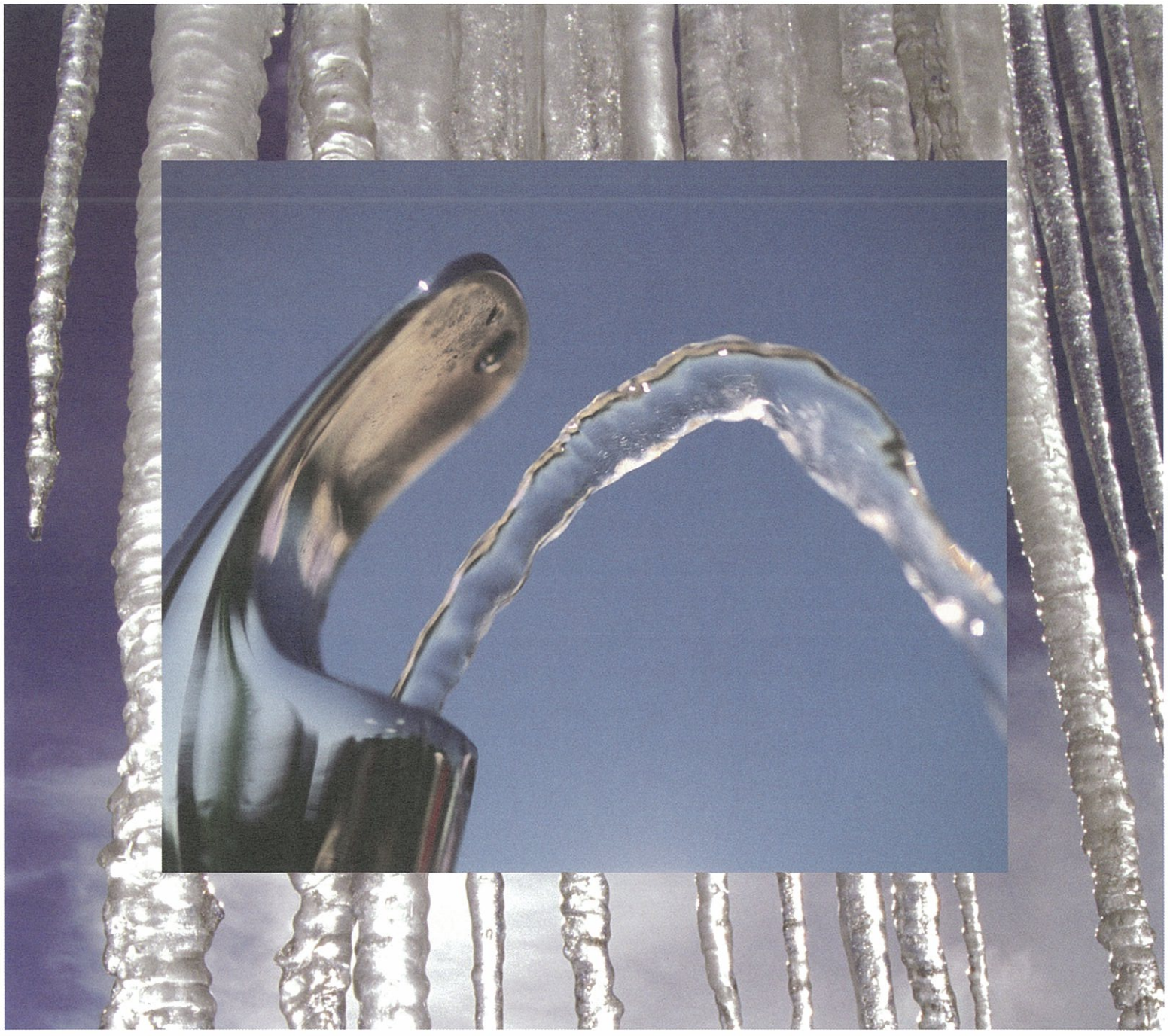
is intimate, complex, and primal. As we consider origin/destination, we also must consider cause/effect: Deplete aquifers/the land above subsides. Remove trees from the watershed/the river floods. Pollute or obstruct the river/the effects flow — and affect the journey of everything in the river's course — all the way to the sea. This book is about a journey. It is, indeed, our journey. Its origin lies in the mysteries of nature and creation. Its destination lies with us. If we are to have adequate water for our journey, that

water must be saved. If the water must be saved, we must save it. If we are to save our environment, we cannot afford to do nothing. When we drink the water, we must remember the spring. When we choose to care for our water, we must remember The New England Water Environment Association.

Photography: Sharon Shea

REFUSE/RECLAMATION

Filthy water cannot be washed. (West African Proverb) This proverb implies that some damage is irreparable – an implication negated every day by the work of NEWEA. Nevertheless, the Association has struggled for public acceptance because of the way its work was described – implying that it may be harder to wash perceptions of language than it is to wash water.



CITY	POPULATION	
New York	8,100,000	25%
Chicago	4,400,000	70%
Boston	2,000,000	0%
Philadelphia	2,000,000	15%
Detroit	1,600,000	0%
Los Angeles	1,300,000	5%
San Francisco	780,000	10%
Pittsburgh	750,000	0%
Cincinnati	500,000	0%
Kansas City	450,000	0%

PERCENTAGES OF SEWAGE TREATED IN A SAMPLING OF AMERICAN CITIES THROUGH THE END OF 1939

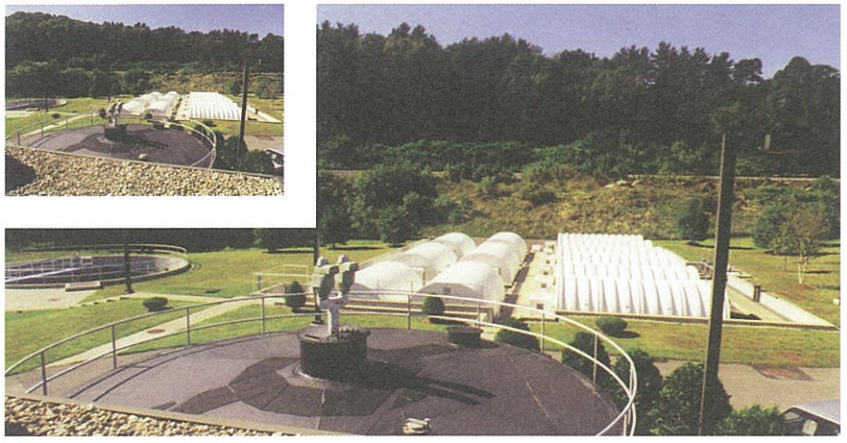
While this book is about a journey, it also is about sewage — raw sewage, treated sewage, people who work with sewage, who founded an organization with *Sewage* in its title, who agonized over the word, later got rid of it, but still worked with sewage.

The New England Water Environment Association (NEWEA) was founded in 1929 as the New England Sewage Works Association (NESWA), an affiliate of the Federation of Sewage Works Associations (FSWA), founded only months earlier. The establishment of these two pioneering organizations didn't come a moment too soon. Statistics from a 1940 issue of the Federation's *Journal of Sewage Works*, (Volume 12, No. 1) provide a startling glimpse of the status of sewage treatment in America through the end of 1939 (see chart above). For New Englanders, the Boston statistics tellingly indicate the regional challenges faced by the water sanitation profession – no sewage treatment facilities for a population of two million; although, the *Journal* includes the vague qualifier that "plans were in the works."

Ironically (and redeemingly) Boston also was the city in which the idea for NEWEA was introduced and acted on. Perhaps we shouldn't be too surprised. Boston had long been an incubator of daring ideas, beginning with its history as the nation's *Cradle of Liberty*. And along with Worcester, Boston was home to some of the country's innovators in water and sewage sanitation. One also might argue that in 1929 all of Massachusetts was fertile ground for this new organization, by virtue of the groundbreaking sewage purification work being conducted at the Lawrence Experiment Station, founded in 1886. What is indisputable is the far-ranging influence of this league of New England men and women throughout the sewage industry, nationally and globally. In 1979, on the 50th Anniversary of what was then called the New England Water and Pollution Control Association (NEWPCA), Federation President Martin Lang was lavish in his praise:

> The driving force that generated the basic concepts of water pollution control now universally accepted, that fleshed out these concepts with solid technology, that created leaders in our field and, by precept and example, set standards for prudent and reliable operation, originated in New England.

New England – two words that remained constant as the Association underwent several name changes to reflect the expanding concerns and responsibilities of the organization, as well as the more delicate matter



Windsor, Vermont:
A 1.5 mgd Secondary Treatment with Rotating Biological Reactors (RBC). In operation since 1988..

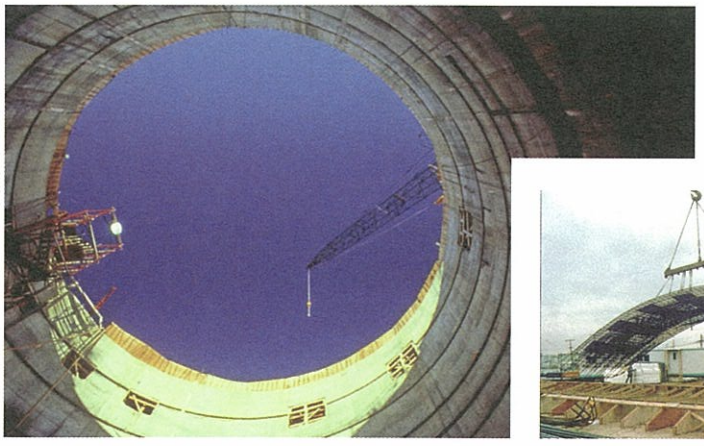
of the word *sewage*. Refreshingly, and to the Association's credit, the latter point always has been embraced with a healthy dose of humor. F. Wellington Gilcreas, the first Secretary and an officer for many years, recalled that accommodations for some of the early meetings were not always easy to obtain. For example, in 1942:

> Our name was the New England Sewage Works Association. Since I was living in Albany, New York, I was asked to make arrangements with the Hotel Wendell [in Pittsfield, MA] for the meeting. When I talked with the manager, he refused to open the hotel to such an organization. It required much sales ability to convince him that we were a respectable outfit. He demanded a bond of $100 to protect the hotel from damages. I gave him my own check and at the close of the meeting he returned it uncashed and was profuse in his commendations regarding the members. Any time I saw him later, he urged me to arrange another meeting of the Association at the Wendell.

In 1950, the Federation of Sewage Works Associations changed its name to the Federation of Sewage and Industrial Wastes Associations (FSIWA) as a sign of its growing involvement in industrial pollution issues. In 1951, following the Federation's lead, the New England Sewage Works Association (NESWA) became the New England Sewage and Industrial Waste Association (NESIWA). But the word *sewage* continued to be a source of debate, becoming a much-discussed subject of the Federation in 1958 and 1959:

> Despite the previous consideration that had been given to eliminating *sewage* from the title, many members of the board (of Control) still felt no need for a name change, and no change was taken on the question at the first Board meeting in Dallas in 1959. At the second meeting, there was still a similar feeling. But when President Mark Hollis related his experience at a Dallas television station, a change in feeling occurred. The word *sewage* had been banned on the television station interviewing President Hollis, and it was therefore impossible for him to tell the name of his organization.

In 1960, the Federation of Sewage and Industrial Wastes Associations became the Water Pollution Control Federation (WPCF). The new name signaled the Federation's focus on the pollution control field as it broadened from sewage and industrial wastes to include pollution from all sources.



East Boston Pump:
The Massachusetts Water Resources Authority's East Boston (Caruso) 125-mgd pump station, which provides the communities of Chelsea, East Boston, and Revere with transport of sewage to the Deer Island wastewater treatment plant. (1991)

The name also eliminated *sewage* once and for all. Predictably, in 1962, NESIWA changed its name to the New England Water Pollution Control Association (NEWPCA). In the NEWPCA Newsletter, the Membership Committee commented:

> The new name of the organization has removed one of the barriers which kept some prospects out of our ranks, and the committee is certain that no one can help but be proud to be associated with the New England Water Pollution Control Association.

Finally, in 1991, to reflect an expanded focus that included non-point as well as point sources of pollution, the Water Pollution Control Federation became the Water Environment Federation (WEF). And the following year, the New England Water Pollution Control Association became the New England Water Environment Association (NEWEA). Throughout this account, for the purposes of brevity and clarity, NESWA, NESIWA, NEWPCA, and NEWEA frequently are referred to as *the Association*, which, incidentally, began one December night in Boston, on a brief journey from Devonshire Street to Tremont Street ....

FOUNDING/FUTURE

By means of water, we give life to everything (Koran, 21:30) By means of water, NEWEA was given life. In the interest of water, two chemists, dinner at Boston's Warmuth Hotel and Restaurant, a stroll up Devonshire Street, and one suggestion made history. In service to water, NEWEA has given life to the vision of Messrs. Rudolfs and Coburn for seventy-five years.

This Association was the brain-child of two chemists, Dr. Willem Rudolfs and Stuart Coburn, conception taking place between Warmuth's Restaurant and Tremont Temple the evening of December 5, 1928 ....

NEWSWA 20th Anniversary Program
Northeastern University, Boston
October 18, 1949.

Mosquitoes were one of Dr. Rudolfs' areas of expertise. As a biochemist in entomology, he joined the Rutgers University Department of Zoology in 1921 and conducted research in the pioneering mosquito control studies at the school's New Jersey Agricultural Experimental Station (the nation's third-oldest experimental station, founded in 1880). He published an article in the Station's bulletin entitled "Chemotropism of Mosquitoes" in 1922 and produced significant data involving the effects of specific odors on repelling and attracting mosquitoes, and the relationship between mosquito behavior and atmospheric conditions, including temperature.

Rudolfs was later named Chief of the Experimental Station's Department of Sewage Disposal, from which he investigated the effects of temperature on bacteria and other micro-organisms. In October of 1928, he and a station colleague submitted an article to the *Journal of Bacteriology* entitled, "Effect of Temperature on Bacterial Numbers in Digesting Sewage Sludge," which was published the following April. In December, less than two months after submitting the article, Rudolfs was in Boston, dining at Warmuth's Hotel and Restaurant on Devonshire Street. Dinner was a prelude to a lecture he would deliver later that evening on *Sludge Digestion.*

Sitting at the table with him was Stuart E. Coburn, a bespectacled chemical engineer at the prestigious engineering firm of Metcalf & Eddy. Founded in 1907 by civil engineer Leonard Metcalf and Worcester Sewer Department Superintendent Harrison Eddy, the company was an innovator in water-sewage research and treatment plant design, including municipal facilities for Milwaukee, Chicago, Dayton, and Toronto. Stuart Coburn also was a member of the Boston Society of Civil Engineers (BSCE), the oldest engineering society in America, founded in 1848. And it was before the Sanitary Section of the BSCE that Rudolfs would be speaking that evening.

After dinner, Coburn and Rudolfs strolled from Devonshire Street a few blocks to Tremont Street, where the BSCE had its rooms in the handsome Tremont Temple, a historic landmark of Florentine architecture and the venue over the years for the oratory of such luminaries as Frederick Douglass, Abraham Lincoln, and Charles Dickens. According to Coburn, Rudolfs suggested during this walk "that I propose at this meeting that the Sanitary Section of the BSCE initiate the formation of a sewage operators section." This sewage operators section would be affiliated with the Federation of Sewage Works Associations, which

Burrillville, Rhode Island: This advanced wastewater treatment activated sludge plant, was part of a initiative that provided centralized sewage conveyance and treatment to an area previously served by septic tank operation. (1980)

had been founded two months earlier in Chicago through a grant from the Chemical Foundation, and had just published the first issue of the *Sewage Works Journal.*

At the meeting, Coburn introduced Rudolfs' suggestion. It was discussed and acted on immediately: the attendees voted that the Chairman, Ralph W. Horne of Boston, should appoint a committee to investigate and report at the next meeting. In a humorous recollection twenty years later, the Association said, "This committee comprised two chemists, Stuart Coburn and F. Wellington (or Butch) Gilcreas, spiked with engineering guidance from Edward Wright," Assistant Engineer at the Massachusetts State Department of Health. Six weeks later, on January 21, 1929, they issued the following report:

Your Committee has studied the question of the desirability of the Sanitary Section fostering the formation of a Sewage Works group to join or become affiliated with the National Federation of Sewage Works Associations, and wished to report that under the By-Laws of the Boston Society of Civil Engineers and of this Section, all of those eligible for membership in the National Federation are not necessarily eligible for membership in this Section. Therefore it does not seem practicable for this Section as such to form this Association. Your Committee, therefore, with the assistance of other interested parties, have constituted themselves an organizing committee to form a new organization to be known as the New England Sewage Works Association.

F. Wellington Gilcreas, in addition to having a deliciously colorful name, was a 1916 Harvard graduate who worked for Weston & Sampson, another leading innovator in the infant science of water treatment. Together he and Coburn "with stenographic assistance donated by, or wrenched from, the firms of Metcalf & Eddy and Weston & Sampson, sent letters to all persons in New England suspected of susceptibility to the proposed organization." These circular letters laid out a broad vision for the nature of this new professional association:

The general idea of such an association is to bring together once or twice a year state officials, superintendents, plant operators, foremen, engineers and others in New England that might be interested in the operation of sewage or industrial waste treatment plants. These meetings might be held in various New England cities from year to year, and would bring together the interested parties on a common

Hartford, Connecticut: The 60-mgd secondary wastewater treatment facilities in Hartford County are designed to handle an average flow of 60 mgd using the step-aeration activated sludge process. (1972)

ground in a manner that is not offered in any other organization in New England today. It is proposed to hold a meeting of this Committee in connection with the New England Health Institute in Hartford at the Hotel Bond on April 23, 1929, for the purpose of organizing such an association.

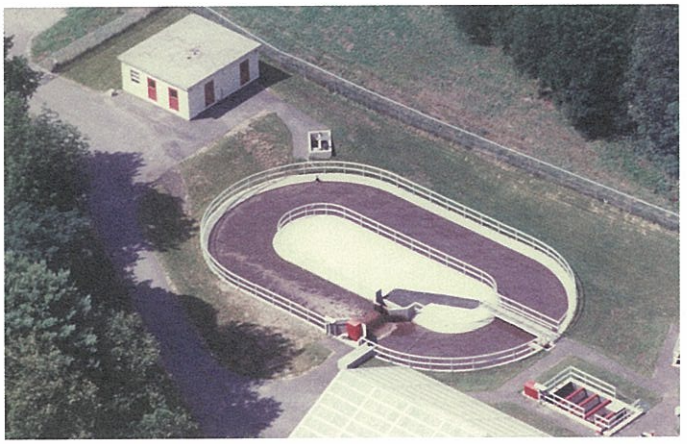
History is filled with examples of similar ideas being developed concurrently and independently, and this was no exception. Coburn and Gilcreas soon learned that Warren Scott, Chief Engineer of the Connecticut State Department of Health, and Stephen Gage, Chief Engineer of the Rhode Island Board of Health, were organizing their respective state sewage operators into local groups. But Scott and Gage quickly realized the wisdom of an organization covering all of New England, and subsequently put aside their local interests in support of the larger, regional association.

A program announcement about the joint meeting with the New England Health Institute was mailed out. On the bottom of this announcement, a note said of the new association, "It is hoped that it will be of valuable service to the sewage plant operator and the engineer. Try to help this new organization get away to a good start by being present at the meeting." Forty charter members committed to the New England Sewage Works Association by the time of the April 23rd meeting in Hartford. This joint meeting at the Hotel Bpnd comprised a who's-who of water sanitation professionals in New England, as well as participants from other states. Edward Wright of the Massachusetts State Department of Health chaired the morning session which featured three presentations:

- **Some Newer Aspects of Sludge Digestion Problems:**
  By Gordon M. Fair, Associate Professor of Sanitary Engineering at Harvard University.

- **Design and Operation of Sewer Tanks:**
  By Charles A. Emerson of Philadelphia, Chairman of the Federation of Sewage Works Associations.

- **Difficulties With Sewage Plant Operation:**
  By J.R. Downes, Plainfield Sewage Treatment Plant, New Jersey. [The Plainfield sewage treatment plant had supplied Dr. Rudolfs with the solid waste samples for his experiments on the effect of temperature on bacterial numbers in digesting sewage sludge.]



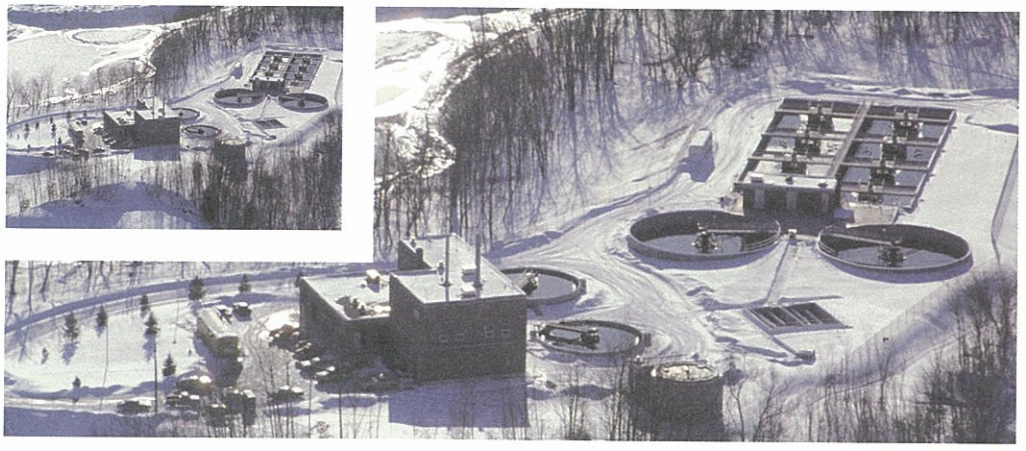
Putney, Vermont:
A 40,000 gpd Oxidation Ditch facility. In operation since 1976.

Stephen Gage of the Rhode Island State Board of Health was Chairman of the afternoon session, which was dedicated to the organization of the New England association. Stuart E. Coburn spoke to the assembly, outlining the purpose of the new association and the details of its affiliation with the Federation of Sewage Works Associations. Charles Emerson, Chairman of the Federation, discussed the goals and programs of the national organization and the value of their new publication, the *Sewage Works Journal.* He then distributed complimentary copies of Volume 1 – Number 1 of this journal.

After some discussion, "those present voted unanimously that the New England Sewage Works Association should be organized as of that date. The proposed constitution was read clause by clause and unanimously adopted, and thus the New England Sewage Works Association was officially formed." And then, according to the Association's witty 1949 reminiscence of that meeting, "Having wished it upon themselves, Messrs. Coburn and Gilcreas were elected first President and Secretary respectively." The entire slate of original officers represented significant credentials in the profession:

- President: Stuart E. Coburn, Metcalf & Eddy, Boston
- Vice President: Julius W. Bugbee, City Engineer, Providence
- Vice President: Warren Scott, Chief Engineer, Connecticut State Department of Health, Hartford
- Treasurer: Roscoe H. Suttie, Professor of Sanitary Engineering, Yale University, New Haven
- Secretary: F. Wellington Gilcreas, Weston & Sampson, Boston.

Following the election of officers, the session adjourned briefly so the forty men who had committed to becoming charter members could officially sign up and pay their annual dues: $2 per person, with $1 of this sum being remitted to the Federation as a subscription to the *Sewage Works Journal.* The remaining $1 from each member would provide the initial financial support for the nascent association. The first act of the New England Sewage Works Association was a unanimous motion by the membership to request the officers to apply for admission as members of the Federation. And from this modest beginning, the New England association would gradually flourish in membership, influence, and achievement. Later that afternoon, additional presentations resumed that exemplified the fledgling Association's emphasis on practical day-to-day issues, realistic solutions, and the importance of literally sitting around a table discussing and sharing ideas:



Lebanon, New Hampshire:
An extended aeration-activated sludge plant, designed to treat domestic sewage and tannery wastes. (1981)

- **The Activated Sludge Method of Sewage Disposal:**
  By William R. Copeland of Hartford, CT.

- **The Value of Keeping Sewage Plant Records:**
  A discussion opened by J. Frederick Jackson of New Haven, CT.

- **A Round Table Discussion on Filter Plant Operation:**
  A discussion opened by Roy S. Lanphear, Supervising Chemist at the Worcester Sewer Department.

And what of Dr. Willem Rudolfs of New Jersey, whose suggestion provided the impetus for all of this activity? He would re-appear in New England in April, 1934, at an Association meeting in Greenwich, Connecticut. Still, with the Agricultural Experiment Station, he delivered a lecture on *Recent Developments in Sewage Treatment in Some Countries Abroad.* And in 1950, his book, *Principles of Sewage Treatment*, was published by the National Lime Association and became a milestone text in the industry.

PRELUDES/PRESCIENCE

Water its living strength first shows, when obstacles its course oppose.(Goethe)
Like water, the living strength of NEWEA was demonstrated from its first opposition. Growing through the 1930s and early 1940s, membership and meeting attendance declined through WWII. At the end of the war, membership jumped to 200. By 1949, membership exceeded 300. NEWEA was poised to exert national influence.

The objective of this Association shall be the advancement of the design, construction, operation, and management of sewage works, and the encouragement of a friendly exchange of information and experience.

Article II of the Constitution of the New England Sewage Works Association, formalized on April 23, 1929.

Six months later, on October 21, 1929, the Association's first independent meeting was held at the Hotel Bancroft in Worcester, with 69 attendees. The program consisted of prepared papers in the morning, luncheon, and roundtable discussions in the afternoon, and featured an eclectic group of participants:

- **Powers and Duties of State Authorities in Relation to the Establishment & Operation of Sewage Treatment Plants:** X.H. Goodnough, Chief Engineer, Massachusetts Department of Health; Warren Scott, Chief Engineer, Connecticut Department of Health; Eskil Johnson, Chemical Engineer, Rhode Island Board of Purification of Waters.

- **The Why and How of Sewage Treatment Plants:**
  By E. Sherman Chase of Metcalf & Eddy in Boston.

- **The Value of Plant Records and Simple Chemical and Biological Tests:**
  Led by J.W. Bugbee, City Chemist for Providence, Rhode Island.

- **A Description of the Worcester Sewage Treatment Plant:**
  By J.C. Brooks, Superintendent of the Worcester Sewer Department, illustrated with lantern slides.

- **Summary of 1929 Operation Results of the Worcester Plant:**
  By R.S. Lanphear, Supervising Chemist at the Worcester Sewer Department.

- **Inspection of the Worcester Sewage Treatment Plant**:
  With J.C. Brooks and R.S. Lanphear.

Visits to local sewage treatment plants became a hallmark of Association meetings, heightening the learning curve of all participants with first-hand observations of equipment and daily operations in various New England communities. It also was common for the mayors or other officials of the host cities and towns to deliver welcoming remarks during these meetings. The following April, the Association held another joint meeting with the New England Health Institute in Boston. This two-day event featured almost a dozen presentations, among them:

Brighton, Vermont: Aerated Lagoon Facility. In operation since 1976.

- **The Future Task of the Engineer in Public Health:** By Abel Wolman of the Maryland State Department of Health
- **Massachusetts – The Cradle of Public Health Engineering:** By Harrison Eddy, co-founder of Metcalf & Eddy
- **Screening of a motion picture entitled Sewage Disposal.**
- **A Roundtable Discussion on:** Maintenance Tools and How to Use Them; Troubles with Oil and Grease; Screenings and What to Do with Them; Sand Filters and Their Operation; How to Add Lime to Sludge-Digestion Tanks; and Sewer Maintenance.

Two Association meetings a year quickly became the standard: the Annual Meeting in the Spring, and a Fall meeting in September or October. (Later, Fall would be designated as the season for the Annual Meeting.) In 1931, 99 members turned out for the 3rd Annual Meeting in Hartford at which, for the first time, manufacturers of sewage-works equipment were invited to participate and furnish exhibits of their products. These exhibits were held in a room adjoining the meeting hall and were open throughout the day and evening, permitting ample opportunity for attendees to inspect the exhibits and talk with those who were showcasing their products and services. Among the manufacturers – each of which paid a $10 exhibitor fee – were Eimer & Amend, Hume Pipe, Inertol, Link Belt, Pacific Flush-Tank, and Wallace & Tiernan. Looking back years later, the Association observed that:

These exhibits served a most useful purpose not only to the manufacturers, but more particularly to members of the association and the operators of small sewage treatment plants, giving them an opportunity to learn at first hand of the new equipment and developments available for improvements in methods of sewage treatment.

From its earliest days, the Association appointed committees to undertake studies and investigations which would be of value to the profession, particularly to the operators. The first committee of this nature was charged with studying record-keeping practices in sewage treatment plants. The result was an inclusive report that suggested, among other things, an effective standardized record-keeping form.

The committee's report subsequently was printed in the *Sewage Works Journal.* Other committees were appointed to study *Sewage Sampling*, *Safety*, and other issues.

The Association's early interest in problems of industrial waste treatment was demonstrated at the April 1932 meeting at which, for the first time, a paper on this subject was presented by Stuart Coburn, entitled *Industrial Waste In Relation to Sewage Treatment.* Concerns about this important phase of water disposal continued, as evidenced by the increasing number of papers and presentations on the subject. Similarly, the problem of stream sanitation was addressed early on and formed the basis of numerous papers, such as *Pollution and Self Purification of Streams* (1930), *Effect of Sewage and Effluents on Streams* (1933), and many others.

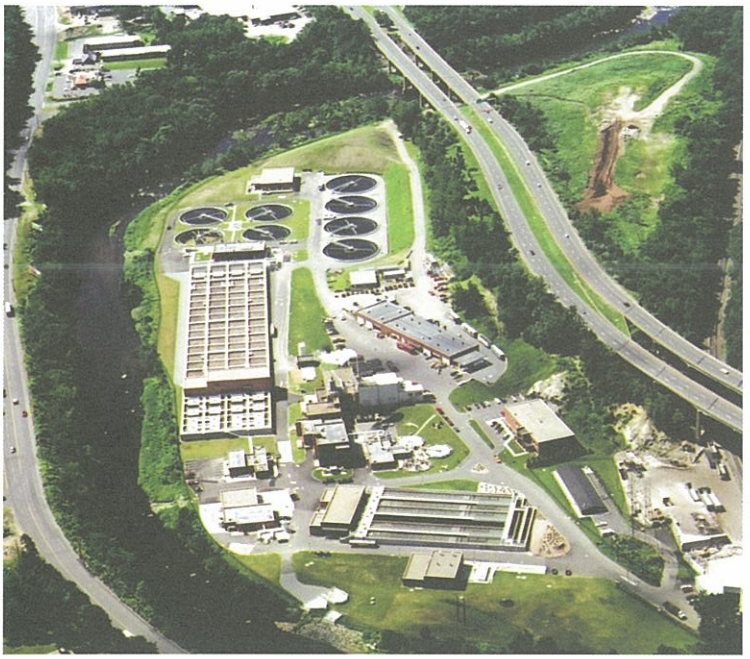
In October 1935, a joint meeting was held with the New York State Sewage Works Association in Schenectady, an elaborate two-day affair with events and exhibits spread across several hotels, General Electric facilities, and local sewage treatment plants. Later, the New England officials proudly noted that "this proved to be one of the outstanding developments in Sewage Works Association meetings throughout the country and established an extremely high mark of program excellence as well as attendance. Three-hundred-twelve members representing both associations were present." The success in Schenectady prompted a second joint meeting three years later in Hartford, at which time the New England Sewage Works Association played host to their colleagues from New York. This 1938 meeting included 37 exhibiting manufacturers, from as far away as Chicago.

The first decade of the Association was one of organization and development, with members contributing to the progress of the New England organization as well as to the broader affairs of the Federation. While early growth was slow and membership didn't always increase as rapidly as the officers would have liked, development was strong and sound and provided a firm foundation for future challenges and accomplishments. LeRoy VanKleeck, who served as Association Secretary from 1939 to 1945 recalled that:

As a result of the sound guidance given us under Mr. Gilcreas' secretaryship, our Association had discarded its short pants and was fast assuming the role of a mature man when I had the pleasure of serving as your secretary. These were difficult years, however, because of the Second World War.

East End Waste Water Treatment Facility, Portland, Maine:
Portland, Maine's largest wastewater treatment facility, treats an average daily flow of 19.8 mgd and peak flow of 80 mgd. Since first opening in 1979, the facility has been expanded and modified in order to increase capacity and provide additional protection to Casco Bay.

Waterbury Water Pollution Control Facility, Connecticut:
A 27.5 mgd advanced wastewater treatment facility for nitrogen removal incorporating the MLE process. The facility handles CSO flows of up to 80 mgd with 50 mgd receiving advanced treatment and 30 mgd receiving primary treatment. Final effluent receives ultraviolet light disinfection, thus eliminating toxicity concerns from chemical disinfection. The facility went online in 2000.



Photography: Robert Randazzo

The effect of the war was evident at the October 1940 meeting at the Hotel Kimball in Springfield, Massachusetts, which coincided with the date established by the United States for draft registration. Consequently, the program announcement informed prospective attendees that:

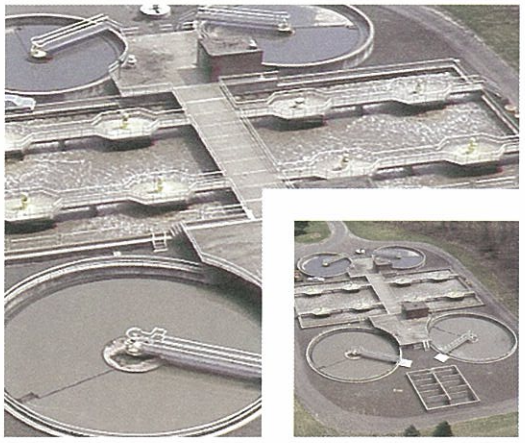
> Members who must register for the draft on October 16 may do so in Springfield. Your registration card will be forwarded to your local district. An announcement concerning registration locations will be made by the president at the meeting.

That meeting provided the earliest memory of the Association for Charles Knapp, who served as President in 1974:

> It was decided that all the eligible men attending the meeting would meet in the hotel lobby and then walk enmasse to the place for registration. It was quite a contingent that walked through the streets of Springfield. The clerks handled us quickly and we soon were able to rush back to the meeting.

Due to travel restrictions during the war, meetings were held in cities in which good rail transportation was available. But the war took its inevitable toll: Membership fell off and attendance decreased. In 1942, the Spring meeting in Boston had only 78 attendees, while only 49 people showed up for the Fall Meeting in Springfield.

With the end of the war in 1945, membership recovered to nearly 200. Two years later, a third joint meeting was held with the New York Sewage Works Association in Albany, a well-attended event with participants from top engineering firms, treatment facilities, and municipalities in New York and New England. In October, 1949, with its membership numbering over 300, the Association celebrated its 20th Anniversary by hosting the 22nd Annual Meeting of the Federation of Sewage Works Associations. "We expect the total registration for this meeting to be close to 1,000," said the announcement. "It unquestionably will be the biggest affair that the NESWA has ever sponsored. You owe it to yourself and to your Association to participate in this meeting."



Westfield, Massachusetts: Wastewater treatment plant originally designed in the early 1970s with a capacity of 4 mgd, but has been upgraded several times since then and recently expanded to handle 6 mgd and provide nitrification and phosphorous removal during the warmer months. (1972)

Among the highlights of this four-day event (October 17-20) was an after-dinner lecture entitled, *Recent Rambles in Europe,* by E. Sherman Chase, a consulting engineer with Metcalf & Eddy in Boston. Chase was one of the 40 original charter members of the Association. At its first independent meeting in Worcester in October, 1929, he had spoken on *The Why and How of Sewage Treatment Plants*. And in April, 1936, he reported on *Safety Methods in Sewage Treatment Plants*. During the war, he had become involved in planning for post-war sewerage construction projects and traveled through Europe to view first-hand the progress of the Marshall Plan. In 1952, Chase was elected Association President.

In a sense, Chase's 1949 lecture and wide-ranging interests would be a precursor of things to come: as the Association entered its third decade, it would undertake a broader role as an influential voice of awareness and involvement in national water-pollution legislation.

EFFLUENT/EDUCATION

We have never really learned how important water is to us. (William Ashworth) NEWEA had to learn many things. The importance of water was not one of them. Given the academic prominence of Dr. Rudolfs – and the scientific accomplishment of Mr. Coburn – NEWEA was firm in its conviction that knowledge, education, and training were the keys to its credibility and its success.

Serendipity, or Adventures of the Princes of Serendip, Who Were Always Making Discoveries, by Accident and Sagacity, of Things of Which They Were Not in Quest.

Keynote Address, NESWA Spring Meeting 1935 by Milton Rosenau, M.D., of the Harvard School of Public Health.

Unfortunately, there is no surviving record of Dr. Rosenau's presentation, nor any eyewitness recounting of what he had in mind seven decades ago. However, his keynote address at the 1935 Spring Meeting is significant for two reasons. First, its whimsical title belies what was undoubtedly a valuable and practical presentation delivered by a man who was a pioneer in food safety and public health, co-founder of the Harvard and Massachusetts Institute of Technology School for Health Officers, and author of *Preventive Medicine and Hygiene* (1913), which quickly became the most influential textbook on the subject. Second, and more significantly, Dr. Rosenau's prominence at the 1935 Spring Meeting illustrates the Association's early and life-long commitment to establishing relationships with scientific and academic experts from America's finest colleges and universities. Consider: Roscoe H. Suttie, Professor of Sanitary Engineering at Yale University, was among the Association's forty original charter members and its first Treasurer. He served as Treasurer for two years, after which, "he decided the Yale job was more remunerative and turned the financial functions over to Secretary [F. Wellington] Gilcreas, who, being a Harvard man, figured it a moral victory and fell for it."

One of the most noteworthy academics in those early years was Gordon Maskew Fair, Associate Professor of Sanitary Engineering at Harvard. At the Association's first meeting in April, 1929, a joint affair with the New England Health Institute, Fair was the opening speaker, with a presentation on *Some Newer Aspects of Sludge Digestion Problems*. He returned a year later for the second Annual Meeting to deliver a talk on *New Developments in Sewage Treatment in Germany*. By 1935, Gordon Fair had been elected President of the Association. At the April meeting that year, he spoke on *The Measurement of Intensity and Concentration of Odors Associated with Sewage Treatment*. Additional presentations by two notable Harvard colleagues can likely be attributed to Fair's influence, interests, and scientific acumen: Professor Philip Drinker – researcher of the hazards of exposure to lead and dust, and developer of the Drinker Respirator, better known as the "Iron Lung" – spoke on *The Occurrence and Prevention of Accidents from Sewage Gases*, while Dr. Rosenau's fancifully titled keynote address has already been mentioned.

Fair was not above occasional touches of whimsy. He occasionally referred to the Association as "The Effluent Society." But his involvement with the Association, his contributions to sanitary engineering, and his influence on his college students were significant and far-reaching. In 1954, he co-authored a book entitled *Water and Wastewater Engineering,* which became a definitive text for the industry. And in 1965,

LIST OF LEADING ACADEMIC PRESENTERS AT THE ASSOCIATION MEETINGS: 1930/1954

1930 • Melville C. Whipple, Assistant Professor of Sanitary Chemistry, Harvard University: Stream Pollution.
1930 • Earle B. Phelps, Professor of Sanitary Science, Columbia University: Pollution and Self Purification of Streams.
1932 • Professor John W.M. Bunker, Department of Biology and Public Health, MIT: Stream Pollution and Self Purification.
1933 • Professor Wilson G. Smillie, Harvard School of Public Health: Field Work in Public Health from the Tropics to the Arctic Circle.
1933 • Professor Charles M. Allen, Worcester Polytechnic Institute: Gasoline and Kerosene: Their Use and Abuse.
1934 • Professor Phelps, Columbia University: Lemuel Shattuck: A New England Pioneer in Sanitation.
1935 • Professor Phelps, Columbia University: Fundamentals of Biochemical Oxygen Demand in Sewage Treatment and Stream Purification.
1939 • Professor Charles R. Hoover, Wesleyan University: Textile Waste Treatment.
1940 • Professor Hoover, Hall Laboratory of Chemistry, Wesleyan University: Sewage and Industrial Waste Research.
1940 • Professor Edward C. Schneider, Wesleyan: Problems of Sewage Disposal.
1949 • Professor Rolf Eliassen, Department of Sanitary Engineering, NYU: Digestion Characteristics of Industrial Wastes Containing Starches.
1954 • Professor William O. Lynch, MIT: Synthetic Detergents: Their Frothing Tendency and Influence on Oxygen Transfer During Aeration.
1954 • Professor Richard Bogan, MIT: Synthetic Detergents: Influence of Chemical Structure Upon Biological Degradation Under Aerobic Conditions.
1954 • Joseph Masselli, Connecticut Water Commission Research Lab, Wesleyan University: Process Chemical B.O.D.

on the occasion of his retirement from Harvard, he made a memorable final appearance before the Association at its Spring Meeting, in which:

He admonished the plant operators to acquire greater knowledge of the streams into which their plants discharged and to keep records which would provide more information valuable for pollution control. He stressed the need for two sets of standards, one for streams which normally purge themselves at least annually; and one for lakes and ponds in which displacement of a very small portion might occur each year.

After Fair died in 1977, the National Academy of Engineering included a moving remembrance of him in their memorial volume. Praising Fair as no "ivory tower" academic, the 1979 tribute declared that "the parading environmental activists of the coming decade will sorely miss the sense of equilibrium that Gordon Fair brought to the discussions of our ever-pressing ills. Although he recognized the ills, he also emphasized repeatedly the possibilities of solutions." Quoting Dr. Fair, the tribute said he did not feel these solutions would come from "the ravings of scaremongers or even by the practice of confrontation, as favored by the young, but through the careful scientific study that needs to precede action."

The Association's early, consistent emphasis on the "careful scientific study" of key water sanitation issues by leading academics is apparent by the impressive list of presentations, discussions, and keynote addresses at their meetings throughout the 1930s, '40s, and '50s (see list above). As membership grew, the Association attracted increasing numbers of university professors, instructors, research assistants, and graduate students. Dr. Clair N. Sawyer, Professor of Sanitary Chemistry at MIT, became Association President in 1957. One of Sawyer's key initiatives was appointing a committee to implement a Voluntary Operator Certification Program for treatment plant operators. Recognizing the significance of this unprecedented program, Sawyer's committee appointments wisely represented a cross-section of Association members: sewage plant operators, state health department officials, consulting engineers, and university faculty represented by Sawyer and Edward Brown, Professor of Engineering at Dartmouth, who sat on various local and state water control and health boards.

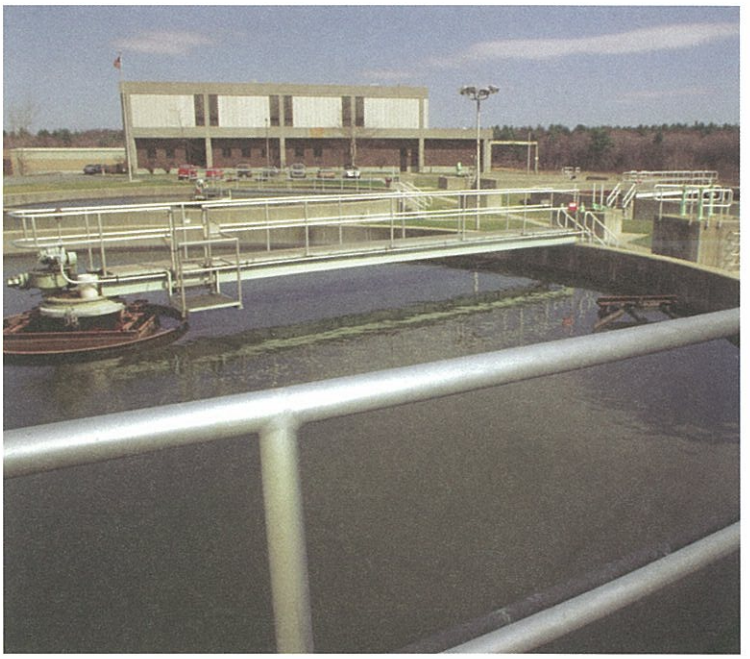
Three years later, Dr. Sawyer authored the book *Chemistry for Sanitary Engineers,* which became essential reading for professionals and students, and remains so today. (Updated and retitled *Chemistry for Environmental Engineering and Science*, it is currently in its fifth printing.) In his President's Message in the January 1963 NEWPCA Newsletter, Earl R. Howard announced that Dr. Sawyer had agreed to head the Association's newly created Research Committee. The Federation's Research Committee had asked each local Association "to establish a parallel committee to work with the Federation toward stimulating research activities at our local Water Pollution Control Plants." By June of 1964, Sawyer and the committee members had drawn up a proposal to "encourage research of a fundamental nature by the larger cities, districts and authorities, and problems of a practical nature at the grass roots level."

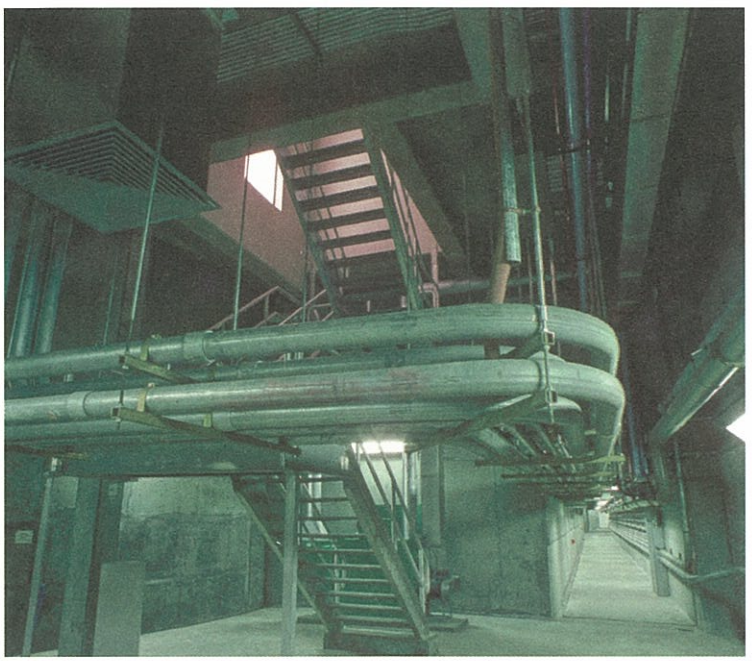
In response to the industry's desire to attract younger, formally educated professionals, the Federation established a Student Membership classification in 1966, with a fee of $5 per year. NEWPCA quickly followed its lead. In its April Newsletter of that year, the New Members list included a separate "Student" category with eight names, six of them from Cornell University. Within a year, 31 additional students had joined the Association.

By this time, the Association's numerous activities were delegated to over a dozen individual committees, including Program, Membership, Public Relations, Certification, Research-in-Plant Operator, Legislative, Journal, and Human Resource committees. As student membership increased, and the Association realized the necessity of addressing the needs of this growing segment, discussions began about establishing a new committee specifically for this purpose. This effort was spearheaded by two college professors: Dr. M. Hamdy Bechir of the University of New Haven's Department of Civil and Environmental Engineering, and Dr. James O'Shaughnessy of Northeastern University's Department of Civil Engineering.

In October, 1976, on the second day of the Association's Annual Meeting, Dr. Bechir moderated a two-hour afternoon session entitled *Student Activities Committee Meeting*, for all student and faculty members. This essentially was an ad-hoc forum to discuss how the Association might best serve the interests of its student membership and promote awareness of the Association to New England colleges and universities. Shortly afterwards, the Association established the Student Activities Committee with Dr. Bechir as its first chairman.

Marlborough, Easterly Waste Water Treatment Facility, Massachusetts:
The 5.5-mgd wastewater treatment plant was originally built in the early 70s and retrofitted in the 1990s to reduce nutrient levels in the effluent. (1974)





At the Annual Meeting in October, 1977, Bechir moderated a second Student Activities Session featuring a panel discussion that presented the water sanitation profession from the viewpoints of Federal, state, and municipal officials; the consulting engineer; the manufacturer; and academia. The panelists representing these viewpoints were Lester A. Sutton, Merwin E. Hupfer, Earl Howard, Robert M. Pope, Frank Mahony, and Robert C. Niles.

At the 1979 Annual Meeting, Dr. O'Shaughnessy moderated the Student Activities Session with a panel discussion on *An Overview of Research Activities at New England Universities*. The academic panelists who participated were Dr. Paul Bishop, Dr. Francis DiGiano, Dr. Bruce Hanes, Dr. Gerald Lowry, Dr. Alician Quinn, and Theodore Rider. That same year the Association established the Kowcsz Memorial Scholarship, in honor of the late Edward S. Kowcsz, a leader in the wastewater treatment profession and the Association's President in 1977. Scholarship funds were to be administered by the Association's Personnel Advancement Committee for members wishing to further their studies at colleges, universities, specialty schools, or at home through correspondence courses. Meanwhile, under the guidance of Bechir and O'Shaughnessy, the Student Activities Committee prepared for the first student presentations at an Association meeting. In October, 1980, O'Shaughnessy moderated a session entitled *Student Research Activities at New England Universities* that featured four lectures:

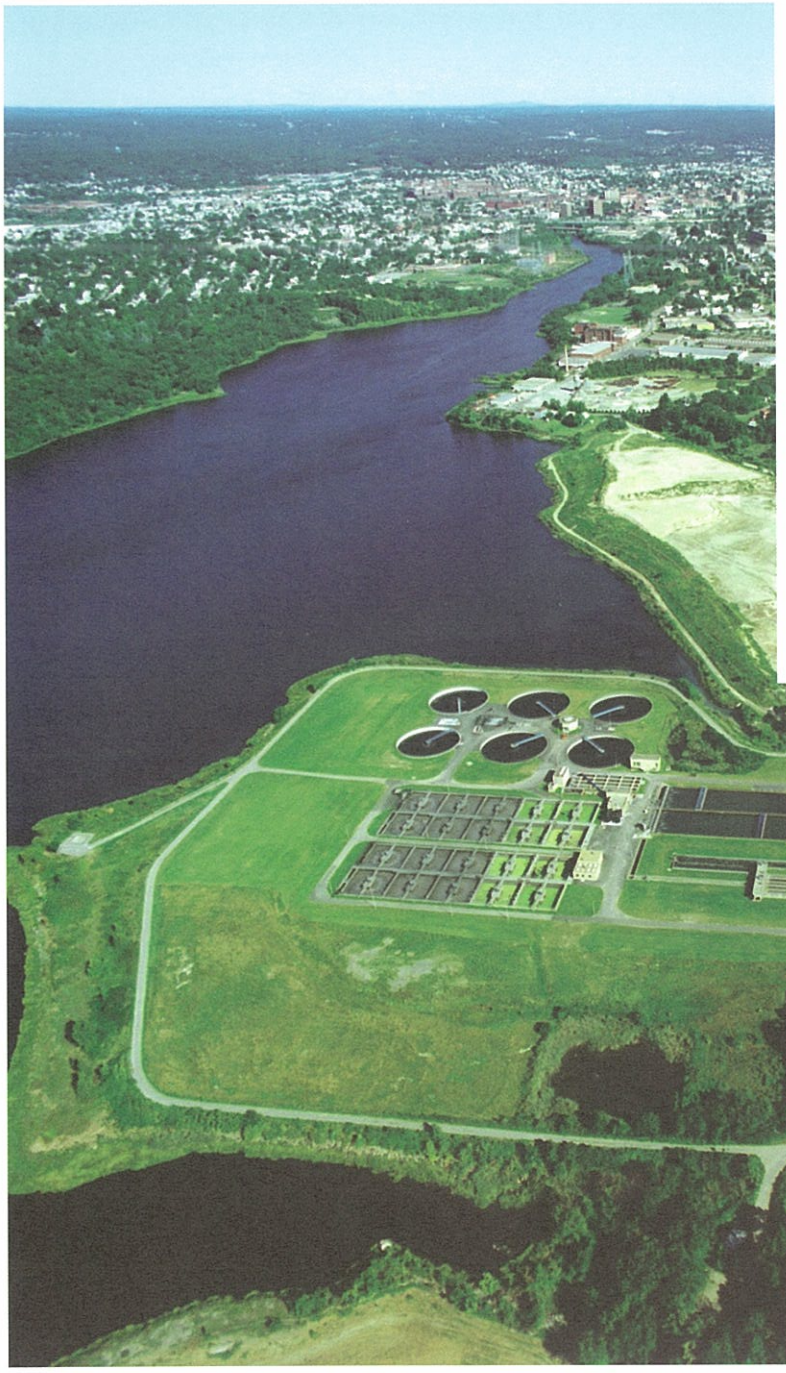
- **Evaluations of a Full Scale Modified Chlorine Contact Chamber:**
  By Gregory Heath and Frederick Hart.

- **Mathematical Modeling of the Recovery of a Eutrophic Lake:**
  By David Bingham.

- **Analysis of the Algal Bloom Problem in Nahant Bay:**
  By Timothy Lewis and Francesca Brown.

- **Effects of Chromium, Copper and Nickel on Activated Sludge and Rotating Biological Contactor Systems:**
  By F.C. Blanc, J.C. O'Shaughnessy, D.K. O'Brien, J.F. Hackler, and E.P. Hall.

Bucklin Point, East Providence, Rhode Island:
Originally known as the Blackstone Valley District Commission Treatment Facility, the Bucklin Point treatment plant, now run by the Narragansett Bay Commission, began operation as a primary treatment facility in 1954. 1972 saw an upgrade to secondary treatment, with subsequent upgrades in 1985, 1989 and 1993. Run by 65 operators and mechanics, Bucklin Point is the second largest in the state. The facility, located in East Providence, serves much of Rhode Island's northeastern metropolitan area. A comprehensive upgrade that will include a new wet-weather treatment facility, ultraviolet disinfection and reduction of total nitrogen is currently underway. The first phase of the upgrade went on-line in September 2004, under budget and approximately six months ahead of schedule.



Construction Photo: Troutrun, Inc

THE WINNING ENTRIES OF THE FIRST STUDENT PAPER COMPETITION: 1981

- Microbiological Control – An Evaluation of Biocides for Toxicity and Mutagenicity:
  By Heather Baird-Barney, Tufts University.
- Comparison of Proposed Fine Bubble Aeration System with
  the Existing Mechanical Aerators at the Upper Blackstone Water Pollution Abatement Facility:
  By David Leidel, Worcester Polytechnic Institute.
- Microbial Degradation of Organics Absorbed on Granular Activated Carbon:
  By P.B. Rao and Sheila McShane, UMass.
- Synthetic Fuels – The Manufacturing Processes and Waste Treatment:
  By Ricky Wade, Northeastern University.

As a follow-up, the Student Activities Committee solicited entries for the Association's first Student Paper Competition. The four winning entries were presented at the Spring Meeting in June, 1981 (see list above). O'Shaughnessy succeeded Dr. Bechir as Chairman of the Student Activities Committee and continued to incorporate student presentations into the Association's meetings. In October, 1981, he moderated a second technical session devoted to *Research Activities at New England Universities*:

- **Applicability of U.V. Disinfection for Sand Filter Effluents:**
  By Jerry Lowry and Susan Romatzich.

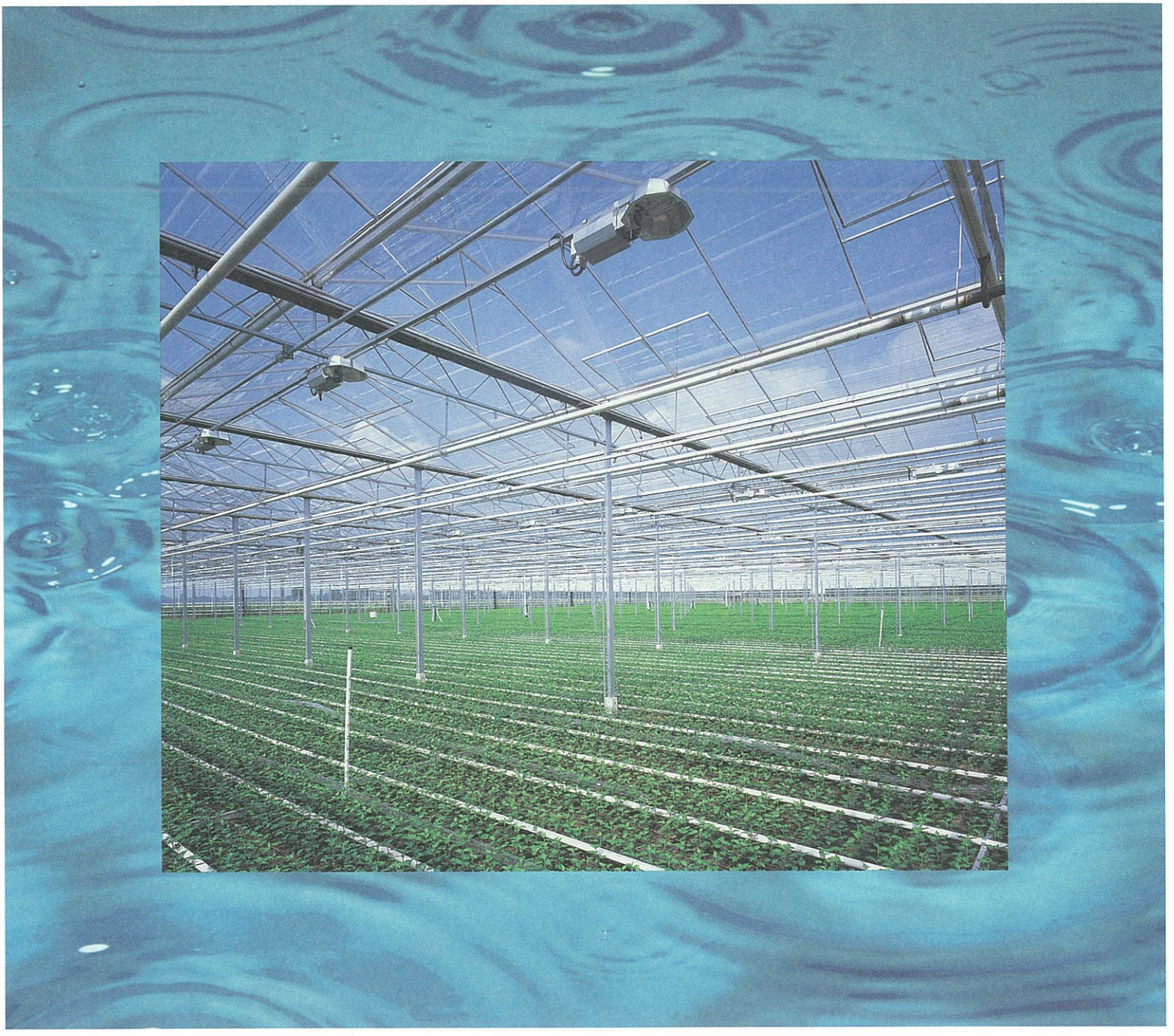
- **The Use of Hydrogen Peroxide for Soiled Soil-Absorption System Rehabilitation:**
  By Thomas Andrews and Paul Bishop.

- **Mathematical Model of Leachate from Sanitary Landfills:**
  By David R. Lynch.

At the January 1984 meeting, O'Shaughnessy fine-tuned what he and Dr. Bechir had begun in 1977, with a session entitled *Career and Education Planning in Environmental Engineering and Sciences*. Panelists included James Leu of Camp Dresser & McKee, Gerald Potamis of the Environmental Protection Agency, George Hoag of University of Connecticut, Nancy Kinner of University of New Hampshire, and Jerry Lowry of University of Maine. O'Shaughnessy relinquished the Chairmanship of the Student Affairs Committee later that year but still remained involved in its activities and programs. In just eight short years, he and Dr. Bechir had proved instrumental in defining and expanding the Association's agenda with respect to its student membership. It was an agenda that would continue to flourish over the next few decades.

DIGGING/DIGNITY

Whiskey is for drinking. Water is for fighting over. (Mark Twain) With mounting friction between engineers and sewage-treatment plant operators, and little cooperation from state and municipal authorities, NEWEA recognized the need to certify operators as professionals. It was prepared to fight for discipline, the establishment of standards, and the adoption of those standards.



A certification program of this type is one of the few ways by which this profession, or art, as you will, can attain proper stature in the community, with the ensuing dignity and compensation it deserves.

John D. McDonald, NESIWA President
NESIWA Newsletter, January 1958.

Talk to some of the "emeritus" Association members and you're bound to hear more than a few colorful stories about the woeful status of some of yesteryear's sewage treatment plant operators – underpaid, under appreciated, insufficiently trained, and in some cases, completely unqualified. Like many civil service jobs of an earlier era, the position of plant operator was often subject to local political patronage and favoritism at the expense of public health and safety. Consequently, the skill set of operators varied considerably from plant to plant, ranging from the highly professional to the utterly incompetent and everything in between. In that respect, the day-to-day operation of sewage treatment plants was not unlike other emerging professions in its lack of industry-wide standards.

From its inception, two of the Association's primary concerns were improving the job performance of plant operators and enhancing the status of their profession. The Association repeatedly addressed these concerns with a practical, educational approach. As we've seen, starting with the first meeting in 1929, presentations were made that focused on specific plant operator issues. Four years later, in May, 1933, a suggestion was made for the Association to conduct a school for operators. This suggestion, no doubt, reflected the fledgling Association's desire to establish uniform procedures and benchmarks in an industry essential to public health. While Connecticut had a state law requiring sewage treatment plant operators to be approved by the State Department of Health, there was no existing legislation in New England defining and enforcing specific operator requirements. It's curious, then, as to why after forming a committee to study the concept of an operators school, the Association tabled the idea in December, 1933, a mere seven months later.

The Association would not revisit this idea until the 1950s, and in doing so would still be far ahead of the states in identifying operator qualifications and providing the necessary training and certification to ensure the eventual standardization of those qualifications. The first formal training for plant operators was a short course given at the University of Massachusetts at Amherst in the Spring of 1951, repeated in April, 1952, at the same location, and continuing intermittently over the next few years. This pragmatic focus on improving the skills of plant operators was reflected in the Association's meetings of the same period: the Fall 1951 meeting, for example, included a roundtable discussion for operators, addressing the topic, *What's Wrong With My Plant?* while the Spring meeting the following year featured a similar format on

Rockland, Massachusetts:
A 2.5-mgd advanced treatment facility, expanded from a 1-mgd conventional activated sludge plant in the early 1980s.

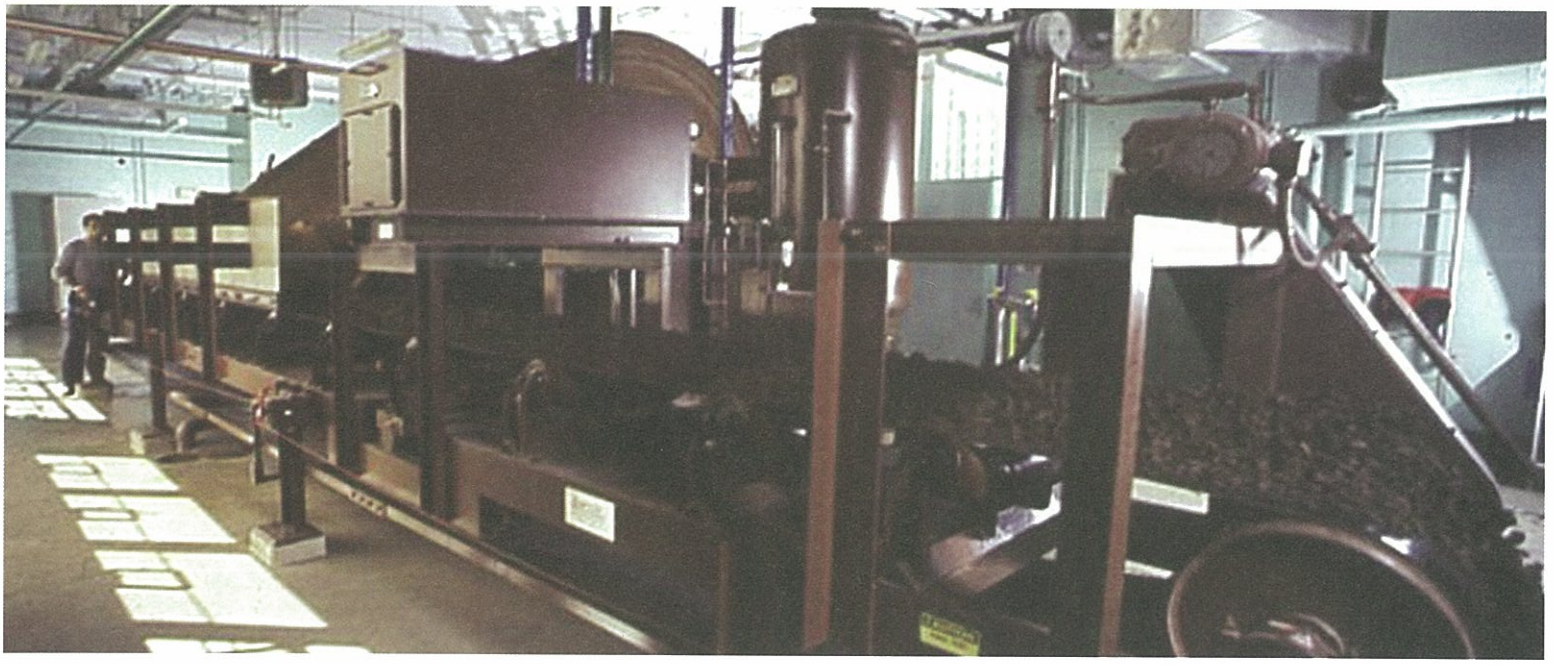
the topic, *What's Right With My Plant?* This was the beginning of the Operator Forums that have become a hallmark of the Association's twice-yearly meetings. In April, 1953, UMass was the setting for the Association's first "advanced course" for plant operators. In the first issue of the Association's Newsletter, which appeared a month later, a front page item reported that the advanced course had been "an outstanding one. Those who attended said it was well worth their time."

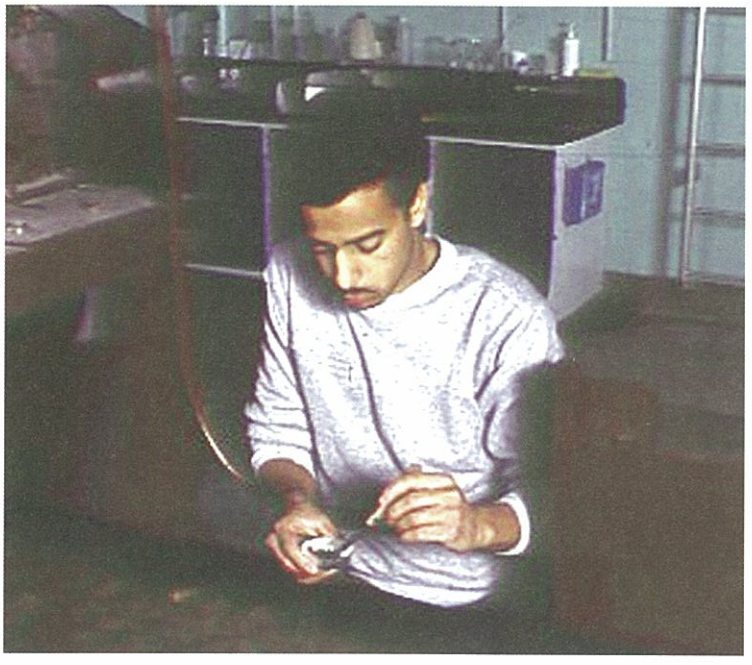
The Association's short course was given again in March,1954, by what was described as "a cooperative enterprise between the University of Massachusetts, the Massachusetts Department of Public Health, and the U.S. Public Health Service." The April Newsletter explained to its membership that "this course has offered an opportunity for men to review fundamental material essential for good sewage plant operations," and that this would be a pre-requisite for another advanced course planned for 1955. But the Association now realized that training was just one of myriad operator issues that needed to be aggressively resolved. By the mid 1950s, "it had become fully evident that to maintain a high degree of ability, impart to the profession the dignity and respect due it, help develop salaries commensurate with the job skills and responsibilities, and protect the safety and welfare of operators and the general public, some means of rating plant operators was needed." Consequently, a committee was established in 1955 to develop a voluntary certification program. (Another committee was created to explore salary issues.) In the March 1957 Newsletter, Association President Clair Sawyer of MIT updated the membership on the progress of both committees:

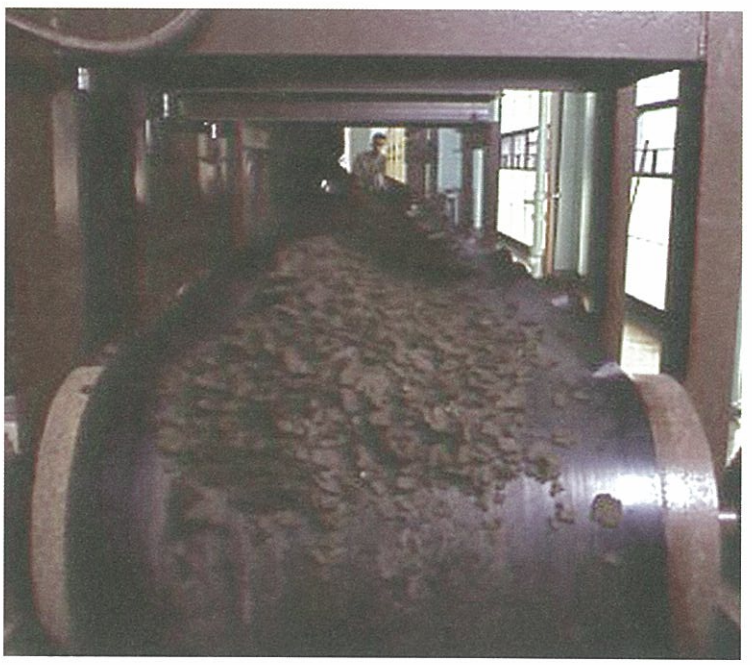
> Within the past few years, there has been a growing awareness of a need to improve the lot of the men on the 'firing line' – particularly the operators and superintendents of municipal waste treatment facilities. Over the past two years Certification and Salary Study Committees have been hard at work on this knotty problem. Those of you who were at the meeting in Greenfield last November know that progress is being made along these lines, and that a positive program can be expected in the near future. So please be patient. You may yet have 'butter for your bread' before you retire.

The certification program developed by the Committee was submitted at the Fall 1957 Meeting and approved. Sawyer then appointed ten men – representing a cross-section of sanitation professionals from five of six New England states – to implement this certification program:

Wareham, Massachusetts:
Water pollution control facility, where improvements included replacing the 25-hp mechanical surface aerators with 50-hp units, replacing the sludge collection equipment in the final settling tanks, and adding two sludge holding tanks. (1992)







State Health Department Members:

- Richard F. Greeley, Massachusetts
- Carlton Main, Rhode Island
- John Richards, Vermont
- Appointment Pending, Connecticut

Sewage Plant Operators:

- Walter Kunsch, Connecticut
- Joseph Hanlon, Massachusetts
- Walter Anderson, Rhode Island
- Appointment Pending, Vermont or New Hampshire

Consulting Engineers:

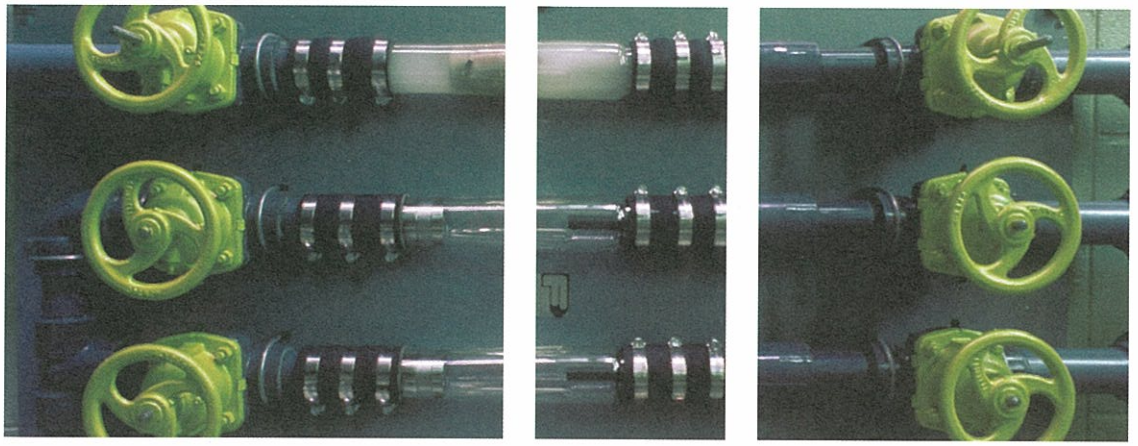
- John Bethel, Metcalf & Eddy
- Frank Heany, Fay, Spofford & Thorndike

University Faculty:

- Edward Brown, Dartmouth
- Clair Sawyer, MIT.

The conspicuous absence of any members from Maine may be attributed to the state's small membership in the Association at that time. In fact, the Newsletter announcement of the 1955 Fall Meeting in Portland observed that "Maine is a fertile field for our membership committee to do some spade work, and we should make the services of our organization available to all Mainers."

1958 proved to be a turning point for the operators, as members were notified of the certification program and the Association's endorsement of a scale of salaries commensurate with the duties in each grade of certification. "This information is being made available to everyone," wrote President John D. McDonald in the January Newsletter, "and is data with which every member and non-member who is engaged in this field should be familiar and should promote in his area of influence." Sensing the historic significance of these initiatives, together with the publication in the *Federation Journal* of articles by two Certification Committee members, the Newsletter concluded with a rousing call-to-arms:



Marlborough, Easterly Waste Water Treatment Facility, Massachusetts.

With the publication in the December issue of *Sewage and Industrial Wastes* of Joe Hanlon's *Salary Survey*, appended by Walter Kunsch's *Qualification for New England Sewage Works Personnel* in the *Operator's Corner*, plus the Operator Certification program now underway, we are really in business, and we are in business for you Operators. So let's apply for certification. Hitch your certification, when granted, to our Recommended Salary Schedule, and prove to your community that you are an essential part of their utilities, which is what we have been trying to prove for years!

Interested members wrote to the Committee for application forms, examinations were given at the Spring Meeting in Gardner, Massachusetts, and the Fall Meeting in Hartford, Connecticut, while the basic training course continued to be given in cooperation with UMass, along with the Massachusetts and U.S. Departments of Health.

The first certificates, thirty-three in all, were awarded at the Fall Meeting on November 6th by Dr. William D. Hatfield, President of the Federation. Eight men received Grade I certificates, twelve received Grade II, four for Grade III, three for Grade IV, five men were certified for Grade V, and one operator received Grade VI certification. A second group was awarded certificates on December 15: one for Grade I, eight for Grade II, four for Grade III, and three for Grade IV. In 1959, the program was expanded to "permit qualified laboratory personnel, public health and sanitary engineers to obtain certificates." By 1960, a total of seventy-three operators had been certified: ten in Grade I, thirty-three in Grade II, eleven in Grade III, eleven in Grade IV, seven in Grade V, and one in Grade VI. And the Certification Committee, which had been meeting annually for four years, now comprised four subcommittees: Operator Classification, Operator Examination, Plant Classification, and Publicity.

The Publicity Sub-Committee, chaired by former president Clair Sawyer, sent program information to New England towns and cities, hoping to stimulate public officials to encourage their operating personnel to apply for certification. Meanwhile, the Plant Classification Sub-Committee had completed a classification of all sewage plants in New England and was preparing to send this information out to communities, together with reprints of the Salary Survey from the December 1957 issue of *Sewage and Industrial Wastes* and a roster of all operators certified to date. In addition, the Association's Operators Education Committee, under former President Henry Munroe, had compiled an *Operators Reading List* which was

attached to the Newsletter. This list was described as a "ready-reference to books and periodicals, which you will find useful in improving your knowledge and keeping up to date in your profession."

"There is a tremendous amount of work being done by the Operator Certification Committee for the good of the Operator," the March 1960 Newsletter exhorted, "and we ask that you seriously consider supporting the program by applying for Certification. Do it now!" In January, 1963, President Earl R. Howard informed the membership that "We have passed the 100 mark in Certified Plant Operators in 1962, and should now start on the second hundred. This is one of the most important of our programs and needs the support of each of you. Send your Operators in to become certified. It will help them and help you, too." By then, the Association had initiated and inspired additional training and certification courses in New England. Henry Munroe, then a member of the Operators Education Committee, had spearheaded a pilot program in Rhode Island in 1961 that was co-sponsored by the U.S. Department of Labor and the Rhode Island Education Department. It is believed to be the first such course given at the state level.

The basic training class, taught by officials from the Rhode Island Department of Public Health and the Blackstone Valley Sewer District Commission, met once a week for twenty-one weeks at the Rhode Island Vocational School. Thirteen operators in the state were awarded diplomas, making them eligible for Grade III certification. A similar course was given several times over the next few years. Speaking at the awards ceremony in 1961, Munroe estimated that the "New England-New York area will need 1,000 trained sewage treatment plant operators to run the growing number of plants planned for the area." Indeed, Rhode Island officials were acknowledging that more water pollution control projects were planned or underway in the state than at any other time in Rhode Island history.

In 1963, Dr. Otis Sproul, an Association member and Professor of Civil Engineering at the University of Maine, conducted an operator training course on campus, in cooperation with the Maine Water Improvement Commission. He repeated the course the following year. In 1965, the Connecticut State Department of Health conducted a one-week operator training course at the University of Connecticut. This program followed the basic course outline that had been published the previous Fall in the *Federation Journal*. That same year the Association Newsletter announced that "a privately owned training school which has been commented on favorably is the Water and Sewerage Technical School in

Neosho, Missouri." Plans were made to invite its President, Lloyd G. Caughran, to address one of the technical sessions at the 1966 Spring Meeting.

By the end of 1965, the Association's Voluntary Certification Program listed more than 200 certified wastewater treatment plant operators. And the Association's influence was now reaching into the area of state legislation. In 1966, the Association and the Massachusetts Water Works Association sponsored a bill for voluntary certification of operators of water supply and wastewater treatment facilities. Officially known as Massachusetts House Document No. 3009, the bill included a provision for the creation of a certification board appointed by the Massachusetts Commission of Public Health that would include a wastewater treatment plant operator approved by the Association's Executive Committee. Association members were urged to contact their state representatives to voice their support of the legislation.

The Association took an even more forceful position in its role as industry voice and educator by informing the membership that the Executive Board had voted for the Association to "act as a strong coordinating agency with the various states to assist in and promoting [sic] the establishment of operators' educational training courses. The President was authorized to approve expenditures of funds needed for this purpose." Meanwhile, operator training courses continued at the Rhode Island Vocational School from which, in addition to 80 hours of classroom work, field trips were made to different plants within the state. The only cost incurred by operators was for their textbooks, a modified version of the *Manual of Instruction for Sewage Treatment Plant Operators* prepared by the New York State Department of Health. The Association noted that "this school would not have been possible without the assistance of the Bureau of Apprenticeship and Training of the U.S. Department of Labor."

A training course also was being offered to employees of the Boston Metropolitan District Commission "to upgrade and prepare men for higher responsibilities and give them an opportunity to acquire better and more responsible jobs in the operation of the MDC's $110,000 facilities." The school was sponsored by James G. Walsh, Deputy Director of Personnel, Commonwealth of Massachusetts, and financed by federal funds through the Federal Manpower Training Act. The course was developed and implemented by former Association President Joseph Hanlon, Lloyd Caughran (President of the Water and Sewerage Technical School in Missouri), and Jesse Barlow of the Federation's Personnel Advancement Committee.

Warren, Rhode Island:
This facility was upgraded in the early 1980s from primary to secondary treatment and expansion to 2-mgd capacity. Upgrades ncluded two secondary settling tanks, renovation of the existing digester to a sludge storage tank, a chlorine contact tank, and a new outfall to the Warren River. (1982)

Nashua, Rhode Island: Primary treatment plant. (1970)

By 1967, the Massachusetts legislation regarding Voluntary Certification had cleared the House and was in the Senate Ways and Means Committee. At the Association's Executive Committee meeting in October, the Operator Education Committee – which included 10 men representing all six New England states – reported that it had discussed the matter of "certification without training." What good was state mandated voluntary certification, the Education Committee reasoned, without stronger state involvement in operator training? The members had concluded that "the training of operators is a state responsibility and the state agency budget should be increased to do this." The Committee reported that the New England Interstate Water Pollution Control Commission (NEIWPCC), a not-for-profit interstate agency founded in 1947, was planning some short courses in the Spring of 1968. Official state involvement in training and certification throughout New England was now well on its way.

NEIWPCC launched what would become regular operator training courses in New England. These included working with the Neosho School from Missouri to develop and implement courses at the Civil Defense Training facility in Topsfield, Massachusetts. In 1969, NEIWPCC established the New England Regional Wastewater Institute (NERWI) on the campus of the Southern Maine Vocational Technical Institute in South Portland. NERWI offered entry level and skill upgrading courses. In the 1970s, NERWI created a mobile training program that took training directly to plants across New England. Throughout all of these landmark initiatives, the Association – with over four decades of experience and expertise – worked eagerly with NEIWPCC, providing whatever assistance was requested.

The passage of the Massachusetts Voluntary Certification legislation, fueled by the growth of water pollution control facilities and the increasing involvement of state and federal agencies, led to the eventual adoption of mandatory certification in all New England states. All of this cannot help but make us think of two gentlemen strolling down a Boston street after dinner one December evening in 1928, tinkering with the notion of an association for the New England sewage works profession.

POLLUTION/PRESCRIPTION

We never know the worth of water 'til the well is dry. (English Proverb)
Increasing awareness of water pollution brought commensurate funding for pollution-control projects. But grants can never be taken for granted. No laurels grow in polluted water. NEWEA didn't rest. It drove activism down from region, to state, to community. It drove cooperation up through the Federation and the EPA.

There are a number of reasons why you, as an individual, should make every effort to attend these meetings. With the popular demand for improved water pollution control measures, you will be aware of the latest programs and reasoning in the areas of legislation, regulation and financial grants.

John S. Bethel, NEWPCA President
NEWPCA Newsletter, April 1964.

The Water Pollution Control Act of 1948 (Public Law 80-845) marked the beginning of the federal water pollution control program, leading to crucial changes for the water sanitation industry, for the Association, and for the Federation. Overall, this early legislation assigned to the federal government a largely secondary position in water quality matters. The government's principal responsibility was to bolster state and local water pollution control programs with research support and technical and financial assistance. For fiscal years 1949-53, the legislation authorized funding of $22.5 million per year in low interest loans (two percent) for the construction of sewage and waste treatment works; $1 million per year for grants to states for pollution studies; and $800,000 per year for grants-in-aid in drafting construction plans for water pollution control projects. Public Law 82-579 extended the provision of the 1948 Act for an additional three years, through fiscal year 1956.

Later that same year, the first federal legislation authorizing $50 million a year in grants-in-aid for the construction of water pollution control plants was enacted. But in associations throughout the Federation, reactions to this legislation were mixed, running the gamut from the extreme right to the extreme left: Some members believed that a utility that must serve people indefinitely should be supported by the people without federal aid. Others believed such facilities were so expensive that they could only be built with federal aid. And many thought that $50 million a year was an excessive amount for the government to contribute. Ultimately, of course, federal contributions provided the lion's share of financial support for such projects. And other amendments in 1956 to the Water Pollution Control Act strengthened the research and training aspects of the federal program, as well as federal enforcement procedures through the removal of the state consent requirement.

This 1956 legislation (known as Public Law 660) stimulated the water pollution control profession on almost every level, generating more interest, more construction projects, and more awareness and involvement in government affairs. The Federation's Legislative Committee – with significant input from the member associations – took the lead as a credible voice for the industry, discussing and influencing federal legislation. In New England, the Association lost no time in using its Newsletter as a vehicle for apprising its members of the new legislation and its effect on the region:

State	1957	1958
• Connecticut	$628,275	$626,575
• Maine	$627,125	$634,650
• Massachusetts	$1,137,125	$1,126,450
• New Hampshire	$543,150	$529,825
• Rhode Island	$520,500	$556,650

NEW ENGLAND STATE ALLOCATIONS FOR FISCAL YEARS 1957-1958

As enacted, the law provides for the appropriation of $50 million each year up to an aggregate of $500 million for grants to any State or municipality for the construction of treatment works. Individual grants for any project cannot exceed 30 percent of the estimated reasonable cost of the project or $250,000, whichever is smaller. Also, 50 percent of the funds for any fiscal year must be used for grants to municipalities of 125,000 population or under. For applications and more information, contact your state water pollution control agency.

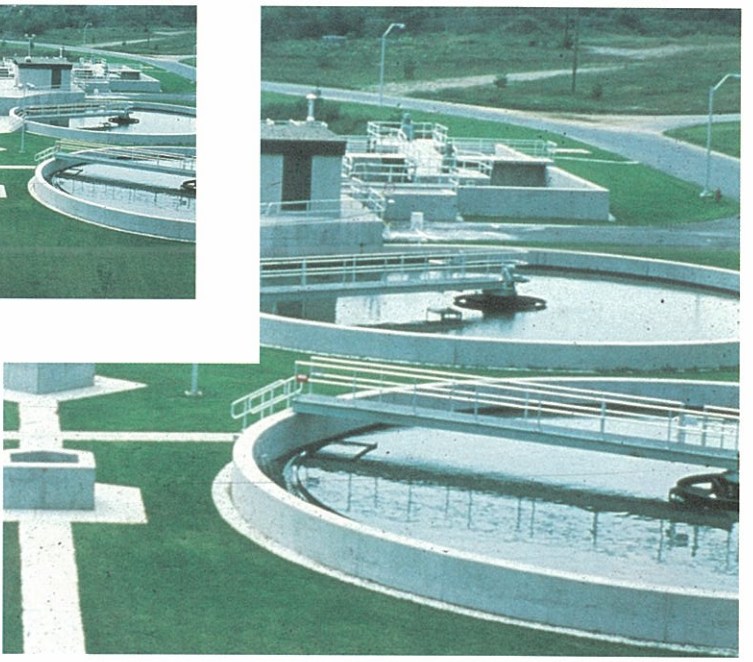
The Newsletter listed the New England state allocations for fiscal years 1957 and 1958 (see chart above). The Newsletter also printed a table, prepared by the Public Health Service, showing specific federal dollars for specific New England projects, along with figures for total project costs and project descriptions. These included three in Connecticut, one in Maine, six in Massachusetts, four in New Hampshire, four in Rhode Island, and two in Vermont. But early on, it was evident to the Association that water pollution control funding could never be taken for granted. In March, 1960, the Association's newsletter issued this alarming item under the heading, "Blatnik Bill Vetoed by President Eisenhower":

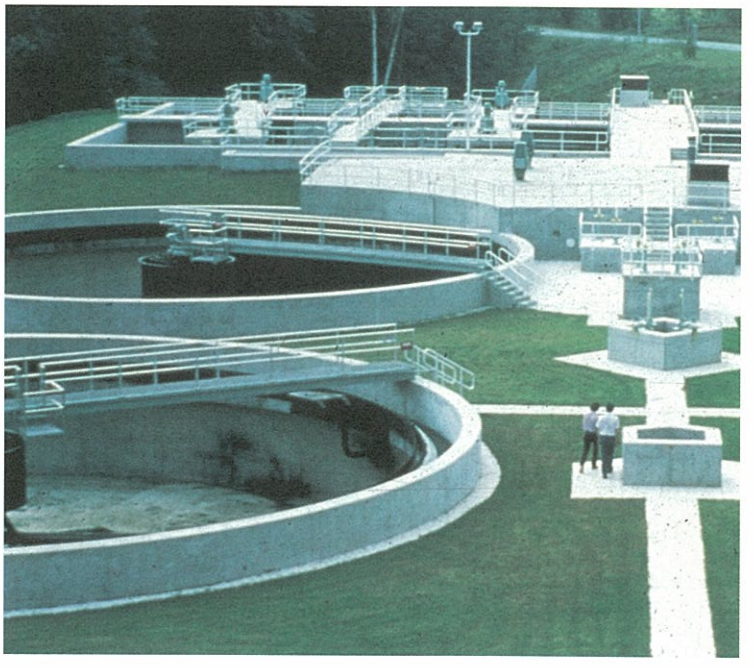
The Blatnik Amendment to the Water Pollution Control Act, Public Law 660, which would raise Federal grants for sewage treatment construction from 50 to 90 million dollars per year, was recently vetoed by President Eisenhower. Congress failed to override the veto. Under Public Law 660, grants are made to municipalities on the basis of 30 percent of the construction costs up to $250,000 maximum. The Federal budget for 1961 proposes to reduce the funds from 50 million to 20 million dollars a year. As there is strong backing in Congress for the Water Pollution Control Program, it is believed the 50 million dollar per year appropriation will be restored.

In this case, the Association's optimism was well-founded, helped in no small part by a new presidential administration. In May, 1962, the newsletter would report that the Federal Water Pollution Control Act had been significantly amended in 1961:

You may not have been aware – or may want to refresh your memories – about congressional action amending the water pollution control act last year. President Kennedy, on July 20, 1961, signed into law the conference version of H.R. 6441 by Rep. John A. Blatnik (D) of Minnesota. This legislation amended

Marlborough, Westerly Waste Water Treatment Facility, Massachusetts:
The Westerly wastewater treatment plant was expanded to 2.9-mgd capacity and upgraded to an advanced secondary system employing single-stage nitrification for ammonia reduction. (1986)





State	Construction Grants	Program Grants
• Connecticut	$1,035,720	$80,600
• Maine	$989,320	$35,500
• Massachusetts	$1,695,760	$130,800
• New Hampshire	$827,000	$32,200
• Rhode Island	$830,400	$58,900
• Vermont	$867,280	$25,100

1962 NEW ENGLAND STATE WATER POLLUTION CONTROL FUNDING

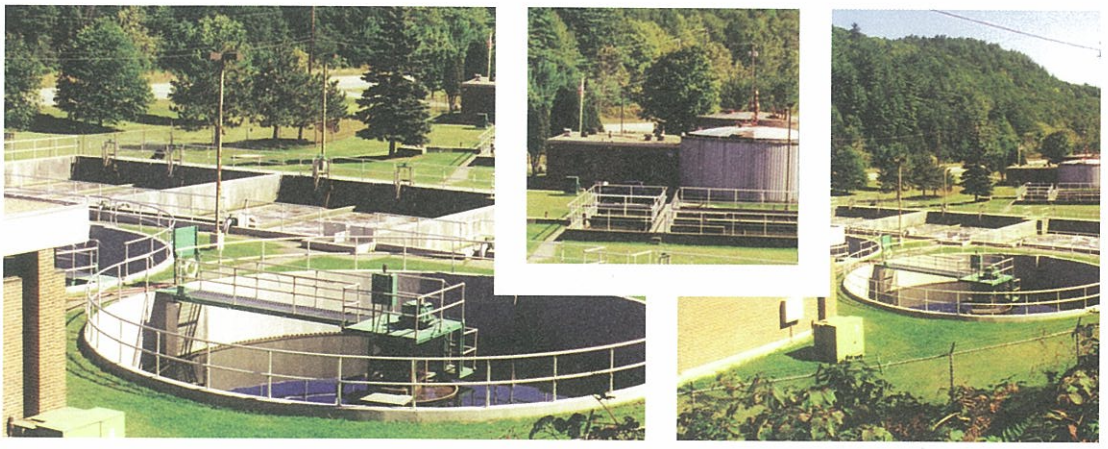
the act, provided transfer of the act's administration from the Surgeon General to the Secretary of Health, Education and Welfare, extended federal authority in water pollution abatement to all navigable waters, and granted power to the Secretary of Health, Education and Welfare to institute remedial action to correct interstate pollution and enter intrastate situations at the request of the governor of any state or other designated state agencies.

The Newsletter also detailed the amendment's other provisions:

- Increased the construction grants for waste treatment plants from $50 million a year to $80 million for fiscal 1962; $90 million for fiscal 1963; and $100 million for the next four years.
- Raised the single grant limit to $600,000 or 30 percent, whichever is lower.
- Imposed a ceiling of $2.4 million on joint projects.
- Established seven field laboratory and research facilities throughout the United States.

State-by-state figures in the Newsletter for construction grants and interstate program grants illustrated the major strides being made in water pollution control funding (see chart above). The 1962 Newsletter also continued a practice it had begun in an earlier issue and would continue into the future – devoting considerable space to itemizing individual communities and projects across New England that received federal grants. The Association's conscientiousness was part of a broader commitment on the part of the Federation. In fact, that same year, the Federation strongly voiced its position in what it obviously envisioned would be an ongoing struggle for effective water pollution awareness and legislation:

Pollution of the nation's watercourses, coast water, and ground waters is a continuing threat to the national health, comfort, safety, and economic welfare. National survival, in terms of future urban, industrial, and commercial growth and prosperity, dictates the protection of all water resources from discharges of pollution, wastes, and other substances, or from any acts which cause their highest level of usefulness. While considerable progress has been made in pollution control by municipalities and industries, many water resources area are being degraded, impaired, and damaged by such discharges and acts, and they will be further adversely affected by the degree and pattern of population growth, industrial processing, commercial expansion, chemical usages, and other technological advancements.



Springfield, Vermont:
A 4.5 mgd conventional
Secondary Treatment.
In operation since 1976.

In April, 1963, the Association Newsletter updated its members on one of the initiatives of the 1961 legislation – the establishment of field laboratories and research facilities:

Announced last Fall [1962] was the 1.7 million dollar salt water research laboratory to be established in Kingston, Rhode Island. It is expected to have a staff of about 100 persons of which 75 will be scientists. The site was chosen largely because of scientific activities in the Marine Services School of the University of Rhode Island there, the Northeast Shellfish Sanitation Laboratory, and a new University Oceanographic Laboratory to be located nearby. Congressman John E. Fogarty, Rhode Island, was instrumental in obtaining appropriations for this facility as well as for a similar facility on the West Coast.

The Association also reported that the Department of Health, Education and Welfare (Public Health Service, Division of Water Supply and Pollution Control) had selected the Boston area as the site of another field laboratory and research facility:

Precise location has not yet been determined. It is expected to have a scientific, engineering and research staff of 150 persons and will cost more than two million dollars. It will be able to draw upon the many scientific and technical resources of the area, as well as many nationally recognized research organizations. Research projects will be carried on in cooperation with schools and research institutions in the area.

The following year, the Association was urging its membership to attend a hearing in Waterbury, Connecticut, that was being held by the Natural Resources and Power Subcommittee on Government Operations. The purpose of the hearing was to review what "is being done at all levels of government by government, by industry, and by conservationists in water pollution abatement." The Association also called attention to the recent activities of Senator Edmund S. Muskie of Maine, who headed the Committee of Public Works' Subcommittee on Air and Water Pollution. Muskie had held four meetings in June, 1963, regarding four water pollution bills:

The bills are S649, which deals with establishing an administration separate from the Public Health Service, providing grants for the separation of storm and sanitary sewers and an increase in Federal participation. S737, a Bill to provide assistance to small business concerns for construction of pollution treatment works, and S1118 and S1183, Bills requiring detergents to comply with standards of degradability.

PROVISIONS OF THE 1965 WATER QUALITY ACT (PL89-234):

- Raised construction grants from $100 million to $150 million.
- $20 million annually for research and development grants related to methods of dealing with combined sewage problems.
- Set a timetable for establishing water quality by individual states for interstate waters.
- Extended enforcement initiatives to abate pollution that adversely affected shellfish in interstate and navigable waters.

PROVISIONS OF THE 1966 CLEAN WATER RESTORATION ACT (PL89-754):

- Increased construction grants to a total $3.55 billion between fiscal years 1967 and 1971.
- Raised federal participation limits as well as total authorizations for research and training programs.
- Increased state program grants.
- Established federal enforcement machinery for international boundary waters.

Not surprisingly, government's role in water pollution control was a subject of numerous presentations at Association meetings. At the 35th Annual Meeting in October, 1963, at Mount Snow, for example, Vermont Governor Philip H. Hoff addressed the 225 members and guests, expressing his commitment to protect public health and welfare through pollution control and abatement measures. Later in the program, David H. Howells of HEW's Public Health Service, spoke about *What's Going on in Water Pollution Control in Washington.*

At the 1965 Spring Meeting in Poland Springs, Maine (the first Association meeting in that state), 250 members and guests heard Donald E. Nicholl, Administrative Assistant to Senator Muskie, speak on *Problems and Prospects of Water Pollution Control.* The Newsletter commented that "his presentation of facts indicating the real need for continued acceleration in cleaning up our waterways and making available additional sources of public supply impressed all present." Mr. Nicholl's presentation was followed by a film entitled, *Trial by Water*, prepared by the Vermont Department of Water Resources and narrated by Lowell Thomas. Over the next couple of years, the Association enlightened its membership about major changes contained in two key pieces of legislation (see provisions above). The Association wrote that:

Under the Water Quality Act of 1965 [PL 89-234], a new Federal Pollution Control Administration was established on January 1, 1966, in the Department of Health, Education and Welfare. On May 10, 1966, by Presidential order, this Administration was transferred to the Department of the Interior.

The increased activity in legislation, funding, construction, research, and education was reflected in the Federation's agenda as well. Its Executive Secretary had testified several times before congressional committees. And in the Spring of 1966, the Federation held the first of many legislative seminars that provided a valuable model for the Association's own legislative affairs program a few years later. The Federation had also established a new publication entitled, *Highlights*, which the Association promoted to its membership, urging them to contribute papers and items of interest. In October 1967, the Association launched its own publication, the *Journal of the New England Water Pollution Control Association*, with Bruce Eaton serving as Editor, and a staff that included Roland Burlingame, David Duncan, Richard Greeley, Joseph Hanlon, Joseph Knox, Frank Mahony, Robert Okey, Robert Pope, Robert Purcell, Kenneth Russell, Edward Beardslee, Marty Weiss, James Connell, and Paul Kelley. In the *Journal's* inaugural issue, Association President, Merwin E. Hupfer, wrote:

With our rapidly expanding membership, it has becoming increasingly necessary to provide more services and a better means of disseminating information. A greater number of papers are being presented at Federal annual conferences and Member Association meetings, making it impossible to print in the Federal Journal all those worthy of publication, particularly ones of regional interest. Thus the commencement of a New England Journal at this time is most appropriate.

In February of 1970, Association members attended the Federation's legislative seminar in Washington D.C. The following month, in a forward-looking effort to strengthen its voice on regional matters, the Association established its own Legislative Affairs Committee. And the timing could not have been more appropriate. In July, the United States Environmental Protection Agency (EPA) was created. The EPA consolidated into a single federal agency all grant-in-aid programs for the construction of wastewater collection and treatment facilities for the abatement of water pollution in the United States. While a government agency dedicated to environmental issues was cause for great excitement and hope among the member associations of the Federation, the devil would be in the details. And those details would come two years later in the Clean Water Act of 1972 (Public Law 92-500), which would galvanize the Federation and its member associations into unprecedented action.

PL 92-500 enacted sweeping revisions of all previous legislation by increasing the level of federal funding to $18 billion to help finance the construction of wastewater treatment facilities. It also established a regulatory and enforcement mechanism that required uniform, technology-based effluent standards and a national permit system for all point-source discharges. In effect, these amendments gave the federal government final authority over most aspects of the program, positioning the EPA for complete control of water pollution initiatives. While the intentions of this legislation were laudable, the Federation and its member associations saw much of its methodology and requirements as dangerously impractical.

Even today, veteran members of the Association passionately recall their concerns and objections with PL 92-500. For one thing, some say, it was written largely by lawyers with too little input from engineers, plant operators, and others involved in the day-to-day business of wastewater treatment. Consequently, specific funding estimates for specific goals were far too low, making it impossible to achieve local and state compliance with federal requirements. Furthermore, as written, PL 92-500 made it easier in many

Franklin, New Hampshire:
The 11.5 mgd conventional activated sludge facility with anaerobic digestion is owned and operated by the New Hampshire Department of Environmental Services Winnipesaukee River Basin Program. The Franklin facility, built in 1979, serves the Lakes Region communities of Center Harbor, Moultonborough, Gilford, Meredith, Laconia, Belmont, Sanbornton, Northfield, Tilton, and Franklin.

Scituate, Massachusetts: One-mgd water pollution control plant, originally designed in 1965 and upgraded in the mid 1980s to include a septage receiving facility, new aerobic digesters, and a sludge dewatering building. (1985)

cases for smaller communities with smaller populations to get disproportionately larger appropriations than the more densely populated cities, simply because a larger percentage of representatives within the states came from smaller communities. The Federation and the member associations quickly set out to correct what they saw as problems with the implementation of these amendments.

When the Environmental Protection Agency was created, ten regional EPA offices were established throughout the country, with each office responsible for the execution of Agency programs within the states in its region. (The New England states were designated as Region 1.) Starting in 1972, the Federation began holding workshops in each of these ten regions to discuss the problems of PL 92-500 and how they might be resolved. These workshops culminated in a report from the Federation's Government Affairs Committee, entitled *PL 92-500: Certain Recommendations of the Water Pollution Control Federation for Improving the Law and Administration*. More than 4,000 copies of the report were distributed to member associations, key officials in the EPA and other agencies, and to congressional members and committees. Concurrent with the Federation's efforts were the aggressive and strategic initiatives of the New England Association.

During this period, one of the Association's principal guiding figures was Al Peloquin, who would become Association President in 1984. Peloquin was Executive Secretary of the New England Interstate Water Pollution Control Commission and the Region 1 representative to the EPA. This entailed routine meetings with EPA administrators and representatives from the other nine EPA districts across the country. Under Peloquin's leadership, numerous Association members divided up into groups, selecting different sections of PL 92-500 to study and discuss thoroughly. Then they invited officials from the EPA and other agencies to meet with them, and over the next few years they succeeded in exerting substantial influence on changing and fine-tuning the bill's regulations.

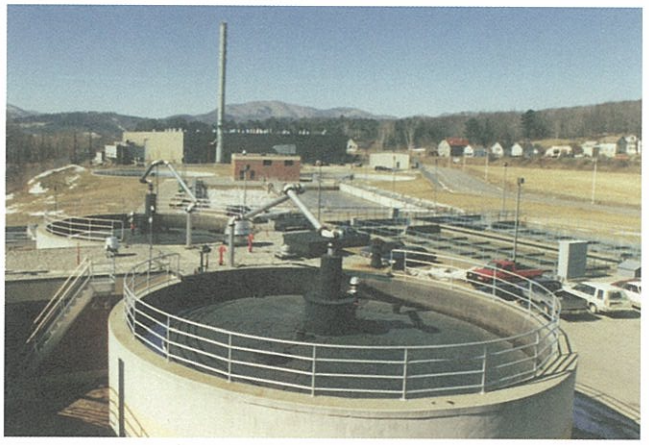
In 1973, Earl Howard, then Chairman of the Association's Legislative Affairs Committee, commented: "The light dawns daily on the Clean Water Act," adding that all who had attended the Federation's workshop on PL 92-500 "have received compendiums of its fruitage. EPA is hearing loud and clear from a disturbed public on the matter." A few months later, he praised both the Federation and the Association for making considerable headway. The Federation had contributed valuable input into the EPA's preparation of

guidelines to implement PL 92-500, and Connecticut was one of only three states to be granted approval to administer a Federal permit program based on the legislative package it had submitted for EPA review.

Charles Knapp, Association President in 1974, recalls that one of the Association's most successful undertakings in 1973 and 1974 was a series of "Town Meeting" seminars to educate the industry and the public about the specifics of PL 92-500. In 1974, resolutions from some of these Town Meetings were read into the Congressional Oversight Hearings, followed by a request by Committee Chairman, Jim Wright, of Texas for comments by the EPA. Two of the most troublesome provisions of PL 92-500 were Section 203 – which addressed plans, specifications, estimates, and payments pertaining to federally funded treatment plant construction – and Section 204, which dealt with limitations and conditions regarding these federal funds. As written, the EPA had authority over these requirements. The Federation and the Association worked tenaciously to support HR 14541, a resolution that allowed the EPA, under Sections 203 and 204, to delegate authority to the states. In 1974, a meeting of the Federation's Executive Committee voted to notify all New England senators and House representatives of the Association's support for this resolution.

A year later, Al Peloquin informed the Association of additional revisions to PL 92-500 that were being discussed on Capitol Hill. Among them was the possibility of Senate support for funding construction grants at $5 billion per year for five years. Peloquin urged the Association to submit position statements in time for the next EPA hearings. Peloquin also told the Association that he was on the witness list for these hearings, as the representative for Region 1. The Association subsequently voted to have Peloquin present its statement before the EPA hearings in June, 1975. The Association's bi-annual meetings throughout the decade also served as ideal opportunities to educate the membership about the details, challenges, and implications of this historic legislation.

The 1973 Spring Meeting at the Mountain View House in Whitefield, New Hampshire, featured a *Legal Forum on PL 92-500, W.P.C. Act Amendments of 1972*. The panelists included attorney Edward Selig of Massachusetts, who specialized in Environmental Law; Donald Stever, Assistant Attorney General for the State of New Hampshire; and Robert B. Taylor, Director of Water Compliance for the Connecticut Department of Environmental Protection. Later that year, at the October meeting at the Colonial Hilton in



Rutland, Vermont:
A 16.8 mgd advanced secondary treatment facility, current improvements will increase the wastewater collection system and treatment from 16.8 MGD to 22.5 MGD in accordance with VT ANR requirements. Advanced Wastewater Treatment with Phosphorus and Nitrogen removal (1983/1993).

Pittsfield, Massachusetts, members were privileged to hear EPA Region 1 Administrator, Michael Deland, talk about EPA standards. At the 1974 Spring Meeting at the Colony in Kennebunkport, Maine, two gentlemen from the EPA discussed *Understanding National Pollutant Discharge Elimination System (NPDES) Permits and Compliance Requirements*. Attendees at the Spring 1976 meeting at the Balsams in Dixville Notch, New Hampshire, listened to a presentation about *The Cost for Municipal Pollution Control in New England Under PL 92-500*. And the 1978 Spring Meeting at the Mount Washington Hotel included a lecture on *The Provisions of the New Clean Water Act*. Strengthening ties with the EPA became a major focus of the Association during the 1970s. The result was the founding of the Association's EPA Liaison Committee to meet periodically with the EPA Region 1 Administrator and other regional staff, maintaining an ongoing dialogue on new developments throughout New England.

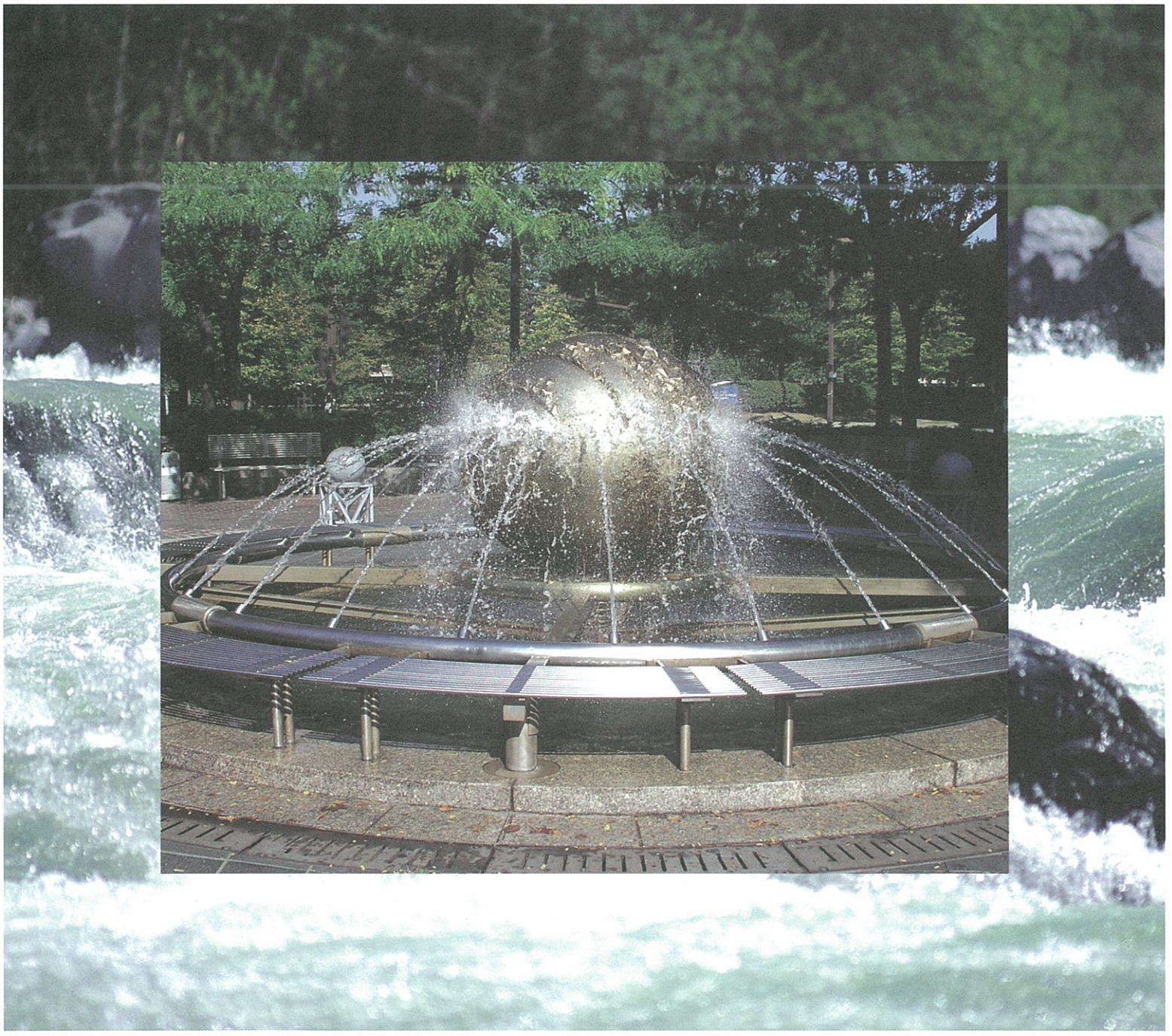
By 1979, the Association already was struggling against Federal efforts to reduce water pollution control funding. The August 1980 Newsletter announced:

> On August 1, the Senate adopted a resolution proposed by Senator Gaylord Nelson (WI) to abolish the EPA deferral of FY-80 Construction Grants Funds. This action releases the remaining FY-80 Construction Grants Funds plus the remaining Talmadge-Nunn funding. The efforts of NEWPCA, combined with other public and private interests in documenting the impact of the deferral, is considered to have played a substantial role in Senate approval of the Nelson resolution.

If the 1970s proved to a be a baptism by fire for the Association as a force of influence in legislative affairs, subsequent decades would see that role deepen and mature.

INVOLVEMENT/INFLUENCE

In sweet water, there is a pleasure ungrudged by anyone. (Ovid) With the Association and legislation progressing apace in remediating water pollution, NEWEA upped the ante. If Congress wouldn't come to New England, New England would go to Congress. The Association's acuity and authority were welcomed on the Hill. And its Congressional Briefings continue today, 22 years after they started.



Photography of Fountain: Sharon Shea

The Association has over 2,000 members representing private industry, governmental pollution agencies, academia, and wastewater treatment plant operators organizations. We have the responsibility, as individuals concerned with the environment and professionals in the water pollution control field, to offer our opinions and inform our elected representatives in order to facilitate discussions on issues of significance to all.

Briefing, First Congressional Breakfast Meeting, March 17, 1983.

For years, the Association recognized the need to strengthen and formalize its voice in the development of federal legislation relative to water pollution. The slashing of federal wastewater funding by nearly $2 billion from 1979 to 1980 only furthered this resolve. On March 17, 1983, the Association hosted the first of its Congressional Breakfasts at the Rayburn House Office Building in Washington D.C. Attending were members of the New England Congressional delegation, their key aides, and Association members from all six states. The success of that meeting made the event an annual affair, which eventually changed its format to an evening dinner and a seminar the following day. These meetings resulted in the establishment of solid contacts with the offices of every senator, congressman, and congresswoman from New England. Each year, the Association prepared and distributed a formal Briefing to the delegation, outlining the major discussion issues. In 1984, for example, the Briefing consisted of position statements on:

- Water Quality Improvements and the Construction Grants Program.
- Related Construction Grants Funding Issues.
- Marine Combined Sewer Overflow Funding.
- Acid Rain.
- Infrastructure Improvements to Water Pollution Control Facilities.

Efforts by the Reagan Administration to weaken the provisions of the Clean Water Act and reduce federal allocations prompted the Association to write:

Although we address a number of very important issues in this paper, one major point we wish to emphasize is the need to actively pursue the goals of the Clean Water Act through its continued authorization, and provide sufficient financial support to ensure that they are achieved. This may very well include the integration into the Clean Water Act of a strategy to deal with a more priceless resource, our nation's drinking water supply, to the extent that this resource is becoming increasingly subject to pollutant invasion from a variety of sources.

While fully recognizing the financial constraints imposed by a federal budget approaching $200 billion, the Association argued it was unrealistic to expect that states would be able to fund all necessary pollution control projects. "In the interests of improved water quality, federal funding must continue until the

Middlebury, Vermont:
A 2.2 mgd tertiary wastewater treatment facility that was recently constructed in the town's industrial park. The facility is designed to remove phosphorus, while incorporating the Sequencing Batch Reactor biological process and performing lime stabilization and heat pasteurization. In operation since 2001.

identified needs are met. Without this commitment," the Association warned, "the benefits of more than 10 years of efforts and the expenditure of billions of dollars may very well be negated." To reinforce this point, the position statement on *Water Quality Improvements and the Construction Grants Program* cited examples of measurable progress: in 1976, 52 percent of New England's major streams met the fishable/swimmable goals of the Clean Water Act. That improved to 56 percent in 1978 and 66 percent in 1982. This statement also expressed concern over the federal funding level of the Construction Grants Program which was being reduced from 75 percent of its total costs to 55 percent on October 1, 1984, a mere six months away. The Association believed this would "increase the burden on local communities who are already struggling to meet their financial commitments."

But the Briefing also demonstrated the Association's broader outlook, grappling with issues beyond specific water pollution legislation. The position statement on "Acid Rain," for example, asserted that "The Federal Clean Air Act requires reauthorization by Congress. Experience to date has revealed weaknesses in the present Act which should be corrected." The existing law favored continued pollutant discharges by older power-generating and industrial facilities in the north-central United States and central Canada "at the expense of the aquatic and terrestrial environment of New England and other northeast states."

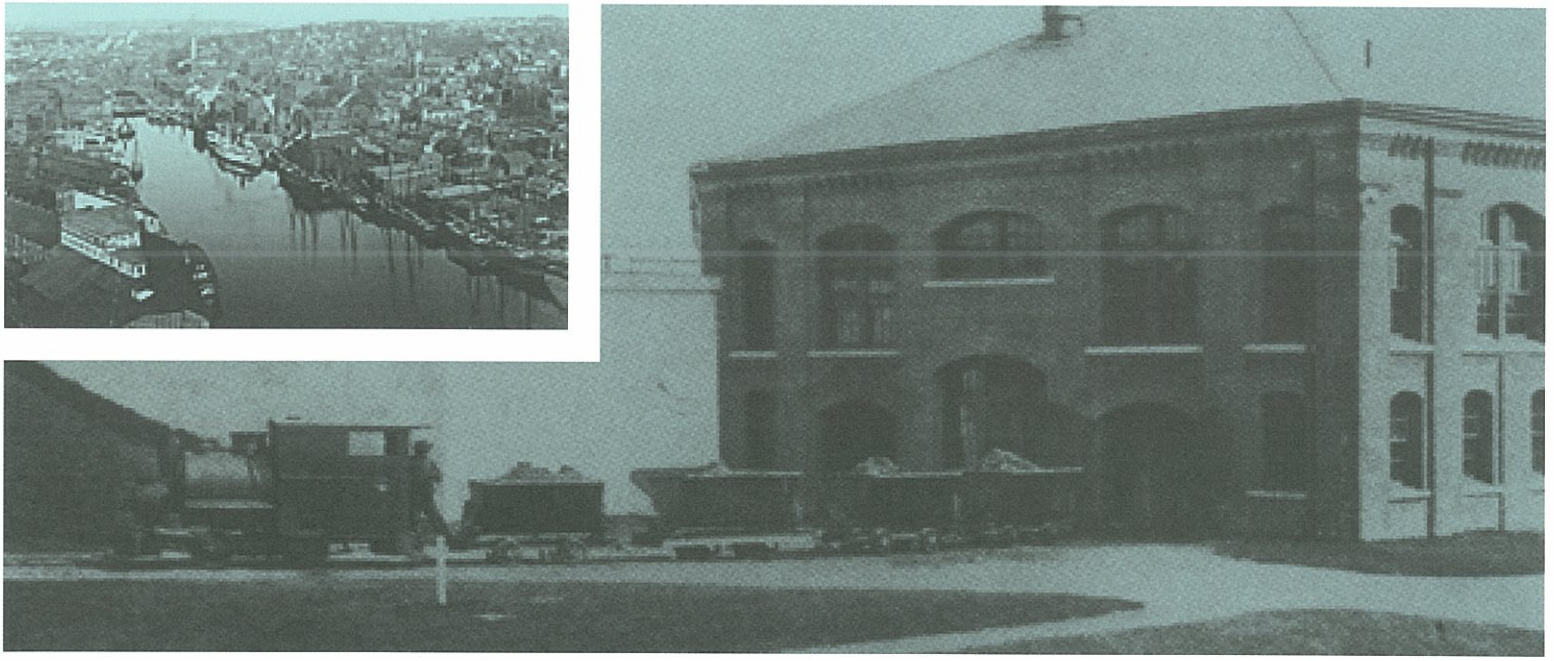
The Briefing called for the immediate implementation of a time-phased program of emission controls to prevent the problem from getting worse. Any delay in such controls posed the risk of irreversible damage to the environment and to human health. Furthermore, the Association strongly supported having federally funded acid rain research projects conducted in New England by local state agencies, universities, and private industry, rather than by remote EPA laboratories. "The problem exists in New England," the Briefing declared, "and must be addressed by those most affected by it and familiar with its impact."
A year later, the 1985 Congressional Briefing articulated with equal force an emerging threat to the public health. "There is growing awareness," the Association wrote, "that the next major environmental crisis we all have to confront is the protection of precious groundwater resources."

The Briefing explained that unlike surface waters, groundwater resources are largely hidden from view and that serious problems relating to their contamination were only now beginning to command regional and national attention. More often than not, the utility of these precious aquifers was destroyed through the

Field's Point, Providence, Rhode Island:
The largest and oldest wastewater treatment facility in Rhode Island (and the 3rd oldest in the United States), Field's Point has been treating wastewater from metropolitan Providence since April of 1901.

Providence Harbor, 1895

Field's Point, Rhode Island 1901



Field's Point, Sewer Construction, 1898

Field's Point, Sewer Construction, 1880

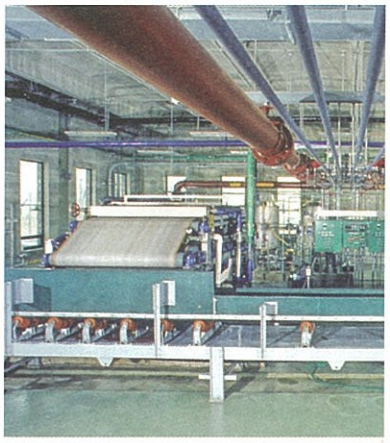
irreversible effects of severe contamination. The fact that groundwater contamination had been reported in every New England state was an indication of the severity of the problem. The Briefing went on to recommend aggressive legislation with achievable goals, express support for Superfund allocations, and urge Congress to provide, through the EPA's operating budget, the necessary resources to effectively carry out a comprehensive groundwater protection program.

By 1986, however, the Association could see the handwriting on the wall for years to come. The Gramm-Rudman-Hollings Bill mandated a 4.3 percent reduction in all federally funded programs in an effort to eventually eliminate the federal deficit. In addition, President Reagan's budget called for amendments to the Clean Water Act, including an annual $600 million reduction in federal participation in the Construction Grants Program, with a goal of total federal phase-out by 1990. In its Congressional Briefing that year, the Association contended that:

> While the federal government's role in the providing of necessary wastewater treatment facilities is reduced, its role as a regulator requiring that those needs be met has not diminished. State and local governments are burdened with increased responsibilities in providing wastewater and sewage treatment facilities at a time when federal financial assistance is ever decreasing.

Among the Association's specific recommendations was for Congress to amend the Clean Water Act by establishing a state revolving loan fund to provide a transition from a grant program to a loan program. "This concept should be enacted by Congress with provisions which will maximize effectiveness of State water pollution control programs," the Association stated, listing numerous provisions by which to achieve these goals. The following year, the 1987 Clean Water Act was passed with the support of every member of the New England Congressional Delegation, creating a State Revolving Loan Fund (SRF) for municipal wastewater treatment. As outlined in the legislation, Congressional appropriations would capitalize the Fund from 1987 to 1994, with a goal of self-sufficiency and independence from the Federal government by 1995.

The 1988 Congressional Briefing congratulated the Association's membership and the New England senators and House representatives: "It was a tremendous effort on everyone's part that culminated in passage of the Act. It would be most appropriate while we are in Washington to express our appreciation to



Southington, Connecticut:
The water treatment facilities in Southington, Connecticut, were upgraded to include anaerobic sludge digestion and expanded to a capacity of 7.4 mgd. (1983)

the members of our New England Delegation for their support of the legislation." 1988 also saw the Association assuming a more aggressive stance on the issue of groundwater contamination. A year later, the 1989 Briefing boldly declared that "Congress in this session should proceed with enacting groundwater protection legislation," while cautioning that existing Federal laws and regulations failed to address groundwater problems in a coordinated manner, creating administrative and statutory inconsistencies.

To emphasize this point, the Association identified thirteen separate Federal statutes that, in some way, affected groundwater protection. Any new legislation, the Association asserted, had to address the comprehensive nature of groundwater as well as "the plethora of existing Federal legislative mandates currently imposed on State and local governments. This does not mean, however, that Federal legislation should simply duplicate existing requirements." The Briefing recommended that the EPA quickly develop health-based criteria for pervasive groundwater contaminants, that the states use these criteria to classify groundwater quality standards, that each state's standards provide the basis for any Federal groundwater program, that states implement their own programs to maintain groundwater standards, and that these state programs address contamination sources of national concern. Finally, the Association urged that "the EPA's role should be that of standard-setting and information dissemination, not program oversight forcing compliance with inappropriate Federal rules."

The 1989 Congressional Briefing also included a more detailed assessment of acid rain. Acknowledging that the national debate over acid rain continues "with both sides seemingly well entrenched," the Association alleged that there was little doubt anymore that pollutant discharges from power and industrial facilities in the United States and Canada were contributing significantly to acid rain problems in the northeast. "Throughout the northeast, acid deposition constitutes a significant threat to human heath and is the cause of considerable damage to aquatic and terrestrial ecosystems. Additionally, it significantly contributes to visibility impairment and the deterioration of historic monuments and buildings." Any overall strategy to reduce acid rain, said the Association, must demand that the EPA work with appropriate state agencies to cooperatively develop effective multi-state strategies for reducing emissions of transported pollutants.

Among the specific recommendations was for national legislation that required "emission reductions at a minimum of ten million tons of SO^2, six million tons of NOx, and ten million tons of volatile organic

compounds," the establishment of "state-wide emission caps leading to a permanent reduction in emissions," and provisions for "alternative means of compliance." The 1989 Congressional Briefing also included, for the first time, a discussion on *Wetlands Protection*. "We must recognize that wetlands are an extraordinarily valuable natural resource," NEWPCA proclaimed, "and a critical component of a larger hydrologic system including surface and ground waters." The Briefing explained that wetlands act as a natural water purification mechanism, removing silt and filtering out and absorbing many pollutants such as waterborne chemicals and nutrients. But despite their value and relative scarcity, wetlands continued to be destroyed at an alarming rate, while wetland protection programs continued to struggle.

While acknowledging that Federal programs to protect wetlands had helped to slow the rate of loss, the Briefing warned that these programs fell short of providing the necessary measure of protection and needed to be reinforced and enhanced. The Association also cited administrative and statutory inconsistencies, similar to those that plagued groundwater contamination legislation. The Association recommended the establishment of clear, national wetland protection policies and goals, recognizing the primary role of states to implement effective protection strategies and appropriate regulatory programs. This would require adequate Federal financial support and technical assistance to the states.

In the early 1990s, one of the recurring themes of the Congressional Briefings was the insufficiency of the new State Revolving Loan Fund to meet pollution abatement needs and standards. The Association pointed out that states and localities were now being encouraged and mandated to assume many new Federal programs such as combined sewer overflow elimination, sludge management, stormwater permitting, toxicity monitoring, expanded water quality standards, and estuary management. But few, if any, additional resources were being provided by the Federal government for proper implementation.

Furthermore, "with the economic downturn the country is experiencing, State and local budget cuts are necessary. Coupled with the end of the construction grants programs, States and communities are suffering major shortfalls in revenues to meet needed environmental priorities." The Briefing emphasized that while the 1987 Clean Water Act provided $18 billion of Federal financing for the Construction Grants Proposal before its phase-out in 1994, the actual appropriations had been made at less than the authorized level. The Association now called for an annual commitment of $2 billion in State Revolving Loan Fund

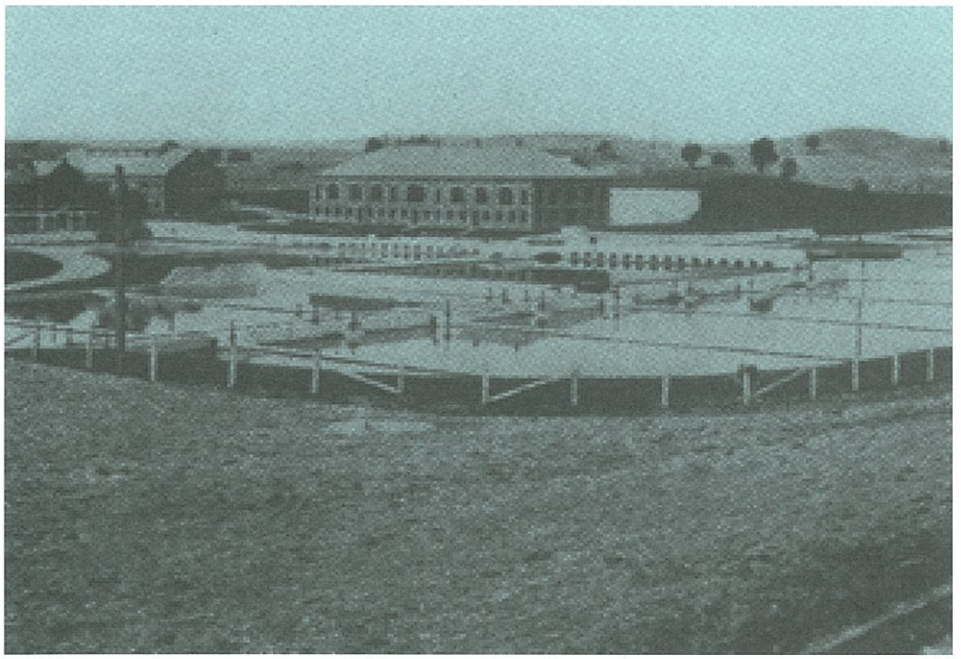
capitalization for a minimum of five years beyond 1994 to provide adequate local assistance for new needs created by the mandate of the 1987 Clean Water Act. For the next few years, the Association pushed hard for this legislation, reflected in strongly worded position statements in their annual Briefings. While the specific wording varied year by year, the essential message was the same: the Association advocated "a return to a federal grant program to help municipalities construct required water pollution control projects; if a return to a grants program was infeasible, then a long-term financial commitment to the State Revolving Loan Fund was necessary."

In its 1993 Briefing, the Association included two bar charts to press its case even further. One graphed Federal Wastewater Funding from 1973 to 1993, while the other tracked the percentage of the total Federal Budget allotted to this funding during the same period. Both graphs effectively drove home the Association's key messages: Federal funding had been reduced from over $5 billion in 1973 to approximately $2 billion twenty years later. This represented a reduction from 2.1 percent of the total Federal Budget in 1973, to approximately 1.5 percent in 1993. The 1994 Congressional Briefing took an even firmer stance on this issue, reprising the two bar charts and citing specific results of reduced SRF funding: the elimination of thousands of badly needed construction jobs; a severe impact on the water quality of rivers, streams, and coastal waters; the closing of shellfish beds; the curtailment of fishing and swimming; and increased threats to public water supplies.

Looking beyond the confines of New England, the Association also underscored the fact that "every public opinion poll for the last 10 years has demonstrated that the citizens of the U.S. place one of their highest priorities on cleaning up rivers, streams, and coastal waters." Consequently, restoring SRF funds slated for phase-out in 1994 "would be an important investment into improving the wastewater infrastructure of our country and preserving our nation's water for future generations." The 1996 Briefing expanded on the linkage between jobs and SRF funding, first touched on in the '94 Briefing. Under the heading *SRF Program Helps Local Economies*, the Association affirmed that "In addition to cleaning up the nation's waterways and protecting public health, the SRF program has created thousands of jobs in our communities. The program has not only provided jobs in the building trades, but has stimulated job creation in the related construction support areas such as environmental equipment manufacturing and servicing back-up."

Field's Point, Providence, Rhode Island:
The City of Providence extensively upgraded the facility in the 1930s and the 1950s. However, by the late 1970s the City had allowed the plant to fall into total disrepair, resulting in the ongoing discharge of raw sewage. Subsequent court challenges resulted in the creation of the Narragansett Bay Commission, a quasi-state corporation which manages, operates and maintains the plant and its collections system.

Field's Point, Rhode Island 1901



Field's Point, Quahoger 1920

Field's Point, Sewer Construction, 1920

Field's Point, Rhode Island, Today

Below this statement, a bar graph illustrated the relationship of SRF funding to construction and other related jobs, based on information from the Massachusetts Water Resources Authority and the Utility Contractors Association. According to the chart, $1 billion of funding generated a total of approximately 36,000 jobs, while $5 billion produced a total of approximately 180,000 jobs. The Briefings in the late 1990s also established nothing less than a visionary strategy for the next century by emphasizing two significant issues: combined sewer overflow (CSO) and watershed management. CSO was certainly not a new topic. The Association had discussed it in earlier briefings, and, in fact, a national policy addressing CSOs had been developed over the years. Feeling that further Congressional action was necessary to ensure the policy's effective implementation, the Association's approach became more aggressive. The 1998 Briefing called CSOs "the last major point source of discharges of untreated or partially treated sewage into the nation's waters," and its description of the severity of the problem left little to the imagination:

> Combined Sewer Systems collect sanitary sewage during periods of dry weather for conveyance to wastewater plants for treatment. However, during wet weather events, combined sewers also receive storm water, which typically causes a hydraulic overload of the system triggering the discharge to receiving waters of untreated or partially treated wastewater through combined sewer overflow outfalls.

In addition to the environmental and human health issues associated with CSO discharges, the Association estimated the cost of solving this problem to be in excess of 50 billion dollars. But without a stronger commitment from Congress on this issue, the Association warned that "hundreds of CSO communities nationwide may be forced to develop CSO control programs designed to meet inappropriate water quality goals and standards which they would then lack the necessary resources to implement." The Briefing explained that most combined systems had been installed at the turn of the century, with what then was state-of-the-art sewer technology, and then cited two case histories to illustrate the current problems facing typical New England communities.

For example, the 26 combined sewers in Manchester, New Hampshire, overflowed an average of 49 times a year, discharging 220 million gallons of sewage into the Merrimack River. In addition to other improvements, the City's Plan would reduce the overflow frequency to four events per year at a cost to the city of $82 million. The EPA's plan, with all of its improvements, would reduce the overflows to two

Worcester, Massachusetts: Waste Water Treatment Facility.

events per year, at a cost to the city of $130 million – meaning that Manchester would have to spend an additional $48 million to reduce CSO frequency from four to two overflow events per year. The City's Plan translated into $850 per year for each household, while the EPA plan would cost each household $1,100. The City's present rates for each household were a scant $238 per year. The Briefing stated, "It now appears that the City and EPA are close to negotiating a settlement which will include a multi-year program of separation, and other improvements to the sewers."

The second case history detailed a CSO Facility Plan that the Sanitary District of Augusta, Maine, had submitted to the Maine Department of Environmental Protection and EPA Region I in 1993. The Plan had finally received approval in July, 1995, and would be implemented over a 15-year period at a total projected cost of $28 million (in 1993 dollars), for a cost to the city of $1,500 a year per household. This meant that sewer bills would rise from one percent of the median household income to 1.5 percent. The Association concluded its discussion on this issue by voicing its support for an amendment to the Federal Clean Water Act, which had been drafted by the CSO Partnership, an organization representing CSO communities nationwide. This amendment called for realistic compliance schedules, modification of existing CSO consent decrees and administrative orders to allow for extended compliance schedules, and the authorization of federal grant-funding assistance for CSO control projects nationwide.

The importance of comprehensive watershed management emerged in the 1996 and 1997 Congressional Briefings. By 1998, the Association gave this discussion its most far-reaching and compelling title: *Watershed Management – The Future of Pollution Control.* "Future responsible growth," the Association said, "will be tied to a comprehensive watershed approach to pollution control and abatement." These Briefings sounded a practical and holistic strategy by asserting that:

> The watershed approach to water pollution control and mitigation is based on a complete look at the water resources in an ecologicaly defined area to include a watershed's uplands, surface waters, groundwaters, and the downstream discharge conditions from the watershed to the next ecologically defined area.

One of the keys to the watershed approach of decision-making would be public involvement, especially when it came to the allocation of limited financial resources to prevent and/or mitigate pollution.

Field's Point, Providence, Rhode Island:
Today, Field's Point is an example of a well-run wastewater treatment facility and in 1995 was named the Best Large Secondary WWTF in the Nation by the USEPA. The 65MGD plant treats an average of 42 MGD, and can handle up to 200 MGD in wet weather.

"Is it better to spend countless millions on sophisticated treatment of 'point' source waste streams," the Association asked, "or is it better to spend monies for treatment of urban runoff or even to implement new agricultural management practices to control farm runoff?" Making the public "a shareholder in the process" would help ensure that the methodologies used would receive the financial commitment to make them successful. Equally critical to the watershed approach was coordination between state and federal programs. The Association cited the recent Safe Drinking Water Act, the State Revolving Loan Fund program for funding watershed protection, the U.S. Department of Agriculture NonPoint Source Control Program, and various local groundwater/source water/wetlands/lake and shoreline protection programs as having individual and overlapping goals. To achieve their objectives and make effective use of their monies required a cooperative effort. The Association's major criticism, once again, focused on what it saw as major shortcomings in the nation's Clean Water Act:

> The Clean Water Act should be modified to manage water quality by considering all pollutant sources, ecological stresses and cross-media (air, land, and water) effects, and by coordinating regulatory timetables, control programs, and funding to gain the most benefit to the individual watershed.

The Clean Water Act's current point source control "is not conducive to our nation's future water quality needs," the Association stated, favoring new regulations that considered all pollutant sources and ecological stresses that can affect watershed quality. As an example, the Briefings cited New Hampshire for the fact that the health of its ocean beaches and shellfish beds was affected by numerous point and non-point pollution sources – illegal stormwater connections, boating impacts, urban and rural runoff, and combined sewer overflow problems from metropolitan areas:

> Control of pollutant generation and transport at the source rather than end-of-pipe treatment can be expected to be significantly more efficient and environmentally sound. Source control improves overall environmental effectiveness when coupled with facilities such as drinking water treatment plants, combined sewer overflow facilities, and wastewater treatment plants. Watershed management produces problem-solving approaches that foster good scientific and technical solutions.

Wallingford, Vermont:
A 60,000 gpd Oxidation Ditch facility.
In operation since 1972.

The Association also pinpointed the need to update state and Federal regulations and legislation regarding "cross jurisdictional borders in a watershed." It noted that parties causing upstream pollution frequently are insulated from the problems and concerns of downstream users:

A key example of this complexity is Mount Hope and Narragansett Bay. Its watershed includes not only Rhode Island's 1000 square miles, but even larger areas from Massachusetts rivers via the Blackstone and Taunton Rivers. The Connecticut River includes major portions of not only Connecticut, but also Massachusetts, Vermont, New Hampshire, and a small piece of Maine. New England abounds with such examples.

In 1999, on the eve of a new millennium, the Association was calling watershed management *The Water Quality Protection Tool for the 21st Century*, with a discussion that was both reflective and forward thinking:

The challenges in solving the remaining water quality problems, beyond traditional point source discharges, are in some ways more daunting than the water quality challenges that have been conquered over the past twenty-five years. The focus on solving water quality problems that are associated with a single identifiable source or pipe is changing. Attention must now be paid to other sources that are not discreet and readily identifiable but often lead to subtle, chronic water quality degradation.

The Association acknowledged that implementing an integrated watershed approach would be more complex than concentrating exclusively on small segments of a body of water or on a single contamination source. Effective watershed management required increasingly sophisticated monitoring, modeling, and analysis to develop cost-effective solutions to water quality problems. As the Association looked forward to the 21st century, it concluded that its success in effectively using the watershed approach would depend on continued technological improvements, sufficient financial resources, and a better understanding of how to prevent contamination from non-point pollution sources. Clearly, the Association's strategy had evolved over the decades into a more integrated, all-embracing approach. But in fact, its awareness of the watershed was evident from its very beginnings.

MOLECULES/MOMENTUM

All the water that will ever be, is, right now. (National Geographic)
Since NEWEA's work concerned groundwater as much as surface water, there was great attention paid to watersheds. New England, rife with rivers to carry commerce and streams to carry off waste, teemed with industry. Its myriad mills and congested canals poured pollution into every downstream village and town.

In the field of pollution control we have just begun to solve our problems; and we are caught up in a national storm of stream improvement, water quality, regeneration, good and bad publicity, Federal support and control, a veritable hurricane of activity.

Earl R. Howard, NEWPCA President
President's Message, January 1, 1963.

At many places in the northern reaches of New Hampshire, a molecule of water from a falling raindrop can flow either east or west, finding itself on an irrevocable journey through the Connecticut River watershed to Long Island Sound, or coursing through the Androscoggin River watershed to the Gulf of Maine. At certain points in Vermont, a molecule of water might make its way to Lake Champlain, then north along the Richelieu River to the St. Lawrence River, which empties into the North Atlantic at the Bay of St. Lawrence, the world's largest estuary; or that molecule might flow south and west along one of the many tributaries of the Hudson River and ultimately end up in New York Harbor.

And so it is with all watersheds. They're intricate webs of brooks, streams, ponds, lakes, and rivers, spread out like ganglia across the landscape, draining geographical areas comprising thousands of square miles. The New England watersheds are generally defined as those that empty into New England coastal waters spanning from the Bay of Fundy in eastern Maine, south to Long Island Sound on the Connecticut/New York border. And as the Association would repeatedly emphasize, the health of each of these watersheds is determined by the quality of the water in any one of its many tributaries. The six New England states cover 66,672 square miles, with approximately 6,000 miles of coastline, and six principal watersheds or river basins, all of them blessed with their original Native American names:

- Connecticut River (Drainage Area: 11,100 Square Miles)

Originates in the Connecticut Lakes on the New Hampshire/Canada border and runs 410 miles through New Hampshire, Vermont, Massachusetts, and Connecticut to Long Island Sound. Its major cities include White River Junction and Brattleboro, Vermont; Chicopee, Holyoke and Springfield, Massachusetts; and Hartford and Middletown, Connecticut.

- Penobscot River (Drainage Area: 8,610 Square Miles)

Located entirely in Maine, it is formed by the confluence of its East and West Branches, and empties into Penobscot Bay at Bucksport. Bangor is its largest major city.

- Kennebec River (Drainage Area: 5,900 Square Miles)

Located entirely in Maine, it begins at Moosehead Lake and flows 145 miles to the head of Merrymeeting Bay, seven miles north of Bath. The state capital of Augusta is its major city.

• Merrimack River (Drainage Area: 4,980 Square Miles)
Formed by the confluence of the Pemigewasset and Winnipesaukee Rivers in central New Hampshire, it is 128 miles long – 78 miles in New Hampshire, 50 miles in Massachusetts. It empties into the Atlantic Ocean at Newburyport. Its major cities are Concord, Manchester, and Nashua, New Hampshire; and Lowell and Lawrence, Massachusetts.

• Saco River (Drainage Area: 4,330 Square Miles)
Originating in the White Mountains, it flows 120 miles through New Hampshire and Maine and drains into the Gulf of Maine at Ferry Beach, south of Biddeford.

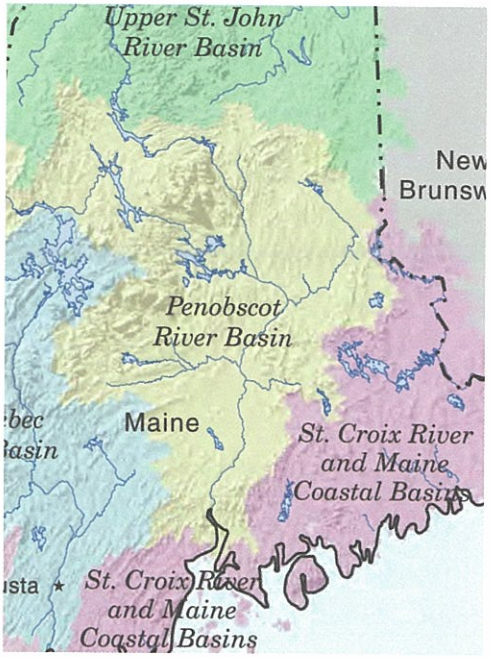
• Androscoggin River (Drainage Area: 3,530 Square Miles)
Flowing from Umbagog Lake in New Hampshire (part of the Rangeley Lakes chain), it runs for 170 miles through New Hampshire and Maine, and empties into Merrymeeting Bay at Brunswick and Topsham. Its major cities include the paper-mill communities of Berlin, New Hampshire; and Rumford, Jay, and Livermore Falls, Maine.

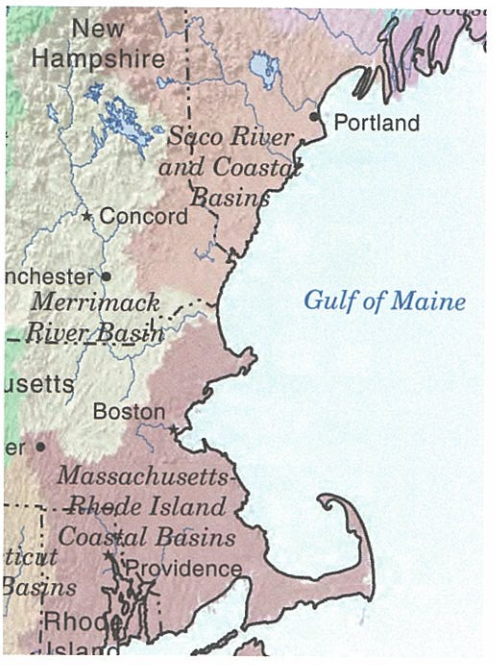
New England also has what are known as coastal sub-basins, which comprise numerous smaller watersheds. Among them are the:

• Connecticut Coastal Sub-basin (Drainage Area: 5,080 Square Miles)
Includes parts of Rhode Island, Massachusetts, and New York, from the Quinebaug, Shetucket, Thames, Quinnipiac, Housatonic, and Saugatuck Rivers, which drain into Long Island Sound. Major cities include Waterbury, Torrington, Bridgeport, New Haven, New London, and Norwich, Connecticut.

• Massachusetts – Rhode Island Sub-basin (Drainage Area 5,510 Square Miles)
Includes the sub-watersheds of the Cape Cod, Charles, Narragansett, Pawcatucket, and Blackstone Rivers, and the cities of Boston and Providence.

Location of Basins In, or Draining Into, New England:
The six New England states cover 66,672 square miles, with approximately 6,000 miles of coastline, and six principal watersheds or river basins.





In contrast to New England's six major river ecosystems, the Blackstone River Watershed drains an area of 472 square miles, about one-third the size of Rhode Island. The majority of the drainage area, 373 square miles, is in Massachusetts. The Blackstone is 46 miles long, beginning in Worcester at the confluence of Mill Brook and the Middle River, flowing southward to Pawtucket, Rhode Island, then cascading over the Slater Mills falls into the Seekonk River, which empties into the head of Narragansett Bay. Since the late 18th century, manufacturing communities have thrived on the banks of the Blackstone. In a 1991 article for the *Fact Sheet of the Rhode Island Sea Grant*, Meg Kerr wrote that:

> By 1800, the town of Pawtucket supported 29 cotton mills. Mill villages like Woonsocket, Blackstone, Millville, Uxbridge, and Millbury grew up all along the river. By the 1830s, there was one dam for every mile of river along the main stem and tributaries. By the early 1900s, the upper Blackstone River in Massachusetts was grossly polluted. In a report to the state legislature, the Massachusetts Department of Health stated, "The Department finds that the condition of the Blackstone River is offensive throughout its course, from Worcester to the state line at Blackstone. The condition of the stream is likely to grow worse until effective measures are completed for removing from the river much of the pollution which it now receives."

It is noteworthy, then, that in October of 1929 this troubled river would be the focus of the first independent meeting of the newly-established New England Sewage Works Association. We can only speculate as to exactly why Worcester was chosen as the place to convene. As the second largest city in Massachusetts, it certainly was a convenient venue for the 69 men who assembled at the Hotel Bancroft. In retrospect, it seems like a perfect choice from a strategic standpoint: a first solo meeting in a city located in a small watershed in central New England, with a contaminated river flowing through it. Given the decades of accomplishment that would follow, and the Association's evolution to a watershed management approach, the Worcester meeting was, indeed, a fitting first step.

While we briefly mentioned this meeting in an earlier chapter, it's worth taking a closer look to see how it provided a model for the ways in which the Association would grapple with issues and challenges. The presentations included:

Leominster, Massachusetts: 9.3-mgd advanced wastewater treatment plant that replaced primary and secondary facilities. (1983)

The Why and How of Sewage Treatment Plants, by E. Sherman Chase of Metcalf & Eddy in Boston. A roundtable discussion on *The Value of Plant Records and Simple Chemical and Biological Tests*, led by J.W. Bugbee, City Chemist for Providence, Rhode Island. A Description of the *Worcester Sewage Treatment Plant*, by J.C. Brooks, Superintendent of the Worcester Sewer Department, illustrated with lantern slides. *Summary of 1929 Operation Results of the Worcester Plant*, by R.S. Lanphear. Inspection of the Worcester Sewage Treatment Plant.

The structure of the meeting was impressive, logical, and well-thought-out: flowing from the theoretical and technical aspects of treatment plants as a way to improve local waters, to the daily minutiae of record-keeping and testing as empirical benchmarks for measuring improvements; from what might be called a case history of a specific treatment plant, to a visit to that plant to see first-hand the practical applications of all that had been discussed. Given the notoriety of the Blackstone River and the influence of the Worcester treatment plant on its water quality, this meeting had to have been rewarding, educational, and perhaps even inspiring for those who attended.

A year later, the Association convened at Fitchburg, Massachusetts, located on the badly polluted North Branch of the Nashua River, which flows into the Nashua, then into the equally befouled Merrimack River, which empties into the Gulf of Maine at Salisbury Beach and Newburyport, just below the New Hampshire border. Here again practical discussions *(Screenings, The Importance of Cost-Keeping for Successful Sewage Treatment Plant Operation,* and *Sludge Disposal)* were followed by a presentation about the local [Fitchburg] treatment plant, with an afternoon inspection of the plant. Over the next few decades, Association meetings would familiarize members with regional facilities and the improvements they had made to specific New England communities, watersheds, and coastal waters, among them:

- Blackstone River (Woonsocket, Rhode Island, and Leominster, Massachusetts).
- Boston Bay (Boston).
- Connecticut River (Hartford and Middletown, Connecticut; Springfield and Greenfield, Massachusetts).
- Housatonic River (Pittsfield, Massachusetts).
- Long Island Sound (Bridgeport, Norwalk, Greenwich, Connecticut).
- Providence River and Narragansett Bay (Providence, Rhode Island).

The 1939 Annual Meeting in Winchendon, Massachusetts, deserves special mention. Winchendon sits on the Millers River, with headwaters in the White Mountains and in the Winchendon area that eventually drain into the Connecticut River. But it was the infamously polluted Merrimack River and the historic innovations to clean it up that were the focus of one of the Friday morning presentations. Arthur Weston, Chief Engineer of the Massachusetts Department of Public Health, delivered a *Summary of the Experimental Work Done at the Lawrence Experiment Station*, which was located in one of New England's largest textile manufacturing communities. Since the mid-19th century, the Merrimack had provided abundant waterpower for the mammoth mills that lined its banks in Lawrence and elsewhere. A few miles upriver, the mills at Lowell were no less formidable, nor any less damaging to the quality of the Merrimack. But even before reaching Lowell, the Merrimack – which originates pristinely in the White Mountains – carried the detritus of the great mills of Manchester and Nashua, as well as the wastes of dozens of upcountry communities.

In 1886, the Massachusetts Legislature passed the Inland Waters Act, a landmark program designed to protect the state's rivers and streams. Among the directives of this legislation was a requirement for communities to test drinking water once a month and for experiments to be conducted on the most effective sewage purification methods. The first venue for these experiments was the Lawrence Experiment Station, described by Richard A. Scott, Supervisor of the Lawrence Heritage State Park, as:

> A modest wooden structure at the far end of Island Street, adjacent to the confluence of the Merrimack and Spicket Rivers. The building, constructed by the Essex Company [waterpower entrepreneurs of Lawrence], was 300 feet long by 10 feet wide by 10 feet high. Since it was nearly entirely underground, windows were placed in the roof to admit sunlight. In order to accommodate the State mandates, [engineer] Hiram Mills supervised the construction of testing equipment and 10 cypress-stave tanks, 17 feet in diameter by 6 feet in depth.

Mr. Scott goes on to explain that the cypress-stave tanks "were sunk into the ground and were filled with various substances (e.g., peat, garden soil, mortar sand, river silt) to test each for purification qualities. For these milestone efforts, the Lawrence Experiment Station has rightfully been called *The Birthplace of Environmental Research in America.*

This Station was recognized as the first of its kind in the world and, as such, attracted many young scientists and sanitary professionals, the first group comprised largely of men from the Massachusetts Institute of Technology. These pioneers in the sanitation industry produced a series of firsts, among them the design of a system of slow sand-filter beds for drinking water, which began operations in Lawrence in 1893 – and the first scientifically controlled water purification demonstration for the purpose of preventing diseases, which reduced the incidences of typhoid and other diseases in Lawrence. No less an authority than the Association's own Professor Gordon Fair wrote:

> Many of the early studies of water purification and sewage treatment at the Lawrence Experiment Station are counted among the classics of sanitary engineering literature. Some of them were so fundamental and so well conceived that they have continued to be reprinted in books on sanitary engineering for half a century. Most important American laboratories for sanitary research, whether supported by federal, state, municipal, or university authorities, are linked in one way or another to Lawrence.

For the ten-year old Association to have recognized the significance of educating its members in 1939 about these innovations is testament to its prescient vision for the organization and for the public health. More important, however, is an implicit watershed awareness that determined how the Association would grow and evolve.

As one of the half-dozen major New England rivers, the Merrimack in the late 19th century was the perfect subject for experimentation. And Lawrence – situated less than 30 miles from the ocean, an unwilling recipient of the wastes that flowed downstream from New Hampshire and Massachusetts, a major polluter in its own right – was the ideal location. The results of the Station's experiments and innovative solutions would transform the water-sanitation industry and the public health, first in the urban areas of Massachusetts, Connecticut, and Rhode Island, and eventually in the municipalities farther north. The lessons of Lawrence and the cities of southern New England would gradually be learned farther upstream, throughout the tributaries of all of the region's large and small watersheds, closer to the countless sources of pollution that were contaminating the waters for communities further downstream.

Crown and Eagle Mills,
North Uxbridge, Massachusetts:

The Crown and Eagle Mill, the centerpiece of Rogerson's Village in North Uxbridge, was the flagship of the Blackstone River Valley textile industry and the first mill to make cotton thread in Uxbridge. It was built by Robert Rogerson (the village's namesake) in two sections spanning the Mumford River. The first, The Crown, was named for the hometown of Rogerson's parents in England and completed in 1825. The second, The Eagle, was named for the symbol of the United States and completed in 1827. The Whitin family of Northbridge purchased the mill in 1841 and renamed it the Uxbridge Cotton Mills. It closed in the early 1920s. A fire destroyed the mill in 1975, the same year it was added to the National Register of Historic Places. The building now has been reconstructed for elderly housing, complete with gardens, 62 apartments, meeting rooms, and a library.

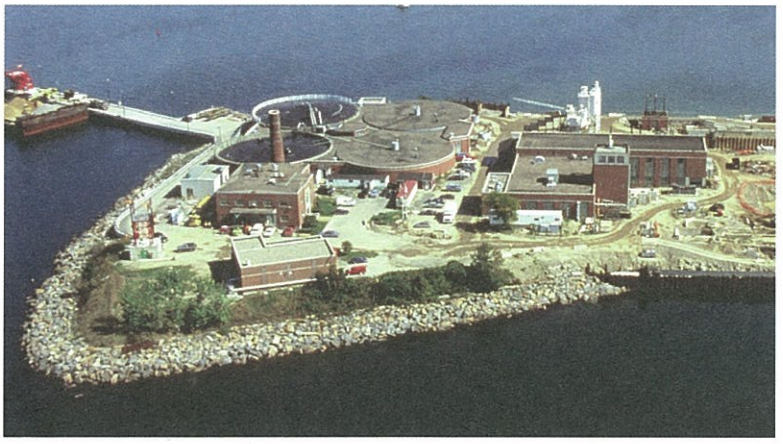
Photography: Randolph Langenbach, 1966

Similarly, the Association's educational and membership efforts reflected a strategy for expanding "upstream," as it were. While early meetings and members were centered around major cities in Massachusetts, Connecticut, and Rhode Island, the Association aggressively pursued and encouraged membership from rural areas in these states, as well as in Vermont, New Hampshire, and Maine. One can only assume that behind this strategy was an awareness that any substantial progress to clean the waters in New England's urban areas required the cooperation of communities upstream in New England's watersheds.

The Association would hold its first New Hampshire meeting in 1953, in Laconia, on the shores of Lake Winnipesaukee, one of the two headwaters of the Merrimack River. This meeting included visits to the treatment plants in Laconia and nearby Meredith, also on the lake. As late as 1957, the Association still had not held a meeting in either Maine or Vermont, prompting President Clair Sawyer to write in the March Newsletter, "It should be our objective to hold meetings in each of these states at our earliest opportunity." And in a typical burst of eloquence, Sawyer added, "Come, you fellows on either side of the White Mountains, bestir yourselves and make things real interesting for us." 1953 also marked the year of the Association's first Newsletter, which quickly became an effective tool for gathering and disseminating information about specific sanitation initiatives and sewage treatment projects. In announcing the meeting in Laconia, the first issue reported:

> The Meredith Sewage Treatment Plant is designed to serve a population of 1,500 and is ready to be placed in operation this coming summer. Facilities consist of an Imhoff tank, standard rate trickling filter, final settling tank, chlorine contact chambers, recirculating tank, and related facilities. Plant is primarily designed to relieve pollution in Laconia, New Hampshire.

A detailed description of the facilities and processes at the Laconia Treatment Plant concluded with the statement: "Clarified effluent is then discharged to the lake, settled sludge being transferred to the digestor after which it is dried in glass enclosed drying beds and trucked away." And a column entitled "Have You Heard" revealed that Portland, Maine, was planning to build its first sewage pumping station. The Association was clearly broadening its influence throughout New England as a vehicle for education, innovation, and change. The Newsletter helped strengthen and refine the Association's voice and seldom



Nut Island, Quincy, Massachusetts:
The 112-mgd Nut Island wastewater treatment plant, which treated flow from the southerly areas of the Boston region until the completion of the Massachusetts Water Resources Authority's Deer Island facilities in Boston Harbor, was repaired and upgraded repeatedly in the 1980s. (1990)

refrained from serving as an occasional bully pulpit. In October 1953, for example, an item in the "Have You Heard" column announced: "Old Orchard Beach [Maine] turned down a proposal to establish a sewage district to solve the sewage disposal problem existing there. Sounds like poor business for a community that depends so much on the tourist trade."

Within a few years, the Newsletter added a feature called *Progress Reports,* which solicited and printed information from all six New England states on sanitation studies, construction and improvements of sewerage systems, and updates on sewage treatment plants in communities, industries, and state and military facilities. For Association members, these reports charted the slow but steady progress of water sanitation throughout the region and the specific streams, rivers, watersheds, and coastal waters that were affected. For example, in 1955, the membership learned that:

Andover [Massachusetts] has constructed an Imhoff tank and trickling filters to serve the Village of Ballardville. The effluent of this plant discharges to the Shawsheen River, a tributary of the Merrimack River.

Lennox, the Hampshire County Tuberculosis Hospital at Northampton, and Marion have rehabilitated their Sewage Treatment Plants. Marion has also installed permanent chlorinating facilities to disinfect the effluent prior to discharge to Aucoot Bay." [an estuary of Buzzards Bay].

New Bedford has rehabilitated several of its sewage pumping stations to prevent the continued discharge of raw sewage to Clark Cove and the Acushnet River [estuaries of Buzzards Bay].

At the same time, these reports grimly reminded Association members that sanitation facilities in specific communities were dangerously inadequate – and in some cases, non-existent. Consequently, in 1955, members would read this alarming submission from Connecticut:

A New York engineering firm was completing plans and certifications for Norwich [on the Thames River] to comply with a cease and desist order of the State Water Commission.

And other *Progress Reports* from Massachusetts were equally revealing:

Amoskeag Mills,
Manchester, New Hampshire:
In 1810, the Amoskeag Cotton and Woolen Manufacturing Company took over a small mill on the Merrimack River near Amoskeag Falls. A group of Boston entrepreneurs bought the company, re-incorporated it as the Amoskeag Manufacturing Company, and purchased water-power rights to the entire river. For more than a century, the Amoskeag Manufacturing Company flourished here, operating 64 mills along a mile-and-a-half of river-front, housing 700,000 spindles and 23,000 looms which turned out 500,000 yards of cloth each week. During the Civil War, Amoskeag operated a foundry, producing rifles, locomotives, and textile machinery. At its peak in 1915, the mill had 17,000 workers and eight million square feet of floor space.

Photography: Randolph Langenbach, 1968

Deerfield has appropriated funds and plans have been approved for the construction of sewage treatment works to serve the community which now discharges its waste without treatment to the Connecticut and Deerfield Rivers.

Russell has appropriated funds for construction of a sewage treatment plant to treat the sewage from the Village which now discharges without treatment into the Westfield River [which joins the Connecticut River at Agawam].

Chicopee faces a hearing requested by the Director of the Division of Accounts with respect to the ability of the city to finance a program of construction of suitable works to prevent the pollution of the Connecticut and the Chicopee Rivers by the city.

Over the next few years, the Association would report that in Rhode Island:

The U.S. Navy has undertaken a project of intercepting the individual sewer outlets from the U.S. Naval Fuel Depot at Melville, which currently discharges into Narragansett Bay.

And from Bennington, Vermont, came this submission:

Consulting engineers for the city have submitted an engineering report on sewage disposal to the city. The report recommends a new interceptor at a cost of $777,000 and a sewage treatment plant to cost about $500,000. The proposed interceptor would eliminate the many town and village sewers now discharging into the Walloomsac River at various points. [The Walloomsac is a 30-mile river that flows to the Hoosic River, a tributary of the Hudson River.]

Additional reports would come in from Vermont about the town of Randolph – which was discharging into the White River, a tributary of the Connecticut River – and Proctor, which discharged its wastewater into Otter Creek, a bucolic 100-mile river that empties into Lake Champlain. In 1957, the Newsletter informed the membership about two extreme situations that necessitated prolonged legal action, emblematic of the local frictions caused by increasingly stringent pollution regulations. In northeastern Massachusetts, the coastal town of Ipswich reported:

1955 STATUS REPORT FOR MASSACHUSETTS AND CONNECTICUT CLASSIFYING THE MAIN STEM OF THE CONNECTICUT RIVER

From Junction of the Deerfield River to the Holyoke Dam:	Present Classification – Class C	Recommended – Class B
From the Connecticut/Massachusetts state line to junction of Farmington River:	Present Classification – Class D	Recommended – Class C
From Junction of the Farmington River to Junction of Park River at Hartford:	Present Classification – Class C	Recommended – Class C
From Junction of Park River at Hartford to Hurd State Park in East Hampton:	Present Classification – Class D	Recommended – Class C
From Hurd Park in East Hampton to Saybrook Point at Long Island Sound:	Present Classification – Class C	Recommended – Class B

From the Holyoke Dam to the Connecticut/Massachusetts State Line: No Classification Reported

At a recent town meeting [Ipswich] has finally voted funds for the construction of a sewerage system and sewage treatment plant to clean up the Ipswich River. This matter has been in the hands of the Attorney General for the past several years, and this action prevented further legal action by the Attorney General's office.

And under the heading, *Goffstown Controversy Ends*, the Newsletter reported on what we can only assume was a tortuous and ugly conflict between the state of New Hampshire and the town of Goffstown, located on a tributary of the Merrimack River:

Residents of Goffstown met in special session on December 9, 1956, and approved a $260,000 bond issue to finance construction of sewage treatment works to abate pollution of the Piscataquog River, in accordance with the order of the New Hampshire Water Pollution Commission. The State has guaranteed the bonds, and bids for construction have been received. The matter has been in both the Superior and Supreme Courts of the state for nearly a year with each court decision upholding the propriety and validity of the Commission's order. Six town meetings and a Superior Court threat of a contempt finding preceded Goffstown's action in complying with the order.

Eventually, more information from Maine began flowing into the Association, including this intriguing entry, also from 1957:

Potato-starch mill waste, one of the major sources of pollution to the streams of Aroostook County in Maine, is being used experimentally to produce quality beef. Dry potato pulp has proven to be an excellent beef fattening ration, costing about 2/3 as much and producing as good or better quality beef than corn, according to information available on experiments to date.

The Association also tracked and reported to its members the status of major river classifications, gathering its information regularly from the New England Interstate Water Pollution Control Commission (see sample of status report above). In 1960, the Newsletter's report on *New Hampshire Water Pollution Activities* included a summary of the state's classified waters, submitted by Mr. Terrence Frost, Water Pollution Control Biologist. Mr. Frost reported: "The legislature has classified about 8,800, or about 55 percent, of the approximately 16,000 stream miles within New Hampshire. Of the more than 9,300 square

1960 DISTRIBUTION OF CLASSIFIED WATERS

Classification	Stream Miles	Percentage of Total Miles
A	397	4.5
B-1	8,047	91.4
B-2	289	3.3
C	8	0.1
D	62	0.7

miles of area in the state, over 59 percent is drained by classified waters." Mr. Frost included a breakdown of the classification distribution (see chart above). That 91.4 percent of New Hampshire's stream miles were classified as B-1 had to have resonated positively with the Association membership. For the next decade, the Association regularly kept its members updated on dozens of specific projects, often identifying the specific waters affected by these improvements. In 1962, Connecticut reported that:

A joint treatment plant serving the Villages of Farmington and Unionville on the Farmington River is almost completed. Also nearing completion are a primary treatment plant for Thomaston on the Naugatuck River and an activated sludge treatment plant for Branford on Long Island Sound. New Canaan has received bids for enlarging and renovating its existing activated sludge plant on the Five Mile River. Final plant and specs for alterations and additions to the Meriden Sewage treatment plant on the Quinnipiac River and for sewers and a treatment plant in Bethel on a tributary of the Still River have been completed.

In 1963, the Association reported three interrelated initiatives regarding the Merrimack River in Massachusetts:

1) An $80,000 appropriation by the Massachusetts Legislature in 1962 for the Department of Health to investigate the present state of pollution on the Merrimack River and to prepare a plan for the needed sewage treatment facilities. 2) A special commission to study the setting up of a Merrimack River Valley Abatement District. 3) Upcoming construction of a sewage treatment plant at Newburyport, at the mouth of the Merrimack.

And elsewhere in Massachusetts, the Association noted projects in other watersheds, among them:

- Completion of a new Pittsfield-Dalton sewage treatment plant on the Housatonic River
- Near completion of a new plant in Williamstown on the Hoosic River, a tributary of the Hudson River
- Recent construction on a plant in Montague on the Connecticut River.

Starting in the mid-1960s and continuing for the next few decades, the Association's reach would consistently extend farther north, growing its membership and holding dozens of bi-annual meetings in Vermont, New Hampshire, and Maine.

Papers, presentations, and tours of community and industrial wastewater treatment facilities increasingly addressed pollution control issues throughout the life of the major New England rivers. These included:

The Androscoggin River Watershed

Tours of the Brown Paper Company wastewater treatment plants in Gorham and Berlin, New Hampshire [forty miles downstream from river's headwaters.]
Paper Mill Wastewater Treatment and Sludge Handling.
Lake Eutrophication Problems Lead to Advanced Wastewater Treatment Plant in Rangeley, ME [a community located among the river's headwaters.]
Effluent Treatment at Great Northern Paper [another industry with a significant presence on the river.]
Lewiston and Auburn [Maine] Go it Together.
Energy Efficient Wastewater Treatment for Wilton, Maine: A Case Study.

The Connecticut River Watershed

Tour of the Groveton Paper Company [New Hampshire] 7 MGD Secondary Treatment Facility.
Tour of the Bretton Woods Resort treatment and spray irrigation facilities.
Consolidation of Five Sewer Systems and New Treatment Facilities at Hanover, New Hampshire.
Tour of the White River Junction, Vermont, wastewater treatment facility [at the confluence of the White and Connecticut Rivers.]
Temporary Sludge Dewatering Facilities at Northampton, MA.
Post-Construction Report and Observations on Holyoke Treatment Plant".
Hartford Water Pollution Control Secondary Treatment Design.
Tour of Pratt & Whitney [CT] pre-treatment and industrial waste treatment facilities.

The Kennebec River Watershed

Evaluation of Waste Treatment Alternatives for the Moosehead Sanitary District in Greenville, Maine [located at the headwaters of the Kennebec.]
Greenville, Maine – Two Years Later, a follow-up presentation.
Combined Sewer Overflow Abatement Planning on Maine's Lower Kennebec River Basin.

The Merrimack River Watershed

Nashua's Ten Million Dollar Water Pollution Control Project.
Hazardous Waste Clean-up at Nashua, New Hampshire.
WPC Plant to Treat Municipal and Industrial Wastewaters, Haverhill, MA.

The Saco River Watershed

Tour of the Waterville Valley, New Hampshire wastewater treatment plant.

The meetings also focused on other areas of New England that were situated in other watersheds, among them:

The Hudson River Watershed
Spray Applications of Wastewater Effluents of West Dover, VT.
Winter Spray Irrigation of Treated Sewage Effluent at Bromley Mountain, VT.
Adams [Massachusetts] Solves its Water Pollution Problem.
The Massachusetts/Rhode Island Sub-basin
River Basin Planning for Water Quality Management in Massachusetts.
The St. John River Watershed (Maine and Canada)
Saint John River Basin Quality Management Study.
The St. Lawrence River Watershed
Removal of Phosphates at Newport, Vermont [a community located at Lake Memphremagog on the Canadian border.]
Tour of Stowe, Vermont .175 mgd AWT Facility.
Design and Operation in Partnership at the Saranac Lake Wastewater Treatment Plant.
Tertiary Treatment by Soil at Lake George Village Sewage Treatment Plant.
Water Quality – Lake Ontario – Past, Present and Future.

PAST/FUTURE

If there's magic on this planet, it's contained in water. (Loran Eisely)
NEWEA's magic has its origin in water. But that magic is sustained by its members, who discover in the Association the magic of connection. Equal parts family and culture, combining professional concern and personal caring, NEWEA's magic has its destination - its destiny - in its members.

Photography of Sewer Cover: Sharon Shea

We accept the challenge to be leaders in our profession. We know that we can and will contribute significantly to improving our environment for the benefit of those who will follow us. It is this heritage which our predecessors left to us. We will guard, protect and nurture it as an expression of appreciation to them and as a gift to those who will follow us.

Edward J. Bayon, NEWPCA President
50th Anniversary Commemorative, 1979.

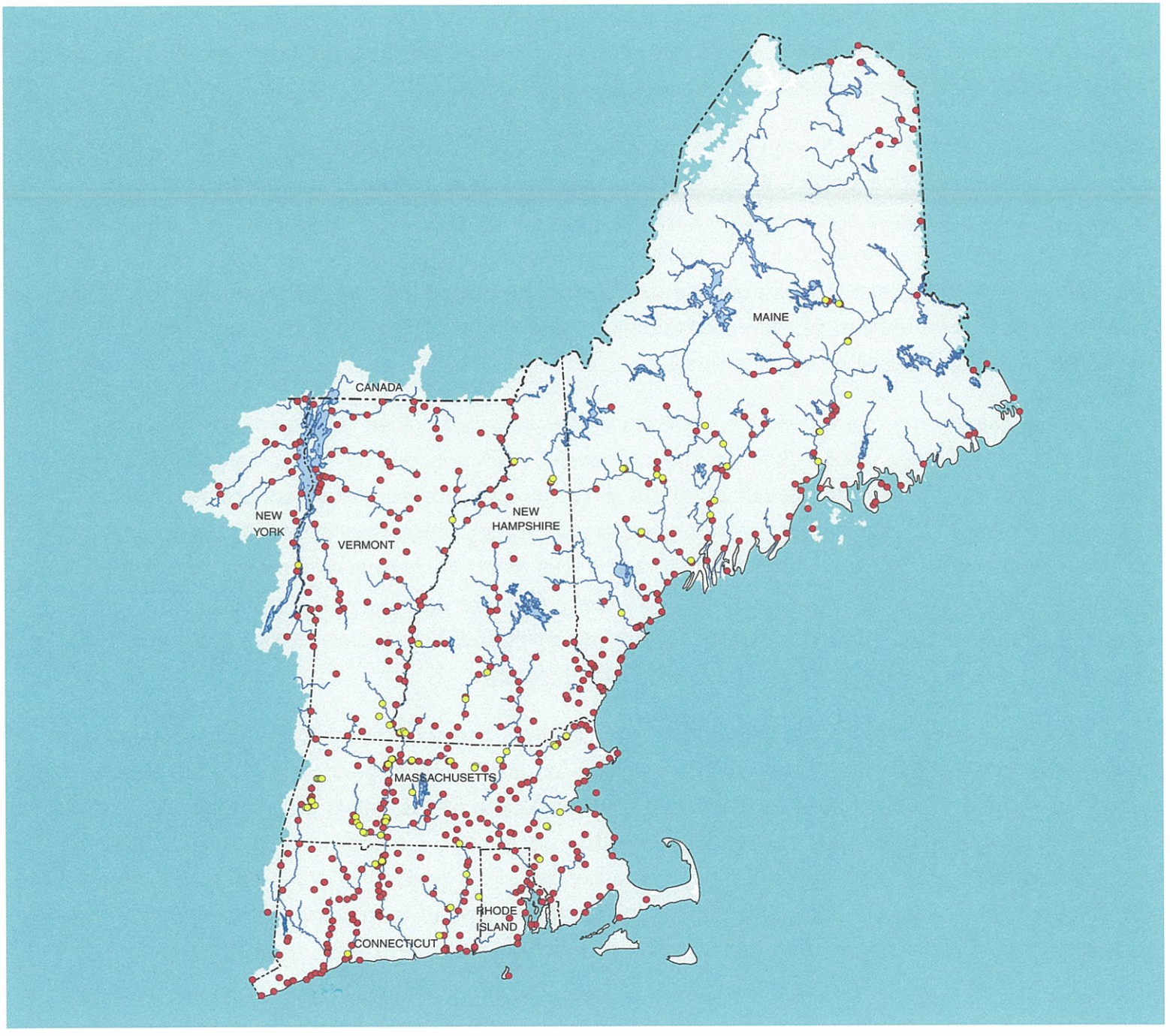
Mr. Bayon was referring, of course, to the natural environment as our heritage. Yet to the members of NEWEA, regardless of generation, his remarks about heritage apply equally to the Association. Seventy-five years is a long time. Politics changed. Popular causes changed. The world changed. NEWEA's mission changed not at all. By the same token, seventy-five years is but a moment in the existence of water. Civilization sprung up around it. Commerce thrived on it. Industry all but destroyed it. NEWEA was founded to save it. In seventy-five years, NEWEA's knowledge, its technical capability, and the scope of its purview, its responsibilities, and its effectiveness increased.

As the journey of water continues its endless cycle, so the journey of NEWEA continues. More than 2,000 members participate in more than three dozen committees. They conduct countless activities, including well-attended Annual and Spring Conferences; specialty workshops and awards presentations; social galas; fund-raising golf outings; educational and community-outreach programs; the *Journal of the New England Water Environment Association*; and student scholarships, grants, paper competitions, and awards. The Association's undertakings are, in fact, limited only by the imagination of its ever-evolving membership and its ever-increasing concern for the environment we share. Time doesn't diminish the imagination, the concern, and the enthusiasm of NEWEA's older members at all. Their voices and faces mix the lines of lessons learned with youthful buoyancy and vitality, born anew in their senses of accomplishment, pride, and commitment to the challenges yet ahead. The Association's younger members carry the torch and keep it alight – deriving reverence for the work of their forebears, discovering relevance in their sense of responsibility to the future.

Like a cross-generational chorus, NEWEA's members sing the praises of the Association for bringing together disparate factions within the wastewater industry – engineers, academics, operators, researchers, manufacturers, and regulatory agencies. They laud the Association for an inclusiveness seldom seen among professional organizations. Marty Weiss (President, 1980) recalls, "There were no professional or academic requirements, just interest in the topic and the work. Our Constitution said, *Anyone with an interest.*" Al Schiff (President, 1985) emphasizes the Association's "geographic and professional diversity, along with a good turnover of ideas, new thinking, and new technology," adding that one of the Association's strengths is the fact that "there are no entrenched committees." In fact, every

Permited Municipal and Pulp-Paper Wastewater
Discharge Locations in New England.

- Municipal Sewer System.
- Pulp and Paper Facility.



committee is required to conduct its own specialty conference every three years to maintain its legitimacy. Others of that generation talk about the self respect, the prestige, and the recognition the Association has always brought to its membership and to the wastewater industry.

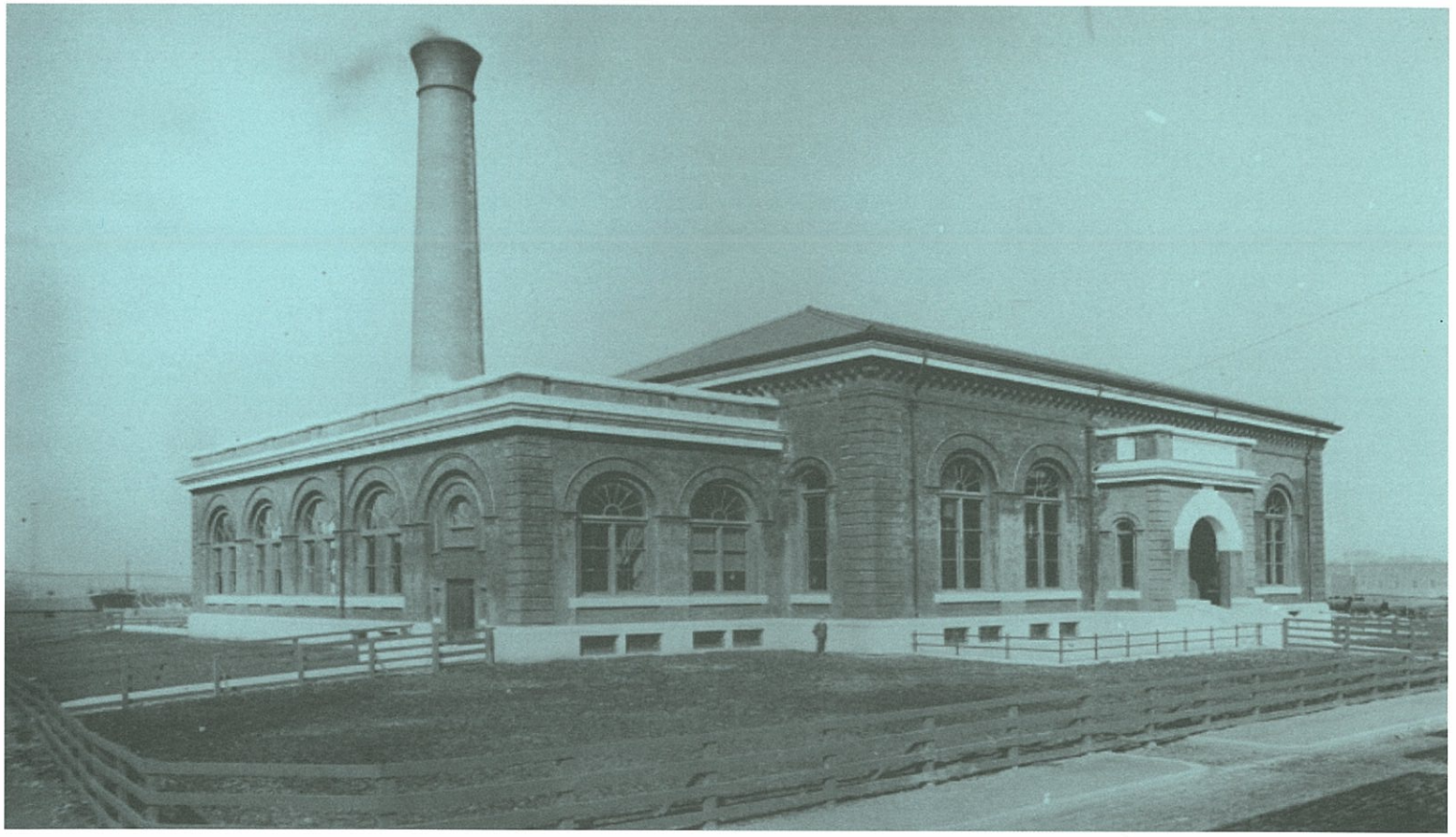
The self-interest of youth is reflected in the comments of NEWEA's younger members. Some of them talk about the opportunities for career-advancement provided by the Association, about their NEWEA memberships being shared commitments between themselves and their employers. They describe NEWEA as a forum for making business associations, for problem-solving, for acquiring mentors, and for interacting with legislators and regulators. Nevertheless, they are wisely mindful of the fact that NEWEA's power lies in its community of peers, in common interests, in the unflagging professional respect and personal regard that prevails among members.

Those same younger members describe the Association as friendly, close, welcoming, and caring. According to Erin Mosley, 2004 Public Education Chair, NEWEA provides an "addictive feedback loop, giving the comforting feeling of a small world, bringing together professional competitors as friends, promoting and valuing volunteerism, providing leadership opportunities, and promoting career growth." Katherine Mello, 2004 Program Chair, recalls that she was asked numerous questions at the first NEWEA meeting she attended, all of which made her sure she was in the right place and there to stay: "People asked me, 'How are you?' 'Are you happy?' 'Are things going well?' They were very supportive. Every question was one of personal caring, acceptance, and inclusion."

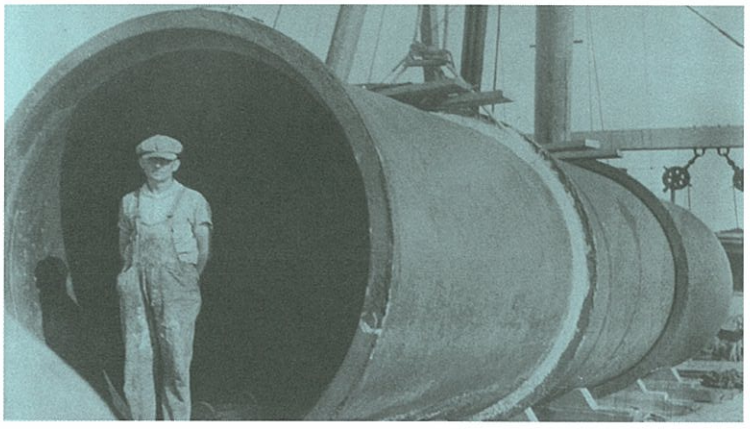
Other themes resound across NEWEA's generations, as well. The emeritus members are unanimous in crediting the Association with establishing certification for waste-water operators before the New England states did, and for offering reciprocity to other organizations and states. Marty Weiss asserts, "We had certification for waste-water operators before any other states. And we offered reciprocity to other organizations and states. Joe Hanlon from Nutt Island pushed for certification in an effort to cultivate more educated, qualified operators. Changing technology created the need for training and certification. And we wanted to resolve increasing friction and misunderstanding between operators and engineers."

Deer Island, Boston, Massachusetts:
In 1876, State legislators approved the construction of the Boston Main Drainage System. The new system, built between 1877 and 1884, diverted sewage from 18 cities and towns to Moon Island in Boston Harbor. Expansions to the sewerage system continued through the early 1900s. The system soon became recognized as one of the best in the country, though it provided no treatment. It merely collected the wastewater and sent it out into the harbor.

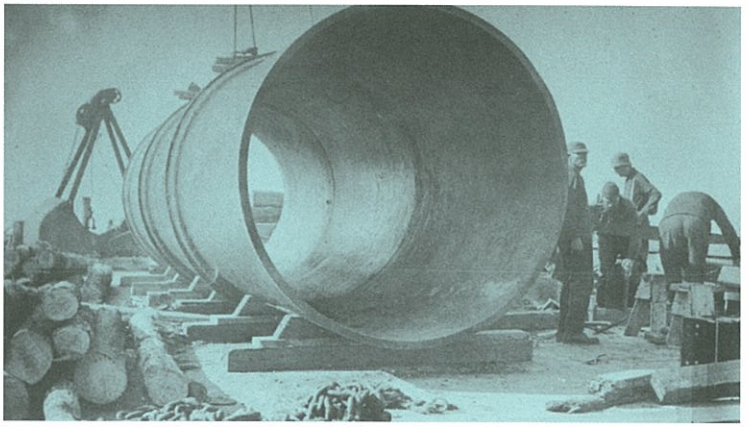
Dee Island, Ward Street Pump Station, 1905



Deer Island Drainage System, Pipe on Lighter, 1917



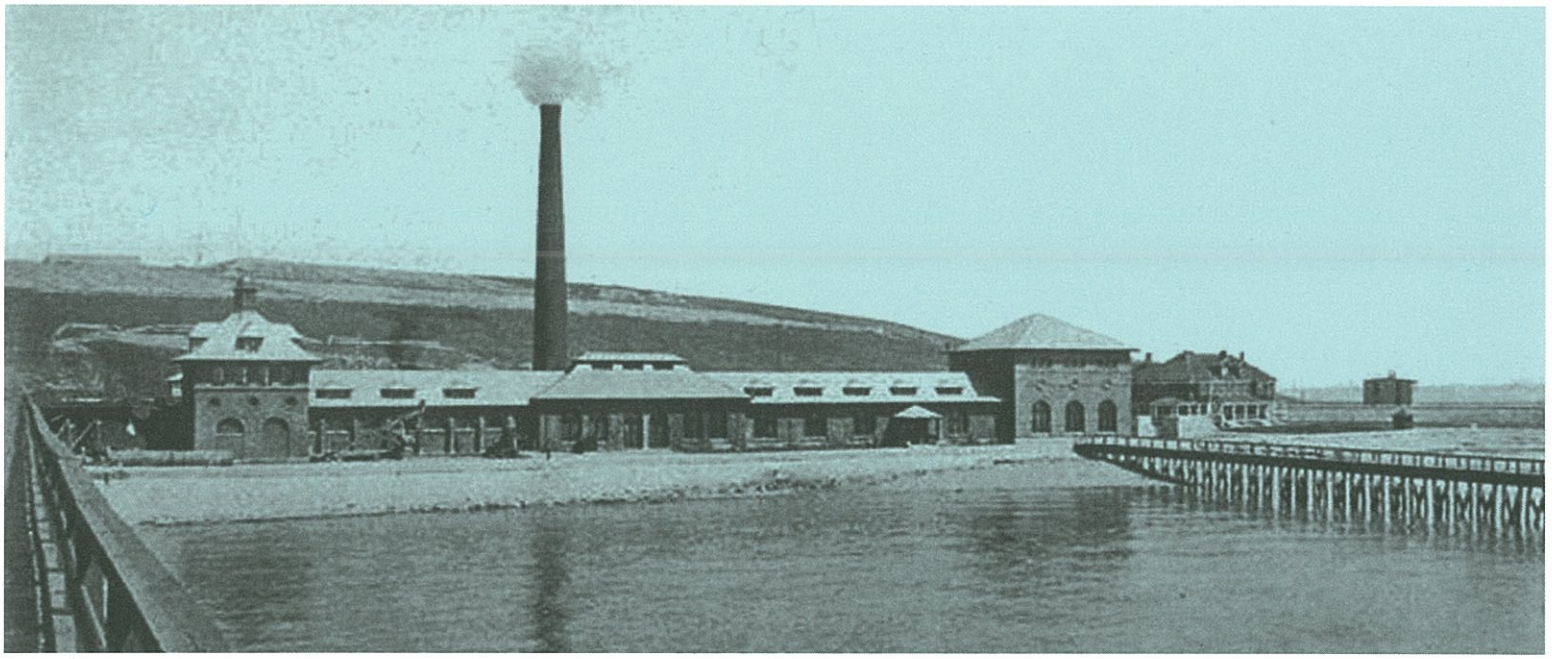
Deer Island Drainage System, Testing an 84-Inch Pipe, 1917



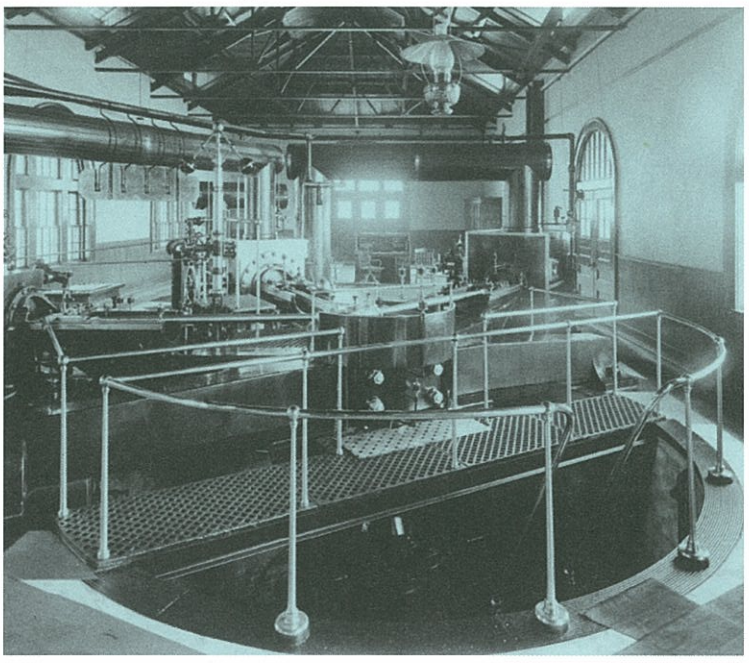
Deer Island, Boston, Massachusetts:

By 1933, due to sewage pollution, all shellfish taken from the harbor required purification. In 1940, city planners recommended the construction of treatment plants at each of the harbor's three raw sewage discharge locations: Moon Island, Nut Island and Deer Island. The Deer Island Primary Wastewater Treatment Plant was completed in 1968. Sewage from the northern collection system received treatment for the first time. Though Metropolitan Boston's sewer system was one of the best in the country, decades of neglect brought it to the brink of disaster in the early 1980s. Because the level of wastewater treatment was below federal standards, a federal court order mandated the construction of a new treatment plant in 1985.

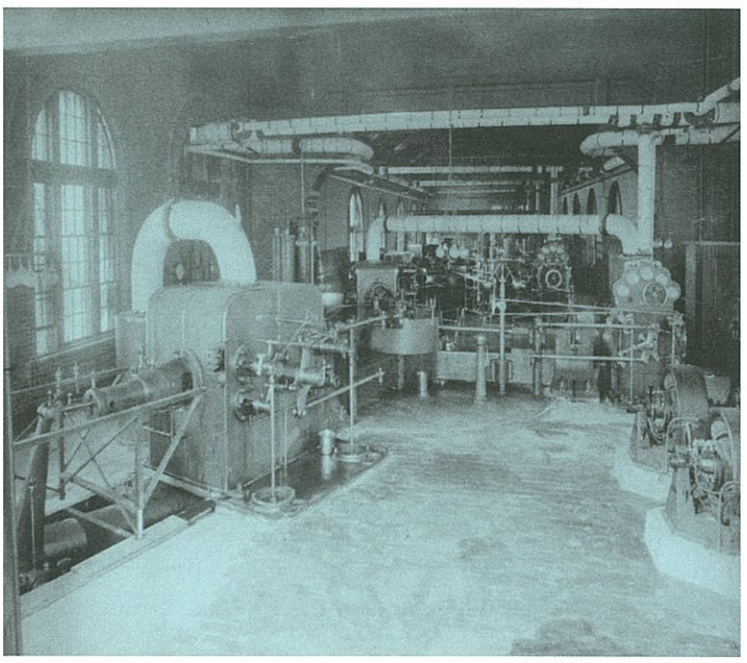
Deer Island, Ward Street Pump Station, 1905



Deer Island, Steam Pump, 1905



Deer Island, Steam Pump, 1905



Not surprisingly, NEWEA's youthful contingent believes the Association's technical viability has been sustained over the years. They applaud the Association for maintaining its technical relevance, believing NEWEA's technical competence and credibility is its core. They're proud that the Association's well-established technical prowess has produced meaningful results – causing changes in permitting requirements, raising standards by which environmental cleanliness is measured, and changing perceptions about environmental responsibility. Erin Mosley describes NEWEA's role as that of providing "nuts and bolts environmental protection." Lisa Gove, of the 75th Anniversary History Book Subcommitee, suggests it's not time to rest just yet: "Under increasingly stringent NPDES permit limits, new technologies have evolved, and we are challenged to design more efficient and complex treatment systems. NEWEA provides an important forum in which to share ideas and lessons learned, to the benefit of the environment." [NPDES is the National Pollutant Discharge Elimination System, initiated by The Federal Water Pollution Control Act amendments of 1972.]

If there's anything like a defining cause by which the older members mark the Association's arrival as an agent of meaningful change (dare we call it a watershed?), it has to be the Clean Water Act of 1972 (PL 92-500). Indeed, that historic legislation – and NEWEA's role in its passing – was nothing less than a test of the founding and future mission of the Association. Bruce Eaton, an emeritus member, who started editing the *New England Sewage and Industrial Waste Association (NESIWA) Journal,* after attending his first meeting in 1953, in Laconia, New Hampshire, is quick to point out: "NEWEA, led by Al Peloquin, was the first group to meet with the Federal Environmental Protection Agency, precipitating 92-500, which required secondary treatment of sewage and waste water." The ever-outspoken Marty Weiss goes a step further in saying, "92-500 started a revolution. The Federation was not proactive. The American Water Works Association (AWWA) learned from that and got busy. The Association of Municipal Sewer Agencies (AMSA) was formed after 92-500. But we led the charge."

And no discussion of 92-500 is complete without citing the leadership of Al Peloquin. He is recognized by his peers as the strategist who orchestrated the Association's efforts to enable state compliance with 92-500's unfunded Federal mandates. While Mr. Peloquin dismisses such recounting of his influence with characteristic modesty, he agrees with many of his comrades-in-arms that one of the Association's

greatest achievements is providing a cohesive voice, a "coalition of points of view and coordination" for environmental legislation. He stresses the importance of "cooperation of the Association, the interstate commissions, and other parallel organizations. Without that activity, it would be difficult to make the Clean Water Act enforceable." For many of NEWEA's elders, the Clean Water Act was a touchstone for much broader issues about the complex and evolving relationships between society, technology, and politics. Bruce Eaton sums it succinctly: "We can't let politics and lawyers determine our solutions to environmental problems." And former CDM President and CEO Bob Marini wonders, with a hint of worry, "What will be the bigger economy of the future: engineering or law?"

It's a concern reiterated again and again as NEWEA's seniors look to the future. Most agree that non-point source pollution, often tolerated for economic reasons, is a huge problem. They fear that some bodies of water won't ever recover from run-off. In more optimistic moments, they cite the industry's growing focus on reclamation of water for irrigation, for fire-fighting, and for industrial and other purposes. All agree that NEWEA needs to maintain its leadership and that solutions to wastewater problems should be more the purview of science and technology than politics. But Frank Mahony (President, 1969) spoke for many when he issued this cautionary statement: "Technology is in disrepute. It's disconnected from the public which is questioning science." And that, too, is on the minds of NEWEA's younger members.

Chloe Peterson, 2004 Registration Chair, sounds a similarly portentous note in citing the difficulty of attracting media attention to the more positive aspects of the wastewater industry: "It's really a complicated set of challenges. In the first place, the media rely on sensationalism to sell news. So, if we have bad news, we get coverage. If we have good news – and there's always more good news than bad – we get ignored. That's sort of the ongoing challenge of trying to make wastewater sound sexy. Beyond that, concerns about the environment seem trivial in contrast to the alarming issues of homeland security." Bob Button, 2004 Meeting Management Chair, adds another layer to the dilemma: "In a way, it's like our children's perception of the telephone. Engineering has accomplished so much that its accomplishments – and public perceptions of engineers – have been diminished. We no longer hold engineers in the same high regard in which they're held in other parts of the world. So, we even have a difficult time attracting attention to the profession, its accomplishments, and its potential to continue changing the world for the better."

Deer Island, Boston, Massachusetts:

The upgrade of this mega sewage and wastewater treatment facility was the largest construction project in the United States from 1988-1993. The $5.5 billion Boston Harbor Cleanup project was a massive engineering and construction achievement as well as a state-of-the-art wastewater treatment plant. The project was carried out under a 1986 federal court order that directed the clean up of Boston Harbor, a result of the region's violation of the Federal Clean Water Act and to improve the harbor for recreational and commercial uses. The project provided primary and secondary treatment for sewage wastewater generated by 44 communities, which have a total of more than 2,000,000 residential housing units and more than 5,500 businesses and factories. It improved public health, provided environmental benefits, and met or exceeded all regulatory requirements of the federal Clean Water Act, a vast improvement over the multi-city individual facilities that served the greater Boston metropolitan area in the past.

But at the end of any discussion, all of NEWEA's members, regardless of their age, return to the inclusive nature of the Association and their joy in belonging. It's a group that celebrates diversity and succeeds at acculturating differences. CDM's Bob Marini speaks for the Association in noting: "NEWEA is attracting young people. Plus, this is no longer a business that's dominated by males. Twenty-five percent of our membership is female; and more and more of our committees are chaired by women." Bob Cutone, 75th Anniversary Chair, elaborates on the way the Association's culture combines amenable inclusion with hard work: "The affiliations are more social than technical, with emphasis on awards and prestige. We work hard, and we play hard. And we emphasize recognition and certification. This still is a volunteer association that attracts 1,500 to 1,600 people to our Annual Conferences." The Association's size notwithstanding, Frank Mahony notes, "There's very little room for phonies."

All of NEWEA's members – regardless of age, tenure, or affiliation – fondly recall the Association's social fabric and its bountiful pleasures – lifelong friendships, endless memories, and limitless laughter. In suggesting we call attention to NEWEA's knack for good-natured mischief-making, Bob Marini quipped, "You ought to call this book *Hellraising.*" The rest we will leave to the musings of the reader, except for this one thing: NEWEA is quite proud of its *Five S Society* – the *Selective Society of Sanitary Sludge Shovelers.* Founded to encourage what the members refer to euphemistically as getting involved, the *Five S Society* acknowledges "Outstanding meritorious service above [one also imagines below] and beyond the call of duty." With the caveat that induction, initiation, and integration can by conducted only by the Influent Integrator, newly selected shovelers are figuratively raised "on the official shovel to the highest ridge on the sludge bed, with the title of *Select Sanitary Sludge Shoveler* and all the honor, atmosphere, perquisites, and dignity appertaining thereunto." All inductees become *Five S* members for life, and don the official Five S Shovel – the Gold Shovel Pin – the wearing of which identifies the wearer as a member in good standing. Failure to wear the Gold Shovel Pin during a NEWEA meeting could cost the offending Shoveler a round of drinks.

Most certainly, the end of this book does not mark the end of the NEWEA story. In the same President's Message excerpted earlier (see *New England Watersheds* on page 75), former NEWPCA President, Earl Howard, described the Association as "a gathering place for our talents, a beacon of guidance for others in our profession, and a safe harbor for the mutual exchange of ideas and discussion of our problems."

NEWEA is, indeed, a gathering place and a beacon, signaling a safe harbor, literally and figuratively. The Association's journey does, indeed, transcend generations. It has done so for more than seven decades. In ways as moving as they are impressive, the words of the Association's founders echo in the messages of NEWEA today. The passion of the founders is rekindled by the unyielding conviction of even the Association's youngest members that clean water is not a right to which we're entitled – it's a privilege to be earned and preserved every day. The achievements of the founders are recalled and reflected in every accomplishment by which NEWEA's members refuse to accept the environmental complacence of others, even as they accept the responsibility to clean up after that complacence. NEWEA is a testament to hope. Its work goes on. So does the journey.

When you drink the water, remember the spring. (Chinese Proverb)

This book is about a journey. It is about the journey of water from source to destination, from ground and sky to fountain and faucet, from well to waste and back. It is about the journey of the New England Water Environment Association from idea to institution. It is the same journey.

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