

## Chapter 7 – NEWWA – the people, the forums, the difference they made

### Beginnings – The idea of a water works organization

The original idea of forming a national water works organization is credited to James W. Lyons of Salem MA. As early as 1877, he bounced this idea off of several of his water works associates who agreed to help pursue the matter. With the encouragement of his peers, he sent 400 letters in 1879 to all of the existing water supplies in the country. He received 70 replies, most of them supportive. However, he dropped his pursuit, noting later that the low response discouraged him. Others would later look at the written responses to his original letter and comment that there was sincere interest in many of them. The seed that he planted took hold and grew, because on March 21, 1881, the American Water Works Association was formed, a tribute to both Mr. Lyons' initiative and to the Water Works professionals that saw merit in the idea and wouldn't let it drop.

### The Founding Fathers of NEWWA

The next steps were taken by an inspired group of supporters of the original Lyons proposal. In an informal meeting between Horace G. Holden, Superintendent of the Lowell MA works, Frank E. Hall, the Worcester Superintendent and Robert C. P. Coggeshall, the New Bedford Superintendent, a decision was made to pursue the idea of a New England organization. The fact that they were informally meeting in Lowell to compare experiences suggests their strong interest in sharing knowledge, especially in light of the difficulties of making a journey across the state in those days. That same day, they visited with and enlisted Henry Rogers, Superintendent of nearby Lawrence MA into their group and began the process of soliciting interest from others.



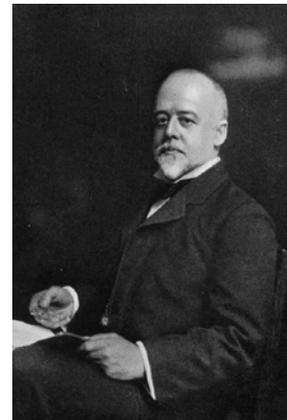
Horace G. Holden  
Lowell MA



Henry Rogers  
Lawrence MA



Frank E. Hall  
Worcester MA



Robert C. P. Coggeshall  
New Bedford MA

The original 4 men later enlisted James W. Lyons to their cause and broke down New England into 5 areas. Each directed a letter soliciting interest to all of the known water supplies in their respective area.

### The Charter Members

The first meeting was held at Young's Hotel in Boston on April 19, 1882. Attending were representatives from the following communities:

The Charter Members:

From Massachusetts

- Fitchburg
- Springfield
- Worcester
- Fall River
- Brockton
- Plymouth
- Lawrence
- Cambridge
- Lowell
- Leominster
- Malden
- Medford
- Salem
- New Bedford

From Connecticut

- New Haven

From Rhode Island

- Pawtucket

From New Hampshire

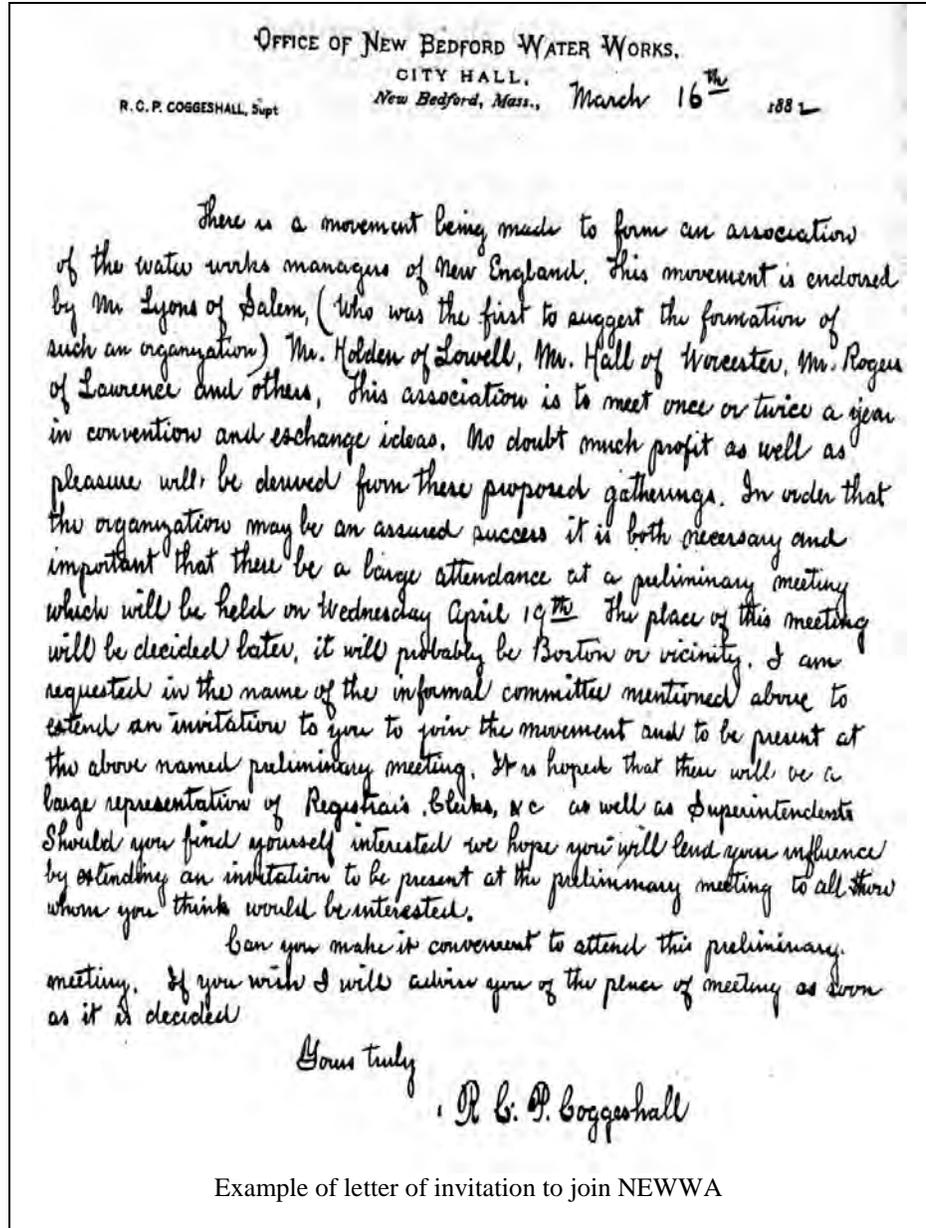
- Manchester

Notably absent were Boston, Hartford, Providence and anyone from Maine or Vermont.

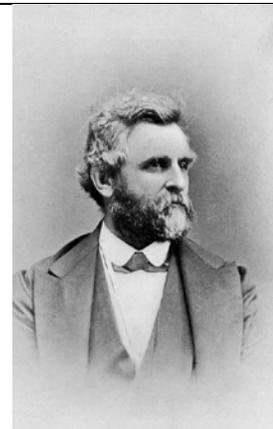
Also present were two meter vendors, one steam pump vendor, and one former governor of New Hampshire (a friend of the Manchester NH representative and an advocate of water supply).

As the first business of the new organization, they appointed staff to develop a Constitution and chose Boston as the site of the next meeting in June.

There is some brief record of water discussions on topics such as wrought iron pipe, fish becoming stuck in service lines, eels in pipes and growth of sponge, algae and clams in reservoirs and pipes, all



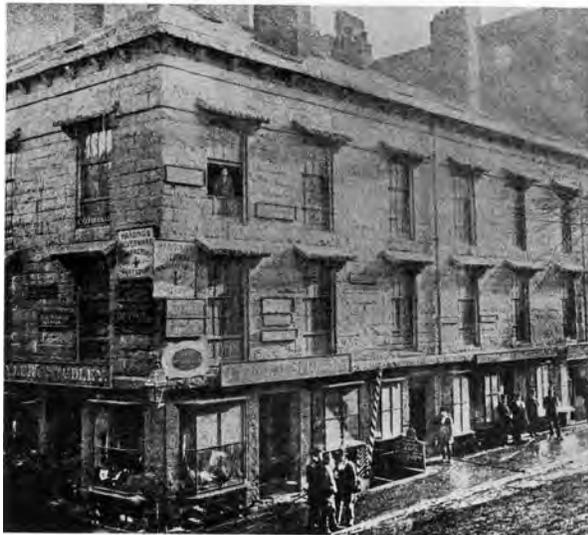
Example of letter of invitation to join NEWWA



James W. Lyons, Salem MA  
The First President of  
NEWWA

normal issues for the day. They then adjourned for a hearty dinner and lighter conversation.

At the second meeting in Boston on June 21, 1882, the draft Constitution was adopted and a vote was taken for officers of the new organization. At this point, James W. Lyons was voted to be the first president of the organization. Other officers were named, the most important of which was the appointment of Robert C. P. Coggeshall of New Bedford to be Secretary. He became the institutional memory of the organization, not only producing the records of the early years, but also the reminiscences of his later days provided many insights to the personalities of the early members and the workings of NEWWA business. He was later elected President and then made Editor of the Journal, important and influential roles.

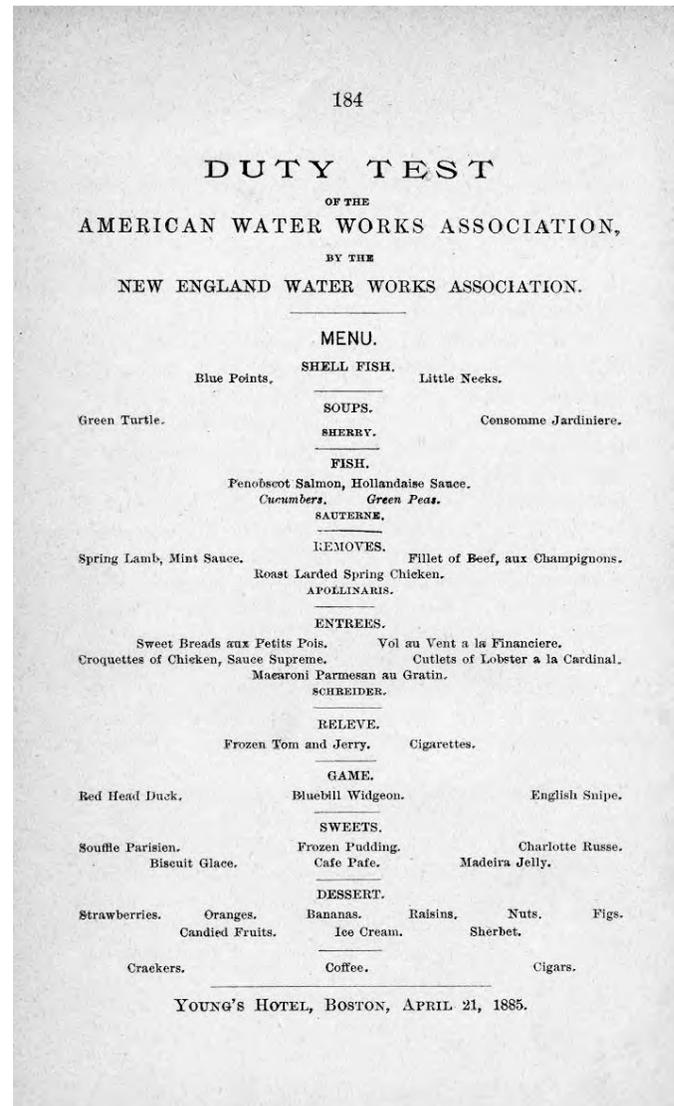


Young's Hotel

Young's Hotel in Boston– Site of the original conference



1883 NEWWA Annual Conference in Rhode Island



Menu from the 1885 joint dinner with AWWA  
Note that "Duty Test" was the term for determining fuel efficiency of steam engines in their day

A few new communities came to the June meeting including Waltham, Winchester, Dedham, Newton, and Melrose from Massachusetts and Meriden Connecticut. Together with the previous

list from the April meeting, these communities were the charter members of the first year of the organization.

### **Growth in the early years**

In the coming years, membership grew rapidly as word of the organization spread and as meetings were held in areas more convenient to other states. More vendors became regulars at meetings as well. But the core of this young organization was clearly water suppliers, the men who ran operations and personally directed the building of systems for their communities. As the years progressed, more consulting engineers began to join, as well as scientists and public health officials. Water suppliers from distant states also became interested and joined despite the difficulties of travel. Some of the more progressive systems in the country, e.g. Louisville and Richmond with their early filtration studies, were taking part in the organization to take advantage of the collective expertise in the east. The New York City engineers and water works men were also drawn to the organization and offered a wealth of experience in construction of large works. The organization rivaled the AWWA in terms of technical programs and respected participants. Membership grew rapidly to about 600 members by the turn of the century, then continued a more gradual growth to the present day total of over 2,800.

The first joint meeting with AWWA was held in April, 1885 in Boston MA and was a much anticipated event. The Mayor of Boston and Governor of Massachusetts spoke to the assemblage that included other local mayors. The program included several days of papers on a variety of technical matters. The excursion was a visit to Boston's water supply including a tour of the Sudbury River works by train and carriage. Other excursions included a tour of Cambridge's works, a tour of the old Mystic River supply and a tour of the Chestnut Hill area with Newton's filters, distribution reservoirs, Boston's aqueducts, water quality labs and reservoirs. A high point of the tour, for those brave souls that wished to partake, had to be the "sail" by boat through the active Sudbury Aqueduct from Echo Bridge to Chestnut Hill, a stretch of about 4 miles through a roughly 9 foot diameter underground conduit illuminated only by lantern light. The banquet was described as being impeccably elegant. NEWWA's reputation as host was certainly enhanced through this early effort.

### **The Early Meetings**

How do today's NEWWA meetings compare to the early days? Some observations are offered on the nature of meetings in the late 1800's:

- On many occasions, the assemblage was led in song by some of the more vocally talented members.
- Papers were "read" literally and supporting documents like full plan sheets and drawings were prepared in advance to be distributed to participants.
- Presentations were sometimes accompanied by "lantern slides", the early equivalent of Powerpoint.
- Jokes that would now be considered politically incorrect were occasionally recorded into meeting minutes.
- Papers were read in three sessions during the day, morning, afternoon and evening. Demonstrations were held early in the morning or between reading sessions.
- Each paper was verbally dissected by an expert panel after the conclusion of the author's presentation, with agreement not being a foregone conclusion and discussions

being respectful but spirited at times. One can read some tension into some of these discussions.

- The Journal records these discussions fairly literally, noting “laughter” whenever it occurred.

One of the most useful parts of the conferences was the excursion to view local works. The conference locations were established with an eye to having a host system provide comprehensive tours of its facilities, often being chosen to highlight a major project like a new water treatment plant or dam. In so doing, NEWWA members could “kick the tires” of other system facilities and see first hand solutions to the problems of the day. This extended regionally to larger systems like New York and Philadelphia that hosted visits by NEWWA.

The early conferences were also a major honor for the hosting community and each strived to make the event unique. There was a determined effort to outdo the previous host community in terms of diversions for the guests and interesting displays. Tours wouldn't necessarily be limited to the water supply, often traveling to local tourist sites and visiting theater performances. An interesting diversion for the host water supply was to show off its pressure by an exhibition of fire streams in a public spectacle, one such example being an early canal tour of Providence during which fire streams were arched over the canal under which the touring member's boats would pass. Meals would often be banquets befitting the important visitors. Remember that early public works were highly regarded and water supply managers were viewed as men worthy of great respect for the complexity and importance of what they did.



This 1906 photo shows a tour of Wachusett Dam construction being conducted for the Consulting Engineers of the Panama Canal. Frederick Stearns and Caleb M. Saville of NEWWA both worked as consultants to the Panama Canal project, the premier civil engineering project in the world at the time.

Guests from other parts of the country would present papers at NEWWA conferences, thus sharing important advances elsewhere. International guests would also contribute with experiences from Canada, Latin America, Europe, Asia or other places of interest. A close relationship was formed with the British Institute of Water Engineers for this purpose, resulting in reciprocal papers being offered on important topics.

## Officers

The organization has always run on volunteerism with literally hundreds of people contributing part of their time to the success of the overall effort. The various Boards and Committees take considerable effort and have little recognition in return.

In 125 years, there have been hundreds of people that have served as officers of the organization. A listing of past presidents is available with the annual NEWWA membership list so it will not be repeated here.

## Awards

Recognition of member’s efforts has always been a strong focus of the organization. The following lists the current awards granted by the organization:

The longest running and most prestigious award is the Dexter Brackett Memorial Medal. Its namesake was Dexter Brackett, the superintendent of Boston’s distribution system, a “salt of the earth” water works man who worked hard on necessary advances like control of water waste and standard pipe specifications. These things were less glamorous than water treatment technology advances and scientific issues but they were desperately needed by water system managers. His drive and attention to detail exemplified the association’s roots in being helpful to the system operators.



Dexter Brackett

Current NEWWA Awards	
Dexter Brackett Memorial Medal, given since 1917	John H. Chafee Distinguished Public Servant award
Past President’s Award, given since 1949	Younger Member award
Award of Merit, given since 1967	Employer Recognition for Younger Member award
George Warren Fuller award	Utility of the Year award
Kenneth O. Hodgson award	Utility Service award
Operator Meritorious Service award	Legislator of the Year award
Distinguished Public Service award	Volunteer of the Year award
Scholarship award, given since 1956	Most Innovative Program award
Historical Landmark award	

The lists of recipients are published annually with membership lists so they will not be repeated here. Suffice it to say that the list of the awardees reads like a Who’s Who of New England water supply.

**AWWA Recognition of NEWWA**

Many NEWWA members have also contributed to the national organization and received recognition. The following are awards earned by these members:

<b>AWWA Water Industry Hall of Fame</b>		
<b>Induction date</b>	<b>Name</b>	
1971	George Warren Fuller	William N. MacKenzie
1971	Allen Hazen	Richard P. McHugh
1971	Clemens Herschel	James S. McInerney, Jr.
1973	George C. Whipple	Clarence L. Ahlgren
1974	Moses N. Baker	Stephen L. Bishop
1976	William W. Brush	Richard C. Drake
1976	Gordon M. Fair	R. Patrick Grady
1978	Thomas R. Camp	Alice I. Hathaway
1978	Malcolm Pirnie	David B. Paris
1983	Robert S. Weston	Raymond J. Raposa
1988	George E. Symons	John P. Sullivan
1989	Joseph C. Lawler	Floyd B. Taylor
1992	Leonard Metcalf	Leonard H. White
<b>AWWA Past Presidents from NE</b>		
1913	Robert J Thomas	
1916	Leonard Metcalf	
1935	Frank A. Barbour	
1990	Fred H Elwell	

**A. P. Black Research Award**

<b>Year</b>	<b>Awardee</b>
1977	Richard L. Woodward
1990	Charles R. O'Melia
2004	James K. Edzwald

**Distinguished Public Service**

<b>Year</b>	<b>Awardee</b>
1952	Abel Wolman
1984	Fred H. Elwell

**Honorary AWWA Members**

Kenneth O. Hodgson  
Donald E. Jackson

**The Journal**

The Journal is the record of the organization and its issues. The Editor plays a significant role, especially in the early days when papers were followed by a discussion that was captured and included in the printed record. Several luminaries would comment on the paper and ask follow-up questions of the author, sometimes more in the manner of a cross-examination if the paper was controversial. Over the years, the Editor has been responsible for cajoling papers out of the presenters, editing for quality and propriety, handling the logistics of production and maintaining the professionalism of the overall product. The Editor position has always been a long term member that has a depth of water supply knowledge and who enjoyed the respect of peers within the organization. A full listing of past Editors is offered annually with the membership directory so it will not be repeated here.

**Most prolific author -**

Charles W. Sherman published 24 papers between 1913 and 1940. He was an engineer at M&E and expert on a variety of topics. Given his skills, he also served as the Editor of the Journal.

**Most esoteric name of paper**

– Multielemental and Hydrochemical Study of Holy ZamZam water

The Journal itself contains several thousand papers and the bound books occupy about 12 linear feet of bookshelf. There is a wealth of useful information on these shelves.

**Offices**

The organization had no permanent offices from 1882 until 1896. Business was conducted by NEWWA officers at their normal water supply offices. A home for NEWWA and its documents was found in 1896 at Boston Society of Civil Engineers’ offices at Tremont Temple in Boston MA. This sufficed until 1935 when NEWWA moved to the Statler Office Building in Boston. In 1948, the office was moved again to 73 Tremont Street, Boston, then in 1968 back to Statler Office Building.



Tremont Street

With the expanding training program that was needed to support operator certification and other needs, a larger office was needed. Milford Water offered space at its facilities in what was felt to be a good central location for members throughout New England. NEWWA moved to Milford in 1988 which allowed much better training facilities and office space but, once again, growth of the organization’s needs outpaced the space available.



NEWWA EDUCATION AND ADMINISTRATIVE CENTER  
MILFORD, MASSACHUSETTS

Milford

The most recent move was to a newly constructed office in Holliston in 2004, once again to gain elbow room for NEWWA activities. Over the years, the role of the Building Committee has been critical and the membership, especially the corporate members, have risen to the challenge each time.



NEWWA HEADQUARTERS & TRAINING CENTER  
HOLLISTON, MASSACHUSETTS

Holliston

**Early important people**

Prior to NEWWA, there were some significant water supply figures that are worthy of note. They paved the way for the early water suppliers and the 1882 birth of the organization

Significant Water Supply Figures – Pre-NEWWA	
Name	Significance
Laommi Baldwin	Built Middlesex Canal, consulted on Boston’s Cochituate supply, “Father of Civil Engineering” in US
E.S. Chesborough	Worked on New York’s Croton system, built part of Boston’s Cochituate works, built Chicago’s sewers and water supply, built Boston’s Main Sewer Drainage works
Charles S. Storow	Wrote first treatise on waterworks engineering in 1835
John Jervis	Worked on Erie Canal, built New York Croton system, planned Boston’s Cochituate Works, went on to build railroads
J. T. Fanning	Wrote 1876 <i>Practical Treatise on Hydraulics and Water Supply Engineering</i>
James P Kirkwood	First American engineer to build a filtration plant for water purification, studied European filtration methods, producing detailed design information and

	sketches
Lemuel Shattuck	Wrote <i>Report of the Sanitary Commission of MA</i> , followed the sanitary reform model set by Chadwick in England and laid the groundwork for public health
Joseph P Davis,	Chief Engineer for Boston Water, became chief engineer for ATT
James B Francis	Published “ <i>Lowell Hydraulic Experiments</i> ” in 1855, invented a successful turbine, one of incorporators of MIT

There are many important NEWWA members and the following only attempts to recognize some of the most important early figures.

Early water quality experts	
Name	Significance
Hiram Mills	The patriarch of LES, he ran the Lawrence MA canals, was the first chair of the MA Board of Health committee on water supply, worked with Kirkwood and Storrow, and trained John R. Freeman and others in his charge.
Allen Hazen	Graduated MIT in 1888 (the first graduate), was made Director of LES, his specialty was filters and sand media, hydraulics of treatment, wrote several books on water treatment, designed filters for many cities nationally and internationally, consulted for dozens of New England supplies, later formed Hazen & Whipple
William Ripley Nichols	MIT professor, joined MA BOH before LES and helped develop “Chlorine Map” to assess sanitary state of MA water bodies.
Thomas M. Drown	The original chemistry expert on the LES team, became President of Lehigh
William T. Sedgewick,	Graduated from MIT, he was the preeminent biologist on the LES team, taught at Harvard, became President of APHA
George W. Fuller	The 3rd graduate of MIT, he succeeded Hazen as Director of LES, then moved to Louisville to conduct landmark rapid sand filter studies
Robert Spurr Weston	Started as chemist working in water supply, worked with Fuller at Louisville, founded W&S, coauthored the <i>Waterworks Handbook</i>
Harry W. Clark,	Was Director of LES after Fuller, prolific author and chemistry expert
Stephen Gage	Started as chemist at LES, went on to RI Board of Health as its Chief Engineer
George C. Whipple	2 <sup>nd</sup> grad of MIT, ran first biological lab at Boston’s Chestnut Hill lab, early algae work, wrote <i>The Microscopy of Drinking Water</i> , formed consulting engineering company with Hazen
M. C. Whipple,	An assistant to Desmond Fitzgerald, he became professor of chemistry at Harvard, consulted on many water issues
M. N. Baker	Editor of Engineering News Record, wrote <i>Quest for Pure Water</i> , the most comprehensive treatise on early water purification
J. Herbert Shed	Wrote the 1874 report for Sewerage of the City of Providence
X. Henry Goodnough	Succeeded Stearns to run MA BOH, expert on reservoirs and sanitary protection, expert in sewerage systems, helped get Quabbin supply developed
Harrison P. Eddy	Sewerage expert, started at Worcester, consulted on many water supply issues, with L. Metcalf, wrote <i>Wastewater Engineering</i> , the bible of sewer design for many years, formed Metcalf & Eddy
Leonard Metcalf	Similar background to H. Eddy, also consulted on many water projects and NEWWA committees
Gordon M. Fair	Water quality expert, professor at Harvard, wrote <i>Water and Wastewater Engineering</i> , a text used by most Civil Engineering courses

Thomas Camp	Hydraulics and water treatment expert, wrote definitive papers on many filtration techniques, helped form Camp, Dresser & McKee
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Early hydraulics & hydrology experts	
Name	Significance
Clemens Herschel	Expert on mill hydraulics at Holyoke Power Co, ran the Jersey City water system, invented the venturi, expert on power
John R. Freeman	Started at LES under Hiram Mills, did early work on fire protection and related hydraulics, member of Boston Metropolitan Water Board, helped NYC, Baltimore, LA, San Francisco, Panama Canal, Grand Canal in China, expert on sewer hydraulics, MIT hosts an annual lecture series in his name.
Gardner Williams and Allen Hazen	Developed the Hazen-Williams equation, hydraulic tables and the hydraulic slide rule, still the standard for distribution pipe analysis.
Dexter Brackett	Ran the Boston distribution system, early expert on pipes, led the development of the first cast iron pipe spec., expert on water waste, one of the Boston’s Sudbury system reservoirs bears his name.
Frank E. Winsor	Started in Metr. Boston Sewerage Commission, worked on Wachusett, Weston Aq., New York’s system, Boston’s Charles River dam, built Catskill reservoirs, Kensico, Hillview, Scituate reservoir in RI, Quabbin Reservoir (the main dam bears his name).
Frederick P Stearns	He was the first Chief Engineer of MA Board of Health, he went to the Boston Metropolitan Water District and helped build the Wachusett works, he consulted on the Panama Canal and for other large cities including the LA Owens River project, a Boston reservoir bears his name.
Caleb M Saville,	Started in Boston’s system, built part of Wachusett, worked as a consultant on the Panama Canal, returned to run the Hartford system through its expansion of sources to Nepaug and Barkhamstead Res.
Desmond Fitzgerald,	He managed the supply sources for Boston, published pan evaporation data that is the definitive data to this day, published hydrologic data to support safe yield standardization, oversaw the first water quality lab
J Waldo Smith	From Lincoln MA, worked with Lawrence Experiment Station, worked at New Jersey with Herschel, Chief Engineer of NYC water system, consulted on the MDC Quabbin/Ware, Providence Hartford, many other cities

The above list is very brief and is meant to honor the NEWWA members who put the organization on the path it is on today. Assembling the biographies of all of the award winners, honorary members and others deserving recognition over the 125 year history of the organization would be a worthy task but beyond the scope of this paper.

**Making a difference**

What has NEWWA accomplished? In the 125 years of existence, some significant water supply improvement has occurred through the efforts of NEWWA’s membership:

- Municipal water supply is available throughout the region. There are over a thousand water systems in the New England states running safely, efficiently and without

interruption. Compared to other parts of the world, this is an underappreciated achievement.

- Billions of dollars of water works construction has been put in place with very few unexpected results. The competence of the designers and builders has been clearly demonstrated.
- Most systems have developed capacity to survive drought with minimal impacts on consumers.
- Waterborne disease has been virtually eliminated.
- The chronic pollution of water sources has been reversed and treatment strategies have addressed risks of environmental contaminants.
- Fire protection has advanced to properly supply fire protection and eliminate conflagrations.
- Cross connections have been regulated and controlled.
- Like peeling an onion, a number of subtle but dangerous public health hazards became known through research and controlled through water treatment improvements.
- Wars, natural disasters and other catastrophes have come and gone, causing trouble but also teaching lessons about being adequately prepared.
- Water operator training and certification has reached all systems and NEWWA has been particularly good at delivering this service as documented by AWWA recognition awards.
- Public confidence in water supply is good, ranging from people who take their water for granted (a sign that they have no problems) to sincere appreciation by people who have traveled to other regions or countries that have poorer aesthetics than New England water.

While there is always room for improvement, things are looking good. The NEWWA organization has been invaluable to the continuing education of its members and the betterment of water supply performance throughout the region. NEWWA's mission is being met.

works challenge.

- In 2070, above ground hydrants will be displayed as historical oddities. *Remains to be seen.*

Now, 25 years later, we see some truth in these. Not to be outdone – I offer some things that I predict will happen:

Water supply adequacy:

Trend – Regulatory philosophy has swung to more aggressive protection of the environment, squeezing water supplies for the sake of relieving stressed river basins. The regulatory rationale is targeting excessive per capita water use with the idea that the river benefits when elective uses like lawn watering are minimized.

***Prediction – Some communities may actually have diminished rights to historic supplies or lose them altogether. Regionalization may be pushed to reduce water withdrawals in sensitive areas.***

Emerging health threats:

Trend - New threats loose in the environment include things like endocrine disrupters, pharmaceutical compounds, personal care products and the like. Existing organisms may develop treatment resistance or change properties.

***Prediction – Water suppliers will struggle with a new genetically engineered or mutated biological threat that either slips past treatment or becomes resident in biofilms in pipe.***

Prediction – A long trusted plumbing material (like copper? plastic? brass?) will turn out to have health impact to the point that it will need to be replaced.

Water quality monitoring:

Trend - Policing distribution system water quality in the post-9/11/01 era requires more than just source monitoring and backflow awareness.

***Prediction – DNA based tests of specific pathogens will eventually replace TCR Rule coliform tests, both to widen the net for unusual pathogens and secondly to speed up the time necessary for results.***

Treatment chemicals:

Trend – Some of the things that we add (e.g. chlorine, fluoride, aluminum salts, copper sulfate, carbonates) are known to cause health problems at higher doses but we use them based on the idea that, like aspirin in pain management, a small dose solves the problem at hand.

Prediction – Some of the chemicals currently used in common water treatment applications will be found to be a problem and will need to be phased out.

***Prediction – Treatment will eventually become more physical (e.g. membranes, UV, ) and less chemical.***

***Prediction – Source water treatment requirements will someday be tightened to produce ultrapure water, then consumer connections will be equipped with polishing treatment (to address distribution system issues like iron particulates, biofilm bacteria).***

### Infrastructure

Trend – With the huge amount of aging cast iron pipe, most communities have focused on larger mains first to improve hydraulics, leaving a large backlog of small diameter tuberculated laterals.

Prediction – A more practical chemical treatment/relining method will be developed to rehabilitate smaller laterals.

### **Computers**

Trend – Customer metering has already seen the emergence of Automatic Meter Reading systems. SCADA and process control have evolved to allow more on-line analyzers. Near real-time data collection is now possible from a variety of home devices.

***Prediction – Someone will produce a multipurpose metering device for each service connection that will read flow, pressure and leak sounds as well as water quality parameters to allow alarms and real time management of the entire distribution system.***

### **The business of water**

Trend – The rising cost of water, aging of water systems and lack of financial resources for many communities has made contract operations an attractive option. Public utilities face more competition with privatizers and are tending to trim down on staff and resources.

**Prediction – More communities will seek contract operations and there will be fewer but larger private water companies remaining to fill the need.**

***Prediction – Design/build projects will become more common but traditional separation of design and construction will continue to provide the bulk of projects in New England.***

### NEWWA's future

Trend – NEWWA's management team and award winning training program will continue to offer timely programs on emerging issues while helping mentor the next generation of water works people in the basics of water supply.

**Prediction - One thing that can be predicted with complete confidence is that NEWWA activities will produce better educated and experienced water professionals.**