

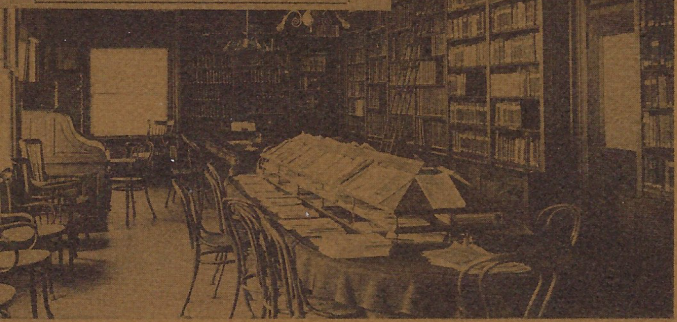
At a meeting of this Soc<sup>y</sup>, held  
1885, it was voted to app<sup>o</sup>int a Com<sup>tee</sup>  
to consider the subject of the relation of  
and Civil Eng<sup>rs</sup> in the U.S. Gov't Ser

JOURNAL OF THE

# Boston Society of Civil Engineers Section American Society of Civil Engineers

VOLUME 65 • JANUARY 1979 • NUMBER 4

BY-LAWS  
— OF —  
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— OF —  
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— OF THE —  
BOSTON SOCIETY OF CIVIL ENGINEERS,  
TREMONT TEMPLE, BOSTON, MASS.

**1848-1979**  
NATIONAL CONVENTION EDITION

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# Contents

## *NATIONAL CONVENTION EDITION*

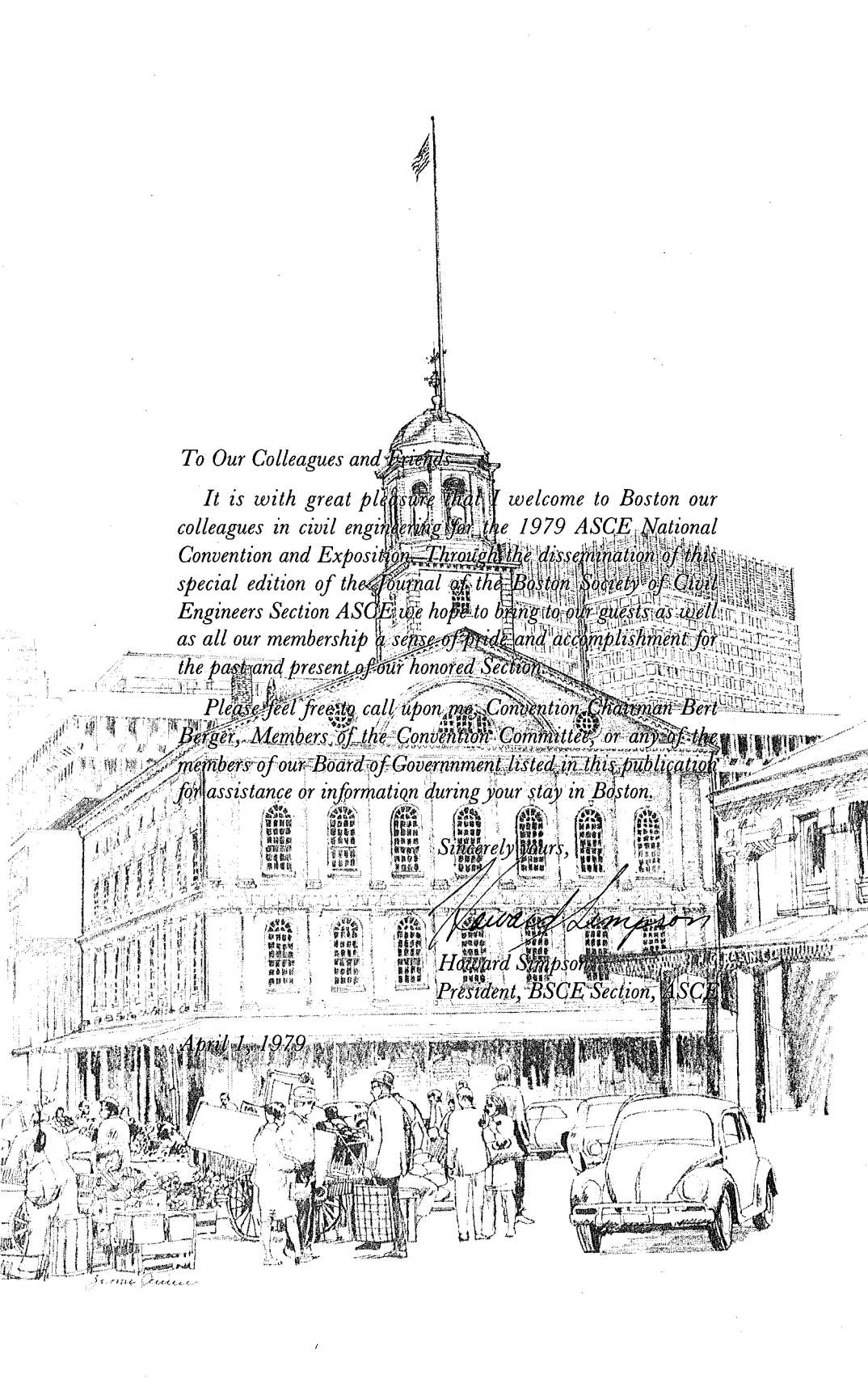
<i>Welcome to Colleagues and Friends</i> .....	96
<i>Convention Highlights</i> .....	97
<i>Landmarks in Civil Engineering</i> .....	101
<i>A History of Progress</i>	
The Year 1848 .....	113
Centennial History 1848 to 1948 .....	115
1948 to 1979 .....	128
Presidents .....	135
<i>Current Proceedings</i>	
Meetings Held — Technical Groups .....	141
<i>Annual Index, Volume 65</i> .....	143
<i>Advertising</i> .....	

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*To Our Colleagues and Friends*

*It is with great pleasure that I welcome to Boston our colleagues in civil engineering for the 1979 ASCE National Convention and Exposition. Through the dissemination of this special edition of the Journal of the Boston Society of Civil Engineers Section ASCE we hope to bring to our guests as well as all our membership a sense of pride and accomplishment for the past and present of our honored Section.*

*Please feel free to call upon me, Convention Chairman Bert Berger, Members of the Convention Committee, or any of the members of our Board of Government listed in this publication for assistance or information during your stay in Boston.*

*Sincerely yours,*

*Howard Simpson*  
Howard Simpson  
President, BSCE Section, ASCE

*April 1, 1979*

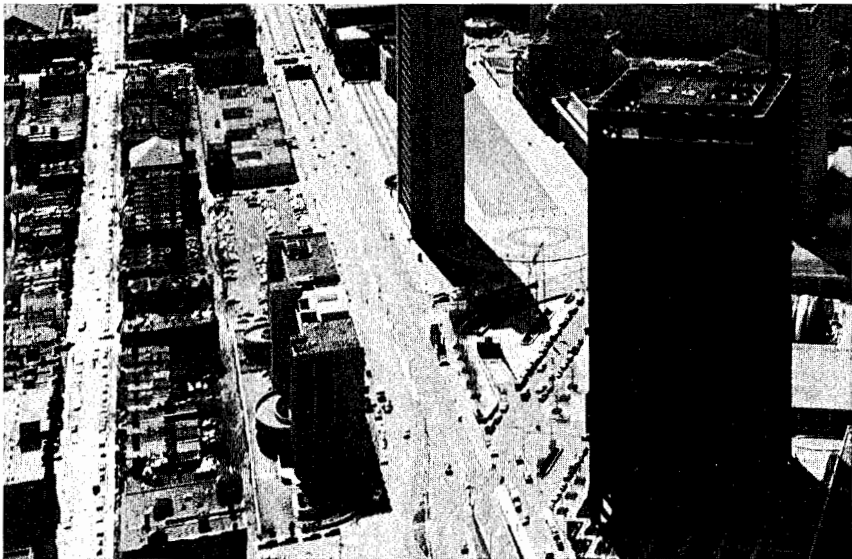
# Convention Highlights

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AMERICAN SOCIETY OF CIVIL ENGINEERS

*A.S.C.E.'s first National Convention in New York one hundred twenty-five years ago had a very modest attendance. This year's meeting in Boston is expected to reach an attendance of several thousand. Boston has served as a host to a national meeting every decade. This meeting with ninety technical sessions, twelve continuing education programs, and a balanced social program for registrants and spouses reflects the broad spectrum and national scope of A.S.C.E. The Committee welcomes you and hopes your stay in Boston will be a memorable one.*



**MONDAY  
AFTERNOON  
APRIL 2, 1979**

Session No. 11 ..... 2:30 p.m.  
**Special Problems in Seismic  
Design of Nuclear Facilities**

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**WEDNESDAY MORNING  
APRIL 4, 1979**

**GENERAL BUSINESS MEETING**

8:30 a.m.-12 Noon

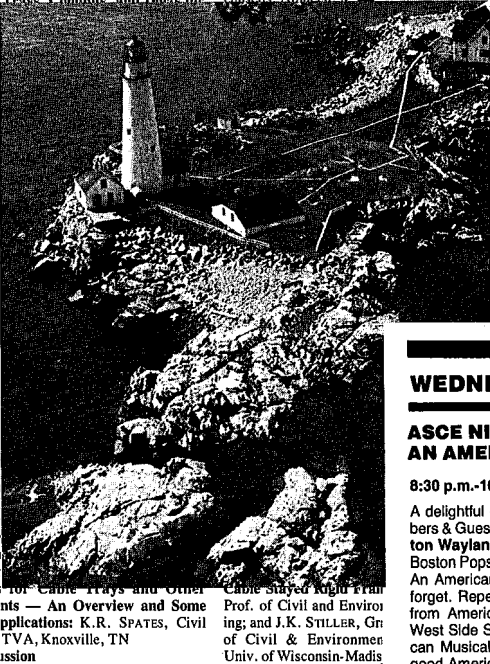
The General Business Meeting will feature a panel of public agency executives who will discuss the crucial role of Engineers in shaping national transportation policies responsive to the perceived future transportation needs (at the same time recognizing the public interest, environmental concerns) and need to bring into the decision-making process society.

9:00 a.m. Call to Order  
Welcome General Remarks  
WALTER E. BLESSEY, *President, ASCE*

MAYNARD, A.E. HARMS, *Director of Cable Trays, Conduits, and Ducts for Nuclear Power Plants, Boston, MA; and MERTON, MA; and MERI of Civil Engineering Consultants, Amherst, MA*

**Session  
Planning  
for Nuclear  
Republ**

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2:30 Lin  
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Services,  
2:55 Bus  
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Analyst,  
and S.T.  
Civil En  
Lexington  
3:20 She  
Shallow C  
Engineeri  
Chief C  
Power Con  
3:45 Seis  
Supports  
Design Applications: K.R. SPATES, *Civil Engineer, TVA, Knoxville, TN*  
4:10 Discussion



Cable stayed bridge under construction. Photo by Prof. of Civil and Environmental Engineering; and J.K. STILLER, Graduate School of Civil & Environmental Engineering, Univ. of Wisconsin-Madison

Session No. 13 ..... 2:30 p.m.  
**Analysis and Design of Nuclear  
Facilities for Impulsive and  
Impartive Loads — I**

Constitution Room  
Conference on Civil Engineering and Nuclear Power  
*Presiding:* GEORGE SLITER, *Electric Power Research Institute, Nuclear Safety & Analysis Dept., Palo Alto, CA*  
2:30 Development of Criteria and Design

**MONDAY AFTERNOON  
APRIL 2, 1979**

**KEYNOTE LUNCHEON**

12:30 p.m.  
*Presiding:* WALTER E. BLESSEY, *President, ASCE*  
*Toastmaster:* HOWARD SIMPSON, *President, Boston Society of Civil Engineers Section, ASCE*  
*Speaker:* (To be Announced)  
Presentation of 1979 John Fritz Medal to Nathan M. Newmark  
Price Per Person: \$10.50

**FIELD TRIP:  
CHARLES RIVER DAM —  
CENTRAL ARTERY  
"MINI" TOUR**

1:00 p.m.-4:00 p.m.  
The new Charles River Dam, dedicated in May, 1978, is a multi-purpose facility for water control, navigation, fish preservation, recreation, and power generation. The dam is 85 feet high and has a vertical lift capacity of 100 feet. The three turbines have a total capacity of 100,000 horsepower per year.  
**Session No. 4** .....  
**Earthquake Design Requirements for Eastern Lifeline System Independence Room — East**  
Technical Council on Lifeline Engineering  
*Presiding:* ROBERT V. WHITMAN, *Civil Engineering, M.I.T., Cambridge, MA*  
8:30 Opening Remarks: R. WHITMAN, *Prof. of Civil Engineering, Massachusetts Institute of Technology, Cambridge, MA*  
8:40 Seismic Analysis and Design of Underground Lifelines: P. W. PARTNER and I. NELSON, *Associate Engineers, New York, NY*  
9:15 Seismic Design of Buried Pipes: MICHAEL O'ROURKE, *Asst. Prof., Dept. of Engineering, Rensselaer Polytechnic Institute, Troy, NY*

**Conventio  
Program**

**WEDNESDAY EVENING — APRIL 4, 1979**

**ASCE NIGHT AT HISTORIC BOSTON SYMPHONY HALL  
AN AMERICAN POPS CONCERT**

8:30 p.m.-10:30 p.m.  
A delightful evening awaits ASCE Members & Guests at Symphony Hall as **Newton Wayland**, a Guest Conductor of the Boston Pops, wields his baton to give you an American Pops Concert you'll never forget. Repertoire will include selections from American Opera, Selections from West Side Story, Selections from American Musical Comedy and a plethora of good American music. Guest Soloist will be mezzo soprano, Jan Curtis.



# STUDENT PROGRAM

WEDNESDAY  
AFTERNOON  
APRIL 4, 1979

MASSACHUSETTS  
INSTITUTE OF  
TECHNOLOGY TOUR

The Student Program has been developed with the following objectives: (1) to maximize student participation in the general convention activities, and (2) to sponsor particular sessions at the convention which will give students the opportunity to interface with practicing professionals.

*Subject:* A discussion base developing urban engineering the pros and cons involved. formulation of guidelines for developments.



## TUESDAY — APRIL 3, 1979

### THE HISTORY OF BOSTON

10:00 a.m.-11:30 a.m.

Ladies Hospital  
Boston, a city steeped in history. Mr. H. Hobart Holly, an exciting and experienced engineering community, will give a slide talk about the History of Boston.

### BOSTON FROM THE HARBOR

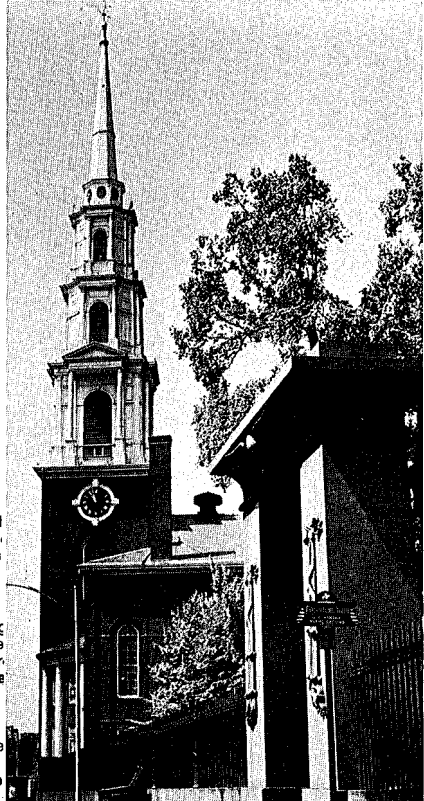
1:30 p.m.-4:00 p.m.

Boston, from the sea, is rich in history, architecture and fascinating. "The Great Molasses Disaster." You will actually see what you've read about in years. You will see the new Boston skyline and the steeples and spires of old Boston. Price Per Person

### BOSTON BY BUS

1:30 p.m.-4:00 p.m.

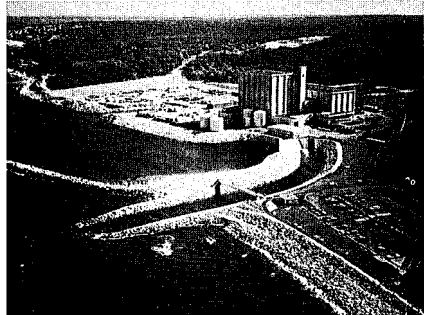
Visit the areas described to you in the History of Boston talk and slide morning by Mr. Holly. This bus tour is designed to familiarize spouses and children. Price Per Person



## SYMPOSIUM CONFERENCE ON STRUCTURAL DESIGN OF NUCLEAR REACTOR PLANTS

A session mini-conference has been organized by the Structural Division, in cooperation with the Power and Geotechnical Divisions. A volume is planned containing papers presented at the Convention. Topics include:

- PRESIDENT'S LUNCHEON
- 1) Topic  
Civil Engineering and Nuclear Power Special Problems in Seismic Design, Planning and Design of Structures
  - 2) Analysis and Design for Impulsive and Impactive Loads  
Sources of Uncertainties and Conservation in Seismic Design  
Nuclear Power and Civil Engineering — sponsored by the Power Division



WEDNESDAY AFTERNOON  
APRIL 4, 1979



## *1979 ASCE National Convention and Exposition*

*Sheraton-Boston Hotel, Boston, Mass.      April 1 - 6, 1979*

*Convention Committee - Chairpersons*

*Seated (left to right)*

S. Frances Berger	Ladies Programs
Judith Nitsch Donnellan	Exhibits
Rubin M. Zallen	Exhibits
Bertram Berger	Convention Chairperson
Edward B. Kinner	Program, Vice Chairperson
Michael T. Gruenbaum	Publicity
Cranston R. Rogers	Speakers, V.P. Zone 1

*Standing (left to right)*

Robert B. Barton	Activities
Thomas K. Liu	Technical Program
Joseph Lavin	Social Events
Philip J. Caruso	Attendance
John T. Christian	Technical Program
Paul J. Trudeau	Attendance
Bruce Campbell	Professional Program
Joseph L. Ignazio	Reception
Estelle Shuman	Graphics
Joseph MacDonald	Transportation
Charles F. Parthum	Social Events
Dalton L. Baugh	Publicity
Alfred Howard	Field Trips
Carol Hogan	Ladies Programs
Robert D. Vanasse	BSCES Journal

*Missing from photo*

John J. Cusack	Program, Vice Chairperson
Brian Hogan	Activities, Vice Chairperson
Richard D. Bedard	Finance
Martin Weiss	Field Trips
Sandra Johnson Cointreau	Sessions Assistants
Anthony Di Sarcina	Sessions Assistants
Prof. Frank Perkins	Speakers
Prof. Richard Scranton	Student Program
Prof. Michael Kupferman	Student Program
Prof. Lew Edgers	Student Program
David Deans	Student Program
Wallace Stickney	Excursions
David W. Gates	Excursions
Morris Root	Excursions
John B. McAleer	Excursions
Barry A. Patrie	Excursions
Stanley Rossier	Professional Program
Herbert G. Spooner	Younger Members
Judith Kinner	Hospitality
Harriet Simpson	Hospitality
Marsha Weiss	Hospitality
Mary Cusack	Hospitality
Leo De Marsh	Transportation
H. Hobart Holly	History and Heritage
William Zoino	BSCES Journal
Edward C. Keane	BSCES Journal
Edward Wood	BSCES Journal
Robert Snowber	BSCES Journal
David Weiner	Social Events





BOSTON SOCIETY OF CIVIL ENGINEERS SECTION

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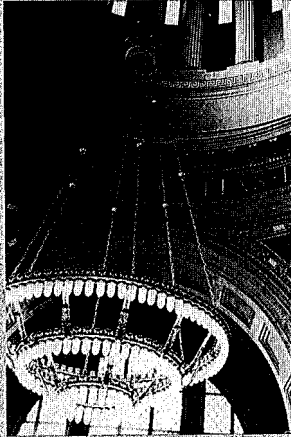
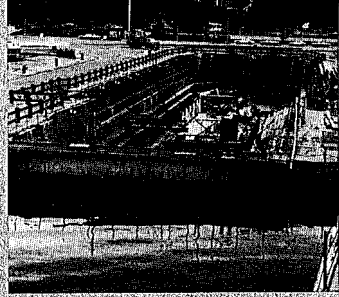
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# *Civil Engineering Landmarks of New England*

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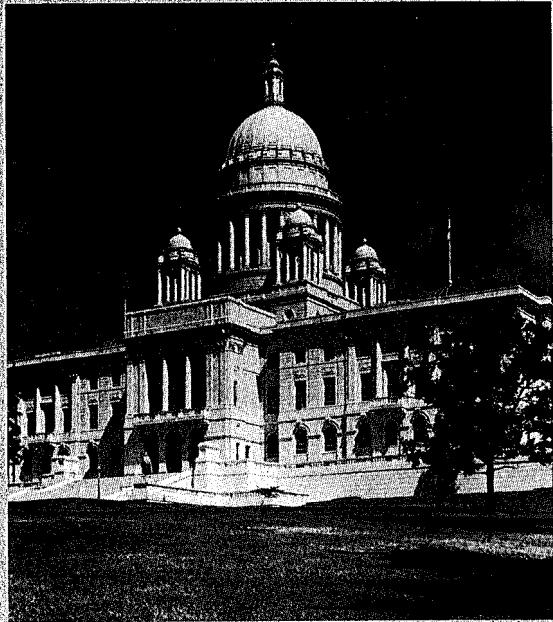
AMERICAN SOCIETY OF CIVIL ENGINEERS



*Farmington River Bridge  
Windsor, Conn.*

*Dry Dock Number One,  
Charlestown, Mass.*

*State House Dome,  
Providence, R.I.*



*Some of the outstanding early civil engineering landmarks in New England are described in the following pages. These projects were selected by members of the New England Council ASCE. Following the descriptions is a list of Transportation Firsts which reflect the primary role played by the Boston region in the nation's transportation growth.*

**SEWALL'S BRIDGE** over the York River in York, Maine. Built in 1761 by Major Samuel Sewall, it was America's first pile trestle structure designed for general highway traffic. It was rebuilt in 1932 on the original design.

**MIDDLESEX CANAL** between Boston and Lowell, Massachusetts. This was the pioneer project that ushered in the canal era of American transportation in the early 1800s. With locks, stream crossings, reservoirs and varied conditions to deal with, Loammi Baldwin here established engineering practices that became standard for many other canals that followed.

**THE ALLENDALE MILLS** are located on the Woonasquacket River in North Providence, Rhode Island. The original mill building is a four story stone rubble structure built in 1822 by Zachariah Allen. The dam raceways are dry stone masonry. The building is one of the earliest applications of heavy timber set in mortar to increase fire resistance. Here was pioneered the use of power looms for manufacturing broadcloth, and the use of a rolling process to produce a gloss finish.

**GRANITE RAILWAY** in Quincy, Massachusetts. This was the country's first railway to be incorporated and operated as a transportation business, in this case, to move Quincy granite from quarry to waterfront. Built in 1826, the operating flexibility required for a common carrier resulted in innovations that are still part of railroad practice. Gridley Bryant was the engineer.

**CUMBERLAND AND OXFORD CANAL** in Maine, from Portland to Sebago Lake. The canal was about 20 miles long and had a rise of 265 feet, 27 locks, and a crossing over a small stream on a wooden aqueduct 100 feet long. It operated from 1830 to 1870. The designer was Holmes Hutchinson, engineer also for the Erie Canal.

**PENOBSCOT BOOM** on the Penobscot River in Maine. For about 100 years this vast complex of booms and crib-work piers along the river played a key role in the prosperity of the area's lumbering industry. In 1835 the boom received and rafted over 82 million board feet of river-floated logs.

**CANTON RAILROAD VIADUCT** in Canton, Massachusetts. Completed in 1834, the viaduct is still used by main line trains (Boston-Providence-New York). It is one of the earliest surviving multi-arch stone railroad bridges in the country, and is 615 feet in length. The engineers were Whistler and McNeill.

**DRY DOCK NO. 1, BOSTON NAVAL SHIPYARD** in the Charlestown section of Boston, Massachusetts. Completed in 1834 along with Dry Dock No. 1 at Norfolk, Virginia, they were the pioneer dry docks in this country and had a great influence on our naval history. Loammi Baldwin Jr. was the engineer. The Charlestown dock is now part of the Boston National Historical Park.

**TUNNEL at Lisbon, Connecticut.** America's first true railroad tunnel, it was built in 1835-1837 by James Laurie as Chief Engineer for construction of the Norwich and Worcester Railroad. It carried the railroad line through a hill of solid rock.

*BABB'S BRIDGE, Gorham and Windham, Maine. Built in 1840 at a cost of \$318, it is the oldest covered bridge in Maine. A queenpost truss structure, it still carries highway traffic.*

*MASSACHUSETTS BASE LINE from Hatfield to South Deerfield, Massachusetts. This was the base line for a geodetic survey of Massachusetts authorized in 1830 and completed in 1841. It was the first such survey in any state. The base line measurement was accomplished by Simeon Borden using surveying equipment of his invention.*

*LEWISTON MILLS CANAL in Lewiston, Maine. The canal system, 1.9 miles long, includes an upper and a lower canal and three cross canals. The design was so advanced that the canal is still being used in much the same way as it was when completed in 1850. The engineer was B. F. Perham.*

*MINOT'S LEDGE LIGHTHOUSE off Cohasset, Massachusetts. Built in 1855 to 1860 on a wave-swept ledge, it has withstood the severest of weather and sea conditions for 118 years. For design and construction it ranks as one of the world's foremost lighthouses and has greatly influenced the design of those that followed.*

*HOOSAC TUNNEL in North Adams, Massachusetts. Built between 1855 and 1876, the  $4\frac{3}{4}$  mile long railroad tunnel presented unusual construction obstacles requiring the pioneering use of a number of tunnel construction practices that have continued as standard. Canadian as well as American engineers were involved in this project.*

*WIRE BRIDGE, New Portland, Maine. A wire cable suspension bridge with a span of 187 feet 6 inches, it opened in 1866. The 3-inch diameter cables were imported from England. It is believed to be the oldest suspension bridge of its type that is still in service.*

*LAWRENCE EXPERIMENT STATION in Lawrence, Massachusetts. Starting in 1886, research conducted at this station had led to pioneering developments in water and sewage treatment with resulting contributions to public health.*

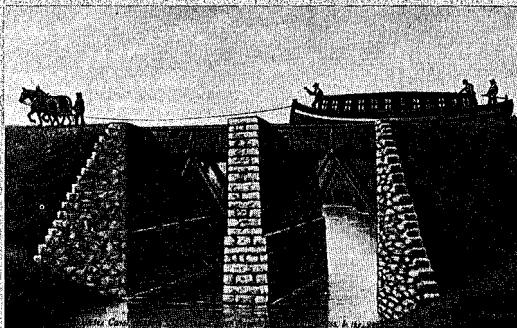
*WINDSOR, VERMONT - CORNISH, NEW HAMPSHIRE. Built in 1866 across the Connecticut River, this is the longest existing covered bridge in the U.S.; 2 spans, 460 ft., town lattice truss. This is the fourth bridge on the site. The first was built in 1796 (probably uncovered) and was destroyed by a flood in 1824. The present bridge was built by James Tasker and Bela Fletcher.*

*FARMINGTON RIVER BRIDGE at Windsor, Connecticut. As Chief Engineer of the New Haven, Hartford and Springfield Railroad, James Laurie replaced many of the line's early wooden bridges. This handsome stone bridge was built in 1867 and is still in use.*

*MOUNT WASHINGTON COG RAILWAY, in the White Mountain National Forest, New Hampshire. Rising 6,288 feet above sea level, the first trip on the world's first cog railway reached the summit of Mount Washington on July 3, 1869. The railway, still in service, has an average gradient of 25 percent, the steepest portion being the 37.4 percent at Jacob's Ladder. The railway founder was a civil-mechanical engineer, Sylvester Marsh.*



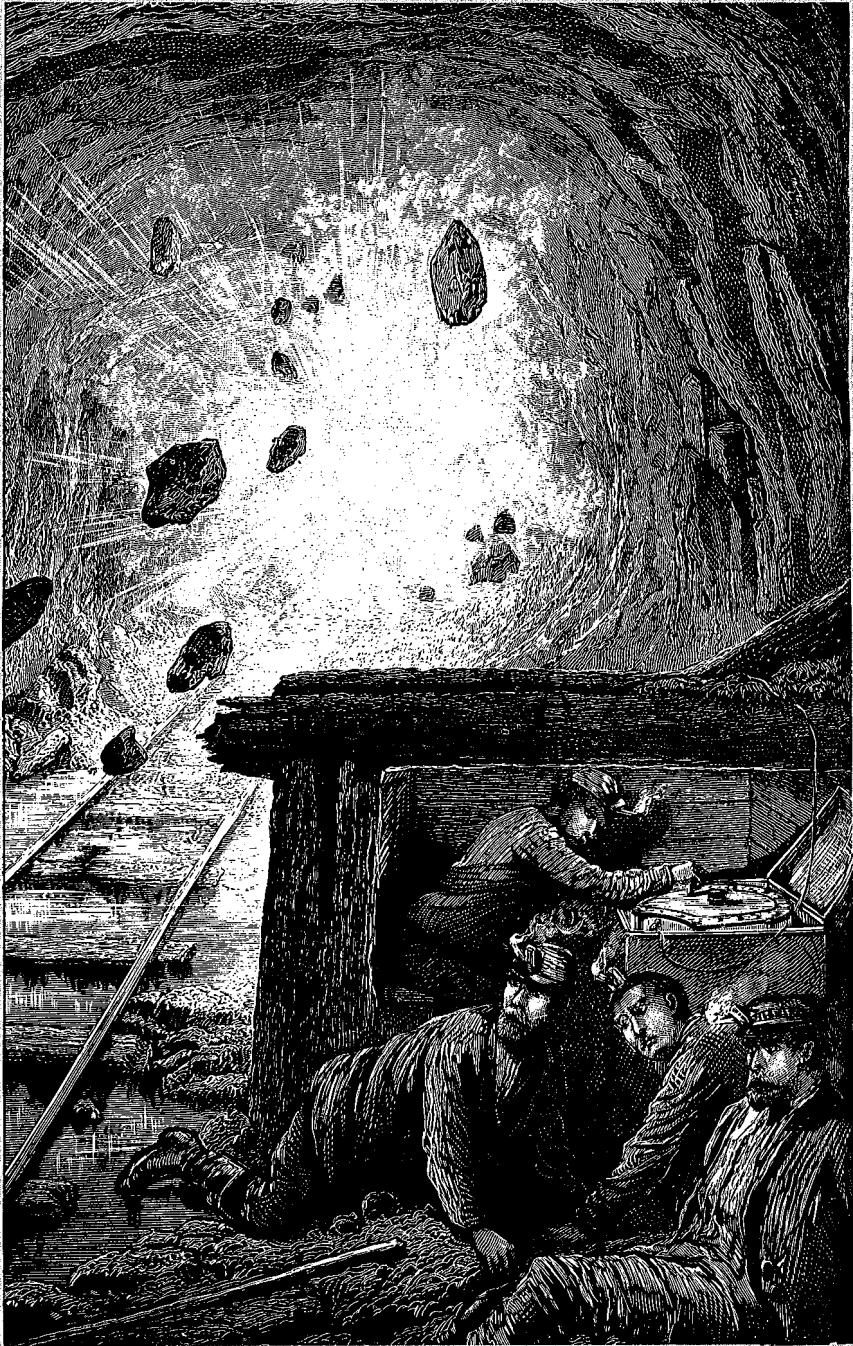
*Gridley Bryant, father of the country's first railway.*



*Middlesex Canal, between Boston and Lowell, Mass.  
Canton Railroad Viaduct, Canton, Mass.*



*Mount Washington Cog Railway, New Hampshire*



*Hoosac Tunnel, North Adams, Mass.*

**SANDY RIVER AND RANGELEY LAKES RAILROAD** in Maine, built in 1870. Connecting with the standard gauge railroad system at Farmington, the 24-inch gauge line served a vast wooded area. Extending over 100 miles, it was America's longest line with that gauge. Thomas Appleton was the engineer.

**SMELT HILL HYDROELECTRIC STATION**, Falmouth, Maine. The dam was built in 1890, and the station and the transmission line to Cumberland were completed in 1896. There were four 225-kw, 1100-volt ac generators. The transmission line is believed to have been the first high voltage line in New England. The station operated until 1947.

**BOSTON SUBWAY** in Tremont Street, Boston, Massachusetts. This was the first subway in North America; it opened for service in 1897. A key element in a complex transportation system, its success spurred the development of other urban subways in this country.

**RHODE ISLAND STATE HOUSE DOME** in Providence. The self-supporting marble dome rises 235 feet above the foundation. It is exceeded in size only by the dome of St. Peter's Basilica in Rome. The capitol building was constructed between 1895 and 1904; McKim, Mead & White were the architects.

**HARVARD STADIUM** in the Brighton section of Boston. This was the first massive structure to be constructed of reinforced concrete. Built in 1903, it is today the country's oldest football stadium. Many concrete construction engineering practices were pioneered here and are reflected in many stadiums that followed.



*AZISCOHOS DAM in Lincoln Plantation, Oxford County, Maine. This control dam on the Androscoggin River system was completed in 1911. It is one of the earliest dams with horizontal reinforced concrete arches between piers. Sawyer and Moulton were the engineers.*

*BAILEY'S ISLAND BRIDGE between Bailey's Island and Orr's Island in Harpswell, Maine. Except for the navigation channel span, the bridge is constructed of dry split stone laid in open crib fashion to provide for flow of tidewater. It is believed to be the only bridge of this type in the world adapted to highway traffic. It was built in 1926 to 1928 to the design of L. N. Edwards.*

*THE QUONSET HUT. The first Quonset hut was fabricated at Davisville, Rhode Island, in 1941. The semi-cylindrical galvanized steel structure was conceived, engineered and the first units shipped, all within eleven weeks, by the Civil Engineering Corps, U.S. Navy. The basic unit was forty feet by one hundred feet. Eventually 160,000 units were built, 32,000 of them at Davisville. The Quonset hut provided the military with an inexpensive, compact and lightweight structure which was adapted to a wide variety of uses during and after World War II.*

*WOLFEBORO WASTEWATER IRRIGATION PROJECT in New Hampshire consists of a sixty-five million gallon storage reservoir and a spray system on approximately one hundred acres of forested land, divided into five separate sections. The new project is a major step in the reduction of wastewater discharge to Lake Winnepesaukee. With the addition of this project, the Town of Wolfeboro will achieve a zero discharge of municipal waste to Lake Winnepesaukee.*

## SIGNIFICANT HISTORICAL DATES • BOSTON REGIONAL TRANSPORTATION

### *Automobile Transportation*

- 1673 - *First Boston to New York routes established by overland mail riders (Boston Post Road, now Route 1 South);*  
*First Boston to Worcester Turnpike, (now Route 9);*
- 1786 - *First large bridge in Boston opened - Charles River Bridge: (City Sq., Charlestown to Keany Sq., Boston);*
- 1802 - *Newburyport Turnpike established (now Route 1 North);*
- 1803 - *Neponset Bridge completed;*
- 1805 - *Cambridge-Concord Turnpike established (now Route 2 & 2a);*
- 1806 - *Canal Bridge and Causeway completed (Leverett Street to Lechmere Point);*
- 1891 - *Harvard Bridge opened;*
- 1892 - *Arborway, from Jamaica Pond to Franklin Park, completed;*
- 1907 - *Longfellow Bridge opened;*
- 1910 - *Charles River Dam and roadway completed;*
- 1913 - *First concrete road in Massachusetts constructed (North Andover);*
- 1915 - *Larz Anderson Bridge replaces North Harvard Bridge;*
- 1934 - *Summer Tunnel opened;*
- 1934 - *World's first ramp-type garage opened (India and Franklin Streets);*
- 1950 - *Mystic River Bridge opened;*
- 1954 - *First segment of the Fitzgerald Expressway opened (Mystic Bridge to Haymarket Sq.);*
- 1955 - *Route I-95 (north) completed (Route 1 to New Hampshire line);*
- 1957 - *Massachusetts Turnpike opened (New York to Weston, Mass.);*
- 1959 - *Southeast Expressway and Central Artery completed;*
- 1961 - *Boston Common Parking Garage opened;*
- 1962 - *Callahan Tunnel opened;*
- 1964 - *Route I-93 completed;*
- 1965 - *Massachusetts Turnpike Extension opened (Weston to South Station);*
- 1965 - *Route I-95 (south) completed (Route 128 to Rhode Island line).*

### *Public Transportation - Land*

- 1767 - *Stage coach line established between Boston and Providence;*
- 1825 - *First omnibus line started between Boston and Roxbury;*
- 1826 - *First railroad in the United States opened (Quincy Granite Railway, Bunker Hill Quarry to Neponset River);*
- 1834 - *First steam train operated in Massachusetts;*
- 1836 - *Boston and Maine R.R. completed first line between Andover and Wilmington;*
- 1856 - *First horsecar line opened;*  
*(Cambridge Railroad; Harvard Sq. to Bowdoin Sq.);*
- 1889 - *First electric streetcar line (Park Sq. to Brookline and Brighton);*
- 1894 - *North Station opened;*

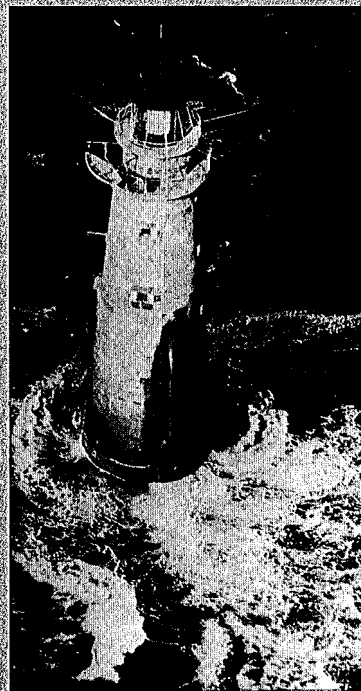
## **SIGNIFICANT HISTORICAL DATES • BOSTON REGIONAL TRANSPORTATION**

- 1897 - *First subway in the United States opened (Public Garden to Park St. Station, using electric streetcars);*
- 1899 - *South Station opened;*
- 1900 - *Last horsecar line discontinued (Marlborough St. to Copley Square);*
- 1901 - *World's largest electric railway terminal opened (Sullivan Square Station);*
- 1901 - *World's first subway-elevated line with multiple-unit trains opened (Sullivan Sq. Station to Dudley Station);*
- 1904 - *World's first subaqueous concrete tunnel opened (Maverick Sq. to Court Street, using electric streetcars);*
- 1912 - *Cambridge Subway opened (Harvard Square to Park St. Station);*
- 1912 - *East Cambridge viaduct opened from Lechmere Square to North Station;*
- 1914 - *Boylston Street Subway opened, Tremont Street to Kenmore Station;*
- 1922 - *First regular transit bus service (Union Sq. to the North Beacon St. Bridge);*
- 1924 - *East Boston Tunnel line converted from streetcar to rapid transit car operation;*
- 1929 - *Mattapan to Ashmont high-speed trolley line opened;*
- 1936 - *First trolley-bus line (Harvard Sq. to Lechmere Sq.);*
- 1937 - *First P. C. C. streetcar in regular operation (Arborway to Charles River Loop);*
- 1942 - *Elevated Structure on Atlantic Avenue removed;*
- 1954 - *East Boston rapid transit extension completed to Wonderland, Revere;*
- 1959 - *Highland Branch opened to Riverside;*
- 1967 - *Arlington Station (Green Line) modernized and opened to traffic;*
- 1967 - *Express bus Watertown-Newton-Boston via Massachusetts Turnpike inaugurated*

### *Public Transportation - Air and Water*

- 1631 - *First ferry established in the United States (Winnisimmet Ferry; Chelsea to North End);*
- 1716 - *Boston Light - First lighthouse in America;*
- 1803 - *Middlesex Canal opened;*
- 1912 - *Commonwealth Pier opened;*
- 1923 - *Boston Airport opened;*
- 1926 - *First New York - Boston airmail service started;*
- 1940 - *Boston, Revere Beach and Lynn R.R. ferry ceased operation (East Boston to Atlantic Ave.);*
- 1946 - *Logan Airport created from Boston Airport;*
- 1952 - *Boston's last ferry service ended (South Ferry, East Boston to Atlantic Ave.);*
- 1963 - *Commuter Boat established (Massachusetts Bay Lines; Pemberton to Rowe's Wharf);*
- 1967 - *Completion of International Terminal, North Terminal and Tower Restaurant, and a three level parking garage at Logan International Airport.*

*Minot's Ledge Lighthouse,  
off Cohasset, Mass.  
Sandy River & Rangeley Lakes  
Railroad, Maine  
Tunnel at Quinebaug River,  
Lisbon, Conn.*



# *A History of Progress*

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AMERICAN SOCIETY OF CIVIL ENGINEERS

## *THE YEAR 1848 IN ENGINEERING HISTORY*

*By Edward E. Wood, Jr.*

Whatever may be said about the early part of the nineteenth century, it cannot be considered as static or unprovocative in the arts and sciences, especially in the fields of engineering. There had been great development of transportation in the early nineteenth century, particularly in the area of highways, canals and railways, in the United States as well as in Europe. Less obvious but equally important were the water and sewer systems which were being improved and extended at that time. These developments brought about a re-introduction of the nearly forgotten Roman arts of bridge and aqueduct construction, plus a great expansion in tunneling, much of it in the comparatively virgin territory of the United States of America.

It was not until 1848, on February 2, at the end of the Mexican War, that the United States and its territories extended in an unbroken band from the Atlantic Ocean to the Pacific. The addition of the California Territory would have been enough, by itself, to begin agitation for a transcontinental railroad. However, another event made a spark setting alight a fuse (albeit a slow one) which eventually would explode into actual construction of such a road.

Just before the signing of the treaty, on January 28, in California at a sawmill outside Sutter's Fort, near Sacramento, a millwright named Marshall found gold. Small wonder that, after the Civil War was over, the first transcontinental railroad was begun at Sacramento!

Actually, in 1848, railroads had not gotten that far west. In that year an old, third-hand locomotive, the *Pioneer*, built in 1837, became the first steam engine to operate in Chicago, pulling a short train five miles to Galena to pick up a load of grain. The *Pioneer* now rests in the Museum of Science and Industry but can, when the occasion warrants, operate under her own steam.

Coming east, we find that the Scottish engineer, James Kirkwood, in 1848 completed the great stone 1200-foot, seventeen-arch Starucca Viaduct in Pennsylvania. Like our own older and smaller Canton Viaduct, here in Massachusetts, this bridge is still in use by main line trains.

Coming east again, the Western Railroad of Massachusetts began double-tracking its line through the Berkshires just eight years after its opening. While this project was beginning, another road was in the process of organiz-

ing. This was the Troy & Greenfield, which had avowed intention of tunneling through Hoosac Mountain, a mission which it could not financially undertake. All of this was going on in 1848.

It was the year when the first eight-wheeled freight cars (except for those makeshift ones on the isolated Granite Railway in Quincy, Massachusetts) began to appear in New England.

This was the year in which it was proposed that the rock barriers in the Hell Gate, East River, New York be destroyed by surface blasting.

In June of 1848, Daniel Webster, that scourge of public transportation, or, rather, the lack of it, suffered himself to be a passenger on the first train of the Northern Railroad of New Hampshire, from Concord to White River Junction, Vermont.

Over in Maine, where the battle of the gauges was a never-ending one, fifty miles of 5'6" track had been laid by 1848's end, from Portland toward Montreal, Quebec.

In December of that year, the New York & New Haven finally secured trackage rights into Manhattan, opening an all-rail route between Boston and New York. This put the kibosh, at least temporarily, on the New Haven & New London, which, earlier in 1848, had obtained a charter to build a shore line rail route, using boats to ferry cars across the as yet unbridgeable Thames and Connecticut Rivers.

In Europe in 1848, construction was begun on the first railroad across the Alps, to connect Vienna and Trieste, then both in the Austro-Hungarian Empire. In Wales, Thomas Telford completed his first great tubular bridge, forerunner of the famous Britannia Bridge, but across the Conway River. It had a span of 400 feet and was of wrought iron. This bridge still carries traffic on the rail-sea line between London and Dublin.

Back in Boston, a new railroad was opened between Boston and Dedham via West Roxbury, an alternative to the old 1834 route via Readville. And, wonder of wonders, fresh water was piped into Boston all the way from Cochituate, out beyond Wellesley; an engineering marvel *par excellence*.

Thus, in this remarkable year, on July 3, 1848, the Boston Society of Civil Engineers, the first engineering society in the nation, held its first regular meeting, and chose James Fowle Baldwin, railroad locating engineer and early hydraulic engineer as its president.

And this was the way it was in that great year, 1848!

**CENTENNIAL HISTORY OF THE BOSTON SOCIETY OF CIVIL ENGINEERS, 1848 - 1948.<sup>1</sup>**

*Abridgement by Robert A. Snowber*

***The Early Years - 1848 to 1874***

An informal gathering on April 26, 1848 of five civil engineers of Boston at the United States Hotel marked the first successful endeavor of engineers on this continent to unite for the advancement of the profession and the improvement of its members. At subsequent meetings, in which additional persons participated, the constitution and bylaws were adopted, and on July 3, 1848, was held the first regular meeting of the Boston Society of Civil Engineers - the oldest engineering society in America! The Society was formally chartered by an act of the Massachusetts legislature in 1851.

In 1852, four years after the founding of the Boston Society, the American Society of Civil Engineers and Architects was established in New York, and in 1869 the Civil Engineers Club of the Northwest (now Western Society of Engineers) was founded in Chicago.

*List of Founders*

Samuel Ashburner	(1816-1891)	Waldo Higginson	(1814-1894)
James Fowle Baldwin	(1782-1862)	Isaac Hinckley	(1815-1888)
Joseph Bennett	(1814-1875)	Eben Norton Horsford†	(1818-1893)
John Harrison Blake	(1808-1899)	Josiah Hunt	(1818-1874)
Simeon Borden	(1798-1856)	Martin Brimmer Inches	(1820-1893)
Uriah Atherton Boyden	(1804-1879)	Samuel Francis Johnson	(1821-1883)
Ellis Sylvester Chesbrough	(1813-1886)	James Laurie	(1811-1875)
John Child	(1802-1858)	Henry Swasey McKean	(1810-1857)
Marshall Conant	(1801-1873)	Samuel Nott	(1815-1899)
Franklin Darracott	(1820-1895)	George Alanson Parker	(1822-1887)
William Lee Dearborn	(1812-1875)	William Pearce Parrott	(1810-1868)
George Minot Dexter	(1802-1872)	Thomas Willis Pratt	(1812-1875)
Sereno Dwight Eaton	(1823-1899)	Theophilus E. Sickels	(1822-1885)
Robert Henry Eddy	(1812-1887)	Lucian Tilton	(1811-1877)
Samuel Morse Felton	(1809-1889)	William Scollay Whitwell	(1809-1899)
James Bicheno Francis	(1815-1892)	Thomas Scott Williams	(1812-1874)
Charles Haynes Haswell†	(1809-1907)		

*The First Officers*

James F. Baldwin, President	George M. Dexter, Vice Pres.
John H. Blake, Secretary	William P. Parrott, Treasurer
Joseph Bennett, Director	Ellis S. Chesbrough, Director
Samuel Nott, Director	William S. Whitwell, Director
James Laurie, Director	

(1)By John B. Babcock, 3d, Past President, B.S.C.E.; original text published in Journal issue of July, 1948.

For headquarters and library a room was leased in Joy's Building on Washington Street at \$100 per year; a library committee was appointed; and appropriations made for the purchase of books and periodicals. The Society maintained this room until January, 1853, when new quarters were established at 11½ Tremont Row, jointly with the New England Association of Railroad Superintendents.

James Laurie presented the first paper before the Society on "Coal and Iron Trade of Great Britain and United States." Many of the papers were on railroads and hydraulics, fields in which most of the members were engaged.

Boston's first water supply was than being built, and papers on that project included "Construction of Beacon Hill Reservoir" and "Mode Adopted for Carrying Water to South Boston," by Whitwell; an excellent one on "Contracts," by Chesbrough; and "Use of Lead for Service Pipes," by Blake.

By 1850 the Cochituate Aqueduct was completed, and within a few years the amount of railroad construction in New England had diminished. Many of the members left Massachusetts to take advantage of midwest opportunities. For some time those who remained carried on the affairs of the Society, but with a gradually decreasing attendance. Finally it was decided to suspend activities, at least for a time, and in 1861 the library books and the Society's records were stored with the Boston Athenaeum.

Opportunities for formal education in civil engineering before 1850 were very limited. Professor Horsford, who was associated with the Society as an honorary member, was the only one of this group who had a degree in civil engineering (Rensselaer, 1838).

Loammi Baldwin, often referred to as "The Father of Civil Engineering in America," was responsible for the sound practical training received by many civil engineers in New England. From an office in Charlestown, Massachusetts, in the short span of his professional career (less than thirty years) he became the most noted civil engineer of that era. He took into his office as students a number of young men whom he trained in physics, mathematics, surveying and kindred subjects. At Loammi Baldwin's death, Samuel F. Felton, a former student, took over the office and some of the younger men remained with him as students. Any history of the Society would be incomplete if it failed to give Loammi Baldwin a large measure of credit for his influence on the civil engineering of that formative period.

Most of the other members of the founder group had the equivalent of a high school education, after which they engaged in civil engineering work and gained their knowledge of the profession through practical experience supplemented by earnest study.



Intensive railroad development provided a fertile field for employment, and at least twenty-eight of the thirty-one regular members of the Society were on railroad work at some stage in their careers.

The development of Boston's first public water supply is closely associated with the Society's early life. For twenty years there had been agitation for a public supply. Finally, in 1846, the Cochituate gravity scheme was adopted and James F. Baldwin, brother of Loammi, was named as one of the commissioners. On October 25, 1848, a celebration was held on Boston Common when the water was turned on at the fountain in the Frog Pond and rose "in a strong column, 6 inches in diameter, increasing rapidly in height, until it reached an elevation of 80 feet. (Editor's note, 1979: In those days they didn't fool around. Imagine, a 20-mile aqueduct designed and completed two years after adoption of the scheme!)

The civil engineers of this period made rapid strides in hydraulic engineering. Many opportunities existed for civil engineers to become associated with municipal, state, and industrial enterprises. The Massachusetts Institute of Technology, incorporated in 1861, had postponed its opening during the Civil War, but in 1865 classes were started and the first students were graduated in 1868.

### *Boston Society of Civil Engineers - 1874 to 1948*

In the 1860's and 1870's a new generation of civil engineers was becoming established in Boston. One of these was Ernest W. Bowditch, M.I.T. 1869, who, on May 24, 1873, wrote to about forty young men in the vicinity of Boston proposing "to form a junior engineers' association."

In response to this call, twenty-six persons met at M.I.T. on May 30, 1873 and agreed to form a Society, the name of "Boston Society of Civil Engineers" being adopted with the following officers: president, Desmond FitzGerald; vice presidents, Henry Manley and Ernest W. Bowditch; secretary, George S. Rice; and treasurer, Robert H. Richards.

Contact was made with the members of the early Society, the charter of which was still in effect. A few of the early members were still living near Boston and a merger was arranged. A meeting was held on April 27, 1874 at which James B. Francis was elected president and Samuel Nott, secretary. The members of the Junior Society (B.S.C.E. of 1873) were proposed for membership in the originally chartered Society, and on June 8, 1874, were elected to membership. Thus there was established that direct link which provides our Society with a continuous existence for a century!

This history would be incomplete if it failed to mention the names of a few of our past members whose services to the Society were outstanding:

Thomas Doane (1821-1897) was elected president August 7, 1874 and served to March, 1880. Later that year President Joseph P. Davis resigned and moved to New York, and Doane again became president, an office which he held until March, 1884. His untiring service had much to do with the sound growth of the Society in the critical years following the reorganization of 1874.

Desmond FitzGerald (1846-1926) was president for two years, 1888-1890. In 1915 he became an honorary member. He was the donor of the medal which bears his name. For many years he made substantial contributions to the Permanent Fund and left a bequest, the income of which is used for the Desmond FitzGerald Scholarship. In 1898, he delivered the Society's Semi-Centennial Address. For fifty years he took part in Society activities, serving as chairman of many important committees.

John R. Freeman (1855-1932) was president for the term 1893-1894. He was elected an honorary member in 1917. He took great interest in the value of the Society to young engineers just starting on their professional careers. In furtherance of this he gave \$25,000 to the Society for the establishment of the John R. Freeman Fund.

Clemens Herschel (1842-1930) was the first treasurer, after 1874, was president from 1890 to 1891. He became an honorary member in 1915. He established the Herschel Library in 1906 and later provided for prizes in recognition of meritorious papers.

Edward W. Howe (1846-1931), was president from 1907 to 1908. He left a bequest, the income of which is devoted to the Society and its membership.

Henry Manley (1841-1919) was president from 1892-1893. When the first annual dinner was held in 1883, Manley was responsible for the arrangements, and for the next 25 years he ably carried out the same assignment. He presented a valuable paper on rapid transit in 1889.

Samuel Nott (1815-1899), one of the founders, was a director in 1848 and served to March, 1849, then became secretary and filled that office until 1874. In 1891 he became an honorary member. His last meeting with the Society was at its Semi-Centennial (1898); at that time Desmond FitzGerald paid high tribute to Nott's devoted service to the early Society.

S. Everett Tinkham (1852-1921) was secretary from 1880 to 1882 and again from 1887 until his death in 1921. Desmond FitzGerald wrote: "The Society has had many officers and members who have contributed to its usefulness and renown, but among them was one whose name leads all the rest, and the good which S.E. Tinkham accomplished for the Society will endure as long as the Society exists."

George L. Vose (1831-1910) was president from 1884 to 1886 and became an honorary member in 1896. Professor Vose in addresses before the Society made several notable contributions on the lives of such famous early engineers as Loammi Baldwin, and George W. Whistler, noted railroad builder.

Frank O. Whitney (1851-1936) was treasurer from 1915 to 1931, having been a director from 1894 to 1896. His careful administration of the financial affairs of the Society, his sound judgment and his faithful service on an arduous task are deserving of high praise.

Of the 67 presidents of the Society since its reorganization in 1874, at least 50 attended engineering schools, and several others had some form of higher education. Of those serving since 1900, all but five or six received a formal engineering education. However, neither Desmond FitzGerald nor Frederic P. Stearns had any technical education; but both rose to the highest rank in the profession and served as presidents of the American Society of Civil Engineers.

At least sixteen members of our Society have served as presidents of national engineering societies, 12 in the American Society of Civil Engineers; 3 in the American Society of Mechanical Engineers; and one each in the American Institute of Electrical Engineers and the American Institute of Mining and Metallurgical Engineers. (J.R. Freeman served as president of both ASCE and ASME.)

### *Membership*

The Constitution and Bylaws adopted in 1848 provided for grades of Member, Corresponding Member and Honorary Member. The 1875 Bylaws of the reorganized Society provided for the same grades. By 1890 the grade of Corresponding Member had been eliminated, and a grade of Associate had been added to include "other persons interested in the objects of the Society and desirous of being connected with it."

In his presidential address in 1909, Joseph R. Worcester laid considerable stress on the desirability of making the Society more interesting to young engineers. A committee was appointed the following year to consider the revision of membership grades and on June 15, 1910 the Society adopted a revised Constitution and Bylaws which provided for a grade of Junior. In 1932 the grade of Student was added.

In the year 1923-24, the Bylaws were amended as follows: "A member of any grade who has paid dues for forty years, or who has reached the age of seventy years and has paid dues for thirty years, shall be exempt from all further dues."

### *Meetings*

Regular Meetings. The Society has always held regular monthly meetings except during the summer. With the establishment of a complete program of technical section meetings devoted to topics in specialized fields, the holding of extra meetings of the main Society has practically ceased. Each year at least one of the Society meetings is held jointly with a Section which sponsors the program.

Annual Dinner and Annual Meeting. the first annual dinner was held at Young's Hotel on March 21, 1883. For several years, the annual dinner and the annual meeting were held on separate days, but since 1909, the annual dinner (or smoker) has been held following the afternoon annual dinner.

For nearly a half century the president has delivered an address at the annual meeting. It became such a regular custom that it was included as a requirement in the 1910 revision of the Bylaws.

Semi-Centennial Celebration. The Hotel Vendome was the scene of our Semi-Centennial Celebration on November 11, 1898. Following a reception by the officers and their wives, President Howard A. Carson spoke on "Glimpses of Boston Fifty Years Ago."

Student Night. A high spot in the program every year is Student Night. On April 5, 1911, when Charles T. Main was president, the first of these events took place. This affair has been carried on each year since then.

Social Activities. The habit of eating together on the evenings of the meetings was established 100 years ago, a custom happily preserved! When the Society quarters were at the Boston & Albany Railroad station (1885-89), the members dined together at the restaurant there before the meeting. In 1914, a Social Activities Committee was appointed to arrange dinners preceding the meetings at the Boston City Club and at various hotels. Since 1933 a dinner has usually been included in the program.

### *Excursions*

Starting in 1885, excursions became a very prominent feature in the Society's program. For the next 30 years, the Excursion Committee arranged about 10 trips each year. Some of them included the ladies and concluded with a clambake or other festivity. Although most of the excursions were made to construction projects or recently completed work, some were to industrial plants. From 1886 to 1890, excursions lasting two or three days were made each autumn to points of interest in New England. Later the interest in such frequent excursions apparently waned and after 1915 no regular excursion committees were appointed.

### *Sections*

Sanitary. Albert F. Noyes, in his presidential address in 1896, suggested the formation of groups within the Society for discussion of topics of particular interest in various fields. In 1903, President George A. Kimball again urged consideration of this subject. On December 21, 1903, the Board of Government received a petition from fourteen members of the Society to establish, "a section for consideration of the special subjects relating to sanitary engineering, to be known as the Sanitary Section of the Boston Society of Civil Engineers." This petition was approved and on January 27, 1904 the Board approved the Bylaws which had been adopted by the Section. For 45 years the Sanitary Section has been in active operation and has been a highly important factor in the Society's activities. The Sanitary Section has appointed a number of committees to study special phases of sanitary engineering.

**Structural.** On May 19, 1920, the Board approved the Bylaws of the Designers Section (renamed Structural Section in 1947). In recent years with the formation of additional sections in separate fields, its meetings have been increasingly devoted to structural engineering.

**Transportation.** The Board approved the organization and Bylaws of a Highway Section on May 1, 1924. The name was changed to Transportation Section in 1946, and the scope of its activities broadened to include railways and airports.

**Hydraulics.** A section devoted to hydraulics was organized on May 1, 1940. This section was formed to occupy a field not previously covered.

**Surveying and Mapping.** The most recent section is the Surveying and Mapping Section, which was authorized by the Board of April 8, 1947. The activity of this section during the past year has justified the expectations of its sponsors.

**Northeastern University.** An affiliate section of the Society was authorized at Northeastern University on January 20, 1922. Membership in this section is limited to students, graduates or members of the faculty of Northeastern University.

### ***Society Rooms***

The quarters occupied by the Society for a library and meeting room were as follows:

- 1848 - Joy's Building on Washington Street.
- 1853 - 11-½ Tremont Row (Scollay Square) jointly with the New England Association of Railroad Superintendants.
- 1874 - 66 State St.
- 1876 - Wesleyan Hall, 36 Bromfield Street.
- 1885 - Boston & Albany Railroad Station Building (briefly).
- 1885 - A room at M.I.T.
- 1893 - Again at 36 Bromfield Street.
- 1896 to 1948 - Tremont Temple, Room 715.

For years it has been hoped that the Society might join with other engineering groups in the establishment of a modern clubhouse with ample accommodations for auditorium, library and cuisine facilities. Although a number of plans to accomplish this have been studied, no plan has yet been evolved which provides a satisfactory solution within the resources of the Society.

### ***Library***

In 1874, books previously deposited with the Athenaeum formed the nucleus of a library for the rejuvenant Society. Its growth since then is indicated as follows: in 1889 there were 600 bound volumes and 900 unbound volumes and pamphlets; in 1925 there were 10,500 bound volumes and 3,800 pamphlets.

From 1874 until 1896, the various quarters occupied by the Society were small and rather inadequate for the library. For about twenty-five years, it has been necessary to make room for new material and progressively discarding older material, particularly bound periodicals and departmental reports which are used infrequently and are available elsewhere. In 1947 the Library committee presented a detailed report to the Board of Government with recommendations for future storage.

The importance of securing the latest text and reference books in civil engineering was recognized from the start and appropriations have been made each year for the purchase of such books. In 1922, some books in electrical and mechanical fields were added by the Society and the list of technical periodicals broadened.

Herschel Library. In 1906, Clemens Herschel, Past President and Honorary Member presented seventy books to form the nucleus of a special library and donated additional books to this collection during his life; others were received from his estate.

In 1909 Harold Parker presented the Society with 300 volumes of historical value which show the developments in civil engineering in the early years of the nineteenth century; in a similar category are a number of books received from the estate of Charles H. Swan in 1901. In 1916, the Society received 1100 books from the estate of Edmund K. Turner. Many other donations of books and transactions have been received from our members.

### ***Publications***

The papers presented before the early Society were copied in a bound volume which was available to the membership in the Society's library. The "Reports of Proceedings - September, 1879 to June, 1881" was one of the first publications of the Society.

Journal of Association of Engineering Societies. In 1881, the Society joined the Engineers' Club of St. Louis, Civil Engineers' Club of Cleveland and Western Society of Engineers in organizing The Association of Engineering Societies in order to provide a joint publication of the papers and proceedings

of the participating societies; other groups subsequently joined the Association; in 1900 there were eleven member societies. The papers and proceedings of our Society were printed in the monthly *Journal of the Association* from 1881 until the Society withdrew in 1913 to establish its own *Journal*.

*Bulletin of New Engineering Work.* From 1900 to 1906 the Society issued a monthly publication which included notices of meetings and excursions and a special section entitled "Bulletin of New Engineering Work."

*Monthly Bulletin.* In 1906 the content of the *Bulletin* was extended to include all Society proceedings, but not the papers presented before the Society, and offering an advertising section to defray the cost of publication. The *Bulletin* was continued in this form through 1913.

*B.S.C.E. Journal.* In 1913, upon withdrawal from the Association of Engineering Societies the Society voted to establish its own *Journal*, as our Society had furnished nearly one-half of the entire text of the Association's *Journal*. It was felt that the advantages to the Society of having its own *Journal* far outweighed the disadvantages of losing the papers presented by other societies and that the cost of publishing such a *Journal*, with the elimination of the *Monthly Bulletin*, would be less than under the previous procedure. The *B.S.C.E. Journal* made its appearance in January, 1914. Ten issues of the *Journal* were published each year in Volumes I to XX. Since 1934, the *Journal* has been published quarterly with an index in the last issue of the year. The *Journal* contains papers presented before the Society and its Sections, reports of professional committees, items of general interest and the proceedings of the Society and Sections.

### *Awards and Prizes*

*Desmond FitzGerald Medal.* On September 15, 1880 it was voted "that the sum of \$15 be appropriated to be expended on books as a prize for the best essay read before the Society during the year ending March, 1881." Apparently no further consideration was given to the establishment of a prize for nearly thirty years. In 1910 the Board voted to offer an annual prize for the best paper presented to the Society. Past President Desmond FitzGerald offered to provide a bronze medal as a prize each year, the society accepted this offer and adopted rules governing the award of the medal. Desmond FitzGerald medals have been awarded for thirty-two papers through the year 1947-48.

*Clemens Herschel Award.* In 1923, Clemens Herschel presented to the Society a number of autographed copies of his book entitled "Frontinus and the Water Supply of the City of Rome" and the Board awarded these books

as prizes for papers. The Clemens Herschel Fund, established in 1931 from a bequest, now provides other books as prizes.

Sections Prizes. The Board voted on April 12, 1924 to present a prize for a worthy paper given in each section.

Desmond FitzGerald Scholarship. This award is made to students in Civil Engineering at Northeastern University in memory of Desmond FitzGerald whose bequest was made with the intent that the income be used for charitable and educational purposes.

Samuel E. Tinkham Scholarship. This fund was established in 1921 at the Massachusetts Institute of Technology in memory of Samuel E. Tinkham. The income of the fund is used "to assist some worthy student of high standing to continue his studies in Civil Engineering."

### ***John R. Freeman Fund***

In 1925 John R. Freeman made a gift to the Society amounting to about \$25,000 to establish the John R. Freeman Fund. The income of this fund is particularly devoted to the encouragement of the younger members. A standing Freeman Fund Committee has the responsibility of determining how the income of this fund shall be used.

Travel Scholarships. From 1927 to 1938, the Freeman Fund Committee awarded travel scholarships to six young men for a total of ten years' study. The scholarships, with one exception, were for study in Europe.

Publications. The Committee has from time to time authorized the use of a portion of the income for the publication of important reports.

John R. Freeman Lectures on Hydraulics. A series of lectures on hydraulics was given in 1939.

Research. Appropriations from the Freeman Fund have been made for hydraulic research at engineering schools in the vicinity of Boston.

### ***Cooperation with Other Societies***

Boston's civil, electrical and mechanical engineering groups have long cooperated, informally at first and later as members of the Engineering Societies of New England. Meeting notices of local sections were included in B.S.C.E. publications.



On June 12, 1922 "The Affiliated Technical Societies of Boston" was granted a charter and continues to operate under its present name, Engineering Societies of New England, Inc. These joint headquarters, at 715 Tremont Temple, have been continued to the present time. The E.S.N.E. Journal contains announcements of the meetings of all the affiliated societies and matters of general interest to the membership.

The most cordial relations have always been maintained with the American Society of Civil Engineers. The Society is honored that the American Society chose Boston as the Scene of its Fall Meeting in October, 1948, in recognition of the B.S.C.E. Centennial Year!

Other national societies have held meetings in Boston which our Society has been privileged to take part. Cooperative relations have been maintained with the New England Waterworks Association which jointly occupied quarters with our Society at Tremont Temple for many years.

### *Committees*

The Committee on Library has been included in every list of committees since 1848. Throughout much of the Society's life there have been committees on Meetings, Programs, Review of Papers, Publications, Hospitality, etc.; their duties are obvious from their names.

Separate Committees are appointed each year for the Desmond FitzGerald and Clemens Herschel Awards and for each Section Prize. A standing committee is in charge of the John R. Freeman Fund.

A Welfare Committee has been active in connection with employment, particularly during the depression of the thirties, and on matters concerned with compensation and other aspects of the welfare of the membership. Others have dealt principally with the internal affairs of the Society and with matters directly concerning the welfare of its members and specific problems of the engineering profession.

The Society in recent years has appointed several committees to study specific problems of importance both to the civil engineer and to the community:

**Boston Subsoils.** In 1921 a Committee on Boston Subsoils was appointed and between 1923 and 1931, the Committee collected about 3900 boring records. The final report of the Committee published in September, 1931 Journal, contains a complete tabulation of the boring records in Boston and Cambridge together with nine detached maps showing the location of the borings, geological cross-sections and a contour map. In 1943, another Committee on

Boston Subsoils was appointed to continue the collection of boring data along the lines of the 1931 report and to consider the possible collection of water table data, settlement records and other information.

Rainfall and Run-off of New England. In 1916, a Committee on Run-Off was appointed, the Committee presented its report, which published in October 1922. Data were later collected in the name of the Committee for the period from 1922 to 1937. A more final assembly of this information was made in April, 1939.

Flood Committee Reports. After complete cause and effect studies had been made for the 1927, 1936 and 1938 floods they were published in January, 1942 Journal. Through the notable reports on rainfall and run-off and on the New England Floods, the Society has made contributions of inestimable value to New England.

### *Public Affairs*

The Society, directly and through its members, has always been active in those public affairs in which the civil engineer could be of service.

For several years the Society was a member of the Federated American Engineering Societies and of American Engineering Council.

### *Miscellaneous Activities*

Society Badge. After considerable discussion, the Society adopted the present badge, a shield with "1848" and "Boston Society of Civil Engineers" in gold letters on maroon background.

Code of Ethics. The Society led the way and adopted its present Code of Ethics on December 18, 1912.

World Wars. During both World Wars the Society remitted the dues of members in the Armed Forces who were unable to participate in the Society's activities. In 1917, the First Corps of Cadets of Boston, in continuous existence since 1741, raised an engineer regiment for the National Guard. The Society obtained subscriptions amounting to over \$2200 for a fund to be used to equip a band — the 101st becoming the first engineer regiment to have its own band attached.

Employment. As early as 1889, the Secretary was directed to maintain a list of members seeking employment and in 1910, the Board established an Employment Bureau. Lists of men available and positions open were maintained at the Society rooms. Brief notices as to men available were published

each month. The Society's employment service was observed by the formation of the Affiliated Technical Societies of Boston in 1922. In 1932 during the early days of the depression the Engineering Societies of New England and the Boston Society of Architects organized the Emergency Planning and Research Bureau, Inc., which rendered valuable employment service and continues to operate an employment service for engineers and architects.

### *One Hundred Years 1848-1948*

In these highlights of the first 100 years of our Society, many items have been omitted because they were deemed of lesser importance — and some no doubt may have been overlooked. In concluding this Centennial History of the Boston Society of Civil Engineers, oldest engineering society in America, there seem no words more fitting than those of Desmond FitzGerald, fifty years ago, in his Semi-Centennial Address.

“In what has already been said, I have attempted to give an historical account of the formation and progress of this Society during the past fifty years. Such a narrative must necessarily deal with facts which can be of little interest outside of our own membership, and with statistics which, I am afraid, tax even your patience. I trust, however, they may be at least useful in bringing to your minds the paths, more or less familiar, which we together have been following at different times in this eventful half century, paths at times clouded by the passing storm, and perhaps even at times by failure, but more often illuminated with the bright rays of success and of progress.

“In the laborious and responsible work of the profession there is little time for looking backward; the swimmer who turns his eyes from the goal is cast into the eddy; but there are times when retrospection is profitable, and a glance into the past, at least once or twice in a century, is instructive and at least pardonable.

“As we consider the record of this Society, founded by the early toil and constant struggles of the fathers of the profession, built solidly on the eternal principles of truth and honesty, and rising slowly but surely out of every discouragement to its present commanding proportions, we have reason to be proud, proud of our Society, and proud of the achievements of our members in every branch or specialty of the work of the civil engineer, who, by patience, by industry, by ability, and best of all by unswerving integrity, have aided in lifting the noble profession of engineering to its place among the great professions of the world.”

***HISTORY OF THE BOSTON SOCIETY OF CIVIL ENGINEERS, 1948 TO 1979***

*By William S. Zoino, President Elect, BSCE Section*

***Non-Technical Activities***

In his April 1949 address entitled "The Second Hundred Years" President Harrison P. Eddy, Jr. suggested that civil engineers should "transfer some of their knowledge and skill into fields not so narrowly technical." Similarly, in April 1954 President Chester J. Ginder in his address entitled "The Status of the Engineer" suggested that civil engineers take a more active role in public affairs, strengthen registration laws, and develop better communications with other professional societies. During the years 1948 to 1979 the principal thrust of the Society continued to be in its strong technical programs and publications. Nevertheless, there were many instances of positive response to the charges of President Eddy and President Ginder. For example, in October 1958, a subcommittee of the Society published a draft of a proposed amended Part 26 Reinforced Concrete of the Boston Building Code, and in October 1967 rules for adjudicatory proceedings for the Massachusetts Board of Registration of Professional Engineers and Land Surveyors were proposed.

The Society has provided technical input to the Boston Building Code Commission during this period and presently is assisting the State Building Code Commission on various aspects of the State Building Code, including preparation of seismic design criteria portions of the Code.

The Boston Society of Civil Engineers likewise has continued over the past 31 years to publish data on test boring information from the greater Boston area. Publication of the data has made an important source of information available to architects and engineers in the planning of new projects. The work has been carried out in cooperation with the U. S. Geological Survey.

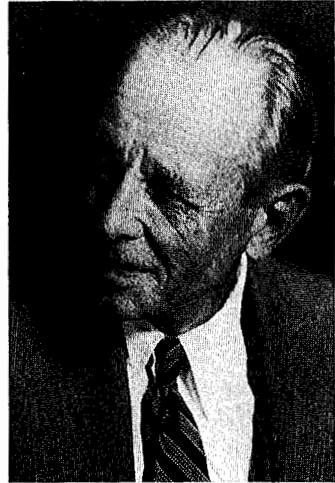
In June 1964 the directors of Fay, Spofford & Thorndike, Inc. established the Ralph W. Horne Fund by a bequest to the Society. The purpose of the fund is to present a prize or certificate annually to a member of the society who has "been outstanding in unpaid public services in municipal, state, or federal elective or appointed posts or in philanthropic activity in the public interest." Today, many members of the Society are active in unpaid public service on municipal planning boards, building commissions, conservation commissions, sewer and water commissions and other public activities where the skill of the civil engineer is needed.

Another area of public service provided by the Boston Society of Civil Engineers members is in its contributions to municipal planning. In January 1959 two papers entitled "Suburbia; Satellite or Sprawl" by Roland B. Gree-

ley and Worthen H. Taylor were published in the Journal of the Boston Society of Civil Engineers. In July 1961 Mr. Greeley also presented a paper entitled "A City Planner Looks at the Urban Explosion." Each of the above papers suggested a systematic approach to planning for both suburban and metropolitan growth.



*John R. Freeman*



*Karl Terzaghi*

### ***Professional Practice***

The professional practice of civil engineering received much attention by the Boston Society of Civil Engineers during the years 1948 through 1979. For example, a paper entitled "Consultants, Clients and Contractors" presented by Professor Karl Terzaghi in January 1958 explored the difference between office and field conditions, and lack of communications between the designer and constructor of a project. Later in 1962 Professor Terzaghi published papers in the BSCE Journal entitled "Engineering Geology on the Job and in the Classroom" and "Past and Future of Applied Soil Mechanics." While Professor Terzaghi was known primarily for his contributions to soil mechanics, his particular insight into the problems of professional practice is exemplified in the above articles which generated considerable discussion among members of the Society and other members of the American Society of Civil Engineers.

### ***Education of Civil Engineers***

The Boston Society of Civil Engineers continued to show interest in the education of civil engineers during 1948 to 1979. In January 1955 the Society sponsored a "Symposium on the Education of the Future Engineer" with papers by Harold L. Hazen, William C. White, John B. Wilbur and Oscar S. Bray. There was also a paper on engineering ethics prepared by Waldo G. Bowman. A code of ethics had been published by the Society in July 1951 replacing one of the earliest codes of ethics by a professional Society which was adopted in December 1912.

The Boston Society of Civil Engineers has received strong support from the universities in the Boston area, particularly MIT, Northeastern University and Tufts University. Each of these institutions of higher learning have contributed personnel from their civil engineering departments to leadership positions in the Society. The Society continues to maintain a strong interest in the education of civil engineers and in the activities of its student chapters.

### ***Public Image of the Civil Engineer***

In April 1963 President George G. Bogren presented his address "Public Image of the Engineer." In his talk President Bogren suggested that the public takes for granted the end product of the civil engineer, but "does not see the drafting boards, studies, and reports." He suggested that more effort be put into upgrading the image of the civil engineer in Society. In March 1966 President John M. Biggs discussed the genesis of civil engineering from ancient times to the present. Professor Biggs made note of the contribution and eminence of past civil engineers, but suggested that peer recognition is of greater satisfaction and importance than public acclaim.

This interest in the image of the civil engineer is much in evidence today with the announcement by ASCE President elect Walter Blessey, that he intends to make the image of the civil engineer a subject of enhancement during 1979.

### ***Technical Activities of BSCE***

While attention was being paid to the non-technical issues of civil engineering during 1948 to 1979, the Society continued to play a major role in the technical aspects of civil engineering. This can be noted in the high quality of the papers published in the Journal of the Boston Society of Civil Engineers. Typical of some of the outstanding publications are the following:

<i>Subject</i>	<i>Author</i>	<i>Date</i>
Notes on Design of Earth Dams	Arthur Casagrande	October 1950
Regulation of Flood Control Reservoirs in New England	Elliot F. Childs	July 1953
Boston Central Artery	J.B. Wilbur and E.C. Keane	October 1953
St. Lawrence International Hydroelectric Development	W.F. Uhl, W.M. Hall and G.R. Rich	July 1955
Structural Failures and How to Avoid Them	Jacob Feld	April 1956
Analog and Digital Computers in Civil Engineering	Saul Namyet	January 1957
The Connecticut River, Its Development and Versatility	Lewis D. Pierce	April 1960
Electronic Distance Measuring Devices	Robert E. Cameron	October 1963
Merrimack River Pollution Abatement Study	Paul W. Prendeville	October 1964
Hydraulics of Mixing Tanks	Thomas R. Camp	January 1969
Hydraulics in the United States	Hunter Rouse	April 1976

The Society published several papers which were state-of-the-art descriptions in their particular disciplines at the time. Typical of such papers were the following:

<i>Subject</i>	<i>Author</i>	<i>Date</i>
The Status of Knowledge of Air Pollution Today	Charles R. Williams	July 1954
Disposal of Atomic Power Plant Wastes	Conrad B. Staub	July 1957
Removal of Cations From Leachate by Interaction with Subsurface Soils	Ira W. Leighton and Frederick C. Blanc	October 1973

There were also published several outstanding papers in the area of engineered and constructed projects. Typical of these projects during the 1948 to 1979 period were the following:

<i>Subject</i>	<i>Author</i>	<i>Date</i>
Fox Point		
Hurricane Barrier	John William Leslie	April 1962
Prudential Center Foundations	Donald G. Ball	July 1962
Engineering the Bear Swamp Project	Robert W. Kwiatkowski and David R. Campbell	July 1974

The Boston Society's Journal is mailed, not only to its members, but also to some 300 other subscribers. The subscribers include libraries and individuals all over the United States, organizations in almost all countries of Europe (including the Soviet Union) and in several countries of Africa and the Far East. Technical or professional papers from outside sources will be received and considered for publication especially if they concern matters relevant to the Boston Society's area.

In recent years the Society has sponsored lecture series in the areas of hydraulics, computers, sanitary (environmental) engineering, structural engineering and geotechnical engineering. These lecture series consisted of state-of-the-art presentations by eminent nationally known civil engineers and have been well attended by members of the Society. In addition to the lecture series special presentations of the John R. Freeman memorial lecture such as the paper on Hydrologic Modeling presented by Professor Ven Te Chow in February 1972 have been well received by the Society.

### ***Growth of the Society***

In 1948 the Society had the following technical sections: Sanitary, Structural, Transportation, Hydraulics, Survey and Mapping, and Northeastern University section. In 1953 the Northeastern University section was disbanded and in 1964 the Survey and Mapping section was disbanded. In 1979 there are seven technical groups within the Society: the Computer Group founded in 1969, the Construction Group founded in 1957, the Environmental Group which replaced the Sanitary Section in 1973, the Geotechnical Group founded in 1969, the Hydraulics Group, the Structural Group and the Transportation Group. Each of these technical groups holds from three to five technical meetings throughout the year for a total of approximately 40 meetings. There are also from five to fifteen special meetings including lecture series. Hardly a week goes by during the year when at least one technical meeting of the Society is not held.

The growth of the Boston Society of Civil Engineers can be illustrated by the following statistics: In 1948 the Society had approximately 800 members whereas in 1979 the Society has over 2,000 members. The operating budget for 1948 was approximately \$12,000, whereas the 1979 operating budget is expected to be approximately \$100,000.



### ***Merger of BSCE with Massachusetts Section ASCE***

During the 1960's the number of joint meetings of the Society with the Massachusetts' Section of ASCE increased. In March 1970 a BSCE-ASCE relationship committee chaired by past President James Archibald proposed short-term and long-term goals for cooperation. The short-term goals included joint technical meetings, a joint newsletter and joint quarters. The long-range goals pointed to a merger or consolidation of the two Societies. The merger took place formally in April 1974 and Thomas K. Liu became the first president of the Boston Society of Civil Engineers Section, American Society of Civil Engineers (BSCES-ASCE). In his presidential address Mr. Liu made note of the accomplishment of civil engineers in the areas of public service, student activities, reactivation of a disadvantaged youth program, strengthening of the public image of civil engineers including sponsorship of the National Historic Civil Engineering Landmarks program. The constitution and bylaws of the BSCES/ASCE were adopted in February 1975.

### ***Quarters***

In 1960 the Society Headquarters moved from 88 Tremont Street (Tremont Temple) to 20 Pemberton Square and in 1962 to 47 Winter Street, and in 1972 to 230 Boylston Street. In 1977 the Society offices were moved to the present location in the Engineering Center at 80 Boylston Street.

With the exception of the Journals of the Society and certain publications such as the contributions to soil mechanics and lecture series notes available for sale, the books comprising the library of the Boston Society of Civil Engineers have been transferred to local universities. In May 1972 most of the books in the BSCE library were transferred to Northeastern University and made part of the University's Library. As a condition of this gift, the Society members have been granted use of Northeastern University's library.

### ***Financial Condition of the BSCES***

The financial status of the BSCES/ASCE continues to be sound as attested by the balance sheet of September 30, 1977. This balance sheet is reproduced here for information purposes. As may be noted, the assets of the Society include monies in various funds which were established by gift or bequest to the Boston Society of Civil Engineers.

**TABLE I**  
**CONDENSED STATEMENT OF CONDITION**  
**Assets, Liabilities and Funds**

ASSETS	BOOK VALUE		MARKET VALUE	
	9-30-77	10-1-76	9-30-77	10-1-76
Suffolk Franklin NOW	\$ 10,688.89	\$ 18,743.90	\$ 10,689.00	\$ 18,744.00
Suffolk Franklin Savings	—	9,282.93	—	9,283.00
Petty Cash	—	24.00	—	24.00
Boston Safe Deposit:				
Bonds	67,759.69	52,684.69	59,166.00	41,767.00
Stocks	76,930.11	118,832.23	103,167.00	164,525.00
Cash	49,364.45	982.99	49,364.00	983.00
Invested Income	<u>14,608.83</u>	<u>23,853.41</u>	<u>14,609.00</u>	<u>23,853.00</u>
Boston Safe Deposit (Total)	\$208,663.08	\$196,353.32	\$226,306.00	\$231,128.00
Total Assets	\$219,351.97	\$224,404.08	\$236,995.00	\$259,179.00
<b>LIABILITIES AND FUNDS</b>				
Permanent Fund	\$ 85,673.49	\$ 81,893.89	\$ 92,917.62	\$ 96,470.00
Freeman Fund	67,047.17	63,032.85	72,716.35	74,608.00
Turner Fund	3,758.69	3,407.08	4,076.50	4,014.00
Fitzgerald Fund	6,225.76	5,824.70	6,752.18	6,861.00
French Fund	3,717.69	3,369.96	4,032.04	3,970.00
Herschel Fund	2,401.28	2,176.67	2,604.32	2,564.00
Howe Fund	4,107.86	3,723.59	4,455.20	4,386.00
Morse Fund	5,756.07	5,398.99	6,242.78	6,360.00
Walker Fund	1,854.38	1,680.96	2,011.18	1,980.00
Horne Fund	5,501.71	4,987.09	5,966.91	5,874.00
Lectures Fund	6,169.69	5,592.59	6,691.37	6,588.00
Camp Fund	13,565.59	12,296.69	14,712.63	14,485.00
Invested Current Fund	<u>2,883.70</u>	<u>2,968.26</u>	<u>3,127.53</u>	<u>2,968.00</u>
Total Invested Funds	\$208,663.08	\$196,353.32	\$226,306.61	\$231,128.00
Continuing Education Fund	\$ 3,866.84	\$ 3,551.23	\$ 3,867.00	\$ 3,551.00
Boring Data Fund	1,595.81	1,595.81	1,596.00	1,596.00
Student Loan Fund	1,404.24	2,786.98	1,404.00	2,787.00
Current Fund	—	31.74	—	32.00
Petty Cash	—	24.00	—	24.00
Group Lectures	12,776.38	19,163.59	12,776.00	19,163.00
Special Funds & Misc.	—	(574.28)	—	(574.00)
Corpus	<u>(8,954.38)</u>	<u>1,471.76</u>	<u>(8,954.00)</u>	<u>1,472.00</u>
Total Liabilities	\$ 10,688.89	\$ 28,050.83	\$ 10,689.00	\$ 28,051.00
Total Liabilities & Funds	\$219,351.97	\$224,404.15	\$236,995.00	\$259,179.00

*Saul Namyet, Treasurer*

***PRESIDENTS OF THE BOSTON SOCIETY OF CIVIL ENGINEERS,  
1848 - 1979***

*Compiled and Edited by E.E. Wood, Jr. and E. C. Keane*

1848-1850. JAMES FOWLE BALDWIN. Chief Construction Engineer, Boston & Lowell Railroad; Co-commissioner of Construction, Boston Water Supply; State Senator.

1850-1852. GEORGE MINOT DEXTER. Agent (i. e. general manager), Boston & Lowell Railroad; architect; President, Vermont Central Railroad.

1852-1856. SIMEON BORDEN. Surveyor of the State of Massachusetts. Directed the mapping of the state; devised improved survey instruments. Consultant on railroad layout and construction.

(After 1856 the society became dormant until 1874.)

1874, April 27 to August 7. JAMES BICHENO FRANCIS. Construction Engineer, Pawtucket Flood Gates, Lowell, Mass. President, ASCE, 1881.

1874-1880. THOMAS DOANE. Consulting Engineer; Chief Engineer for Hoosac Tunnel and Deerfield Dam. Founded Doane College, 1872.

1880, March 17 to September 15. JOSEPH PHINEAS DAVIS. City Engineer, City of Boston. (Resigned presidency to join American Bell Telephone Company.)

1880-1884. THOMAS DOANE. See above.

1884-1887. GEORGE L. VOSE. Professor of Civil Engineering, M.I.T.

1887-1888. LEWIS FREDERICK RICE. Consulting engineer for municipalities, railroads and American Bell Telephone Company.

1888-1890. DESMOND FITZGERALD. Superintendent, Western Division, Boston Water Works. President, ASCE, 1899.

1890-1891. CLEMENS HERSCHEL. Hydraulic Engineer, Holyoke Water Company; inventor of the Venturi meter. President, ASCE, 1916.

1891-1892. FREDERIC P. STEARNS. Hydraulic engineer; developed use of weirs as measuring devices. President, ASCE, 1906.

1892-1893. HENRY MANLEY. Civil engineer; Assistant Chief Engineer, City of Boston.

1893-1894. JOHN RIPLEY FREEMAN. Consulting engineer in construction and hydraulics. President and Treasurer, Massachusetts Mutual Fire Insurance Company and Associated Companies. President, ASCE, 1922.

1894-1895. WILLIAM EDWARD McCLINTOCK. City Engineer, City of Chelsea; Partner, McClintock and Woodfall.

1895-1896. ALBERT F. NOYES.

1896-1897. GEORGE FILLMORE SWAIN. Professor, Head of Department of Civil Engineering, M.I.T., engineer member, Massachusetts Railroad Commission. President, ASCE, 1913.

1897-1898. DEXTER BRACKETT. Engineer, Distribution Department, Metropolitan Water Works.

1898-1899. HOWARD A. CARSON. Chief Engineer, Boston Transit Commission. Directed construction of America's first transit subway.

1899-1900. CALVIN FRANCIS ALLEN. Professor of Railroad Engineering, M.I.T.

1900-1901. FREDERICK S. GIBBS.

1901-1902. LAWSON BENNETT BIDWELL. Engineer, Eastern District, New York, New Haven and Hartford Railroad.

1902-1903. GEORGE A. KIMBALL. Consulting engineer; designed Sewage Treatment Plant, Brockton, Mass., 1893.

1903-1904. IRA N. HOLLIS. Professor of engineering, Harvard. President, Worcester Polytechnic Institute.

1904-1905. FREDERICK BROOKS. Consulting engineer.

1905-1906. JOHN WALDO ELLIS. Consulting hydraulic engineer; engineer-inspector, Boston & Providence Division, Old Colony Railroad.

1906-1907. FRANK W. HODGDON. Chief Engineer, Waterways Division, Massachusetts Department of Public Works.

1907-1908. EDWARD WILLARD HOWE. Civil Engineer in charge of Parks and Bridge Construction, City of Boston.

1908-1909. JOSEPH RUGGLES WORCESTER. Partner, J. R. Worcester and Company, structural engineers.

1909-1910. GEORGE BLINN FRANCIS. Consulting engineer; Head of Civil Engineering Department, Westinghouse, Church, Kerr and Company.

1910-1911. HENRY F. BRYANT. Partner, French and Bryant, consulting engineers.

1911-1912. CHARLES T. MAIN. President, Chas. T. Main, Inc., consulting engineers.

1912-1913. JAMES W. ROLLINS. President, Holbrook Cabot & Rollins, general contractors.

1913-1914. FREDERIC H. FAY. Bridge engineer, City of Boston; Partner, Fay, Spofford and Thorndike, consulting engineers.

1914-1915. HARRISON P. EDDY. Partner, Metcalf & Eddy, consulting engineers. President, ASCE, 1934.

1915-1916. CHARLES RICE GOW. Engineer, Boston Transit Commission; consulting engineer on subway construction and foundations.

1916-1917. RICHARD AUGUSTUS HALE. Engineer, Essex Company, Lawrence, Massachusetts; member Lawrence Park Commission.

1917-1918. GEORGE C. WHIPPLE. Gordon McKay Professor of Sanitary Engineering, Harvard University; Partner, Whipple and Hazen, consulting engineers.

1918-1919. CHARLES MILTON SPOFFORD. Head of Civil Engineering Department, M.I.T.; Partner, Fay, Spofford and Thorndike, consulting engineers.

1919-1920. LEONARD METCALF. Partner, Metcalf and Eddy, consulting engineers.

1920-1921. FRANK A. BARBOUR. Partner, Barbour and Snow, consulting engineers.

1921-1922. ROBERT SPURR WESTON. Partner, Weston and Sampson, consulting engineers.

1922-1923. DUGALD CALEB JACKSON. Head of Department of Electrical Engineering, M.I.T.; Partner, Jackson and Moreland, consulting engineers.

1923-1924. FRANK M. GUNBY. Director, Chas. T. Main, Inc., consulting engineers.

1924-1925. EDWIN H. ROGERS.

1925-1926. RICHARD KING HALE. Director of Waterways Division, Massachusetts Department of Public Works.

1926-1927. CHARLES METCALF ALLEN. Professor of Hydraulic Engineering, Worcester Polytechnic Institute.

1927-1928. FRANK ALWYN MARSTON. Partner, Metcalf and Eddy, consulting engineers. President, ASCE, 1960.

1928-1929. CHARLES BLANEY BREED. Professor of railroad and highway engineering and Head, Department of Civil Engineering, M.I.T.

1929-1930. FRANK E. WINSOR. Chief Engineer, Metropolitan District Water Supply Commission, Boston.

1930-1931. LEWIS E. MOORE. Consulting engineer, structures.

1931-1932. HARRY EDGAR SAWTELL. Director and Head of the Structural Department, Chas. T. Main, Inc.

- 1932-1933. RALPH W. HORNE. President, Fay, Spofford & Thorndike, Inc., consulting engineers.
- 1933-1934. ARTHUR W. DEAN. Chief Engineer, Massachusetts Department of Public Works.
- 1934-1935. ARTHUR TRUMAN SAFFORD. Hydraulic Engineer, Proprietors of the Locks and Canals, Lowell, Massachusetts.
- 1935-1936. JOHN B. BABCOCK, 3d. Professor of Railroad Engineering, M.I.T.
- 1936-1937. HAROLD KILBRITH BARROWS. Professor of Hydraulics, M.I.T.; consulting engineer.
- 1937-1938. ARTHUR DANIEL WESTON. Director, Division of Sanitary Engineering, Massachusetts Department of Public Health; consultant, sanitary engineering.
- 1938-1939. KARL R. KENNISON. Hydraulic engineer; chief engineer, New York City Board of Water Supply. Chief Engineer, Metropolitan District Water Supply Commission, Boston.
- 1939-1940. GORDON MASKEW FAIR. Gordon McKay Professor of Sanitary Engineering, Harvard Engineering School.
- 1940, March 20 to June 3. FRANK B. WALKER.
- 1940-1941. ARTHUR L. SHAW. Partner, Metcalf & Eddy, consulting engineers.
- 1941-1942. ALBERT HAERTLEIN. Professor of Civil Engineering, Northeastern University.
- 1942, March 18 to August 22. CHARLES REED MAIN. President and Treasurer, Chas. T. Main, Inc., consulting engineers.
- 1942-1943. ATHOLE B. EDWARDS. Engineer, Division of Metropolitan Planning, Metropolitan District Commission; member, State Planning Board.
- 1943-1944. HOWARD MOORE TURNER. Consulting engineer; Partner, Turner, Mills-paugh and Safford.
- 1944, March 22 to August 13. SAMUEL MORRISON ELLSWORTH. Consulting engineer. (Died in office.)
- 1944-1945. HARRY POOLE BURDEN. Dean of the School of Engineering, Tufts University.
- 1945-1946. CARROLL A. FARWELL. Treasurer and Director, Fay, Spofford and Thorndike, Inc., consulting engineers.
- 1946-1947. GEORGE ARTHUR SAMPSON. Partner, Weston and Sampson, consulting engineers.
- 1947-1948. HARVEY BANKS KINNISON. District Engineer, United States Geological Survey, Massachusetts District.

1948-1949. FREDERIC NIXON WEAVER. Chairman, Department of Civil Engineering, Tufts University.

1949-1950. HARRISON P. EDDY, JR. Partner, Metcalf and Eddy, consulting engineers.

1950-1951. THOMAS RINGGOLD CAMP. Partner, Camp, Dresser and McKee, consulting engineers.

1951-1952. JOHN B. WILBUR. Professor of Structures and Head, Civil Engineering Department, M.I.T.

1952-1953. EMIL ANTON GRAMSTORFF. Dean, Graduate Division, College of Engineering, Northeastern University.

1953. J. STUART CRANDALL. President and Chief Engineer, Crandall Dry Dock Engineers, Inc. (Died in office.)

1953-1954. CHESTER J. GINDER. Engineer, Parks Division, Metropolitan District Commission.

1954-1955. MILES N. CLAIR. President, Thompson and Lichtner Company, Inc., consulting engineers.

1955-1956. EDWIN B. COBB. Senior Vice President, Metcalf and Eddy, consulting engineers.

1956-1957. JOHN G. W. THOMAS. Consultant in Safety Engineering.

1957-1958. ARTHUR CASAGRANDE. Gordon McKay Professor of Soil Mechanics, Harvard Engineering School.

1958-1959. WILLIAM L. HYLAND. Vice President, Fay, Spofford and Thorndike, Inc., consulting engineers.

1959-1960. EDWARD C. KEANE. Vice President, Fay, Spofford and Thorndike, Inc., consulting engineers.

1960-1961. ARTHUR THOMAS IPPEN. Ford Professor of Engineering and Director, Water Resources Division, School of Engineering, M.I.T.

1961-1962. JAMES F. BRITAIN. Hydraulic Engineer, Stone and Webster Engineering Corporation.

1962-1963. GEORGE C. BOGREN. Partner, Weston and Sampson, consulting engineers.

1963-1964. JOHN F. FLAHERTY. Chief Engineer, City of Boston Public Works Department.

1964-1965. WILLIAM A. HENDERSON. President, Universal Engineering Corporation, consulting engineers.

1965-1966. LESLIE J. HOOPER. Professor of civil engineering, Worcester Polytechnic Institute.

1966-1967. JOHN M. BIGGS. Professor of civil engineering, M.I.T. Partner, Hansen, Holly & Biggs, structural engineers.

1967-1968. HARRY L. KINSELL. Vice President, Metcalf and Eddy, consulting engineers.

1968-1969. HARL P. ALDRICH. Partner, Haley & Aldrich, Inc., geotechnical engineers.

1969-1970. ROBERT H. CULVER. Vice President, Camp, Dresser and McKee, Inc., consulting engineers.

1970-1971. ERNEST LINCOLN SPENCER. Chairman, Department of Civil Engineering, Northeastern University.

1971-1972. ERNEST A. HERZOG. President, Alonzo B. Reed, Inc., consulting engineers.

1972-1973. JAMES P. ARCHIBALD. Vice President, Natgun Corporation.

1973-1974. MAX D. SOROTA. Vice President, Fay, Spofford and Thorndike, Inc., consulting engineers.

(In April, 1974, the Boston Society of Civil Engineers merged with the Massachusetts Section, ASCE, and the merged organization became the Boston Society of Civil Engineers Section, ASCE.)

1974-1975. THOMAS K. LIU. Vice President, Haley & Aldrich, Inc., geotechnical engineers.

1975-1976. CHARLES A. PARTHUM. Vice President, Camp, Dresser and McKee, Inc.

1976-1977. BERTRAM BERGER. Vice President, Fay, Spofford and Thorndike, Inc., consulting engineers.

1977-1978. CHARLES C. LADD. Professor of geotechnical engineering, M.I.T.

1978-1979. HOWARD SIMPSON. Partner, Simpson, Gumpertz and Heger, Inc., consulting engineers.

1979-1980. WILLIAM S. ZOINO. (President Elect). Partner, Goldberg, Zoino, Dunicliff and Associates, geotechnical engineers.



# *Proceedings*

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**AMERICAN SOCIETY OF CIVIL ENGINEERS**

***MEETINGS HELD — TECHNICAL GROUPS***

***Computer Group***

November 1, 1978. Dinner meeting at MIT Faculty Club. Dr. W. Wayne Black, Chas. T. Main, Inc., spoke on "Computer Graphics Applications in the Production Environment" covering computer-aided drafting with examples of interdisciplinary checking, material take-offs, and engineering drawings and maps. Attendance 25.

November 29, 1978. Dinner meeting at MIT Faculty Club. Mr. Martin Ernst of Arthur D. Little, Inc. spoke on the office of the future, with electronic gear used routinely by clerical personnel and management to meet the anticipated shortage of workers. Manufacturers may be offering, within five years, systems that will integrate the necessary components. This was an official BSCE Section meeting. Attendance 18.

***Construction Group***

January 10, 1979. Dinner meeting at Cottage Crest Restaurant, Waltham. Mr. James J. Myers, partner in Gadsby and Hanna, Inc., an expert on construction law, spoke on concerns of the owner and general contractor with regard to subcontractors' and suppliers' rights to direct payments. Attendance 18.

***Environmental Group***

January 18, 1979. Dinner at Purcell's Restaurant, Boston. Mr. John Smith, Chief, Urban Systems Management Section, Environmental Protection Agency, MERL, Cincinnati, and Mr. Allan Hais, Chief, Municipal Technical Branch, Environmental Protection Agency, Washington, spoke on "Innovative/Alternative Systems for Wastewater Systems" and discussed EPA's new I/A Manual. Attendance 75.

***Geotechnical Group***

November 30, 1978. Dinner meeting at Mugar Hall, Tufts University. Mr. David McKittrick of Reinforced Earth Company gave an overview of the concept of reinforced earth, including development, costs, design and applications. There were discussions by Mr. Thomas Tsotsi of CE Maguire, Inc. and Mr. John Aherne, Bridge Engineer, Massachusetts Department of Public Works. Attendance 72.

January 17, 1979. Dinner meeting at Mugar Hall, Tufts University. Messrs. Steve Poulos, William Hagen, Edmund Johnson, Donald Goldberg and Rene Luft, members of the Advisory Committee for Article 7 of the State Building Code, presented a discussion of proposed revisions of that article. Attendance 30.

### ***Hydraulics Group***

December 6, 1978. Evening meeting at Parsons Water Resources Laboratory, MIT. Mr. John J. Fairfield, Manager of Projects, and Mr. Jack C. Howe, Mechanical Engineer, both of Chas. T. Main, Inc., spoke on existing and potential developments of low-head hydro power in New England and turbine developments in the field. Attendance 65.

January 31, 1979. Evening meeting at Parsons Water Resources Laboratory, MIT. Mr. M. B. McPherson, Director, ASCE Urban Water Resources Research Program, spoke on "Urban Runoff Control Planning." Attendance 30.

### ***Structural Group***

December 13, 1978. Evening meeting at Ell Student Center, Northeastern University. Panel discussion on retrofitting of bridges by Mr. John Aherne, Bridge Engineer, Massachusetts Department of Public Works, and Mr. Paul Maimoni of J. F. White Contracting Company. Attendance 75. This was an official BSCE Section meeting.

### ***Transportation Group***

November 16, 1978. Luncheon meeting at Polcari's Restaurant. Mr. Paul Levy, Partner, Storch Engineers, spoke on the utilities inventory made in connection with the proposed project for depression of the Boston Central Artery, including data research and storage on computer cards for later retrieval. Attendance 139.

January 24, 1979. Luncheon meeting at Nick's Restaurant. Mr. George M. Joseph, Director, Capital Expenditures Program, Massachusetts Department of Public Works, spoke on the 1979 Transportation Act providing for highways, mass transit and highway safety. Attendance 79. This was an official BSCE Section meeting.

# Annual Index

## CONTENTS, VOLUME 65, 1978-1979

### No. 1, April 1978

#### PAPERS

New President's Message <i>Howard Simpson</i> .....	4
Presidential Address <i>Charles C. Ladd</i> .....	5

#### PROCEEDINGS

Report of the Board of Government .....	9
Minutes, Annual Meeting of BSCE Section .....	13
Report of the Treasurer .....	15
Annual Reports of Committees .....	21
Annual Reports of Technical Groups .....	32
Contents, Volume 64 .....	39

### No. 2, July 1978

#### PAPERS

Unique Challenges Associated with Marine Structures in New England <i>Francis C. Pierce and Victor Calabretta</i> .....	43
Wastewater Disposal Planning and the Societal Matrix <i>William B. Moeller</i> .....	54

**CONTENTS, VOLUME 65 (cont.)****No. 3, October 1978**

## PAPERS

Structural Design in the Marine Environment <i>John W. Gaythwaite</i> .....	67
--	----

## PROCEEDINGS

Meetings Held — Technical Groups .....	93
--	----

**No. 4, January 1979 — NATIONAL CONVENTION ISSUE**

## WELCOME

<i>Howard Simpson</i> .....	96
-----------------------------	----

CONVENTION HIGHLIGHTS .....	97
-----------------------------	----

CIVIL ENGINEERING LANDMARKS .....	101
-----------------------------------	-----

## A HISTORY OF PROGRESS

The Year 1848 <i>Edward E. Wood, Jr.</i> .....	113
---	-----

Centennial History 1848 to 1948 <i>J.B. Babcock, 3d (abridgement by Robert A. Snowber)</i> .....	128
---	-----

List of Presidents .....	135
--------------------------	-----

## PROCEEDINGS

Meetings Held, Structural Groups .....	141
--	-----

ANNUAL INDEX, VOLUME 65 .....	143
-------------------------------	-----

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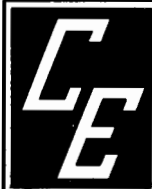
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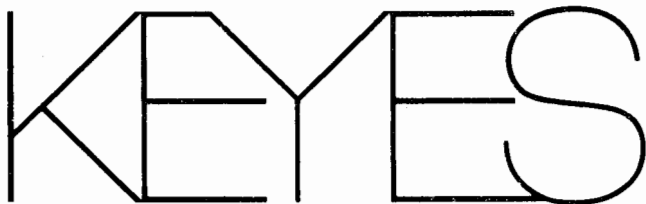
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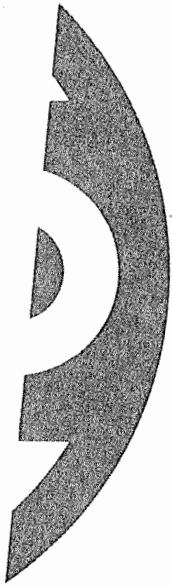
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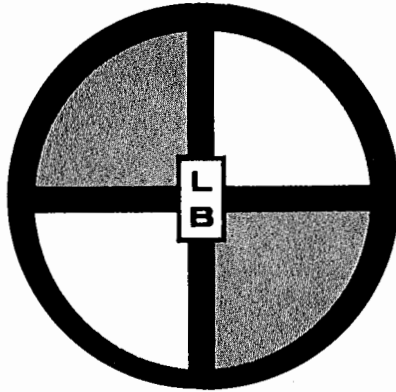
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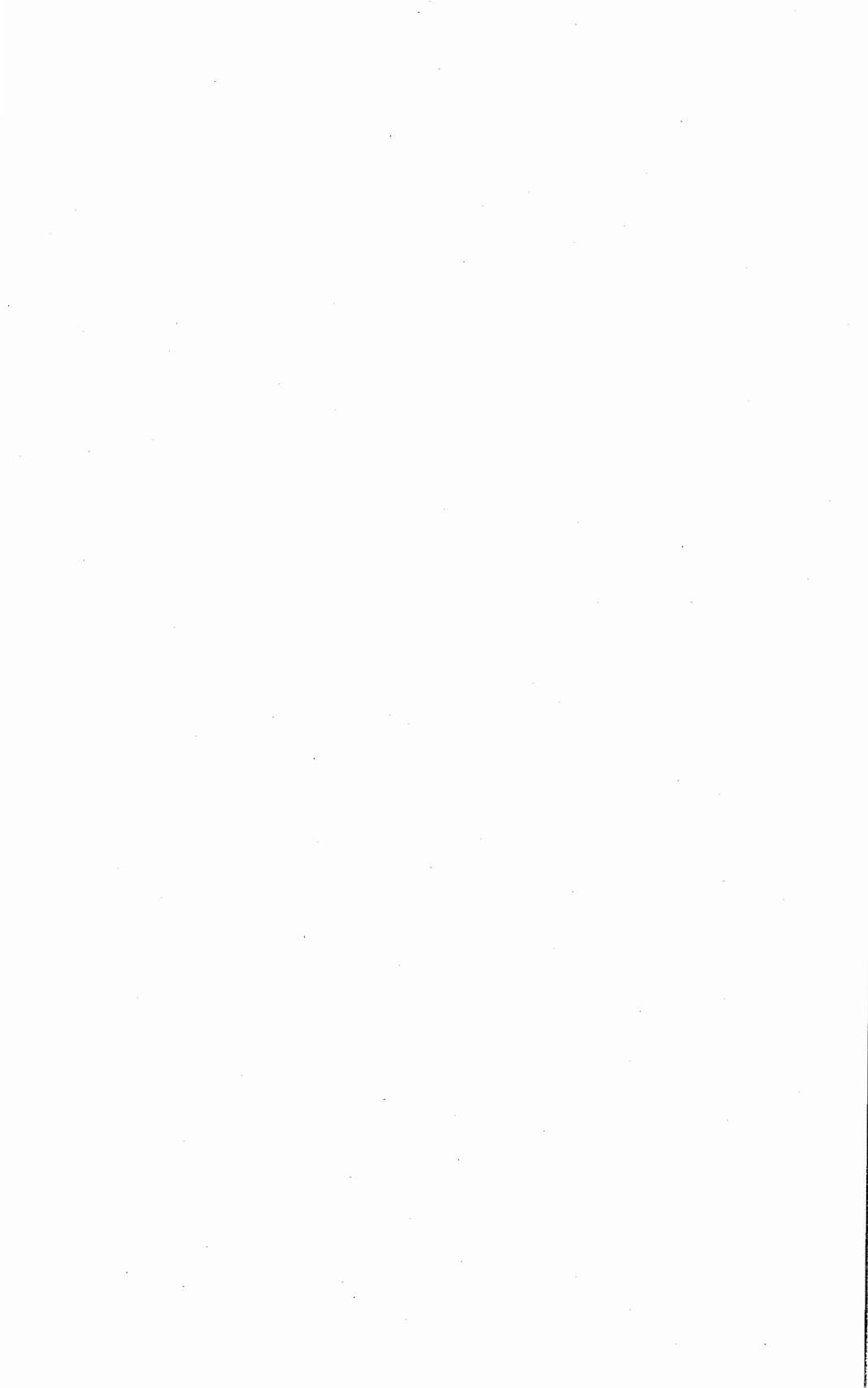
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