The Geology of Boston & the Surrounding Region

Who but geologists and a few civil engineers would look at New Old South Church on Bolyston Street in Copley Square and think that a mere 600 million years ago, the conglomerate stone of its walls was being formed as accumulating sediment along the shore of a volcanic island just off the coast of the continent of Gondwana, the forefather of present-day Africa. Or you might ponder as you gaze across Copley Square that only 22,000 years ago, the glacial ice thickness over Boston was twice as thick as the John Hancock Tower is tall. About 3,500 years ago, Native Americans were harvesting fish using an ingenious weir at the site of 500 Boylston Street in the tidal embayment and mud flats of the Back Bay. Less than four hundred years ago in 1630, geology beckoned the 1,000 or so people to settle on the hills of the Shawmut Peninsula, the peculiar layering of soils providing many fresh, free-flowing springs, with the geography providing defensible high ground and an adequate harbor for ships of the day. It was just one hundred and fifty years ago that the state of Massachusetts was in the midst of the world's greatest land-moving operation ever to import sand and gravel fill from the glacial kames and eskers in Needham and Dedham to fill the Back Bay. Our history is founded on geology, as are our buildings. Our tunnels are bored through very interesting accumulations of rock and soils. It is therefore with great pleasure and excitement that the Editorial Board presents this special combined edition of your BSCES Journal, *Civil Engineering Practice*, on "The Geology of the City of Boston & Surrounding Region."

The opportunity to publish this major work on the geology of Boston came to BSCES from two well-known geologists, Dave Woodhouse and Pat Barosh. Their work has appeared before in the Journal in 1989, along with other notable geotechnical engineers and engineering geologists. However, the current 2011/2012 combined edition of the Journal puts a plethora of geologic information and nearly a century of the authors' research, practice and expertise in one bound volume. The bibliography contains well over eight hundred references. The authors are to be congratulated on such a significant undertaking and I personally thank them for the opportunity that BSCES now has to present this work to our members, as well as to the geological and civil engineering community. The first three papers present details of the geologic

setting of Massachusetts, and in particular the Boston Basin. The geologic factors of soil and rock conditions and the impact of these conditions on building foundation requirements are described in two papers. The impacts of geology on tunnel construction and the details of the geology discovered along the routes of tunnels for transportation projects and for water and wastewater conveyance are described in the final two papers. As much as these papers are about the geology of Boston and surrounding region, they are also a history — a history of ground's formation and man's interaction with it. Every engineer should find something of interest in the majority of the papers.

Special thanks are also given to the eleven firms and individuals who have contributed at various levels of support to sponsor this special edition of the journal. These firms and individuals are acknowledged on the sponsorship page that preceeds this editorial. Their sponsorship shows a keen interest in the Journal and the geology of Boston, and of course greatly helps to defray the cost of editing and printing production of this nearly five-hundred-page edition.

In order to accommodate this extraordinary undertaking of this focus on Boston's geology, we have altered some of our usual practices in presenting papers. Since all papers have common authors, we have printed their biographies once (on page 410). In addition, since the papers share many of the same references, we have collated references for all of the papers at the end (on pages 411-442), and in text instead of using superscripts to note a reference, we use APA style. Also, since papers do refer to figures in other, preceeding papers, we adopted a two-number system to make it easier to identify and locate figures across papers (for example, Figure 3-12 refers to the twelfth figure in the third paper in this issue). Last, since color is key in conveying information for some of the figures (especially photos of rock samples), we have included a special color insert (on pages 449-480).

For the next edition of *Civil Engineering Practice* — for the year 2013 (Volume 28) — we will examine issues of seismicity in the Boston Basin. However, our ongoing quandary is what will we publish in subsequent editions of the Journal. The Editorial Board continues to face a dearth of professional papers on the practice of civil engineering. One previous source of papers to publish has essentially done dry because it used to be that the different BSCES seminar series required submittal of formal papers from every guest speaker. These provided several papers each year for the Journal. Unfortunately, printed PowerPoint slides have become a substitute means of disseminating the information presented in these lectures. Although a picture might be worth a thousand words, words are needed to tie pictures together! We are investigating possible means of capturing these presentations in a format that could be turned into ready material for publishing in the Journal, perhaps by capturing the spoken words at a technical presentation, coupled with some of the PowerPoint images.

However, we are still a journal for our members. Therefore, we would really like to publish a paper on professional practice that you would write. Got an idea about an interesting project you worked on some time in the past? Want to write about it? Or maybe one of the young engineers in your firm could be encouraged to write about that project? If you have ideas for possible papers, please get in touch with me or other members of the Editorial Board.

Sincerely yours,

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