

The Sabines at Riverbank

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Preface

Wallace Clement Sabine (1868-1919) is the father of the science of architectural acoustics. During his investigations of the acoustical conditions in several Harvard University buildings, Wallace Sabine gained the confidence he needed to consult on the acoustics of the new Boston Symphony Hall being designed by the legendary New York City architectural firm of McKim, Mead, and White. This firm was formed in 1878 when Charles Follen McKim formed a partnership with William Rutherford Mead and William B. Bigelow. Bigelow retired the following year when Sanford White joined the firm and the firm's name was established. Largely on the basis of his success at Boston Symphony Hall, Sabine's counsel was sought on a wide range of buildings the New England Conservatory of Music's new building in Boston; the Pulitzer House and Century Theater in New York City; churches and cathedrals in Los Angeles, Detroit & Boston; and the Rhode Island State capitol building. By 1916, Sabine's list of consulting projects had grown to include the chamber of the U.S. House of Representatives in Washington, D.C.; the U.S. Military Academy chapel at West Point; the Halifax Cathedral in Nova Scotia; the Remington Typewriter Company, where he advised on quieting typing clatter; and the Gustavino Company, for which he developed and patented a ceramic acoustical tile that found wide application in churches. His consulting files reveal that many of his projects after 1913 also involved noise and noise telescoping of heating and ventilating equipment sound and vibration. Clearly, Sabine was the foremost authority on architectural acoustics through most of the first quarter of the twentieth century.

One of Wallace Sabine's consultations around 1913 was with the wealthy industrialist, financier Colonel George Fabyan. Sabine met him at his estate in Geneva, Illinois, where the Colonel dabbled in various scientific enterprises. Fabyan had heard of Sabine's reputation in physics and acoustics through his brother Marshall, who served as a visiting adviser for the Fabyan Chair at Harvard Medical School. Marshall had retained Sabine to advise him on an acoustic levitation machine that was not working. During this consultation, Fabyan learned of Sabine's frustration with his inadequate acoustic isolation laboratory at Harvard and offered to build him a suitable one in the quiet prairie country of Illinois at Riverbank estate. Sabine accepted the offer and designed what was to become the internationally recognized Riverbank Acoustical Laboratory. He

supervised its construction, which was completed just a few months before his untimely death in 1919 at the age of fifty.

Sabine's death left a great void at Riverbank, a void that was to be filled by two other Harvard physicists named Sabine: Paul Earls Sabine (1879-1958) and Hale Johnson Sabine (1909-1981). In 1919, Colonel Fabyan again turned to Harvard University to find someone to direct the new Riverbank Laboratory and was referred to Paul Sabine, a distant cousin of Wallace. Paul Sabine was working on a World War I research project in spectroscopy at the time and had had little contact with, or knowledge of, Wallace Sabine's work. Fabyan apparently charmed Paul Sabine into coming to Riverbank to direct what was then the only laboratory devoted to acoustical research and testing of acoustical materials and systems. Paul directed Riverbank during the critical formative years and for nearly three decades thereafter until his death in 1958. During this period Paul Sabine was also involved in founding the Acoustical Society of America and establishing acoustics as a respected and essential subdiscipline of physics. Paul's son, Hale, whose physics training at Harvard ultimately led him to the profession of acoustics, also became involved in Riverbank during the 1950s and 1960s to round out the leadership of the Sabines at Riverbank.

No one other than John Kopec with the historic perspective, patience, persistence, and inside knowledge of the Riverbank Acoustical Laboratory could have documented this extraordinary history. John's undamped fascination and enthusiasm for the Riverbank history began with his employment as a laboratory assistant there in 1974 and continues today in his current position as manager of the laboratory. He also serves as curator of the Riverbank Museum and of the Architectural Acoustics Archives of the Acoustical Society of America, located at Riverbank since 1984. About two years after the 1976 discovery of the Wallace Sabine research notebooks, John found Sabine's missing consulting files in a little-used storage room at Riverbank. He coauthored with Leo Beranek the article entitled "Wallace C. Sabine, Acoustical Consultant" (*Journal of the Acoustical Society of America* 69: 1-16, 1981). Without doubt, John Kopec has become the leading scholar on the Sabines at Riverbank.

In this volume, John Kopec masterfully weaves a fascinating story with many intricate details. It includes the involvement of an often controversial philanthropist and lover of science and scientific things Colonel George Fabyan; the germination and execution of an idea for a state-of-the-art laboratory specializing in acoustical research and measurements; and the successive leaderships of three Harvard University-trained physics graduates named Sabine and their contributions spanning nearly three quarters of the twentieth century, toward the advancement of the profession and discipline of acoustics. Wallace Sabine's life and work has already been documented thoroughly in William Dana Orcutt's affectionate biography, *Wallace Clement Sabine: A Study in Achievement* (Plimpton Press, Norwood, Massachusetts, 1933) and in *Sabine's Collected Papers on Acoustics* (Peninsula Publishing, Los Altos, California, 1994). However, the substantial contributions of the two other Sabines to acoustics have, until now, been less well documented.

It is clear from Kopec's history of the Sabines at Riverbank that architectural acoustics and indeed, the wider field of applied acoustics itself involve a great deal more than merely the acoustics of auditoriums and churches. Even on his first important consulting project, Boston Symphony Hall, Wallace Sabine insisted on more than just the application of his new reverberation equation. He required adequate isolation of the hall's listening chamber from exterior sounds, hence the hall's interior surrounding buffer corridors and other features that protected the hall from exterior traffic and streetcar noise of the early 1900s and still do today. He also ensured shallow balcony and concert-stage depth to guarantee evenly distributed sound over all the seats and wall niches and deep ceiling coffers to enhance diffusion of the sound field throughout the concert hall. Wallace Sabine's later research focused more and more on unanswered questions of sound distribution and transmission and other unquantified problems in acoustics and noise control, and Paul and Hale Sabine continued his pioneering work. They, too, were deeply involved in the growing public awareness about noise pollution. Indeed, the need for methods and materials for environmental noise control became even greater after World War II, especially with the introduction of new and noisy transportation modes such as jet aircraft. The Sabines' and Riverbank's technical and research staff members were all part and parcel of this expanding acoustical activity. We are in John Kopec's debt for his dedication in telling the story of solid achievement of the Sabines at Riverbank.

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