



Morris G. Salway

MARIO G. SALVADORI

1907–1997

Elected in 1983

“For innovative contributions to the design and analysis of shell and high-rise structures and methods of numerical analysis in engineering.”

BY MATTHYS P. LEVY

MARIO SALVADORI, an inspired teacher, writer, and consultant, and the developer of a motivational, hands-on approach to teaching young people the rudiments of how structures work, died on June 25, 1997.

When Mario was born, in Rome on March 19, 1907, the doctor warned his parents that, because of his low birth weight, the baby might not survive. Ninety years later, marshalling his indomitable spirit, Mario was still teaching and writing. Reared in Genoa and Spain, he had hoped to become an orchestra conductor, and when he was 18, he established Italy's first jazz band. His father, who was an engineer, dissuaded the young man from pursuing a musical career. Instead, he earned two doctorates, one in mathematics and one in engineering.

Always ready for adventure, Mario was an avid mountain climber. He was known in the mountaineering press as the “Lion of the Mountain” for opening 27 new routes in the Dolomites, barely surviving a serious fall in the process. Part of the challenge for Mario was defying his father who often forbade him to climb, but who, in the end, was justly proud of his son. When Mario was in his eighties, he and I had to visit the sculptor Alexander Lieberman to look at a recent work being assembled in central Connecticut. I offered to fly to Connecticut myself and meet Mario, then fly him home to an airport close to his weekend house. It was a warm day, and the air was not

very stable. After we took off, Mario reminded me not to fly too high where the air was very thin, because it would not be good for his heart. That meant we had to fly in constant turbulence for the short 45 minutes we were in the air. Although we were jostled about, Mario was a good sport, and we landed safely—only on the second try, however, because I was a little nervous about ferrying my illustrious passenger. When Mario alighted, he breathed a sigh of relief. He was somewhat green but glad to be alive.

Following his graduation from the University of Rome with doctorates in both civil engineering and pure mathematics, Mario spent a year in London studying photoelasticity. During that time, he came into contact with a number of refugees from Nazi Germany and came to realize that Mussolini's fascism was not far behind Hitler's and that it would be wise to leave Italy. Thanks to the intervention of Enrico Fermi, the Salvadori family—Mario and his first wife Giuseppina—was able to immigrate to the United States.

After working in a number of temporary jobs, including production-efficiency engineer for the Lionel Train Company, Mario was offered a substitute position at Columbia University in mechanical engineering. This soon became a permanent position in civil engineering when the war reduced the number of available instructors. Mario proved to be an inspired teacher and remained at Columbia for 50 years; he was named "best teacher" in 1962 and was honored with other prestigious awards. His students never forgot Mario's enthusiastic, clear presentations. Now scattered around the world, they remain his greatest advocates and legacy.

Mario developed a lecture curriculum in architectural structures, which he taught at Princeton University from 1954 to 1959 and then in the School of Architecture at Columbia. In 1965, when the School of Architecture was in disarray, Mario stepped in and started a program in architectural technology. He introduced new courses describing structural principles in qualitative terms without resorting to mathematics. The courses were supplemented with six films showing experiments and demonstrations that illustrated those principles. The "Structure

in Architecture" program was a big hit and became the centerpiece of a popular new way to introduce the concepts of structure to non-engineers. The program was also the basis for a book with the same title.

In 1943, while at Columbia, Mario was asked to participate in a classified project, which, he learned later, was the Manhattan Project to develop a nuclear bomb. Mario's participation was purely technical and dealt with only one of the components of the ancillary structures, not with the bomb itself. It did, however, present him with a conundrum, because, although he supported the defeat of fascism, he was basically a pacifist. In the 1960s, however, he had no conflict, when during the Vietnam War and in support of his moral convictions, he actively participated in protests against the war and in support of nuclear disarmament.

In 1955, when he met and later joined with Paul Weidlinger to establish one of the leading consulting engineering firms in the country, Mario entered a new phase of his multicareered life. Several of his former students joined him as the firm grew. At first, Mario specialized in the design of concrete thin-shell structures and structures that could survive a nuclear attack. The scope of the consulting work soon included forensic engineering and the design of major structures. Mario continued as a principal in the firm until his retirement in 1992.

While he was still at Columbia, and for the rest of his career, Mario was involved in forensic investigations that often led to his testifying as an expert in court cases. He found forensic work to be both challenging and an opportunity to extend his natural ability as a teacher to the court room. A natural showman, he loved to spar with attorneys who tried to trip him up and often cited Newton as justification for an opinion. In one case, early in his career, he was asked to evaluate whether an individual had committed suicide by jumping out of a high-rise window or whether he had fallen accidentally. By invoking the laws of physics, Mario demonstrated the difference between a free fall with only vertical velocity and a jump that involved horizontal velocity as well. Based on where the body landed, he proved that the fall was accidental and earned the gratitude of the

widow who was able to collect on her husband's insurance policy. That case became a landmark that has been cited in similar situations.

A supremely ethical person, Mario was always careful to inform potential forensic clients that he was only concerned with the truth, even if it were to damage the client's case. In such situations, however, Mario recused himself rather than cause his client embarrassment.

In the late 1950s, there were changes in Mario's personal life. He divorced his first wife and married Carol Kazin, becoming a father to her son, Michael, as well as his own son, Vieri. A perpetual humanist, Mario was not only a pianist with modest talent but also a translator into Italian of his beloved Emily Dickinson. He also lent his special insight into Joyce's *Ulysses* by lecturing students and colleagues or anyone who would listen, of the importance of this work and its significance as literature and a reflection of the times (upon his death, Umberto Eco eulogized him as a poet as well as an engineer). Mario's ability to present ideas clearly in the classroom was translated to paper when he started the first of his 15 books, five on mathematics and 10 on structures. The last books were written specifically for a lay audience, especially young people with whom Mario had developed a special bond. I was privileged to co-author five of his books, including *Why Buildings Fall Down* (W.W. Norton & Co., 1994), which remains popular to this day.

Of his many honors, Mario often said, if you live long enough, you will be rewarded, because they, that is various institutions, will run out of other people to honor. He received, of course, many honors from many institutions, including the Pupin Medal for outstanding service to the nation from the Columbia Engineering School Alumni Association in 1991, the Topaz Medallion from the American Institute of Architects in 1993, and the Founders Award from NAE in 1997 "for accomplishments that benefited the people of the United States."

In 1976, Mario began teaching a course on "Why Buildings Stand Up" to junior high school children in East Harlem. This

started him on a new career to motivate young people to appreciate mathematics and physics through a hands-on understanding of the built environment. He was tremendously successful at explaining complex structural concepts using real-world examples of how bridges and skyscrapers are built. Eventually, his methodology was formalized into a curriculum, and Mario taught teachers and developed a manual outlining his approach. Today, the Salvadori Center, a non-profit organization, continues to promote and expand the methodology Mario pioneered. The “kids” became his passion, and Mario continued teaching them to the end. Had he not died on June 25, 1997, he would certainly still be using his bag of toys to teach his “kids” whom he loved and who loved him in return.