Piero Villaggio
30 December 1932 - 4 January 2014.

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Piero Villaggio, after a short illness, died on 4 January 2014 in Rapallo, Italy. He was born on 30 December 1932 in Genoa, twin to his brother Paolo.

His father, Ettore, was an accomplished surveyor and later an eminent construction engineer who came from Palermo. His mother, Maria Faraci, originally from Venice, was a language teacher. Piero, who attended the famous Liceo Ginnasio Andrea D'Oria in Genoa, graduated in 1957 from the University of Genoa with a degree in Civil Engineering, having taken his applied mathematics course under Guido Stampacchia, and defended his thesis on hydraulics supervised by Enrico Marchi. In 1966, he was appointed to a professorship in the Strength of Materials in the Department of Structural Engineering of the University of Pisa. There he joined the rapidly developing research group devoted to modern continuum mechanics that not only continued but enhanced the Italian tradition and strongly interacted with Clifford Truesdell and other members of the North American school. Piero himself held visiting professorships at Johns Hopkins University and the University of Minnesota at Minneapolis, and also made short visits to other departments including that at Heriot-Watt University, Edinburgh. The main part of his career, however, was spent in Pisa where his teaching included courses in structural engineering and aerodynamics in the University, and in fluid dynamics and continuum mechanics in the Scuola Normale. On his official retirement, he was appointed to an emeritus chair in the University of Pisa. In September 1998 he was elected a corresponding member of the Accademia dei Lincei, and in 2011 became a full member.

His working week commenced with an extremely early Monday morning departure from his home in Genoa shared with his wife, Rosa Maria *née* Pertusio, known affectionately always as Omi, and to whom he was devoted. They had married in 1962 and Piero received from Omi greatly appreciated unwavering support throughout their long life together. He was at his desk in Pisa invariably by 08.00 each day, where usually he could be found except between 12.00

and 15.00 which was exclusively reserved for his great passion of rock-climbing. He was a renowned climber and distinguished member of the Italian Academic Alpine Club, and when younger often spent summers in the Alps and Dolomites. After his daily excursion, Piero returned and remained at his desk unless interrupted by teaching duties until about 18.30 or 19.00 when he adjourned for dinner either at some specially selected restaurant or at the students' mensa in the Scuola Normale. On such occasions, in addition to food, he enjoyed invigorating conversation with Ennio DeGiorgi and other equally stimulating colleagues. At the end of the week he returned to Genoa.

His preferred personal dress, except on formal occasions, was invariably simple. In winter, corduroy trousers and jersey; in summer, much less. Unlike his twin, he was clean-shaven with hair kept disappearingly short.

Piero was an internationally recognised expert with an outstanding reputation in linear elasticity and its applications, and more generally, in mechanics, its history, the evolution of principles, and modern developments. The succinct history of linear elasticity, written as part of his book *Qualitative Methods of Elasticity* (Noordhoff 1977), is exemplary. He was convinced that understanding fundamental principles was of vital importance. In the introduction to the same book, he wrote "A more spontaneous understanding of a theory results when we are able to recognise the motivation behind a particular problem or its generalisation instead of being presented with a formal development." His approach employed a deep understanding of basic mechanics to simplify a problem without sacrificing essential elements. He then selected the most appropriate mathematical technique to derive a meaningful solution, refusing to become distracted by mathematical arguments, of which he possessed impressive command, that do little to enhance physical understanding. He strove always for, and successfully achieved, elegance in argument and in brevity of presentation. Prolixity was anathema.

He was the author or co-author of over one hundred and forty research papers, covering a vast range of topics including unilateral problems, friction, detachment of bodies, elastic plates, plasticity, viscoelasticity, inequalities, Saint-Venant's principle, stability, impact of moving bodies, history of mechanics, and pedagogy. A full list of publications is appended and also may be found in the August 2014 issue of the Journal of Elasticity. The selection of problems and their mathematical treatment were remarkably original, and frequently independent of mainstream activity. The choice displayed impeccable physical insight that facilitated the application of effective but simple mathematical techniques. As with most of his papers, diagrams, drawn in his own inimitable style, enrich the text. He remained active until the very end, and indeed among his final papers is one that still awaits publication in the Journal of Engineering Mechanics.

Apart from his research articles, Piero was responsible for three erudite books. One has been mentioned already. The second is the comprehensive *Mathematical Methods of Elastic Structures* (Cambridge University Press 1997), while the third is the authorative commentary *Die Werke von Johannes Bernoulli: Mechanics* (Birkhausner 2007), published as part of a series to commemorate

the anniversary of the Bernoulli brothers. Piero's critical evaluation of Johannes Bernoulli's contributions to mechanics is achieved by incisive scholarship and profound understanding of seventeenth and eighteenth century scientific thought.

Editorial duties involved the refereeing and review of books and research articles, as well as dedicated service on numerous editorial boards, such as those of Meccanica, the ASCE Journal of Engineering Mechanics, the Journal of Elasticity, and the Journal of Nonlinear Differential Equations and their Applications.

He willingly gave his time and care to the education and encouragement of his students, inspiring many to develop highly successful careers. Moreover, academics and non-academics alike regularly sought his wise advice and were seldom, if ever, disappointed. A modest personality concealed immense charm and warmth. He was spontaneously hospitable and genuinely enjoyed the company of others. Conversations with him were a delight, fueled by a reflective and extensive knowledge that besides mathematics and engineering, embraced philosophy, history, politics, and literature.

The gradual erosion of mechanics from school and university syllabuses was of deep concern, and he acted to reverse the decline. In 2000, he wrote an open letter strongly deploring the so-called reform of the general university system and the adverse effect on engineering and mechanics. In 2009, he delivered public lectures in Udine and Reggio Calabria demonstrating the contemporary significance of mechanics and vigorously arguing why it must be retained as part of a complete general education. One of his final lectures was in the months before his death to an audience of school leavers, school teachers and academics on the same risks. This typified his active commitment and robust spirit that clearly emerged whenever he perceived retrogressive trends that required to be opposed.

In 2012, he underwent lung surgery from which he recovered only to suffer a serious fall and broken leg in November 2013. He returned by ambulance to Genoa and spent his final weeks at home with Omi in a city of which he was inordinately proud.

He was a natural Natural Philosopher and a perfect ISIMM member. His memory and influence will long be remembered and cherished.

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July 2014.