

SEM History

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A. J. Durelli

Any History of the SEM would not be complete without an article about A. J. Durelli. He was a versatile engineer, a prolific writer, and an extraordinary mentor for young experimentalists. A.J. regularly attended the early SESA semiannual meetings, where his innovative papers and frequent discussions created much interest and excitement. The interchanges between A.J. Durelli and Max Frocht were legendary and the two of them were responsible for a large share of the progress in photoelasticity in that era. SEM conferred upon A.J. Durelli two of its highest honors, the William Murray Lectureship in 1965 and Honorary Membership in 1972. In addition he received the Lazan Award in 1986.

The article which follows was written by Dr. Cesar Sciammarella, who is a Fellow in SEM and presented the William M. Murray in 2001. He also received the M. M. Frocht in 1980, the Hetenyi Award in 1982, and the Lazan Award in 1991. Cesar was a close friend and colleague of A.J.'s for more than five decades.

Cesar's article tells about an important side of A.J. Durelli that is not well known by SEM members. It also enumerates Durelli's monumental technical contributions and adds that, "One of his most precious legacies has been the training of many outstanding disciples, close collaborators and students". I fully agree on all accounts, especially the legacy. As the SEM Historian, I can add some facts that strongly support that allegation. A. J. Durelli's advisees include those listed near the end of his article. These are the first generation Durelli derivatives. In that group are four Murray Lecturers, three SEM Honorary Members and two SEM Past Presidents. No other educator in the history of SESA/SEM can match those numbers. The story continues because their students (second generation Durelli derivatives) have much momentum. Already they include an SEM Past President, several SEM Fellows and many SEM Award winners. The third and fourth generation of Durelli derivatives are underway and

are gaining momentum. This is the living legacy of A.J. Durelli, the small dynamo from Argentina. -CET

The Remarkable Life of A.J. Durelli

by Cesar A. Sciammarella

In March of 2000 A.J. Durelli left the world of the living to enter in the realm of the history of an extraordinary century in the development of science and technology of the United States of America. Trained in the rigorous scientific school of European engineering sciences, he can be considered one of the main figures in the development of Experimental Mechanics in the last century.

Augusto J. Durelli was born in Buenos Aires Argentina on April 30, 1910. He attended the School of Sciences and Engineering of the University of Buenos Aires where he got a degree in Civil Engineering at the age of 22, in 1932. His classmates recall him as an outstanding student, but one that did not conform to prevailing rules of behavior. In those days at the University of Buenos Aires, following European tradition, the entire student body attended school in formal attire, but not A.J. He was notorious for his neglect of dressing codes, characteristic that he preserved until the end of his life. Another of his characteristics as a young man was his disregard for the amenities that wealth can provide. He had a Spartan sense of living, and again this was the way he lived his life and the way that he educated his children, many times to their chagrin. After his graduation he was supposed to join his father's construction company, but he decided otherwise and marched on to Paris. In the 1930's this was not an unusual thing to do for young wealthy Argentineans, but his motivation was a quite different one from other young men. There he continued his engineering studies getting a doctoral degree at the famous Sorbonne School of the University of Paris. But this was not enough for him, he had a second life-lasting love: social issues. In the same year that he got his doctoral degree in Engineering 1936 he got a doctoral degree in Social Sciences at the Catholic University of Paris. A profoundly religious person, he embraced the social activism of Jaques Maritain, a Roman Catholic philosopher. In Maritain's thought it was not enough to be a follower of Christ in words but that one had to actively act on behalf of ones fellow man's welfare. Durelli adopted this view and through all his life was an active participant in the political arena. He was always on the side of the poor, the oppressed, and the needy. He published books, newspaper articles, and letters to the editor on social and political issues in Spanish, English and French. He published four books on social issues, three in the French language and one in the Spanish language.

Upon his graduation in France he returned to Buenos Aires but he did not stay for a long time. He decided that to become a businessman and head his father's construction firm was not what he wanted in life and applied for a Guggenheim Fellowship. He was awarded the fellowship and he chose to join the Massachusetts Institute of Technology. From MIT he moved to the Ecole Polytechnique in Montreal, where he was appointed Visiting Professor. He was married in Montreal and had his first child. In 1944 he returned to Buenos Aires where he became the Head of the Laboratory of Testing

Materials of the Municipality of Buenos Aires. Those were difficult years in Argentina. A military revolt had overturned the civilian government and inside the military there was an internal struggle for power. During this time Durelli wrote a number of political articles, there was one that became very famous in Argentina, it was entitled "The Colonel's Backpack". In this article Durelli pointed out the fascist leaning of Peron who was at the time not well known, but clearly was moving to take power. In October 1945 he joined a group of engineering students that seized the engineering school as a protest against Peron. A slight, short and bold guy popped out of an external window of the Engineering building. This was the way that I met A.J. We were finally dislodged by the police and taken to a jail in the outskirts of Buenos Aires. Our misfortune did not last long, Peron was deposed and jailed. The detained students were liberated. By a twist of fate A.J. and I were left in jail for two additional days. In this way we became friends, expending two full days together in the most unusual circumstances that one can imagine. Many years later he invited me to join his research group, thus changing the course of my life.

In 1946 he left Buenos Aires for good. He joined the recently formed Armour Research Foundation at the Illinois Institute of Technology where he became the Head of the Stress Analysis Section. In 1956 he received an additional appointment at the Illinois Institute of Technology where he became a Professor of the Civil Engineering Department. These years were very productive years in his professional life and were also the years when he helped to form a number of close associates and students who later have become one of his important legacies.

In 1961 he left the Illinois Institute of Technology and joined the Catholic University of America in Washington DC. There he had another batch of prominent students and postdoctoral students. In 1963-64 he was a visiting lecturer at Princeton University and in 1968 he became a Fulbright Scholar. In 1975 he retired from the Catholic University of America and in the subsequent years he became visiting professor at the University of Oakland in Michigan and at the University of Maryland.

An engineer by vocation he combined both rigorous scientific approach and a practical sense in the solution of actual engineering problems of significance. As the leader of a research group at the service of industry he provided solutions for a wide range of problems; stresses and strains in solid propellants, stresses in the structure of missiles, wave propagation problems, ordinance problems, stresses in dams, stresses in nuclear reactors, stresses in soil caused by mining and drilling for oil, stresses in turbine jet blades and studies of a large variety of industrial products. His approach was always based in experimental mechanics techniques. He used all the tools of the trade and continuously sought new techniques if the case under study posed questions that could not be answered by existing methods. Trained as a photoelastician, he introduced in America the diffused light polariscope with large field so that photoelasticity could be utilized as a practical tool. He developed a number of new techniques in dynamic photoelasticity, and in three-dimensional photoelasticity. He introduced a number of extremely useful procedures to utilize photoelasticity to solve design problems such as minimizing weight. He developed, with the assistance of his associates, the theoretical

basis for the brittle lacquer technique. This technique was extensively used in the stress analysis of the Polaris missile. At times before the launching of the missile, work was done on 24 hours basis. He contributed to the development of the moiré method and wrote a textbook on this subject that is a classical piece in this field. He also worked in the fields of holography, failure of materials, composite materials, and problems involving large deformations. All his experience was presented in four books and in more than two hundred papers, reports and technical notes. One of his most precious legacies has been the training of many outstanding disciples, close collaborators and students. To mention just a few W. F. Riley, A. S. Kobayashi, J. W. Dally, I. M. Daniel, K. B. Hofer, R. J. Sanford, V. J. Parks, L. Ferrer, R. Marino, V. J. Lopardo, A. J. Clark, Dick Marloff., myself and my former doctoral student, Dr. F. P. Chiang. Through them he has influenced the development and teaching of Experimental Mechanics in the second half of the last century. He was among the initial members of the Society of Experimental Mechanics, known at the time of its foundation as the Eastern Photoelasticity Conference. One of the first things that he did when I joined his group was to take me to a meeting of the Society of Experimental Stress Analysis (SEM today). Most of his students had similar experiences and he pushed all of us to be active participants in the Society. He was an active participant himself and published a great deal of his work in the different versions of what is known today as Experimental Mechanics. In his life the international community of fellow mechanicians recognized him as an international authority in Experimental Mechanics. He lectured in Universities and research institutions throughout the world.

The addition of all his research work, his academic contributions, and his teaching make him one of the most outstanding figures in the field of Experimental Mechanics in the world in the second half of the last century.

I had the privilege of being very close to him and saw him just before his health condition made him unreachable. In spite of his deteriorating health he preserved his deep religious faith and his humanitarian outlook. In the last moments of his life he shared with me some of the deep wounds that life inflicted upon him. But in spite of these troubling events his last message to me was one of faith in God and of His immense love for us. He died in March 2000, a month short of his 90th birthday.