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FOREWORD

The Seventeenth International Conference on Coastal Engineering was extremely important in many ways to those who attended the conference and to those who will benefit from use of these *Proceedings*. The Seventeenth Conference marked the 30 year point in the history of the coastal engineering conference series and a change in leadership. Since the first conference was held in Long Beach, California in October 1950, Dean Morrough P. O'Brien and Professor Joe W. Johnson have provided the continuity, direction, and motivation that have made the International Coastal Engineering Conferences so successful. For thirty years Dean O'Brien has served as Chairman and Professor Johnson as Secretary of first the Council on Wave Research and now the Coastal Engineering Research Council. Because of the importance of their contributions to the coastal engineering conferences the Council decided that these *Proceedings* will be dedicated to these two leaders. A summary of the accomplishments of each in coastal engineering is presented here.

MORROUGH P. O'BRIEN

His distinguished career in coastal engineering has been much too full to cover adequately in this space; only a sketch of his accomplishments are included here. M. P. O'Brien retired as Dean of the College of Engineering at the University of California, Berkeley, in 1959. His tenure at Berkeley included an impressive record of teaching, research and university administration. During this interval, through his students and research, he established the reputation of "The Father of Coastal Engineering." After leaving his post at Berkeley he has been very active in industrial and governmental research and development projects. At his present age, 78, Dean O'Brien is still an extremely active professional in coastal engineering.

Dean O'Brien graduated from Massachusetts Institute of Technology in 1925 and pursued graduate work at Purdue University. In 1927 he was awarded the ASCE John R. Freeman Scholarship which allowed him to attend the Technische Hochschule, Danzig, and the Royal College of Engineering, Stockholm, to study hydraulic structures and machinery. He has received honorary degrees from Northwestern University, D.Sc.; Purdue University, D.Eng.; and University of California, Berkeley, LL.D.

He joined the Mechanical Engineering Department at the University of California becoming Department Chairman in 1936 and Dean of the College in 1943. During his tenure as Dean he was instrumental in the development of graduate education and research and in the modernization of the undergraduate program.

In 1929, Dean O'Brien organized and initiated a program of research on shoreline processes and coastal engineering for a board appointed by the Chief of Engineers of the Army; subsequently, Congress established this work on a permanent basis under the U.S. Beach Erosion Board. Dean O'Brien has served as a member of this board and its successor, the Coastal Engineering Research Board from 1938 to 1980. He has maintained an active interest in ocean waves and shoreline phenomena. During the war years, this interest led to work on the design of landing craft, on forecasting surf conditions,

and on intelligence studies of landing beaches. Following the war he served as Chairman of the ad hoc committee on Amphibious Operations of the National Research Council which reviewed the plans for modernization of the Marine Corps. Consulting engagements in the field of coastal engineering included restoration of the beach at Santa Barbara, regulation of the estuary of the Columbia River, Dos Bocas Harbor in the Gulf of Campache and other similar coastal projects.

Dean O'Brien's research on hydraulic machinery led to many practical applications by industry. Most of the jet pumps sold in the United States follow the designs of O'Brien and Gosline. Application of the theory of airfoils to the design of propeller pumps and fans by O'Brien and Folsom provided the basis for extensive production of low-head, high-capacity pumps for irrigation and drainage. Consulting engagements on hydraulic machinery during this period included Byron Jackson, Food Machinery, Fairbanks-Morse, Becker Pump, Navy Department, Corps of Engineers, and many other governmental agencies. His experience with turbo-machinery led to his appointment in 1949 as a consulting engineer by the Aircraft Gas Turbine Division of the General Electric Company, an association which has continued to the present. He is now a consultant to the Technical Systems and Materials Sector of General Electric, dealing with both technical and management problems of jet engines, missiles and space vehicles, ordnance, and electronic systems.

During the war years, Dean O'Brien directed the University of California's program of engineers' science and management war training for technical and professional personnel in the aircraft and shipbuilding industries. During the four years of its existence, this program included 1800 instructors and 46,000 students. Concurrently, he served as dean of the college and as consultant in the research section of the Bureau of Ships on problems of submarine propeller noise, and on amphibious operations. In 1946, he participated in Operation Crossroads at Bikini as a consultant on the measurement of waves generated by the bomb tests; most of the photographs of the Baker tests, which appeared in the press, were taken by the tower and aerial cameras which Dean O'Brien and his associates operated for wave measurements.

Twice, he has taken full-time leave from academic duties to engage in engineering practice; once, 1947 to 1949, to serve as director of research and engineering with the Air Reduction Company and, again in 1953, to join General Electric Company's Aircraft Nuclear Propulsion Project. He has held membership on many influential boards and commissions, among them the Coastal Engineering Research Board, formerly the Beach Erosion Board; the National Science Foundation's panel of engineering consultants; the Army Scientific Advisory Panel; the Atomic Energy Commission's personnel security board; the Maritime Research Advisory Committee and the Advisory Board on Education of the National Academy of Sciences, National Research Council; and the board of directors, McGraw-Hill Publishing Company. In 1958 President Eisenhower appointed him a member of the Board of the National Science Foundation. During 1958-1959, he was a visiting institute professor at the Massachusetts Institute of Technology, and a visiting research fellow at Harvard University.

Among awards he has received are the Army-Navy Certificate of Appreciation; the Distinguished Civilian Award, Department of the Army (twice); and the Bliss Medal of the Society of American Military Engineers. In 1968 he received the ASEE's Lamme Award, and in 1969 a building at the University of California's Berkeley Campus was named after Dean O'Brien.

He has written more than 100 published articles on technical subjects and engineering education, and is co-author of "Applied Fluid Mechanics," published by McGraw-Hill in 1937. The bibliography is his own selection of the papers which he most enjoyed

writing. He is a registered professional engineer in the states of California and New York, and a chartered Mechanical Engineer in Great Britain. In 1969 he was elected to the National Academy of Engineering. He is an Honorary Member of both the ASCE and ASME.

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JOE W. JOHNSON

Professor Johnson has had a long and very distinguished career in coastal engineering. His reputation extends around the world, reaching forth from his consulting, his research and especially his students. In 1975 he retired as Professor of Civil Engineering from the University of California, Berkeley. Professor Johnson is also well known for his excellent handling of the *Proceedings* of all sixteen prior coastal engineering conferences. Since his retirement from the University of California he has been extremely active in his consulting practice and professional duties.

Professor Johnson graduated from the University of California, Berkeley, in 1931 with a B.S. in Civil Engineering and in 1934 with an M.S. degree. Following a brief stay at the Waterways Experiment Station he devoted eight years to studying sediment transport with the Soil Conservation Service. He then returned to the University of California and enjoyed a very fruitful career of teaching, research and public service.

He has been consultant to many international projects involving shoreline development including: an ore port in Vitoria, Brazil; harbor development along the coast of Venezuela; port development in Northwest Australia; port development in Damietta, Egypt; sedimentation at Bahia Blanca, Argentina; Hay Point Coal Port, Australia; and wave action and sedimentation in Brazil. His associations with coastal engineering projects in the United States are equally extensive; a brief list follows of his involvement: Rio Grande Valley, wind tides in Lake Okeechobee, wave analysis of Marina del Rey, San Francisco Bay Area Rapid Transit, Turkey Point Power Plant in Florida and beach erosion at the Zion Atomic Power Plant.

In addition Professor Johnson has been a member, since 1974, of the Shoreline Erosion Advisory Panel created by the U.S. Congress. His expertise in coastal engineering has been quite instrumental in the success of this research and development program. He also has been selected as the chairman of the U.S. Delegation to the U.S.-Japan Cooperative Seminar on Coastal Engineering held in Japan. Professor Johnson has been appointed to numerous other boards and committees. He was the Secretary of the Council on Wave Research during its existence from 1950 to 1964, and then of the subsequent organization, The Coastal Engineering Research Council of the ASCE. He has been very active in the AGU holding key positions and has been a major driving force behind the American Shore and Beach Preservation Association as Vice President and Editor of *Shore and Beach*.

In 1976, Professor Johnson was elected to membership in the National Academy of Engineering and in 1979, he received the distinguished honor of Honorary Member of the ASCE. He is also the recipient of the Guggenheim Fellowship, The Outstanding Civilian Service Medal for his service in the field of coastal engineering and the Berkeley Citation. A selected listing of his over ninety publications are given below. Professor Johnson has been and still is a very active and important part of international coastal engineering.

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The omissions from the accomplishments of Dean O’Brien and Professor Johnson are solely the responsibility of the writer; however, the magnitude of their contributions to coastal engineering has forced the writer to condense their many activities. Indeed a detailed listing of their individual efforts would fill a volume.

While listening to the discussions of the mechanics of sand waves by Professor Arthur Brebner, Professor Longuet-Higgins was able to tie some of Brebner’s findings with the theoretical work he (Longuet-Higgins) had done on water waves of maximum steepness. Since Professor Longuet-Higgins’ Keynote address begins the *Proceedings*, it was felt proper to end them with a brief summary explaining the application of his limiting wave theory to sand bed-forms. His discussion can be found on page 3107.

Billy L. Edge, Secretary
Coastal Engineering Research Council
American Society of Civil Engineers



Morrough P. O'Brien



Joe W. Johnson

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THE UNSOLVED PROBLEM OF BREAKING WAVES

by

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