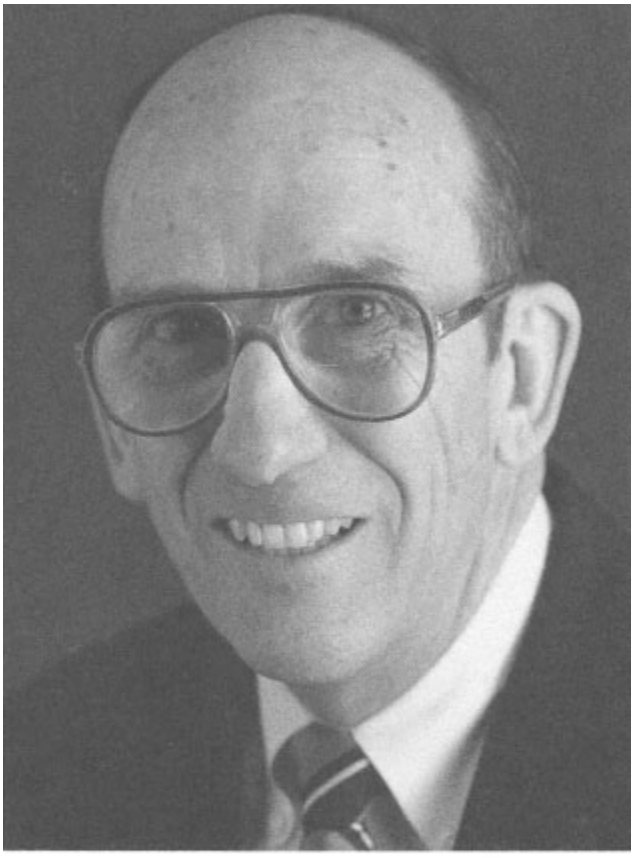

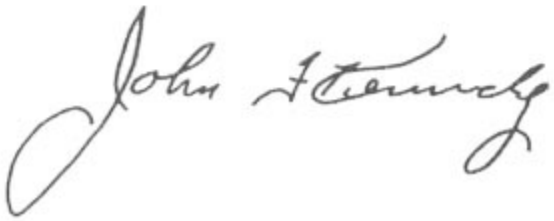

John Fisher Kennedy

1933-1991

By Vito A. Vanoni And Norman H. Brooks

JOHN F. KENNEDY, Hunter Rouse Professor of Hydraulics, University of Iowa; director emeritus, Iowa Institute of Hydraulic Research; and internationally known hydraulic engineer, died in Iowa City on December 13, 1991, at the age of fifty-seven years. He was born in Farmington, New Mexico, on December 17, 1933.

Dr. Kennedy earned a bachelor's degree in civil engineering at the University of Notre Dame in 1955. He continued his academic education in civil engineering at the California Institute of Technology (Caltech), where he obtained a master's degree in 1956 and a Ph.D. degree in 1960.

The title of his thesis was "Stationary Waves and Antidunes in Alluvial Channels." The results of this research, published in the *Journal of Fluid Mechanics* (1963), clarified the phenomena of antidunes and became a landmark study on the subject. This served as his introduction to river sedimentation, the various aspects of which became the subject of much of his research and engineering work.

Upon completion of his graduate studies at Caltech, Dr. Kennedy immediately entered a long and productive career of academic teaching, research, and professional engineering.

In 1960-1961 he remained at Caltech as a postdoctoral fellow while he continued his work on sedimentation and started his teaching career. In the fall of 1961 he joined the civil engineering faculty of the Massachusetts Institute of Technology (MIT) as

assistant professor of hydraulics, and in 1964 he was promoted to associate professor. While at MIT, he taught hydraulics courses and extended his research to include hydraulic resistance in alluvial streams, transport of cohesive sediment, and density-stratified flows.

In 1966 Dr. Kennedy joined the University of Iowa as professor and director of the prestigious Iowa Institute for Hydraulic Research (IIHR), a position held previously by Dr. Hunter Rouse. In 1981 he was named Carver Distinguished Professor. He retired as director in August 1991 after a busy tenure of twenty-five years.

Under Kennedy the program of IIHR continued to work on basic hydraulics but at the same time undertook research on engineering problems that were of interest to him. The engineering problems often resulted from consulting projects that Kennedy undertook at times, and were a welcome factor in maintaining the fiscal viability of the laboratory.

John Kennedy's accomplishments were appreciated by his associates as indicated by the University of Iowa President Hunter R. Rawlings III, who said, "During the distinguished twenty-five-year tenure as director of the Iowa Institute of Hydraulic Research, Professor Kennedy contributed greatly to the institute's position of world leadership. All of us will remember him not only as a great engineer but as a warm and caring human being. We will miss him."

While he was director of IIHR, Kennedy devoted much of his time to research. During this time over two hundred technical papers and reports were published in which he was the sole author or a coauthor. The wide range of subjects of these papers is an indication of the breadth of his interests in hydraulics. A portion of these papers dealt with aspects of alluvial streams, including sediment transport, bedforms, and flow in bends and meanders. These papers mostly were fundamental in nature and tended to advance the understanding of the complicated erosion processes acting in rivers. His paper in the *Annual Review of Fluid Mechanics,* 1968, entitled "Formation of Sediment Ripples, Dunes and Antidunes" summarizes his work on bedforms and is a reference work on the subject.

In addition to river sedimentation, Kennedy's many papers dealt with mechanics of river ice, density currents, density stratified flows, cooling towers and pumping systems for circulating cooling water for power plants, transport of cohesive sediment, and biographies of famous hydraulicians and history of hydraulics.

Kennedy's interest in ice hydraulics dates from the time a colleague called his attention to ripples that form under the ice cover of rivers. He was intrigued immediately with the ice ripples and ice problems and set out to obtain funding for studying these problems. This led to the construction of a refrigerated laboratory to house a flume to study ice problems. This laboratory was the first of its kind in the world. Kennedy was called on to consult for the design of other similar facilities.

Kennedy and his Ph.D. student George D. Ashton developed a theory that explained the formation of ice ripples, and which was confirmed by experiments in the refrigerated laboratory. The results of this work, for which they won the Hilgard Prize, were published in the *ASCE Journal of the Hydraulics Division* in 1972. Kennedy became a leading figure in ice hydraulics research. He was called on frequently to lecture on ice engineering and was instrumental in forming the International Association for Hydraulic Research Section on Ice Research and Engineering. Together with his Ph.D. students, he produced what remains the leading theoretical model of ice jam equilibrium and other papers on ice hydraulics.

As the program on ice engineering grew, Kennedy delegated its coordination to his colleagues, several of whom went on to develop careers in ice research.

Dr. Kennedy traveled widely and gave lectures at a number of foreign laboratories. In September and October 1969 he visited several scientific centers in the USSR under the auspices of the Academy of Science of that country. In the academic year 1972-1973 he was Fulbright Fellow and visiting professor at the University of Karlsruhe, Germany. In the winter of 1976 he was Erskine Fellow and visiting professor at the Canterbury University in Christchurch, New Zealand. In the winter of 1981 he was visiting consultant at the Central Power and Water Research

Station, Poona, India, and in the spring of 1985 he was guest professor at Eidgenössische Technische Hochschule, Zürich, Switzerland.

Dr. Kennedy was the recipient of many honors and awards starting early in his career. The crowning award came when he was elected to the National Academy of Engineering in 1973 at the unusually young age of thirty-nine years. When he was still in the lower academic ranks, he received several awards for his publications in the journals of the American Society of Civil Engineers. In 1980 he was elected president of the International Association for Hydraulic Research and reelected for a second term in 1982, and in 1989 he was elected honorary member of the association. He was invited to give the American Society of Civil Engineers' Hunter Rouse Hydraulics Lecture in 1981, and in 1983 he was awarded the Iowa Governor's Medal.

Through his publications, travel, and other activities, he became known widely and received a number of international honors. In 1983 he was elected honorary member of the Hungarian Hydrological Society. Two years later in 1985 he was named honorary fellow of the Institute of Water Conservancy and Hydroelectric Power Research, Beijing, China, and was appointed honorary professor by the East China Technical University of Water Resources, Nanjing, China. In the next year, 1986, he was named corresponding member of the Chinese Engineering Society.

Kennedy was an active member of the National Academy of Engineering, International Association for Hydraulic Research (honorary member and past president), American Society of Civil Engineers, American Society of Mechanical Engineers, and American Society of Engineering Education. He served on and chaired numerous committees of these organizations.

Kennedy served on the following committees of the National Research Council:

Commission on Engineering and Technical Systems, Committee on Natural Disasters, chairman 1983-1984, member 1980-1991,

Commission on Engineering and Technical Systems, Committee on Computer Analysis of River Sedimentation, chair

man 1980-1983,

Commission on Engineering and Technical Systems, Water Technologies Board, 1982-1984,

Commission on Engineering and Technical Systems, Panel on Niagara Ice Boom Investigations, 1983, and

Commission on Engineering and Technical Systems, Advisory Committee for the International Decade of Hazard Reduction, 1987.

He served on the following national consulting boards:

Board of Consultants for the Sacramento River and Tributaries, Bank Protection and Erosion Control Investigation, 1978-1991,

Board of Consultants for St. Lawrence Seaway Navigation Extension Season, 1975-1979, and

Peer Review Group, Alden Research Laboratory Power Reactor Containment Sump Studies, Department of Energy, Nuclear Regulatory Commission and Sandia Corp., 1981-1982.

In addition, he served on the following international consulting boards:

Team of Experts to Review Development of National Water Plan for Saudi Arabia, 1982-1991,

Advisory Panel of International Experts for Three Gorges Dam Project (China), 1986-1988, and

International Commission of Experts to Review Leningrad Storm Surge Barrier, Lenhydroenergospesstroy (USSR), 1990.

Through his activities in teaching, research, professional societies, and international and national committees and consulting boards, John F. (Jack) Kennedy had a major influence on hydraulic engineering. He was an effective speaker, knowledgeable of a broad range of technical subjects, and a sought after leader. Engineers who have worked closely with him admired him for his pleasant personality and his ability to grasp the salient features of an engineering problem and to quickly conceive its

solutions.

Jack Kennedy was a very personable, articulate, friendly, and caring person. He was devoted to his wife, Nancy, and their four children. He will be missed.

The following poem included in the introduction to his doctoral thesis reflects his personality as well as his skill with words:

SEDIMENT RESEARCH
Sand in my hair,
Sand in my teeth,
Sand overhead,
Sand underneath.
Plugging the pitot,
Abrading the pump,
Clogging the samplers,
Filling the sump.
This was my research,
Exciting and grand.
Very rewarding
Despite all the sand!!
JFK 1960