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NATHAN M. NEWMARK

1910—1981

A Biographical Memoir by

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September 22, 1910–January 25, 1981

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NATHAN MORTIMORE NEWMARK, internationally known educator and engineer, died January 25, 1981, in Urbana, Illinois. Dr. Newmark was widely known for his research in structural engineering and structural dynamics at the University of Illinois at Urbana-Champaign, for his contributions to the design of earthquake-resistant structures—including the Latino Americana Tower in Mexico City—and, most recently, for his work on the design of the trans-Alaska pipeline.

EDUCATION AND EARLY CAREER

Nathan M. Newmark was born in Plainfield, New Jersey, on September 22, 1910, to Abraham S. and Mollie Nathanson Newmark. He married Anne May Cohen on August 6, 1931, and is survived by his wife and three children, Richard, Linda (Mrs. James Bylander), and Susan (Mrs. Paul Mayfield).

After receiving his early education in North Carolina and New Jersey he attended Rutgers University. There he accumulated a number of prizes and graduated in 1930 with high honors—including special honors in civil engineering—giving evidence of his unusual skills and talents at a young age. He then enrolled as a graduate student at the University of Illinois in Urbana where he worked under the late professors

Hardy Cross, Harold M. Westergaard, and Frank E. Richart, receiving his M.S. and Ph.D. degrees in 1932 and 1934, respectively.

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Beginning in 1930 as a graduate research assistant, Nate Newmark held a succession of positions for over half a century at the University of Illinois. He was appointed research professor of civil engineering in 1943, skipping the intermediate rank of associate professor. Early in his career he contributed significantly to the fields of structural analysis and structural materials and received national and international recognition for his work pertaining to highway bridges. His contributions in the area of structural dynamics, including consideration of impact, wave action, wind, blast, and earthquakes, greatly influenced structural and mechanical design throughout the world.

In 1956 he was appointed head of the Department of Civil Engineering of the University of Illinois at Urbana-Champaign, a position he held until 1973. He retired from his university position in 1976. Although the reputation of the department had been great almost since its founding, under Professor Newmark's leadership its stature rose to new heights.

From 1947 to 1957 he was chairman of the Digital Computer Laboratory at the university. During this period he had a major hand in developing one of the first modern, large-scale, digital computers (ILLIAC-II)—work that eventually led to the university's eminent position as a developer of computer science for engineering.

Newmark served in many important leadership capacities in the university and had the distinction of the longest tenure to date on the University Research Board. This board was in large part responsible for making the university one of the

world's great research institutions, and Nate's vision and foresight played no small role in the success of this effort.

THE WORLD'S EARTHQUAKE ENGINEER

During World War II Dr. Newmark was a consultant to both the National Defense Research Committee and the Office of Scientific Research and Development. Part of his national service time was spent in the Pacific War Zone. In 1948, he was awarded the President's Certificate of Merit. In addition to serving on numerous Department of Defense boards and panels, he made major contributions to the development of the Minute Man and MX missile systems.

As a practicing engineer he was instrumental in developing the design criteria for many of the largest and most complex projects of the world.

In the late 1940s and early 1950s, Newmark served as the earthquake consultant on the forty-three story Latino Americana Tower in Mexico City. A plaque is mounted on that building, which withstood a strong earthquake in 1957 without damage, attesting to his design accomplishment.

Newmark was also responsible for developing the seismic design criteria for many other large projects, including the Bay Area Rapid Transit System and the trans-Alaska Oil Pipeline System, now the largest privately financed project in the history of the world. During the seventeen years before his death he carried the major responsibility for developing earthquake design and review criteria for about seventy nuclear power plants and for proposed liquid natural gas facilities on the West coast; at the time of his death, he was the consultant on seismic design for the Alaska-Canada Gas Pipeline.

Professor Newmark's publications include over 200 papers, books, and chapters in books. He is the coauthor of the following books on earthquake engineering: *Design of Multi-*

Story Reinforced Concrete Buildings for Earthquake Motion, with John A. Blume and Leo Corning (Chicago: Portland Cement Association, 1961) and *Fundamentals of Earthquake Engineering*, with Emilio Rosenbluth (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1971).

HONORS AND AWARDS

Nate played a major role in many of the most important technical activities of the American Society of Civil Engineers. He was one of the founding members of the Engineering Mechanics Division and a prime mover in furthering the Society's computer application activities. Having received virtually every major award given out by the American Society of Civil Engineers and the Engineering Foundation Founders Society, he was an honored member of the many learned societies to which he belonged.

He was elected a fellow of the American Academy of Arts and Sciences in 1962, a founding member of the National Academy of Engineering in 1964, and a member of the National Academy of Sciences in 1966. Among his many NAE/NAS/NRC activities were the following: NAE Council, 1964–1968; NAE/NAS Joint Board, 1966–1968; NAE Committee on Earthquake Engineering Research, 1965–1970; NAS/NAE Committee on Scientific and Technical Communication, 1966–1969; and NAE/NRC Committee on Natural Disasters, 1971–1977 (member and chairman).

In 1968, Nathan Newmark received the National Medal of Science from President Lyndon B. Johnson. A year later he received the Washington Award—a joint award given annually by the major engineering societies of the United States. In 1979, Dr. Newmark was presented the John Fritz Medal, an all-engineering society award. In 1980 he received the sixteenth Gold Medal in the fifty-seven-year history of the Institution of Structural Engineers of Great Britain—the

second American engineer to be so honored. He also received honorary degrees from several universities: Rutgers University (his *alma mater*) in 1955, the University of Liège in Belgium in 1967, the University of Notre Dame in 1969, and the University of Illinois in 1978.

On February 19, 1981, three weeks after his death, the Board of Trustees of the University of Illinois renamed the Civil Engineering Building the Nathan M. Newmark Civil Engineering Laboratory, in commemoration of his contributions to the university.

IN CONCLUSION

Nate Newmark was a university unto himself. Whether in academia or professional practice, engineers young and old sensed the challenge of this man's education and intellect. His penetrating insight, his keen engineering judgment, and his genuine interest in people were a constant source of inspiration to all who had the privilege of working with him.

Professor Newmark possessed an unusual ability to attract young people to the field of civil engineering, to inspire them with the confidence for undertaking new and varied tasks, and to guide but not direct their thinking. He insisted they receive appropriate recognition as individuals for their accomplishments. His unceasing devotion to research, his noteworthy and continuing contributions to the betterment of structural design practice, and his leadership in engineering education, teaching, and professional activities had a profound influence on civil engineering. It is no accident that there grew up around him one of the most active research centers in civil engineering in this country, or that the alumni of this group have assumed broad leadership in education, industry, and government throughout the world.

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