



*J H Horvath*

# JOHN H. HORLOCK

1928–2015

Elected in 1988

*“For distinguished contributions to knowledge of the thermodynamics and fluid dynamics of gas turbines, and for innovations in engineering education.”*

DANIEL WEINBREN

SUBMITTED BY THE NAE HOME SECRETARY

**S**IR JOHN HAROLD HORLOCK died May 22, 2015, at age 87. He revolutionized transportation through his significant contributions to aerodynamics, fluid dynamics, and energy and the development of gas turbines. By describing the detailed air flow in turbines and compressors in mathematical terms he paved the way for greater efficiency in jet engine design.

Born April 19, 1928, John Horlock grew up in Winchmore Hill, north London, with his older sister Beryl and their parents, Harold Edgar and Olive Margaret Horlock. His father ran an undertaking firm, Blake and Horlock, in Edmonton. His mother, the third child of Christian Kissner, was born in Kassel, Germany, whence the family had emigrated in the 1880s.

Starting in 1939 John attended the Latymer School in Edmonton. Due to a leg injury he was not required to serve in the armed forces. Instead, with a scholarship to St. John’s College, Cambridge, he read for the mechanical sciences tripos. It was here that he became interested in gas turbines, won the Rex Moir Prize (awarded to the examination candidate who demonstrated the greatest distinction in engineering), and obtained a First Class degree.

After graduation he worked as a design engineer for Rolls-Royce (1949–1951), where he contributed to the redesign of

the compressor. After a year's sabbatical at the Massachusetts Institute of Technology, Rolls-Royce funded his return to Cambridge and provided an axial compressor rig for his use. Back at the university he taught engineering, worked for his PhD, and studied three-dimensional compressor design.

In 1958, at age 30, he was appointed Harrison Professor of Mechanical Engineering at the University of Liverpool. That year also saw the publication of his first book, *Axial Flow Compressors Fluid Mechanics and Thermodynamics*, and in 1966 he followed up with *Axial Flow Turbines* (both published by Butterworths Scientific Publications). While at Liverpool he also edited a series of books on thermodynamics and fluid mechanics for engineers, and became head of the Mechanical Engineering Department.

In 1967 he returned to Cambridge where he held a chair and became deputy head of the Department of Engineering, which had nearly 1,000 students and a teaching staff of about 100. In addition, he chaired the Mechanical Engineering Committee of the Science Research Council, the UK agency that from 1965 to 1981 was in charge of publicly funded scientific research activities. He gained Science Research Council funds for a turbo machinery research laboratory in Cambridge that became the Whittle Laboratory. He was its first director and, in 1973, the laboratory's extension was named after him.

From 1974 to 1981 he was vice chancellor of Salford University, a relatively small technology-focused institution. He acquired the task of administering a government funding cut of 40 percent over three years.

He went on to a decade-long appointment as vice chancellor of the Open University (1981–1990). This relatively new and distinctive institution provided for students who wished to study part-time and without travelling to a campus. As only the second person to hold this post he consolidated the status of the university by helping to ensure the success of a 1985 visit from an influential critic, Secretary of State for Education Sir Keith Joseph.

His experience dealing with government bodies proved useful, as he noted when he compared the post to his previous

one: "the civil servants liked to have their fingers in the Open University pie, whereas I hardly saw a civil servant in all my time at Salford." There were also savings to be made in the new post. The capital grant from the UK government was halved in real terms the year after his arrival, and there were further cuts in subsequent years. Nevertheless, he was able to strengthen science and engineering at the university, ensure the introduction of a postgraduate master's program, and oversee the opening of the Open Business School and the expansion of the university into Western Europe. While vice chancellor he maintained his interest in turbomachinery and thermodynamic cycles and continued to publish papers.

At the end of his term he did not seek reappointment but retired in 1990 at age 62. He felt that the university was "no longer a strange new immature organization, but a massive national resource, with a high international reputation." Long after he left the university he lived nearby and supported the establishment of similar institutions in many countries.

The Open University named a building in his honor in 1989. In addition, during his tenure he was known as "the students' vice chancellor," and in 1991 the Association of Open University Graduates established the Sir John Horlock Award for Science.

In retirement he published on gas turbines and combined cycles, notably an account tracing the history of combined cycle plants to the early part of the 20th century: *Combined Power Plants: Including Combined Cycle Gas Turbine (CCGT) Plants* (Pergamon Press, 1992). His *Cogeneration—Combined Heat and Power (CHP): Thermodynamics and Economics* (Krieger Publishing, 1996) introduced numerous aspects of the topic and compared the performance of CHP plants to that of conventional plants.

In 1990 he became the first chair of the Aerothermal Panel, an advisory body to Rolls-Royce, and rejoined the Whittle Laboratory. In addition to his academic career he was an advisor to British government and industry for decades. He was a board member at the National Grid; from 1979, chair of the Aeronautical Research Council, which provided advice

to the Ministry of Defense and the Department of Industry; and chair of the advisory committee on the Safety of Nuclear Installations (1984–1993).

He was elected a fellow of the Royal Society “for services to science, education, and engineering” in 1976 and served as its vice president (1981–1983) and treasurer (1992). He was also a fellow of the Royal Academy of Engineering, American Society of Mechanical Engineers (ASME), and Institution of Mechanical Engineers, and was elected a foreign associate of the US National Academy of Engineering in 1988. He was an honorary fellow of the Royal Aeronautical Society and in 1996 was knighted for services to science, engineering, and education.

In 1969 he was awarded, together with R. Ivan Lewis, the annual Thomas Hawksley Gold Medal, for their paper “Flow Disturbances Due to Blade Thickness in Turbomachines.” In 1997 he received ASME’s R. Tom Sawyer Award in recognition of his contributions to advancing the purpose of the gas turbine industry and to the International Gas Turbine Institute over a substantial period of time. In 2001 he was selected for the Institute of Civil Engineers’ James Alfred Ewing Medal in recognition of his meritorious contributions to the science of engineering in the field of research.

He received honorary awards from many universities: Heriot-Watt University (1980), Salford (1981), East Asia (Macau; 1985), Liverpool (1986), Coventry (1991), de Montfort (1995), and Cranfield (1997). He became a fellow of the Open University in 1991. He was also an honorary fellow of St. John’s College (1989) and of the University of Manchester Institute of Science and Technology (1991), as well as prochancellor of the latter (1995–2001).

His contributions went beyond those made at governmental or institutional levels. As recalled by John Young, the Hopkinson and ICI Professor of Applied Thermodynamics at the University of Cambridge, John Horlock “maintained a strong interest in the personal welfare of students, young academics, and not-so-young academics. Many have cause to be grateful for his kindness, generosity, and support.”

As a schoolboy John Horlock had a soccer trial with the Tottenham Hotspur Juniors and remained a keen follower of the senior club. He also loved cricket and a variety of types of music.

While living in Edmonton John met Sheila Joy Stutely. They were married June 8, 1953. John is survived by Lady Sheila Horlock, daughters Alison Heap and Jane Spencer, son Tim Horlock, and eight grandchildren.