

Sir James Lighthill

Sir James Lighthill was born Michael James Lighthill on 23 Jan 1924 in Paris, France, where his father was a mining engineer. The original family name (the family was from Alsace) was Lichtenberg, which literally translates to Lighthill, and that is the name his father adopted in 1917. When James was three years old, the family settled in England.

At the age of 15, James won a scholarship to Trinity College, Cambridge, but he commenced his studies there only when he was 17. In two years he graduated with a BA degree as courses were shortened during World War II. He joined the National Physical Laboratory in 1943 in the Aerodynamics division. In 1945 he was elected a Fellow of Trinity College. He joined the University of Manchester in 1946 and established there one of the leading centres in Fluid Dynamics and Applied Mathematics. He also had a large number of research students, the most famous among them being G B Whitham, who was later with the California Institute of Technology at Pasadena. In 1955, together with Whitham, Lighthill gave an application of the method of characteristics in the theory of kinematic waves, which could be used to study traffic flow and shock dynamics. Lighthill's early work included two-dimensional supersonic airfoil theory and supersonic flow around bodies of revolution. He is credited with founding the subject of aeroacoustics, including the reduction of noise in jet engines. Besides, Lighthill initiated studies that led to the study of nonlinear equations, a topic which was carefully avoided by earlier applied mathematicians.

In 1959 Lighthill left the University of Manchester to become the director of the Royal Aircraft Establishment at Farnborough. This must be where he developed his fondness for the study of flight – of supersonic aircraft, as well as that of birds and humming bees. In 1953 Lighthill was elected a fellow of the Royal Society and in 1964 he became the resident Royal Society Research Professor at the Imperial College in London. At this time he founded the Institute of Mathematics and its Applications to support work in applied mathematics and recognize stalwarts in the field by electing fellows and by having a journal dedicated to this area. While at Imperial College, Lighthill worked in the area of biofluidynamics. His studies include the swimming and flying of animals at high Reynolds numbers and ciliary and flagellar propulsion at low Reynolds numbers.



In 1969 when Paul Dirac retired as the Lucasian Professor at University of Cambridge, Lighthill was appointed to succeed him. This was the chair held by Sir Isaac Newton, and Lighthill held it for 10 years to be succeeded by Stephen Hawking. Lighthill then became Provost of University College London, a post he held till he retired in 1989. Here he worked for new developments in the college, particularly in biology and biotechnology, and dramatically improved the representation of women in senior posts.

Lighthill published 6 books and 150 papers. These have been collected in a four volume publication by Oxford University Press. To quote David Crighton “they (his work) show at every stage a well nigh perfect correspondence between a clearly identified physical process or mechanism and its expression and description in mathematical terms. He was in no sense simply a deployer of existing mathematics against a rich range of practical problems.”

Lighthill had many varied interests besides fluid dynamics. He was a pianist in a piano quartet and he married the cellist. He had interest in languages and chess. At 14 he read the three volume *Cours d'Analyse* by Camille Jordan in French.

Although he did not hesitate to share credits with a colleague in a publication, he almost never added his name when his students published a paper. He was tireless in his support of young students and of scientists who worked in disadvantaged circumstances. He made visits to India and invited a number of Indian scientists to work both at Imperial College and University College. Some of us who attended his lecture at IIT Delhi on the flight of birds can never forget how he swung his arms, curved and flapped them to mimic the flight of both large birds and humming bees. It was an unforgettable experience.

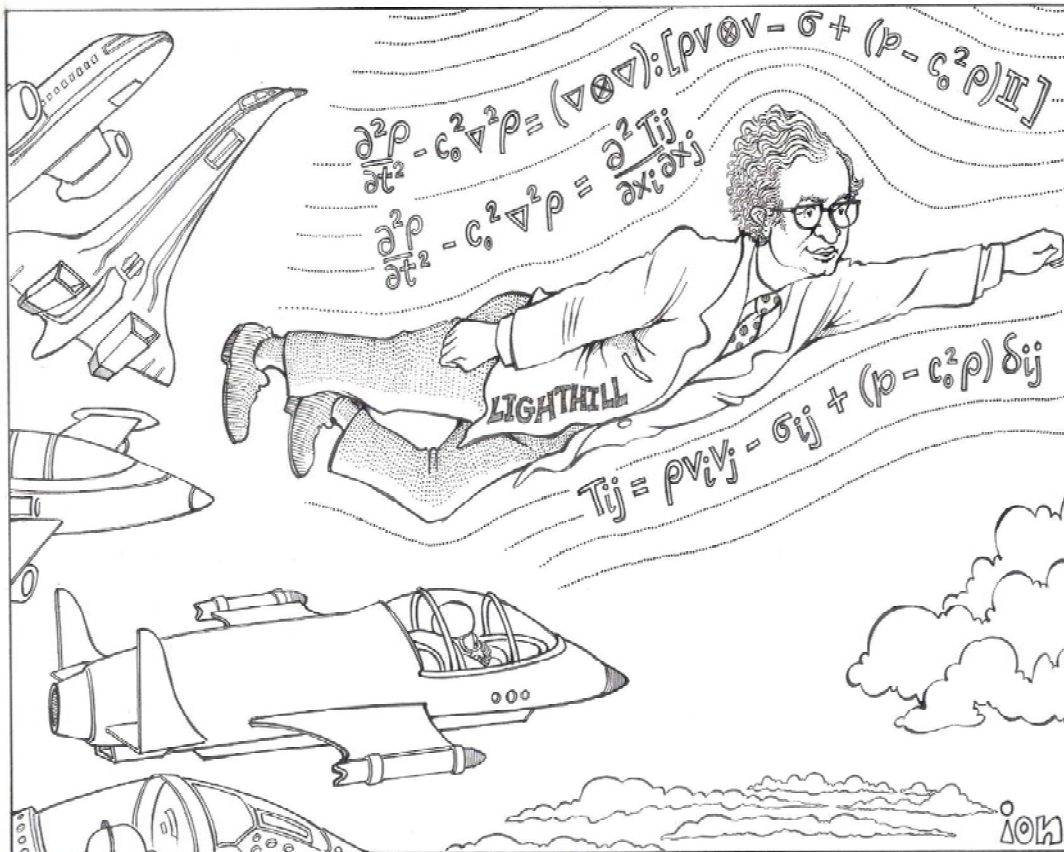
Lighthill was a good swimmer. At 49, he was the first to swim around the Channel Island of Sark. He called the ten-mile swim around the island in choppy waters “a pleasant way to see the scenery”. He did this formidable feat five times. His sixth try was his last. The mitral valve in his heart ruptured and he died in the water while swimming. Perhaps it was the best tribute to a man, who understood the flow of fluids so completely and the art of swimming in all its intricacy.



Suggested Reading

- [1] D G Crighton and T J Pedley, Michael James Lighthill (1924–1998), *Notices of the AMS*, Vol.46, pp.1226–1229, 1999.
- [2] T J Pedley, *Lighthill, Sir (Michael) James (1924–1998)*, Oxford Dictionary of National Biography, Oxford University Press, Oxford, Vol.33, pp.762–765, 2004.
- [3] T J Pedley, James Lighthill and his contributions to fluid mechanics, *Ann. Rev. Fluid Mech.*, Vol.33, pp.1–41, 2001.

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