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James Hunter Whitelaw – in Memoriam

On August 16th 2006 the world of experimental turbulent flow and heat transfer lost one of its most powerful and charismatic leaders after a long and characteristically dogged battle against the progressive advance of motor-neurone disease.

It might be said that Jim Whitelaw's early development gave no clue that he would make such an impact in convective flows. After progressing through high school he embarked upon a sandwich-course in Mechanical Engineering at Glasgow University followed by a graduate apprenticeship with Rolls Royce. His undergraduate years had kindled an appetite for research, however, and as soon as possible he returned to his *alma mater* to follow a PhD research programme on the viscosity of steam. This he completed in three years despite the distraction of marrying just one year into that programme. Thereafter, in July 1961, he sailed to America to spend two years as a post-doc at Brown University continuing research on thermophysical properties with Professor Joseph Kestin.

Kestin had spent some time at Imperial College before emigrating to the USA and it may have been that connection that led Brian Spalding, the then Professor of Heat Transfer at Imperial, to recruit Whitelaw as the experimentalist among the growing academic team he was assembling. But Spalding wasn't interested in thermophysical properties so Jim re-directed his research to film cooling, the starting point of a new phase in his research that was to last the remainder of his professional life and during the course of which he would author over 400 refereed technical publications and supervise over 80 successful PhD students. His progress at Imperial was rapid, with his gaining promotion to Reader in 1969 and to Professor

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of Convective Heat Transfer in 1974. He led the Fluids (and later Thermo-fluids) Section at Imperial for nearly 25 years and, over most of two decades, served on the Department's senior management committee as Finance Director.

Undoubtedly, the most important research initiative he led was in laser-Doppler anemometry. He didn't invent the technique but, at the start of the 1970's, LDA was just an emerging research tool requiring hours to align the individual optical components. Together with his outstanding research student, Franz Durst, and, later, Adrian Melling, he took the instrumentation and packaged it into a recognizable precursor of the commercial instruments that were to become available a few years downstream. The same three authors were also to write the first and highly influential textbook on the subject. With this major shift to optical instrumentation, his research on applications likewise progressed to velocity and turbulence measurements in far more complex flows than could be explored with hot-wire anemometry, the performance of combustion chambers, both in gas turbines and internal combustion engines, becoming a particular interest.

Perhaps triggered by his period as a post-doc at Brown, Jim became an inveterate traveller, initially mainly to the USA but later also to the Far-East and to Southern Europe. In 1977, with Durst and two of the editors of this journal (BEL and FWS), he helped organize the first Turbulent Shear Flow Symposium at the Pennsylvania State University. While conceived as a one-off event, the meeting clearly filled a need and so a further ten biennial symposia in this series were held. A little later he helped breathe into existence the series of conferences on the Application of Laser-based Methods to Fluid Mechanics held at the Gulbenkian Institute in Lisbon, a series which continues to this day. In addition to conferences he also contributed to more than eighty short courses, some two thirds of which were held in overseas universities. In 1983, with Wolfgang Merzkirch, he persuaded Springer to found the journal *Experiments in Fluids*, a publication that again precisely matched the needs of the moment and which grew, under their editorship, to one of the most respected journals in the fluid flow arena.

These numerous and diverse contributions won him widespread recognition abroad, a fact reflected by: his honorary degrees from the technical universities of Lisbon, Valencia and Athens and from Trinity College, Dublin; by his being awarded the international Nusselt-Reynolds Prize; by his holding visiting professorships at UC Berkeley, Arizona State University, the University of Minnesota and the Hong Kong Polytechnic University; and by his election as a Foreign Associate to the US National Academy of Engineering.

Besides these overseas awards, he was by no means unrecognized at home, being elected a Fellow of The Royal Society, The Royal Academy of Engineering and The City & Guilds of London Institute. Some felt it odd that, with his exceptional talents for sizing up a situation and taking decisive, clearly-thought-out actions, he had never become Head of Department at Imperial College. Indeed, on more than one occasion he had been approached to take on that role but each time he declined, confiding to a friend that he was happy with being just the Department's Finance Director since "he who controls the purse strings controls the Department!"

Yes, in some respects, James Whitelaw was, indeed, the epitome of a canny Scot, as that remark suggests... but he was so much more besides.

Thomas Gatski
Nobuhide Kasagi
Brian Launder
Frank Schmidt

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