

## **Professor Ian Simpson Hughes**

Ian Simpson Hughes was Professor of Physics in the University of Glasgow until his retirement in 1989, and was a figure of national importance in the development of Elementary Particle Physics.

He gained a B Sc in Natural Philosophy in Glasgow in 1952, studying under Dee, Gunn, MacFarlane and Touschek, and proceeded to post-graduate studies in the same place. In so doing, he embarked on a research career in particle physics – arguably the most fundamental area of all physics which explores the basic building blocks of nature deep within the atom. His research employed the nuclear emulsion technique to study the properties of some of these fundamental particles and the polarisation of gamma rays from nuclear sources. Although a precise technique, the use of nuclear emulsions involved the painstaking scanning and measurement of photographic plates using microscopes over periods of many months and so the data collection rate was very slow.

Having successfully completed his thesis in April 1956 he, shortly afterwards, took up a research position at Duke University and Lawrence Radiation Laboratory, Berkeley, in the USA. Here he worked with a helium bubble chamber, a new type of detector which had begun to open up new horizons for the study of the fundamental particles of nature. In the bubble chamber technique, large numbers of sets of three stereoscopic photographs are produced of the trails of bubbles left by the passage of charged particles as they pass through the liquid within the chamber – not dissimilar to vapour trails in the sky which mark the passage of high flying aircraft.

He returned to the University of Glasgow in 1958 to take charge of the recently formed Bubble Chamber Group. He determined on two actions. As frontier particle physics was progressively becoming the domain of international laboratories, he would take the group into CERN, the recently established European accelerator laboratory in Geneva. In addition, he would have to ensure that the Glasgow group had the very best of analysis equipment to scan and measure the vast numbers of photographs produced by the bubble chamber technique.

Having successfully established collaboration with a number of European groups working at CERN, he set about the task of equipping the group in Glasgow. By the mid 1960s, and by dint of considerable perseverance, he had obtained for Glasgow three scanning and measuring projectors controlled by the very latest in mainframe computer technology (an IBM 7044 computer, fully transistorised and occupying a large air conditioned room) as well as several scanning machines. Early experiments were to involve the analysis of tens or hundreds of thousands of such photographs; by the mid 1970s this number had risen to several million. Shifts of scanning and measuring staff were employed to enable this work to proceed by day and by night.

It was during these years that Ian Hughes' vision as well as sense of adventure came to the fore. It was evident that he had a great gift of leadership. He would identify the particular skills and abilities of each person in his group and encourage and enable each to contribute to the full. In this way he built up the strength of the group enabling it to compete and contribute at the highest international level. The group expanded to seventy people.

His contribution to the department was recognised in 1968 when he was appointed Reader and again in 1971 when he was awarded a titular professorship. In 1974 he was elected a Fellow of The Royal Society of Edinburgh.

The work of the Bubble Chamber Group was to continue until the early 1980s but it had already become apparent in the early 1970s that this technique had its limitations. He encouraged part of his group to explore other techniques both at CERN and at the Deutsches Elektronen-Synchrotron (DESY) in Hamburg. With colleagues, he began to work on the OMEGA spectrometer, a large and powerful magnet surrounded by a variety of detectors and electronic instrumentation, which removed the necessity for film. OMEGA was to provide a wealth of exciting physics well into the 1980s.

In the 1980s it also became apparent that CERN's future lay in the construction of a new, large accelerator in which beams of electrons and positrons would collide at very high energy. Designing equipment to observe these collisions required several hundred engineers and physicists and once again he brought to Glasgow a leading role in the design, construction, commissioning and operation of major detector systems for the ALEPH detector, which became operational in 1989.

He served on various national and international bodies. He was chairman of the SERC Film Analysis grants committee (1968-71), of the Particle Physics Grants Committee (1980-83), of the Rutherford Laboratory Users Advisory Committee (1973-76), of the Rutherford Laboratory Computer Liaison Committee (1983-86), of the Governing Committee of the Scottish Universities Summer Schools in Physics (1976-81), and of the Committee of Scottish Professors of Physics (1985-88). He was member of the SERC Nuclear Physics Board (1968-72 and 1980-83) and of the Particle Physics Committee (1980-83), of the Central Computer

Committee of SERC (1983-86), of the Computer Consultative Council of the UGC Computer Board (1983-86), of the CERN track chamber committee (1970-73), and of the UK Particle Physics Experiment Selection Panel (1977-80), and UK delegate to the European Committee on Future Accelerators (restricted ECFA) (1980-83).

With his research he combined an active role in the teaching and administration of the department in which he worked. To these he gave the same attention to detail as he gave to his research. In 1972 his undergraduate textbook *Elementary Particles* was published in the Penguin Library of Physical Sciences, appearing in its third edition in 1991. From 1986 until his retirement in 1989, he was Head of Department and while this made it more difficult for him to spend as much time in his research as he would have liked, he nevertheless continued to take a keen interest in what was going on, supporting and encouraging at every opportunity.

On retirement, he continued his love for education, teaching particle physics to undergraduates in the University of Aberdeen and travelling to China to give a series of lectures to the University of Dalian under the auspices of the World Bank. He was also an active member of the Perth branch of the University of the Third Age, being responsible for its science programme for seven years. In all his teaching he was anxious to show that, in physics at least, it is more important to understand the basic principles and build one's understanding on these, rather than learn and remember numerous facts and figures.

During his retirement years in Perthshire, he had more time to follow his wider interests including wood turning, sailing and his lifelong passion for the hills. He, with his wife, Isobel, completed the Munros in 1985.

To his colleagues it was a privilege to have known and worked along side him. In all aspects of his life, his family, his love of mountains, walking and climbing, and his career in the University of Glasgow, he gave of himself unsparingly and with the greatest of enthusiasm. He will be sadly missed by all who knew him.

He is survived by his wife, Isobel, daughter, Anne, and son, Colin.

**David Saxon**

***Ian Simpson Hughes, B.Sc., Ph.D (Glasgow, 1956), F Inst P and fellow of the European and American Physical Societies. Born November 1, 1930, Liverpool; Elected FRSE 4 March 1974; died June 21, 2003, Perthshire.***