

Donald Cecil Pack

14 April 1920 – 3 December 2016

Donald Cecil Pack was born on 14 April 1920 in Higham Ferrers, Northamptonshire. He attended the local primary school where, among other things, he learned to read music at the age of eight. At the age of 10 he won a scholarship to Wellingborough School where he became Head Boy, was leader of the orchestra and gained colours for soccer, cricket and tennis. He then won a scholarship to study Mathematics at New College, Oxford and went up in 1938. He was one of four Mathematics undergraduates who were told to finish their degrees before entering war service. He gained a First Class BA in Mathematics in 1941. He was then assigned to the Mathematical Laboratory in Cambridge to work for the Ordnance Board and received a BA by incorporation from Cambridge University. After a year he was transferred to the (Royal) Armament Research and Development Establishment (ARDE) at Fort Halstead, near Sevenoaks, Kent, a multi-disciplinary establishment. There he worked on problems involving armaments and explosives and, along with R Hill and Sir N F Mott FRS, he wrote a seminal paper on fundamental laws governing phenomena in hypervelocity impact. In 1945 he was awarded an MA from Oxford.

After the war he was appointed to a lectureship in Queen's College, Dundee. There he met another young Oxford Mathematics graduate called Constance (Connie) Gillam who was also on the staff. (It is interesting to note that she was the joint author, with C A Coulson FRS, of a paper in Proceedings A of the RSE, volume 62, in 1948.) They were married on 19 November 1947 (the day before the wedding of Queen Elizabeth and Prince Philip). Donald and Connie had asked if they could have the day off but the Head of Department told them that they had to fulfil their duties that morning so it was only at 12 noon that they were free to prepare for the wedding ceremony in the afternoon ! While at Dundee, Donald submitted a thesis to the University of St Andrews for which he was awarded the degree of DSc. After a Visiting Research Associateship at the University of Maryland, Donald took up a lectureship at the University of Manchester in 1952. One day he was informed that he was being paid too much for his age! Accordingly he did not feel disloyal in applying for a Chair of Mathematics at the Royal Technical College (RTC) in Glasgow. He was duly appointed and took up the position on 1 September 1953, at the age of 33. This was the start of an association which was to last for 63 years.

When Donald was appointed, the Mathematics Department at the RTC contained just six staff and provided only service teaching. Essentially no research was being undertaken. Donald set in train two processes which led to the evolution of the department into its present form as the Department of Mathematics and Statistics at the University of Strathclyde. Firstly, based on his own experience, he felt that the time was ripe for a course for Mathematics students who wanted to work in industry. He therefore established a four-year Honours course in Applied Mathematics which led to an Associateship of the RTC. This course contained two features which were novel at the time. At the end of the third year, students were to undertake a 6-month placement in an industrial or scientific establishment. Then after their final written exams in April of fourth year, students were to embark on a major project during the long vacation, at the conclusion of which they had to produce a substantial report. Although the industrial placement has long gone, the various BSc Honours degrees now offered by the Department of Mathematics and Statistics still contain a project, albeit of much more modest proportions.

The second innovation was the initiation of a research culture in the Department. Donald set up a group studying transonic flow which soon gained international recognition, not least by the United States Air Force Office of Scientific Research which provided funding over a period of almost 10 years. In the early 60s, Donald's research interests moved into the areas of non-equilibrium flow and rarefied gas dynamics.

Around this time, consideration was being given to the establishment of a professional institute for applied mathematicians, following a suggestion from Professor Sir James Lighthill FRS. Donald served on an *ad hoc* committee which was set up to carry this forward and in April 1964 the Institute of Mathematics and its Applications (IMA) came into being. Donald served on the IMA Council as the first Treasurer from 1964 to 1972. On the occasion of its 50th anniversary in 2014 the IMA organised a special event in London and everyone was delighted that Donald, as a founder of the organisation, was able to be present. He was a Fellow of the IMA (FIMA) and was

also accorded the designation of Chartered Mathematician (CMath).

Throughout his career, Donald wrote over 50 refereed papers (along with others which remain classified) and supervised 15 postgraduate students. He received many invitations to visit leading universities and to give plenary lectures related to his research. He had a long collaboration with Professor Helmut Neunzert of the University of Kaiserslautern with whom he organised five conferences on transport theory and the kinetic theory of gases at the Mathematisches Forschungsinstitut in Oberwolfach. Professor Neunzert also instigated the award to Donald of the first Honorary Fellowship of ECMI (European Consortium for Mathematics in Industry) in 1988.

Donald's work at Fort Halstead was the start of a remarkable relationship with the organisation which later became DERA (Defence Evaluation and Research Agency). This lasted for almost 60 years and led to the award of a Visiting DERA Fellowship in 1999, the first (and possibly only) such award.

In the first part of his career in Glasgow, Donald was involved in the transition from Royal Technical College to University of Strathclyde. This was not without its problems, just as there had been opposition in certain quarters to the introduction of the Honours course in Applied Mathematics. University status was gained in 1964 and from the beginning Donald was heavily involved in its governance. He was Vice-Principal during the period 1968-1972, was a member of both the Senate and University Court, and served on a range of committees, often as Chair. Within the Department of Mathematics he was Head of Department for many years. In 1975 he wrote a short history of the department on the occasion of the 150th anniversary of the establishment of the Chair of Mathematics in Anderson's College, a Chair which has been in continuous existence ever since. He retired in 1982, becoming an Honorary Professor conducting research and, in 1986, an Emeritus Professor.

Donald had a long-standing interest in school education. He was a member of the (then newly created) General Teaching Council for Scotland from 1966 to 1973. From 1968 to 1976, he served two consecutive four-year terms as Chairman of the Scottish Certificate of Education Examination Board, an antecedent of the Scottish Qualifications Authority (SQA). His experience led to an invitation from the Secretary of State for Scotland to chair a committee of inquiry into truancy and indiscipline in schools in Scotland. The resulting report, invariably referred to as The Pack Report, is probably the thing for which Donald is best known by the public at large. It also generated a large number of invitations to speak at conferences for teachers and others in education, including a seminar in Bavaria.

For his work in academia and in education more generally, Donald received a number of prestigious awards, in addition to those mentioned above. He was made an OBE in 1969 and a CBE in 1978. He was elected a Fellow of The Royal Society of Edinburgh in 1954 and a Fellow of The Educational Institute of Scotland in 1978. At the age of 94, he received the honorary degree of Doctor of the University from the University of Strathclyde and insisted on making an acceptance speech to an audience containing the latest crop of graduates in Mathematics and Statistics. It was a memorable occasion for all who were present.

Apart from Mathematics, one of the great passions in Donald's life was music. Learning to read tonic sol-fa at the age of eight set the ball rolling and after leading the school orchestra he took violin lessons from a member of the London Symphony Orchestra until war service intervened. There were Saturday night musical evenings in Dundee and, on coming to Glasgow, Donald formed a string quartet which met regularly for 25 years. He served for 40 years on the committee of Milngavie Music Club and latterly was its Honorary President and an Honorary Member.

However, his most significant contribution to the musical life of Scotland was his involvement in the founding of the National Youth Orchestra of Scotland (NYOS). The National Youth Orchestra of Great Britain had been founded in 1947 and it was felt that there was a good case for establishing a similar organisation for talented young musicians in Scotland. Donald was invited to chair the Steering Committee charged with bringing these ideas to fruition. While there was strong support from some quarters, notably from the (now Royal) Scottish National Orchestra, with Sir Alexander Gibson agreeing to serve as the first President, it was far from plain sailing. Some local authorities viewed the proposal as a threat to their own orchestras. Also, there was a major issue as regards funding, with the Scottish Arts Council being initially unsympathetic. However, through his

determination and powers of persuasion which had achieved success in his early days at the RTC, Donald overcame these obstacles by holding a few face-to-face meetings which helped to resolve misunderstandings. NYOS was duly set up in 1979 and was immediately a great success, with its performances receiving rave reviews. The plan was to have two concerts per year, each preceded by an intense residential course. Right from the start, Donald and Connie tried to attend every residential course and concert, whether at home or abroad. Donald served as Chair of Council from 1978 to 1988 and was thereafter Honorary President for life.

At the memorial service for Donald, we heard of a remarkable occurrence where his interests in Mathematics and music came together in a most unexpected way. Donald was on one of his frequent trips to Germany and heard someone upstairs playing the piano. He decided to introduce himself to the pianist who turned out to be none other than the theoretical physicist Werner Heisenberg, famous for his Uncertainty Principle. Donald fetched his violin and the two of them ended up playing duets.

Another major interest was golf. Donald was a member at Douglas Park for many years and was still managing a few holes until not far short of his 90th birthday. Even after that he went to the clubhouse regularly for lunch with his friends until a few weeks before his death. He enjoyed working in his garden. He loved growing fruit and vegetables, especially runner and broad beans, but had no great interest in flowers. The church was also a big part of his life. He was a member at Bearsden Cross (formerly Bearsden South) Church from 1953 and an elder from 1973. For many years he was Convener of the Praise Committee and Treasurer of the Session Fund. The Kirk Session made Donald an Elder Emeritus a few days before his death.

The biggest joy of Donald's life was his family. He shared 63 years of married life with Connie. They were blessed with three children and subsequently six grandchildren and five great-grandchildren. Donald was very proud of all that they achieved. I am grateful to Donald's son John for supplying me with the material upon which this obituary is based.

Adam McBride

Professor Donald Cecil Pack CBE, MA(Oxon), BA (Cantab), DSc (St And), HonDUniv (Strath), CMath, FIMA, FEIS. Born 14 April 1920. Elected FRSE 1954. Died 3 December 2016. Councillor 1960-63.