

Professor Sir Bernard Crossland

**A Tribute by John Fitzpatrick (Professor of Mechanical Engineering in Trinity College Dublin)
given at the Service of Thanksgiving in McCracken Memorial Church on Thursday 27 January 2011**

Sir Bernard Crossland (or BC as he was affectionately known) was Professor of Mechanical Engineering at Queen's from 1959 to 1984 and Professor Emeritus from then until his recent death. Among the many public and professional honours bestowed on Bernard were Knight Bachelor (1990) and CBE (1980) for services to education and industry. He was a FRS, FEng & FIAE and a Member of the RIA & Academia Europaeae and an honorary Fellow of IMechE, Engineers Ireland and ASME. He was awarded the Kelvin Medal (ICivile), the James Watt Gold Medal (IMechE), Cunningham Medal (RIA) and the Sustained Achievement Medal (REng) all in recognition of his substantial and sustained contribution to Engineering and its art and practice. He was also awarded 9 honorary degrees during his long life. In deference to these honours, he mischievously referred to himself as a successful Blacksmith! I think he was a little more than that.

Bernard started as an apprentice with Rolls Royce and gained Bachelors and Masters degrees through part time study. After a brief period at Luton Technical College, he was appointed to a Lectureship at Bristol University where he conducted research on strength of materials and was awarded a Ph.D. in 1953. In 1959, he was appointed to the Chair of Mechanical Engineering here at Queen's at the age of 37. Almost immediately, he was involved in the planning and construction of the Ashby Institute which was opened in 1966. The Ashby was well equipped including a "state of the art" workshop which he considered essential for research in Mechanical Engineering. He then set about recruiting a team of academics who were to be tremendously active in research and, in the ten year period after the opening of the new building, the Department gained an International reputation for the quality of its research in a wide range of areas related to the expertise of the academic staff. During this time, in addition to continuing his high pressure work, Sir Bernard began to conduct research into the use of explosives for welding and fabrication for a range of industrial processes. This was an interesting activity in the Belfast of the seventies and there are countless anecdotal stories related to experiments

conducted in a quarry in the vicinity of Ballymena! (Ken Wylie, who unfortunately cannot be here today, has been dining out on them ever since.)

I first got to know Bernard as a final year student when he persuaded me to undertake postgraduate work on vibrations in heat exchangers. This arose from his work with Babcock on explosive plugging to repair damaged tubes in nuclear reactors and it was typical of him to propose to them a project on the root causes of the tube failures, namely vibrations. This was despite the fact he hadn't worked in this area for many years as I discovered soon after I started. Nonetheless, we both survived the experience with the support of the late Ian Donaldson. In passing, when I submitted a draft of my thesis for his approval, his main comment was on my use of the word "window" as a verb in the context of signal processing. He excoriated me for misuse of the English language with the comment "window is a noun not a verb"! He really was a stickler for standards especially when it came to grammar.

During my time as a postgrad, one particular event sticks in my mind. It was a lecture given by Bernard to 6th form students on the applications of engineering as part of a recruitment drive. Among the demonstrations performed by Bernard, one involved hydrostatic forming of a denture plate. For this, a tub of water was wheeled into the lecture theatre. Into this, Bernard lowered a retort stand with a mould covered by a metal sheet at the bottom and a small explosive charge located some distance above it. He then detonated the charge as he put up an umbrella and the water splashed out over the first few rows. He continued his talk as a technician appeared from the side carrying towels to the bewildered students. I'm not sure if this increased or decreased the applications for engineering that year. Another side to this work was reassuring patients that the forming process did not take place in their mouths!

The highlight of the year for many in the Dept was the annual staff/graduate student outing around early June. This started, I am told, as a industrial visit to

some location in the south and was followed by dinner at the likes of Bunratty Castle with an overnight stay. It seems that the industrial visit aspect was quickly abandoned and a weekend excursion to islands off the west coast became the norm. These trips included golfing, fishing and walking together with typical evening activities which I will leave to your imagination. These outings provided an opportunity for the staff to get together on an informal basis for a few days in the wilderness. If one thinks about the recent trend in management speak for “away days” and “team building activities”, Bernard was nearly 30 years ahead of the game here. On one occasion before my time, he was billeted in an annex of a guesthouse in Clare Island which doubled up as a coffin maker’s workshop. Some colleagues removed the base of Bernard’s bed and placed a coffin beneath it. He retired later in the evening somewhat fatigued and had a great night’s sleep in what he described later as a very comfortable station. It was also on that trip that the boat crossing to the island was in rather stormy conditions and one of the cohort who was a Salvationist played abide with me to jolly the troops along as recorded in Bernard’s autobiography. These trips also involved an element of competition in respect of who was first back to Belfast and Bernard’s Jaguar was often in contention with the late Gordon Blair. Mind you, Bernard dumped the Jaguar after the gearstick came away in his hand twice. In respect of cars, he also had problems with a Triumph 2000 when the driver’s seat came adrift due to fatigue of the seat rails. He replaced the rails with those from the passenger seat and he instrumented these to examine the defects in the design. He often stated that this failure to pay attention to detailed design was the beginning of the end for the British motor industry.

I had little contact with Bernard after leaving Queen’s in the mid-seventies until I met him at an ASME meeting in Florida in July, 1982. Although we were both very busy, we did take some time off to visit Disney world and I still recall discussions on the engineering infrastructure necessary for the various sectors of the park. A particular memory is a ride on the Rocky Mountain Railroad with Bernard, between his “yipees” and “yahoos”, regaling me on the tremendous “centripetal action” we were experiencing.

One of Sir Bernard’s chief passions was, of course, education in engineering with particular emphasis on design and manufacture. To further this, he has over the past 15 odd years provided support through Engineers Ireland for an annual Symposium, an annual lecture and a medal for Engineering Innovation. The Symposium is for Graduate students in Mechanical Engineering and his generous donation provides prizes annually for the best three papers presented by students from the universities in Ireland. This has been a very successful event over the past 15 years and continues on an annual basis. Until recently, Bernard delivered a short lecture each year usually on a “hot topic” such as sustainability or global warming and he was very encouraged by the range of research being conducted in our universities. The continuation of this and the other events which bear his name will ensure that his legacy to engineering education will be sustained.

Despite being a long term “blow in”, he was a tremendous driving force in claiming for Northern Ireland proper recognition of its Engineering Heritage. He was a consistent advocate for the establishment of a Centre to celebrate the great Engineering achievements of the late 19th and 20th centuries. I believe that in this, he leaves behind an ambition which should surely be fulfilled and such a Centre would be a fitting tribute to the great Ulster Engineer I would propose he was.

Of course, behind every successful man is a woman and Audrey, his wife for over sixty years, was a quiet and powerful influence in his life. I know life has been very quiet for them in recent times, but they shared many adventures during their time together. To quote from Bernard’s autobiography “it cannot have been easy to be married to a confirmed workaholic” but, despite this, I know they were devoted to each other over their long time together.

On behalf of his friends and colleagues from Ireland, Britain and across the world, I offer to Audrey, their children Jennifer & Mary Anne, sons in law Clark & Darius and granddaughter Becky our deepest sympathies. I know that Bernard’s passing will leave a considerable void in your lives. He was in all senses, a larger than life character with the enthusiasm of a youngster for every task he engaged in and the tenacity to see these tasks finished. He will be missed by all who had the privilege to know and work with him. We will not see his like again.