

THOMAS MALCOLM CHARLTON
BSc(Lond), MA(Cantab), FICE

Thomas Malcolm Charlton was born on 1 September 1923 at South Normanton, Derbyshire, of a long-established mining family. Following his father's appointment as an underground engine-wright at Hatfield Main Colliery, his family moved to Stainforth. He won a scholarship for Doncaster Grammar School where he remained until 1939. Railways were the love of his life. He founded the School Railway Society; he treasured a prize from Meccano, and revelled in seeing the construction of the streamlined Gresley Pacific Locomotive. During his tenure of a premium apprenticeship which enabled him to study for a Higher National Certificate in Engineering at Doncaster Technical College, he realised that a university degree was necessary if he were to improve his position. Despite a considerable financial sacrifice his parents wholeheartedly supported his aims. He became a full-time student at Derby Technical College for the external Inter BSc(Eng) of London University. Undaunted by the wartime bombings which often caused long delays in his train journeys home, he made considerable progress.

He successfully completed his studies in 1943 at Nottingham University College, under the infectious enthusiasm of Professor C H Bulleid, OBE and his dedicated staff. Although not part of the academic course, ballroom dancing and concerts became part of his life at Nottingham.

In common with other wartime graduates in Science and Engineering, Charlton was interviewed by C P Snow who instructed him to report to the Royal Radar Establishment (TRE), Great Malvern as a Junior Scientific Officer. He was duly assigned to C L Blackburn, a partner of Mertz and McLellan, on secondment as a consultant on engineering design. Blackburn was a hard task-master, but the young Charlton earned his senior's respect when he queried successfully his analyses of the rotation of parabolic disc aerials that were desperately needed in time for D-Day. The hectic pace of work with Blackburn, together with the social life at TRE, suited Charlton's temperament, and the friendships and connections in the scientific world that he made there were to stand him in good stead for the rest of his life.

In January 1946, Blackburn offered Malcolm Charlton an appointment as Assistant Engineer in his firm's Newcastle office. He was to enjoy eight golden years there. Working under W T Bottomley, Technical Adviser in the Mechanical Division, he gained wide experience on power plant engineering and later on hydraulic systems. Bottomley and his wife were kind to Charlton. They regularly welcomed him to their home, showed him how to celebrate properly the New Year and, on Newcastle's Town Moor, Bottomley taught him to play golf (not very successfully). An early contribution on stress analysis led to award of a Graduates' Prize of the Institution of Mechanical Engineers (IMEchE), and through publication of a further paper in the *Transactions of the North East Coast Institution of Engineers and Shipbuilders*, he gained the solid support of its Secretary, T S Nicol. Under the auspices of the I Mech E he was able to spend his summer holidays of 1947 to 49 visiting the Belgian coal mining and shipbuilding industry and water power installations in Switzerland and Norway.

These activities in major Engineering Institutions, and well-regarded presentations at meetings of the British Association, gained him early respect in the academic world. In 1954 he accepted an offer of a University Lectureship at Cambridge and with his wife Valerie, whom he had married in 1950 and their son Richard, he set off for academia.

His first year at Cambridge proved difficult. Allocated teaching duties that were outside his own field of experience, he had to begin an abrupt personal learning exercise on new subjects. Uncooperative but cunning students regularly confronted him with awkward questions. His new academic surroundings seemed daunting, and he was glad of the friendship of three other arrivals, A H Chilver, K L Johnson and R K Livesley. An uncharacteristic intervention during a lecture, and criticism by Professor (later Lord) Baker, the Head of Department of Engineering, caused him great distress, and Charlton anticipated an early end to his academic aspirations. Instead it was a turning-point. The unruly students now rallied to his support, and the incident was never mentioned again by Baker. Further recognition came when he was invited to Sidney Sussex College, of which he was duly elected a Fellow, a position in which he took great pride, returning there throughout his life to enjoy the company of his many friends. He was able to witness the burial of the embalmed head of Oliver Cromwell at the College. Acceptance at Cambridge now gave him great heart. Through Baker, he took control of a departmental research project on steel structures and later became a consultant to the National Coal Board. For (Sir) Martin Ryle he advised on the reconstruction of his radio telescope structure, after its collapse during a gale in 1957. The publications of his books *Energy Principles in Applied Statics* (1959) and *Analysis of Statically Indeterminate Structures* (1961), confirmed his standing. The latter title prompted a poem in the publisher's journal:

I'm a quite indeterminate framework
What's worse I am statically so
The thought of analysis
Gives me paralysis -
Ought Mr Charlton to know?

Charlton's achievements inevitably received the attention of Chair assessors and on St Patrick's Day 1963, he was appointed Professor of Civil Engineering at the Queen's University of Belfast (QUB).

Belfast seemed to provide fulfilment of every aspect of his professional and personal character. He rendered sterling administrative service to the University, serving on virtually every committee and notably Buildings and General Policy. His standing rose even higher when he spotted the use of sub-standard reinforced concrete in the construction of new University Halls of Residence, the structure consequently being demolished.

Civil Engineering was a major activity in Northern Ireland at that time, and Charlton found himself much in demand for advice and comment that brought him into close contact with civic leaders, Government Ministers, senior Civil Servants and the BBC. A hectic social life accompanied his activities at the University and with the engineering industry of the Province.

The many visitors to Belfast were always received with great courtesy by him and his wife, including the Chairman of the

Finnish State Board for Engineering Research. A subsequent invitation to lecture in Helsinki gave rise to his election as a Foreign Member of the Finnish Academy of Sciences, a distinction that delighted him.

His former students often commented on the fine quality of his lectures, and that their graduation day at the University was completed by Professor Charlton's hospitality towards them and their families. Charlton represented with distinction his University at extramural events, including the Inauguration of the University of Bradford, and in London met informally with senior members of both Government and Shadow Cabinets, such as Harold Wilson and Margaret Thatcher. His acquaintance with the latter was long-standing.

During his Deanship of the Faculty of Applied Science and Technology he became noted for brevity in meetings. When he took over, he advanced the start of Faculty meetings by 15 minutes to 2pm; on the first occasion, staff arriving at 2.15pm found that the meeting had already finished.

It was inevitable that he should make contact with the Army in Northern Ireland: as Chairman of the Military Instruction Committee of QUB, he developed a strong professional and social connection with the most senior Army and RAF officers in the Province, and also on the British mainland. Civil unrest in 1968, and the reappearance of the IRA, led to Charlton being invited to sit on a newly-established six-member Advisory Council for the Ulster Defence Regiment under the Chairmanship of General Sir John Anderson.

At the height of his position in Northern Ireland, an unexpected invitation saw him tempted away from Belfast to assume in 1970 the Jackson Chair of Engineering at the University of Aberdeen. Engineering at Aberdeen had been in a precarious state, and only the intervention by its Principal at a meeting of the University Senatus some months before had saved the Department there from closure. Charlton arrived with characteristic flair. He was interviewed and offered the post, bought a house, and arranged a school place for his younger son, all in one day.

He proceeded to establish a new undergraduate degree course in Engineering Science, arranging a visit to Aberdeen by the University Grants Committee to gain their approval for his plans. University staff who had been teaching mechanical and electrical engineering subjects at the local Robert Gordon's Institute of Technology were brought back to Marischal College. The entire Department became based there. A building and refurbishment programme was begun. Charlton set about recruiting new lecturing and professorial staff, committed to a broad-based undergraduate course that he and they believed was right for the UK and for Aberdeen University.

A conference on Engineering Education that he organised in 1973 at Marischal College brought to Aberdeen many of his friends and acquaintances throughout the academic world and with them recognition that Engineering at Aberdeen had been turned round. Under his crisp style of management, teaching and research flourished although, as one humorist observed, his conduct of staff meetings appeared to be modelled on best contemplative monastic practice, where we generally sat in silence and with bowed heads, whilst Professor Charlton pronounced on the issues of the day. As a result, though, staff meetings were mercifully short and we could return to work or, in some cases, to the golf course. The 1970s there were heady days.

Charlton was elected to Fellowship of the Royal Society of Edinburgh in 1973. A new edition of his book *Energy Principles in Theory of Structures* was published the same year, and his Chair at Aberdeen University seemed likely to become the pinnacle of a remarkable academic career.

High blood pressure in the latter part of 1973 caused Charlton to have an enforced rest for some months, although by now his re-organised Department at Aberdeen was moving rapidly forward. Heart trouble was to bother him thereafter. His ill-health became a frustration to his active temperament.

In the later 1970s there were differences too with new senior members of the University Administration on the role that should be taken by the Engineering Department in the oil industry then booming in Aberdeen. Charlton maintained that the Engineering Science degree should be its backbone, as it provided adaptability for entry to many job markets. In hindsight, he was right - many Aberdeen graduates found ready employment not only with the offshore firms but throughout industry, in the UK and overseas. Many of the staff contributed significantly to research in Marine Technology and to the practical needs of oil companies. Despite the new vigour in his department, Charlton decided that with insufficient control over his own health he could not continue to do justice to it. He retired in 1979. In Aberdeen, he gave his staff the scope to develop their own talents whilst still firmly guiding them. A testimony to his time are the nine former members of his department who proceeded to occupy Chairs of Engineering in British Universities.

Professor and Mrs Charlton settled eventually at Burwell, near Cambridge. Free from daily academic responsibilities, he continued to write on engineering. His excellent *A History of Theory of Structures in the Nineteenth Century* was produced in 1982. In his spare time he undertook a study of the history of the Anglican Church. 'Professor Emeritus', memoirs written especially for his family, were published in 1990.

Blessed with an engaging and humorous personality, Malcolm Charlton had an almost Pepysian gift for meeting and befriending notable scientists and engineers. In spite of his own internal diffidence, he could swiftly gain their confidence; but he was no snob, and just as readily earned the respect of the humblest of his acquaintances. He was ever staunch to the many who were his friends, and greatly valued in turn by them.

He and his wife were regular attenders at church throughout their married life. They were greatly heartened when their son Richard, having been accepted by the Church of Scotland for training as an auxiliary minister, recently began a course in Divinity at Aberdeen University after a career in the police. They were equally proud of their younger son Edward, a graduate in Engineering from Aberdeen University, who became an RAF Squadron Leader and is now a military air crew instructor.

Professor Malcolm Charlton died on 1st February 1997.

Professor Sir Bernard Crossland, CBE, FRS, FEng, MRIA, Mr A W Gray, Professor K L Johnson, FRS, FEng, Professor R V Jones, CH, CB, CBE, FRS, FRSE, Professor N F Robertson, CBE, FRSE, Professor B B Willetts, FRSE, are thanked for their helpful comments in the preparation of this obituary.

JOSEPH McGEOUGH