

Works, where he became Director-General, with responsibilities including direction of the building and construction and planning of the whole wartime programme of works and supply of building materials.

After the war he joined Arthur Guinness Son & Company Ltd, where in 1946 he became Managing Director, and in 1959, with Lord Boyd, Joint Managing Director. The following year he retired.

Sir Hugh Beaver's activities were legion: after World War II he was a member of the Reith New Towns Committee (on whose principles the new towns were built), and of the working party on the building industry. He was Chairman of the Advisory Council of the Department of Scientific and Industrial Research (1954–56), of the Committee on Power Station Construction (1952–53), of the British Institute of Management (1951–54) and of the Committee on Air Pollution—which led to the Clean Air Act of 1956. From 1951–60 he was a Director of the Colonial Development Corporation and from 1956 onwards of Richard Thomas & Baldwins. President of the Federation of British Industries (1957–59), he was also Chairman of the Industrial Fund for the Advancement of Scientific Education in Schools. From 1958–63 he was Chairman of the governing body of Ashridge College. At one time President of the Institution of Chemical Engineers, he was Chairman of the British Association's Committee of Enquiry into the metric system. Honorary degrees were conferred upon him by three universities, including Cambridge. In 1943 he received a knighthood and in 1956 was created KBE.

In 1955 he lectured to the Conference on the Conservation of Natural Resources on 'An attempt to assess the avoidable waste of materials and resources due to air pollution' (1955, p. 82), and in 1960 delivered the sixth Graham Clark lecture on 'Engineering and civilization'. *Proceedings*, 1960, 16 (Aug.) 381.

Sir Hugh had much at heart the strengthening of links between industry and education and his uncanny intuition in assessing public reaction was never more evident than when the Treaty of Rome first came to the notice of the heads of British industry.

Elected an Associate Member in 1932, he became a Member in 1940.

He is survived by two daughters.

Alfred Raworth

who was born in 1882, died on 22 January, 1967.

Educated at St Aubyn's, Lowestoft, and Dulwich College, his practical training was with the Blowitt-Lindley Company in Manchester and Brush Electrical Engineering of Loughborough (1900–03). From 1903–12 he assisted his father, John S. Raworth (M), Consulting Engineer, mainly on electric traction work (tramways). This early experience was invaluable, since the introduction of electric railways in southern England on a large scale was imminent. Alfred Raworth was to prove the right man at the right moment.

In 1912 he joined the London & South-Western Railway as Chief Assistant to their Electrical Engineer, and over the next three years helped to prepare a report and estimates for electrification of the LSWR suburban lines. Later he stage-managed the launching of the scheme.

During World War I he served from 1915–18 in the RNVR, with the rank

of Lieutenant. On demobilization he became Electrical Engineer to the South-Eastern & Chatham Railway and prepared a scheme for electrification of their south-eastern suburban lines (1918–23).

In 1923 he joined the Southern Railway as Electrical Engineer, New Works, and in this capacity prepared and implemented all schemes for electrification of the Southern lines. He was appointed Chief Electrical Engineer in 1938 and so remained until his retirement in 1946. He then became Consulting Engineer to the English Electric Company at their head office in Kingsway.

Throughout his railway career Alfred Raworth had to fight prejudice against the high cost of electric railways. This led him to practise rigorous economy in staff and engineering costs and to give meticulous attention to economical planning. Single-handed, he reached his own decisions, but had the complete confidence of Sir Herbert Walker, the Southern Railway's first General Manager. Under his guidance, the Southern advanced rapidly in electrification technology, so paving the way for the complete electrification system which Raworth recommended in a report produced shortly before his retirement, but did not live to see fulfilled.

The austerity of his methods did not reflect the man himself, who liked to relax among friends and played a good game of golf. Unfortunately he left no published work for the benefit of his successors.

He was elected direct to membership in 1942.

He is survived by his widow and a daughter.

Robert Valentine Burns, PhD, BSc

who was born on 4 November, 1898, died on 26 January, 1967.

Irish by birth, he went to school in Dundalk before emigrating to Canada at the age of 14. Here he continued his education at the Technical School in Toronto and at Jarvis Collegiate Institute. From 1919–23 he studied engineering at Massachusetts Institute of Technology, and took his BSc degree. In 1923 he also passed the Associate Membership examination. Ten years later he was to study at the City & Guilds London Institute, and in 1935 he received his PhD.

Harbour construction, dams and irrigation projects were his subjects, and in the course of his career he travelled widely—to the United States, Ceylon, Turkey, Haiti, and finally Thailand.

After working in the United States on several irrigation and dam projects, he went to Ceylon to take up an appointment with the government as a Research Engineer. In 1937 he completed the design and construction of an hydraulic research laboratory in Colombo and was appointed Divisional Irrigation Engineer, under the Director of Irrigation. He instituted a number of flood protection schemes (on the Nilwala, Kelani, Gin and Kalu rivers), and several drainage projects, before proceeding to Turkey: thence in 1951 to Haiti, where for the next seven years he was engaged on the Artibonite project (irrigation and drainage works). He then left for his final stint in Thailand.

After an eventful career, he retired to Florida in 1965.

He was a member of the American Society of Civil Engineers, and co-author with C. M. White of a paper, 'The protection of dams, weirs and sluices against scour'. *J. Instn civ. Engrs*, 1938, 10 (Dec.) 23. Corrigenda: 1938, 10 (Dec.)