Industrial Fuel Efficiency Service and Rickmansworth & Uxbridge Valley Water Company Ltd, President of the Cambridge University Engineers' Association, and Chairman of the governing body of Loughborough Technical College.

For his war services, Sir Edward was awarded the *O.B.E.* in 1919 and the Croix de Guerre in 1918. He was a member of the Institution of Mechanical Engineers, and a Fellow of the Institute of Industrial Administration.

Elected an Associate Member in 1917, he became a Member in 1957.

He is survived by his widow, Lady Herbert, and a son and daughter.

DAVID KERR DUFF, F.R.S.E., who was born on 29 December, 1892, died on 20 September, 1963.

Educated at George Watson's College, he studied engineering at Edinburgh University and Heriot Watt College, Edinburgh, until 1914, when he took a year's practical training with Hunter, Duff & Middleton (MM). From 1915–19 he served with distinction as an A.A. Area Commander in France and Belgium, and was awarded the Croix de Guerre in 1917. During the next five years he gained experience with public works contractors in London, Manchester, and Carlisle, where for two years he acted as Agent and Engineer to Muir & Co., public works contractors, working on the main river sewer.

Mr Duff's extensive knowledge of waterworks, sewerage, and reinforced concrete structures led to his employment on the Gold Coast by the Crown Agents for the Colonies on the construction of the great harbour of Takoradi and new railways and roads from Seccondee. Acting under the Chief Engineer on the Gold Coast, he worked in 1924 on the design and construction of roads and bridges, large buildings, the water supply and sewers of Takoradi —a scheme running to a total cost of £3 000 000. Owing to a change of government, the whole staff returned to this country, and in 1925 Mr Duff was appointed Resident Engineer for Edinburgh, under the City Engineer, working on the outfall sewer.

In 1926 he became a partner with Hunter, Duff & Middleton (MM), Edinburgh, where earlier he had served an apprenticeship. With this firm he designed and constructed large reservoirs in Africa for the Crown Agents, and at home for public authorities. Drainage and purification works were undertaken, and many civil and structural engineering schemes: Parliamentary Bills (including the Galloway Hydro-Electric Bill) and Court cases were also serviced by the firm. Among the waterwork schemes carried out, the largest was for Perth at a cost of £120 000.

This work was interrupted by World War II, and from 1940–43 Mr Duff served as an Officer in the Royal Artillery and commanded various heavy A.A. batteries. In October 1943, he resumed his professional work, and in 1944 with the fusion of Hunter, Duff & Middleton, with the firm of John & G. H. Geddes, he became sole partner of Duff and Geddes.

In recent years he was appointed a consultant engineer of the North of Scotland Hydro-Electric Board and became associated with the Breaclaich Section of the Board's Breadalbane Scheme.

A member of the Institution of Structural Engineers, he was made Chairman of the Scottish Branch in 1938. From 1956–60 he was a member of the Council of The Institution, representing the Edinburgh and East of Scotland Association.

Elected an Associate Member in 1922, he became a Member in March 1944. Mr Duff is survived by his widow and two sons.

PROFESSOR RONALD NATHAN ARNOLD, D.Sc., Ph.D., M.S., who was born on 23 December, 1908, died on 30 December, 1963.

Educated at Albert Road Academy and Shawlands Academy, Glasgow, he studied engineering from 1928–1936 at the Royal Technical College, Glasgow and at the Universities of Glasgow, Sheffield, and Illinois. In 1932 he received the degree of B.Sc. at Glasgow University with first-class honours in mechanical engineering, and in the same year was granted the associateship of the Royal Technical College, together with its premier award in mechanical engineering. There followed four years of research, first at Sheffield University, where he received the degree of Ph.D. in 1934, then—on gaining a Commonwealth Fund Fellowship—a further two years of research at the University of Illinois, where under Professor H. F. Moore, he studied impact stresses in beams.

On his return from America in 1936 he joined the engineering staff of the Royal Technical College, Glasgow, as assistant lecturer in engineering and applied mechanics, and for his research work on ships' propellers he was awarded jointly with a colleague the gold medal of the Institution of Engineers and Shipbuilders in Scotland and the Thomas Lowe Gray prize of the Institution of Mechanical Engineers.

In 1940 Professor Arnold became a member of the senior research staff of the Metropolitan-Vickers Electrical Company, and for the next two years was engaged on a number of research projects. In 1944 he became Professor of Engineering at the University College of Swansea, where he remained until his appointment to the Regius Chair of Engineering at Edinburgh University, a position he retained until his death. He instituted two post-graduate schools at the University of Edinburgh, one in electronics and radio (1950), the second in applied dynamics (1957).

An expert in fluid dynamics, metals, and stress analysis, Professor Arnold devoted much time to research into mechanical vibration, dynamics, the properties of metals, gyrostatics, and foundations. He was the author of numerous papers published in *Engineering*, the *Proceedings of the Institution of Mechanical Engineers*, the *Proceedings of the Royal Society*, etc.

Apart from awards already mentioned, he received the Thomas Hawksley Gold Medal in 1946, the Institution Prize from the Institution of Mechanical Engineers in 1952, and the T. Bernard Hall Prize in 1957. In 1947 he was elected F.R.S.E.

Elected an Associate Member in 1945, he became a Member in 1959.

He is survived by his widow, and a son.

CORRIGENDA

Proceedings, vol. 30, April 1965:

Page 793, § 227, line 1. For 'Messrs Bertlin, Wildon and Bell' read 'Messrs Bertlin, Wilton and Bell'.

Proceedings, vol. 31, May 1965:

Page 79, § 63, line 1. For 'Undoubtedly there was' read 'Undoubtedly if there was'.

Page 128, Obituary of V. F. Bartlett: § 4, line 3. For 'C. Seager' read 'C. Seager Berry'; § 6, line 2, for 'W. H. Caldwell' read 'W. H. Cadwell'.