

and 1871, when he gave up his professional pursuits, Mr. McClean represented his firm on many works carried out by them, including the Barrow Docks, and the Furness and Midland Railway, surveys and borings at Piel Bar, and the extension of Piel pier and railway.

After his retirement, Mr. McClean devoted the remainder of his life to astronomical science. The results of his labours were embodied in various important Papers communicated by him to the Royal Society and the Royal Astronomical Society, and in 1899, he was awarded the gold medal of the latter society for his researches in solar and stellar spectroscopy. In 1890 he founded the Isaac Newton studentships at Cambridge, and in 1895 he presented the Victoria photographic telescope to the Cape Observatory. The honorary degree of LL.D. was conferred upon him by Glasgow University in 1894, and in the following year he was elected a Fellow of the Royal Society. Mr. McClean married in 1865 Ellen, daughter of Mr. John Greg, of Escowbeck, Lancaster.

He was elected an Associate Member of the Institution on the 5th April, 1864, and was transferred to the class of full Members on the 10th December, 1867.

ALEXANDER McDONNELL, M.A. (Dublin), third son of John McDonnell, M.D., of Dublin, was born on the 18th December, 1829, and studied at Trinity College, graduating in Arts with mathematical honours in 1851. He then became a pupil of Mr. Charles Liddell, of Westminster, for 3 years, remaining in the same service after completing his articles until 1858. With the exception of an interval spent in study at the École des Ponts et Chaussées, Paris, he was engaged during this period in a variety of railway work, chiefly on the construction of the Newport and Hereford Railway, to which, on its completion, he was appointed Resident Engineer and Locomotive Superintendent, continuing in this office after the line was amalgamated with the West Midland system. At the end of 1861, he relinquished this appointment and proceeded to Turkey to organize the Locomotive Department of the Danube and Black Sea Railway, returning to England in 1863. In the following year Mr. McDonnell accepted the appointment of Locomotive Superintendent to the Great Southern and Western Railway of Ireland, which position he held for 18 years. In 1877 the carriage and wagon departments were also placed under his charge, and in this year he contributed a Paper to the Institution entitled "Repairs and Renewals of

Locomotives,"¹ for which he was awarded a Telford premium. During his period of office, the locomotive, carriage and wagon shops at Inchicore were greatly developed and rendered capable of producing all the rolling stock required for the different lines. In 1882 Mr. McDonnell transferred his services in a similar capacity to the North Eastern Railway, holding the appointment until 1884, when he resigned. Afterwards he engaged in consulting practice, in connection with which he twice visited Brazil and once travelled to Australia. He died after a short illness on the 4th December, 1904, aged seventy-four.

Mr. McDonnell was elected a Member of the Institution on the 6th February, 1872.

FRANK THEODORE MARSHALL² was the only surviving son of Mr. Francis Carr Marshall, M. Inst. C.E., for many years the principal Managing Director of Messrs. Hawthorn, Leslie, and Co., Limited, Newcastle-on-Tyne, and one of the most progressive British marine engineers. He was educated at Durham School, and, when sixteen years of age, entered as a premium pupil the works of which he subsequently became engineering manager. Those were times of great activity and originality at the works, as his father was then engaged on the machinery of some of the earlier high-speed war-vessels in which forced draught was introduced in the boiler-rooms, a high rate of revolution adopted for the engines, and other new departures made in order to reduce the weight of propelling-apparatus and to attain high speeds in vessels of small size.

After a period of practical training Mr. Marshall became a pupil at University College under Professor Kennedy, and passed through the full course of engineering study. He then rejoined his father's staff at St. Peter's Works and served in various capacities, taking an active part in shop-management and the conduct of steam-trials of important ships engined by his firm. In 1897 when his father retired in consequence of ill-health he became the technical head of the business, and 3 years later he was appointed to a seat on the board as managing director of the engineering works at St. Peters, Newcastle-on-Tyne. While he had control of them many successful designs were evolved, and many important warships and merchant vessels were engined. In

¹ Minutes of Proceedings Inst. C.E., vol. xlviii. p. 2.

² This notice is based on that which appeared in *Engineering* of 23 December, 1904.