

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.

the nineties he was intimately associated with the machinery for many of the Elswick cruisers, which, because of their speed, created considerable interest. His firm took a leading part in the introduction of water-tube boilers, which were used at an early date in vessels built by them for the Russian Volunteer fleet. It is characteristic of Mr. Marshall's broad-mindedness that he regarded the boiler question as "one which must be dealt with in its relation not only to each individual class of ship, but to each individual service." He considered that "the adoption of any type will depend upon what particular qualities are most desirable for the boilers to possess to meet the special work which the vessel is designed to do. The general naval policy of any Power will thus have a direct bearing upon the question of what type of boiler is preferable for a given ship."

Among recent British ships for which Mr. Marshall designed and constructed the machinery may be noted the battleship "Bulwark," four of the cruisers of the County class, each indicating 22,000 HP., and the cruiser "Duke of Edinburgh," launched in 1904, as well as several foreign warships. In the construction of machinery for torpedo-boat destroyers he was particularly successful, and since 1899 the firm have engined about a dozen of these vessels, all of which have given satisfactory results. For the two British scouts built at Elswick he also designed machinery, and, in view of the success of the destroyers' engines, he preferred to adopt in those scouts two sets of such machinery on each shaft, in order to develop the full power of 18,000 I.H.P. rather than to have a twin set of heavier units. By means of specially-designed valve-gear, this was done without increasing the engine-room length, and a considerable saving in the weight of machinery was effected.

Although he was deeply interested in the Institution his state of health prevented any active participation in its work. Under circumstances of increasing difficulty he continued to perform his professional work to the end, and his death at the early age of 38 years terminated a career that promised still greater performance and advance.

Mr. Marshall was a member of the Institution of Mechanical Engineers, of the Institution of Naval Architects, of the North-East Coast Institution of Engineers and Shipbuilders, and was one of the founders and chairman of the committee of the Northern Scientific Club.

He was elected a Member of this Institution on the 2nd February, 1904.