MEMOIRS OF DECEASED MEMBERS.

MR. CHARLES ATHERTON, third son of the late Mr. Nathan Atherton, was born in 1805, at Calne, Wiltshire, where his father practised as a solicitor. At the age of nineteen he entered the University of Cambridge, and for four years pursued a special course of study to fit him for the Engineering profession. On leaving the University with a B.A. degree, and the rank of Wrangler, he immediately commenced the active business of life under Mr. Telford, Past-President Inst. C.E., by whom he was employed on the St. Katherine's Docks as assistant to Mr. Rhodes, M. Inst. C.E., the resident Engineer. These works being completed, in 1830 Mr. Atherton was sent to Edinburgh, to superintend the erection of the Dean Bridge, then in course of construction. Here he acquitted himself entirely to Telford's satisfaction, and contributed an account of the bridge to the "Encyclopædia Britannica," which is quoted by Telford in his "Life and Works."[1] In the early part of 1832 Mr. Atherton was transferred to Glasgow as Resident Engineer of the new bridge then being erected at that place, also from the designs of Telford.[2] He, however, appears only to have remained a few months in that position, as in the same year he was appointed by the Trustees of the River Clyde, on the recommendation of Mr. James Walker, Past-President Inst. C.E., as their Resident Engineer. In this capacity Mr. Atherton prepared a plan for extending the then existing wooden wharf on the south side of the Broomielaw Harbour, which was submitted by the Trustees to Mr. J. Hartley, who, in a report dated "Liverpool, 30th of April, 1834," observes, "I do not see that such line can be improved."

In 1834 Mr. Atherton resigned his appointment under the Clyde Trustees, to take the management of the old-established business of Messrs. Claud Girdwood and Co., iron founders and engineers, in Glasgow, with whom he remained till 1837. During this period several marine engines of a highly creditable character were made by the firm. Of these the most remarkable were for the steamer "Don Juan," built for the Peninsular Steam Company.

[1] Page 197. [2] *Ibid.*, p. 191.

They were of the side-lever class, with 68-inch cylinders and 6-feet stroke, and were the most powerful engines of that day. In them were introduced various features of novelty, which subsequently became general. One of these was the marine governor, in which the centrifugal force of the rotating balls was made to act against springs, and which, consequently, was undisturbed in its operation by the motion of the ship. The governor acted not merely on a throttle valve in the steam pipe, but also upon another in the injection pipe. When the steam was shut off the water was turned on, and *vice versâ*. Starting cylinders were also first introduced in these engines. To ventilate the holds a fan was employed, driven by a Barker's mill, through which the injection water passed on its way to the condenser. The boiler was furnished with two tiers of furnaces, and the steam, before entering the steam-pipes, had to traverse an annular chamber surrounding the funnel, by which it was superheated. The safety-valves were kept down by spiral springs, to prevent the loss of steam in a sea-way from the inertia of the weights previously employed. An apparatus driven by a clock was introduced into the engine-room, which registered on a sheet of paper by pencils of various colours the pressure of the steam, condition of the vacuum, and number of strokes per minute throughout the whole voyage. These different devices originated with Mr. John Bourne, C.E., under whose superintendence the engines for the "Don Juan" were made; but they were executed by Mr. Atherton's firm, and under his direction. The high quality of the work brought the firm other orders, among which was one for the construction of the engines of the steamer "British Queen," intended for the navigation of the Atlantic. These engines were partly made, when financial reverses broke up the firm.

Mr. Atherton next proceeded to Canada, and was engaged for two years under the Colonial Government, conducting operations for the improvement of the navigation of the St. Lawrence. On leaving Canada he passed twelve months in the United States, after which he, in 1845, returned to England, and in June of the following year was appointed Assistant to the Chief Engineer in Woolwich Dockyard, and was promoted to the rank of Chief Engineer in April 1847. Mr. Atherton was active and energetic in the performance of his duties, and was imbued with a genuine love for the profession, coupled with an ardent desire for the advancement of scientific knowledge among its practitioners. From his high standing he possessed considerable influence, and he considered it his duty to report unreservedly to the Admiralty his views on professional subjects. His reports were not confined

merely to matters of engine detail, but were in exposition of the principles of engineering proceedings with reference to the systematisation of the steam-ship service generally. Many amendments were introduced into the service, if not directly in consequence of Mr. Atherton's suggestions, at any rate in the direction which those suggestions brought into notice. These reports included "Engine Classification," 1846; "Proposal for making the Government Factories Practical Training Schools for Naval Engineers," 1847; "Marine Boiler Classification," 1847 and 1848; "Steam-ship Ventilation by the Agency of the Funnel," and "Proposed Boiler Arrangement for Ships of War," 1849 and 1850.

Further, with a view of directing public attention to matters bearing on mercantile Marine Engineering, Mr. Atherton published papers on the following subjects: "On Marine Engine Construction and Classification," 1851; "On Steam-ship Capability," 1853, and a second edition, with Appendix on the Capability of large Ships, 1854; "On the Capability of Steam-ships for Mercantile Transport Service," a paper for which the medal of the Society of Arts was awarded in 1855; "Tonnage Registration," "Mercantile Steam Transport," and "Freight Charges as affected by Differences in the Dynamic Properties of Steam-ships;" the three last having been communicated to the British Association. As Chief Engineer of Woolwich Dockyard, Mr. Atherton was called upon to give evidence before various Parliamentary Committees appointed to inquire into Dockyard affairs, and on such occasions his evidence was always dictated by an uncompromising sense of duty to what he regarded as the best interests of the public service. During this most active period of his career he was a frequent attendant at the meetings of the Institution of Civil Engineers, and he took every opportunity of enforcing his views on the subject he had most at heart, viz., the improvement of the marine steam-engine. Mr. Atherton was transferred from Woolwich to Devonport in December 1848, and did duty there as Chief Engineer of the Factory until September 1851, when he was retransferred to Woolwich, where he remained until 1862, when he finally left the service. He was granted a special retiring allowance in consideration of having been selected for the responsible situation connected with the engineering works at Woolwich at the advanced age of forty-two, on account of his professional and practical experience. The position held by Mr. Atherton was one the duties of which could not be performed by any one at the ordinary age of entering the public service, and the Lords of the Admiralty expressed themselves

highly satisfied with the ability and zeal he had displayed during a long and faithful service.

On leaving Woolwich, Mr. Atherton established himself in Whitehall as a consulting Engineer, for which his large experience well fitted him. In 1870 he retired to Sandown, in the Isle of Wight, where he passed the last five years of his life in seclusion, his chief recreations being the care of an orchard-house, and taking astronomical observations with a 3-inch telescope. He died on the 24th of May, 1875, aged seventy years.

Mr. Atherton had a good reputation as a scientific engineer, and that, moreover, at a time when the practice of the profession proceeded rather by rule of thumb than by the more exact principles since laid down. When he first gave his attention to marine engineering the steam navy was comparatively in its infancy; he lived to see it achieve a wonderful development, to which, by his talents and industry, he greatly contributed. He was one of the oldest members of the Institution, having been elected a Member on the 19th of February, 1828, when Telford was President, and he is said to have acted for some time as Secretary.

Mr. EDWARD BELL was born on the 4th of October, 1812, at Hackney, where his education was conducted under Dr. Allen. In 1827 he was articled to Mr. John Hague, M. Inst. C.E., for seven years, during which time he was employed in the drainage of fens in Norfolk and Lincolnshire, the Shadwell entrance to the London Docks, the St. Katherine's Docks, the drainage and water supply of the city of Amsterdam, the mints at Amsterdam and Rio de Janeiro, &c. After the completion of this service, he had charge of Mr. Ogle's steam-coach for common roads. In 1836 Mr. Bell was engaged by Messrs. Gower and Co., of London, to make surveys, valuations, and reports upon their property and establishments in New York, in erecting patent slips and hydraulic stages for lifting ships, and in inspecting the Erie and Philadelphia railroads. On his return, in 1837, he obtained, through the agency of the Messrs. Gower, the appointment of Chief Engineer to H.H. Mehemet Ali, Pacha of Egypt, for three years, when he was occupied in altering and completing the graving dock and pumping machinery in the arsenal of Alexandria; in directing the transport of steamships and their machinery across the Isthmus of Suez to the Red Sea; and in superintending various works. In 1840 he returned to England and commenced practice for himself, at the same time obtaining the Lectureship on Machinery in connection