

usefully employed in connexion with the works, that the benevolent projector of this too infrequent care for the spiritual welfare of the working class, could rejoice in the success which attended so noble an undertaking. Mr. William Bagnall will be long remembered for his uniform good temper, his generous and happy disposition, and his kindness of manner towards all with whom he was connected; and he will ever be considered as having been the friend as well as the benefactor of the poorest of his workmen. This was evinced in many ways; and so much was he beloved by the poor, and his loss lamented, that thousands manifested their affectionate respect, by attending his funeral, which took place at All Saints Church, West Bromwich. Mr. Bagnall was elected an Associate of the Institution of Civil Engineers, in the year 1841, but his residence in the country prevented his frequent attendance at the Meetings.

MR. FREDERICK LAWRENCE, the fourth son of the late Mr. Alderman William Lawrence, was born in London on the 4th of April, 1828. He was educated at the City of London School, which he entered on the day of its opening, February 2nd, 1837, and after passing through the junior school, and obtaining several prizes, he took a high position in the senior class, standing on one occasion second for a scholarship, and on another second for the senior mathematical medal and prize. He afterwards entered University College, London, where he obtained the first prize for geology, for civil engineering, and for architecture, besides certificates for chemistry and other branches of knowledge. In the year 1845 he was articled to Messrs. Walker and Burges, and was employed under them for two years in superintending extensive drainage works in the Middle Level, Cambridgeshire, and afterwards on the harbour and pier works at Dover, Plymouth, and Spurn Point, and he subsequently assisted in carrying out many other important works. Of one of these, the Blackfriars Landing Pier, he communicated an account to the Institution of Civil Engineers,¹ and for it he received a Council Premium of Books.²

Whilst at the Middle Level, his attention was directed to the defects in the working of the sluices, and having been allowed to fix, by way of experiment, a small sluice constructed on a novel principle, it was found to act so efficiently, that he patented the invention. The large sluices at the Commercial Docks were then constructed on this principle,³ and for the system as there demonstrated he

¹ *Vide* Minutes of Proceedings Inst. C.E., vol. ix., p. 144.

² *Ibid.*, vol. x., p. 66.

³ *Ibid.*, vol. xvii., p. 401.

obtained Honourable Mention at the Great Exhibition of 1862. The invention consists in using the head of water as the motive power for raising and lowering the sluices. He also invented and patented, in conjunction with his brother and Mr. W. Davison, a modification of the rotary engine, which consists in making the cylinder a true epicycloidal curve.

In 1852 he entered into partnership with his brother, Mr. Alfred Lawrence, and they jointly established the City Ironworks, London, where he was enabled to turn to practical account his mathematical and engineering knowledge. In 1857 he was elected an Associate of the Institution of Civil Engineers, by many of the Members of which he was well known and esteemed. Some years previously he had joined the Society of Arts, in the proceedings of which he took so great an interest, that in 1863 he was elected a Member of the Council of that Society.

Mr. Lawrence died, after a few days' illness, at the Mansion House, London,—where he was residing during the mayoralty of his brother, Mr. Alderman William Lawrence,—on the 31st of May, 1864, aged thirty-six, deeply lamented by his numerous friends, who valued him for his great talents, for his persevering energy, but above all for his high integrity and upright character. His modesty and kindness of manner endeared him to all who knew him, and his memory will long be cherished, not only by his sorrowing relatives, but by all those who were associated with him in many benevolent works, and who admired the example he showed of pure moral life sustained by high religious principle.

MR. THOMAS TELFORD MITCHELL, the youngest son of the late Mr. John Mitchell, Engineer and General Inspector to the Parliamentary Commissioners for Highland Roads and Bridges, was born at Inverness in the year 1815. He served a regular pupilage under his brother, Mr. Joseph Mitchell (M. Inst. C.E.), who had succeeded to the appointment on their father's decease, and he was employed for some years in the office and on works both for his brother and for Mr. Leslie (M. Inst. C.E.). He was then for two years Resident Engineer on the Newtyle and Coupar Railway, and subsequently for eight years was engaged in the same capacity on the Slamannan Railway, under Sir John Macneill (M. Inst. C.E.). He was next for several years on the staff of Messrs. Stephenson, Brassey, and Mackenzie, contractors, and had charge, for them, of the construction of the Scottish Central Railway tunnel at Perth, and of the works on the Scottish Midland from Perth to Forfar.

On the death of his brother, Mr. Alexander Mitchell,¹ in 1848,

¹ *Vide* Minutes of Proceedings Inst. C.E., vol. ix., p. 103.