

and became principal assistant to Mr. Sandford Fleming, M. Inst. C.E., the Engineer-in-chief of the Intercolonial railway. His duties in this office were mainly to superintend the preparation, under Mr. Fleming, of the designs and working plans of the numerous and varied structures in timber, stone, and iron required for that important line of railway. He acquitted himself in that post with great professional skill and judgment, and earned the well-merited esteem and respect both of the Engineer-in-chief and of the Dominion Railway Commissioners. He continued to hold this responsible situation until his death; but he was obliged to relinquish active work in May 1873, having been seized by an attack of pleurisy of a severe character, from the effects of which he never fully recovered. He spent the summer at Kamouraska, on the lower St. Lawrence, in the hope of recovering his health; but whilst making a tour of inspection of some of the works of the Intercolonial railway, he was suddenly prostrated by illness and carried back to Kamouraska. There he rallied a little, but only for a brief space, for he breathed his last at that place on the 9th of September, 1873, and was buried at Ottawa.

Mr. Forrest was a clever engineer, but he was not fortunate enough to enjoy many opportunities of displaying his skill as an Engineer-in-Chief. He was a man of a high sense of honour, and was ever most jealous of the interests and fair fame of his profession, to which he was ardently attached. He was elected a Member of the Institution of Civil Engineers on the 2nd of March, 1869, and was also a Member of the Institution of Mechanical Engineers.

MR. JOHN ROBINSON McCLEAN, M.P., F.R.S., &c., was born at Belfast, in the year 1813. After receiving a good general education, he studied at the University of Glasgow, with the intention of qualifying himself for the profession of Civil Engineering. About the year 1838 he entered the office of Messrs. Walker and Burges, by whom his talents were soon duly appreciated. He was actively employed on some of the large works under their direction, particularly upon the improvement of the Birmingham Canal, where he exhibited great engineering talent and skill, as well as fertility of resource. But he more especially displayed qualities which gained many friends, who at a future period gave that effectual support which carried him forward in his successful career. He subsequently acted for the firm as Resident Engineer on several important works, where, by attention and skill, he so distinguished himself, that Mr. Walker, desiring to retain his services, made him seemingly most advantageous offers; but,

acting on the judicious advice of an attached friend, he determined to start on his own account in London, and at the end of a year found success was assured.

Mr. McClean's professional engagements became eventually varied and extensive, as will be apparent from a glance at the names of some of the enterprises with which he became connected. Among the earliest of his important works were the South Staffordshire railway and branches, followed by the Birmingham, Dudley, and Wolverhampton line, traversing Birmingham by a double tunnel. Then came the system of the Furness railways, of which he was the Engineer-in-chief. This led to the numerous great enterprises of the Barrow-in-Furness district, including the harbour, docks, and railways, with all which Mr. McClean maintained his connection as long as he continued to practise professionally. He was also interested in the iron and steel manufactures of the district.

In 1849 plans were invited by the Metropolitan Commissioners of Sewers for the complete drainage of both sides of the Thames. In answer to this, one hundred and sixteen designs were sent in, and among them one from Mr. McClean, which was designated by the Commissioners as "the best conceived and most practicable scheme submitted, characterised by a well-devised system of intercepting sewers, in determining the situation and course of which a careful and elaborate study of the levels has been made." On two consecutive years Mr. McClean introduced into Parliament a well-considered scheme for supplying the metropolis with water, principally by gravitation, from Henley-on-Thames; and although the water companies were successful in their opposition to it, they were shortly afterwards obliged by Parliament to remove their pumping stations from London to above Teddington Lock, to improve the quality of the water supplied.

In the same year Mr. McClean took into partnership Mr. F. C. Stileman, M. Inst. C.E., who had been engaged with him as assistant in the construction of the South Staffordshire railway, the Birmingham, Dudley, and Wolverhampton railway, the Staffordshire and Worcestershire Canal Reservoirs, and the South Staffordshire Waterworks, by which latter a very extensive district is supplied with water from Lichfield.

In 1851 Mr. McClean received instructions from the late Emperor Napoleon III. to report upon the practicability of introducing in Paris the English system of public baths and washhouses. His advice was sufficiently favourable to induce the construction, at the private expense of the Emperor, of some extensive buildings

and machines, in which he was assisted by the late Mr. John Manby, M. Inst. C.E., long resident in Paris.

About the years 1854 and 1855 M. Ferdinand de Lesseps repeatedly visited England, for the purpose of resuscitating the scheme of cutting through the Isthmus of Suez, and, by means of a canal, to give a direct communication for large vessels between the Mediterranean and the Red Sea, so as to facilitate the voyage to India and China. The project had been examined in 1840 by Linant Bey and Mougel Bey, French Engineers in the Egyptian service, and then by M. Paulin Talabot, M. de Negrelli, and Mr. Robert Stephenson—the latter personally traversing the Isthmus—and, by the careful levelling and survey made under their direction by MM. Bourdaloue, Enfantin, and assistants, the identity of level of the two seas was established. This fact caused the abandonment at the time of the project, and induced the conviction that although the canal could be executed without difficulty, there were circumstances connected with it which would render the undertaking commercially unprofitable. M. de Lesseps, however, with his usual indomitable energy, suggested the nomination of an International Commission, composed of some of the leading Engineers of England, France, Austria, Italy, Spain, and Holland,¹ to visit Egypt, for the purpose of examining the localities, and of advising H.H. Said Pacha, then Viceroy of Egypt, on the project. M. de Lesseps sought aid in this country, when Mr. Rendel and Mr. McClean were nominated commissioners, and Mr. Charles Manby, the then Secretary of the Institution of Civil Engineers, was appointed one of the secretaries; but, from circumstances, Mr. McClean alone could proceed to Egypt at that

¹ "La Commission Internationale pour le percement de l'Isthme de Suez est composée de: M. F. W. Conrad, Ingénieur en chef du Water-Staat, à la Haye; M. Harris, Capitaine de la Marine Britannique des Indes, à Londres; Jaurès, Capitaine de Vaisseau de la Marine Impériale de France, et Membre du Conseil de l'Amirauté; M. Lentze, Ingénieur en chef des travaux de la Vistule, à Berlin; M. Lieussou, Ingénieur Hydrographe de la Marine Impériale de France, à Paris; M. J. R. McClean, Ingénieur Civil, à Londres; M. Charles Manby, Ingénieur Civil, à Londres; M. Montesino, Directeur des Travaux publics, à Madrid; M. De Negrelli, Inspecteur-général des Chemins de Fer de l'Empire d'Autriche, à Vienne; M. Paléocapa, Ministre des Travaux publics du Royaume de Sardaigne, à Turin; M. Renaud, Inspecteur-général et Membre du Conseil-Général des Ponts et Chaussées de France, à Paris; M. J. M. Rendel, Ingénieur Civil, à Londres; M. Rigault de Genouilly, Contre-Amiral de la Marine Impériale de France, à Paris. M. Conrad, Président; M. Barthélemy St. Hilaire, M. Lieussou, et M. Charles Manby, Secrétaires."—*Vide* "Percement de l'Isthme de Suez, documents publiés par M. Ferdinand de Lesseps." Troisième série. Paris, 1856.

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time. On the return to Europe of the Commissioners, it was resolved that the results of the local investigation should be reported upon by a scientific commission at Paris. This was attended by Mr. McClean and Mr. Manby, when, as the reports show, they both dissented from most of the conclusions of the majority. Recent events have proved that the opinions formed by Mr. McClean, on his first visit to Egypt, as to the commercial prospects of the undertaking, were substantially correct.

In the course of his professional career Mr. McClean, among other works, became connected with the Birmingham Canal Navigation, the Bute Docks, the Cardiff Docks, the Alexandra Docks (Newport), the Surrey Commercial Docks, the Tottenham and Hampstead Junction railway, the Bristol and Portishead Pier and Railway, the Eastbourne Water and Sewerage Works, and many others. He was also extensively consulted upon foreign works, and was Consulting Engineer of the system of railways in Galicia and Moldavia, for which the late Mr. Brassey was the contractor.

In 1861 he was appointed one of the Royal Commissioners for examining and reporting upon the numerous plans submitted for the Thames Embankment—a project to which he was always very favourable. In 1862 and 1863 he again acted on Royal Commissions for the extension of the Thames Embankment; and in 1865 upon the Royal Commission appointed for the investigation of the Cattle Plague, upon which he expressed some sound original views. In the latter year he was also appointed one of the Royal Commission on Railways.

On the decease of Mr. James Walker, in 1862, several Government appointments which became vacant were offered to and were accepted by Mr. McClean, who thus became the Engineer to the harbours of Dover, Alderney, and St. Catherine's, Jersey; with the Breakwater and the Shovel Rock Fort at Plymouth—most of which positions he held until the year 1868, when he retired from the active duties of the profession, on entering Parliament as Member for the Eastern Division of Staffordshire. He had previously, in 1857, in conjunction with Mr. G. F. Ferguson, unsuccessfully contested Belfast against the present Lord Cairns and Mr. Richard Davison. Henceforth he took more leisure. He travelled much, visiting Egypt several times. At last he unfortunately determined to make a longer journey, to India, China, Australia, &c.; but whilst in India he received a sunstroke, which necessitated his return to England, and from the effects of which his health never completely recovered.

It should not be omitted to be mentioned that Mr. McClean took an active interest in ocean telegraphy, and was for some time Chairman of the Anglo-American Telegraph Company. He was a Fellow of the Royal, the Geological, the Astronomical, and other scientific societies.

Mr. McClean was elected a Graduate of the Institution of Civil Engineers on the 12th of February, 1839; in June 1844 he became a Member by transfer; in 1848 he was elected a Member of Council, in 1858 one of the Vice-Presidents, and in the years 1864 and 1865 he occupied the Presidential Chair. In his able inaugural address, which attracted considerable attention, he demonstrated very forcibly the direct bearing of Engineering work upon the general prosperity of the country. He was warmly attached to the Institution, and never omitted any opportunity of being useful to it, or of impressing upon the world the benefits which it was calculated to confer upon society. He also took great interest in the creation of the Benevolent Fund of the Institution of Civil Engineers, and employed his influence as President to secure the adoption of that admirable project.

For more than thirty years Mr. McClean occupied a prominent position in the profession of which he was an ornament, not only from his talents, but from his uniformly upright, conscientious conduct. His decease occurred at Stonehouse, Isle of Thanet, on the 13th of July, 1873. Esteemed as a public man and beloved as a friend, his loss was deplored by a wide circle, whilst there are many who will miss the kindly, generous acts so unostentatiously and so delicately performed by him.

Mr. CHARLES NIXON was born in London, on the 2nd of June, 1814, and was educated at a private school at Brighton. His father, Mr. William Nixon, an architect and surveyor, was engaged in superintending the erection of the Royal Pavilion at Brighton, and of Buckingham Palace, up to the time of his death. Mr. Charles Nixon commenced his professional studies in the year 1832, under Mr. John Nash, the architect, upon whose death, in 1835, he was engaged as an assistant to Mr. William Ranger, a contractor for several extensive engineering works. Among other duties he was intrusted with the superintendence of the new graving docks then building in Her Majesty's Dockyards at Chatham and at Woolwich, and afterwards of a length of 7 miles of the Great Western railway, which comprised a stone bridge over the floating harbour at Bristol, a bridge over the River Avon, five tunnels, and a stone viaduct of forty arches. The contract for the latter works