

MR. WILLIAM TIERNEY CLARK was born at Bristol, on the 23rd of August 1783. By the premature decease of his father, young Clark was deprived of the advantages of a full course of education, and he owed his eventual position in life entirely to unremitting attention to his duties, and to his determination to avail himself of every opportunity for self-improvement. He was apprenticed, at an early age, to a millwright at Bristol, and having, whilst serving his time, availed himself of all occasions, rare as they were at that period, of acquiring scientific and practical knowledge, he, on being engaged at the Coalbrook Dale Iron Works, soon became a good practical mechanic. Not, however, content with the mere practical part of his profession, all his leisure hours were devoted to studying the higher branches of science, and thus his services were soon rendered so valuable to his employers, that he was, at an early period of his career, intrusted with the superintendence of important works.

The Coalbrook Dale Foundry was celebrated for having produced the first iron bridges erected in England, from the designs of Telford and Jessop; and in that establishment, where he remained until the year 1808, he gained great experience, in the application of cast and wrought iron.

At that time Mr. Rennie, who, in the substitution of cast-iron for other materials, in the great works executed by him, visited every important foundry, and knew every rising man, offered him a situation at his works in Holland-street, Blackfriars, which, with the assent of his employers, he gladly accepted, and thus was at once removed, from comparative obscurity in the country, to a sphere of extended action under an eminent engineer, whose confidence he enjoyed to such an extent, that he encouraged the commencement of that intimate connexion and private friendship between his sons and Mr. Clark, which only terminated with the decease of the latter.

Under Mr. Rennie he was engaged on several large works, and in 1811 he was recommended by his employer, for the post of Engineer to the West Middlesex Waterworks, at that period, though five years after its creation, still a very insignificant establishment, with one pumping-engine of 20 H.P., a small reservoir, barely sufficient to contain one day's supply for the neighbouring straggling hamlet of Hammersmith, and with

a capital of only £20,000, upon which no dividend had ever been received. By unremitting attention, judicious extension of the works, and increasing the capital, as the westward emigration from the City converted fields and gardens into streets and squares, he lived to see the works increased, under his direction, to an aggregate engine power of 245 horses, reservoirs capable of containing about 40,000,000 gallons, and of furnishing nearly one-tenth of the requisite supply of the metropolis, with a capital of £700,000, and an annual rental of nearly £70,000.

During the progress of these labours he executed some interesting works; such as the large engines, and the main of pipes across the Thames, at Hammersmith, with the reservoirs, and filter-beds, &c., at Barnes, and was, with the consent of his employers, extensively engaged as a consulting Civil Engineer.

The first public work upon which he was actively engaged, was the Thames and Medway Canal, which presented considerable difficulties of execution, particularly in the tunnel between Gravesend and Rochester; they were, however, successfully overcome, and the canal proved of essential service in shortening the navigation, until, in the course of events, in 1844, a line of rails was laid on a timber viaduct, partially covering the canal through the tunnel, and eventually, the channel was filled up, and appropriated for the rails, on which the rapid locomotive superseded the sluggish canal-boat.

His next work, in order of execution, was the Hammersmith Suspension Bridge, commenced in 1824 and finished in 1827. This bridge is somewhat remarkable for the small deflection of the chains, the span between the points of suspension being 422 feet 3 inches, and the versed sine only 29 feet 6 inches. It exhibits some originality in the careful forging and boring of the links, the turning of the pins, the trussing of the platform, and the good proportions of the piers.

He then completed the Suspension Bridge at Marlow, which had been commenced in 1829 by Mr. Millington, his predecessor as Engineer to the West Middlesex Works.

The Suspension Bridge over the Arun, erected for the Duke of Norfolk, near Shoreham, then occupied his attention, and is a favourable specimen of his architectural taste and knowledge of proportion.

He also designed and erected a handsome cast-iron bridge at Bath, and a smaller one, of the same material, near Windsor.

In the Gravesend Town Pier, erected under his directions in the short space of thirteen months, from the passing of the Act in 1834, he carried into effect more fully the principles he had imbibed under Mr. Rennie, of substituting iron for other materials, wherever it was practicable. The circumstances of the violent opposition to the erection of this landing pier, which was the first of the kind on the Thames, where they are now so numerous, and yet still so ill-adapted for the accommodation of the multitudes who pass over them, are detailed in the Transactions of this Institution, with full details of the structure.<sup>1</sup>

The most important work undertaken by Mr. Clark, was the Suspension Bridge over the Danube, to unite Pesth and Buda, in Hungary. This magnificent structure has been recently well described in a work<sup>2</sup> published under Mr. Clark's directions. It contains the origin and progress of the undertaking, with translations of the Reports of Count George Andrásy and Count Stephen Széchenyi, and other documents, with details of the whole work, which was commenced in 1839 and was finished in 1849, at a cost of £622,042.

Mr. Clark says of it, "Thus was finished Pesth Suspension Bridge, a work which, in its construction, encountered probably more difficulties than any structure of a similar kind in existence; the magnitude of the river over which it is thrown, its depth, the nature of its bed, and the velocity of the current, created misgivings, at one time almost universal in Hungary, that no permanent communication could ever be established across the Danube, between Buda and Pesth.

"The moral difficulties to be overcome, no less than the physical obstacles, were very great; pride, prejudice, and jealousy had each to be encountered, so universally against the object at one period, that nothing less than the extraordinary energy and perseverance shown by Count Széchenyi could have withstood their evil effects, and few would have made the attempt."

<sup>1</sup> Vide Trans. Inst. C.E., vol. iii. page 245; 4to. London, 1842.

<sup>2</sup> Vide "An Account, with illustrations, of the Suspension Bridge across the River Danube," &c., by W. Tierney Clark, F.R.S. 8vo. Plates. Weale. London, 1852-3.

On the completion of the Pesth Bridge, the Emperor of Austria presented to Mr. Clark, through the Archduke Charles, a snuff-box, set with brilliants, as a token of his approbation of the work, and of the mode of its construction. Its stability has been signally demonstrated, not only by its withstanding the shocks of the masses of ice brought against the piers, by the torrent of the Danube, but whilst yet in a comparatively incomplete state, by its being subjected to bombardment; its bearing the alternate and repeated charges of an attacking army, and the tumultuous crowding of a retreating force, as well as its even resisting the attempts of the military Engineers to destroy it by gunpowder.

The physical difficulties recorded in the volume, which has been mentioned; and which were perhaps greater than in any similar work, were encountered and overcome by Mr. Clark and his assistants, with an amount of skill, energy, and perseverance, which reflects honour, not only upon them individually, but upon the whole of the profession, and is another instance of the noble manner in which English Engineers can and do perform their duty.

The Emperor of Russia also, in 1845, presented to Mr. Clark a gold medal of the first class, for a design for a suspension bridge across the Neva, at St. Petersburg.

He was frequently consulted on other engineering works, and for some time, previously to his decease, had been engaged on the works for supplying Amsterdam with water; but his favourite branch of the profession was bridge-building, and in that he attained a high reputation, and it is to be regretted that his failing health, for a long period, prevented his undertaking many large works, which would have been worthily executed by him.

Mr. Clark was a Fellow of the Royal and of several other Societies; he was a very old Member of this Institution, having been elected in 1823. He served on the Council, and contributed an original communication;<sup>1</sup> and whenever he attended the meetings, which, however, was much less frequently than could have been desired, he took an active part in the discussions.

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<sup>1</sup> Vide Transactions, Inst. C.E., vol. iii. p. 245. London, 1842.

He was a man of refined taste and elegant pursuits, of much originality of design, and careful consideration of the details of his plans, which the practical character of his early life enabled him to lay down with great minuteness. His professional career was not one of excitement, and he was particularly fortunate in his undertakings. He was universally respected by his brother Engineers, and his decease, which occurred on the 22nd of September 1852, in his sixty-ninth year, after a lingering illness, caused deep regret to a large circle of attached friends.

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Mr. FRANK FORSTER was born in the year 1800, in the neighbourhood of Newcastle-upon-Tyne, and was placed at an early age with Mr. Fenwick, to learn the business of a colliery viewer, or mining agent. After some years, so spent, in that district, he was intrusted with the management of some extensive mining works, near Swansea, and subsequently was engaged in a similar capacity in Lancashire. While in this employment, about the year 1830, he made the acquaintance of Mr. Robert Stephenson (M.P., V.P.), then embarking in the arduous undertaking of the London and Birmingham Railway, who at once perceived in him the precise qualities for a valuable assistant. Thenceforth they became intimate friends, and Mr. Forster was at the right hand of his chief, both in the severe parliamentary struggle, to obtain the Act of Parliament and in the more congenial professional duty of carrying that Act into execution. The section of the work confided to Mr. Forster's immediate superintendence, included the Kilsby Tunnel, and the Blisworth Cutting, and in these difficult and novel services, his energy and skill were conspicuous. He continued, from that time, to be the trusted associate of Mr. Robert Stephenson in his chief enterprises, up to the completion of the Chester and Holyhead Railway, on which he was the Resident Engineer of the portion from near Conway to Holyhead, embracing all the masonry and the general arrangements of the Britannia Bridge, besides the troublesome tunnels, sea-walls and other works, through the Welsh hills and ravines and along the coast.

During this period of his career, an Engineer of sound expe-