having read papers on the subject at the meetings of the British Association both at Norwich and at Exeter. He also submitted to the Institution a Paper "On the Benefits of Irrigation in India, and on the Proper Construction of Irrigating Canals,"[1] for which he received a Telford Premium. If his life had been spared, he would have been permitted to carry out experiments on a large scale, with a view to obtain more certain data upon this important question.

The Suez Canal having been opened about the time of his return to India, he was ordered to visit it on his way out, and report upon it on his arrival. In passing through Egypt, he was much impressed with the mode of cotton cultivation practised there, which he considered had many advantages over that customary in India, and on his arrival at Umballa, he carried out some experiments on the ridge and furrow system, which apparently produced a much larger yield than the native broad-cast system.

Having been appointed Officiating Superintending Engineer at Umballa, he acted in that capacity for two years, and his appointment to that grade was confirmed in October 1873. His labours as Superintending Engineer of a large district were varied and onerous, and his health was failing; but he proceeded early in the following year to survey and report on the roads north of Simla. He had completed this survey, and was returning to his station, when an attack, in the valley of the Sutlej, of fever and paralysis ended in death, on the 5th of June, and his remains were interred at Simla on the following day. In Mr. Login the Public Works Department lost a talented officer of great experience, and upright and consistent in his conduct.

Mr. Login was a Fellow of the Royal Society of Edinburgh. He was elected a Member of the Institution of Civil Engineers on the 19th of May, 1868, and by the presentation to the library of copies of various reports showed the interest he took in its prosperity.

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MR. WILLIAM RICHARD MORRIS, only son of Mr. Joshua Morris of Greenwich, was born on the 24th of October, 1808. He was articled to Mr. Charles Alexander Weir, Civil Engineer and Surveyor, and Manager of the Kent Waterworks, under whom he was engaged in making roads in the Grand Duchy of Mecklenburg Schwerin, in the erection of the Hammersmith Suspension Bridge,

[1] *Vide* Minutes of Proceedings Inst. C.E., vol. xxvii., p. 471.

and other works. He was afterwards employed by Sir W. Heygate to superintend the completion of the pier at Southend, one of the longest in the kingdom. Subsequently, he assisted the late Mr. T. G. Barlow in designing and erecting gasworks at Vauxhall, Lewes, Stratford-on-Avon, and other places.

In 1834, he made and published a complete survey of the parish of Greenwich; he was also engaged professionally by the Grand Surrey Canal Dock Company and Lord Lonsdale. In 1835, he was appointed superintendent of the Kent Waterworks under the late Mr. Thomas Wicksteed, M. Inst. C.E., Consulting Engineer; on whose resignation, in 1846, he was appointed Engineer to the Company. Under his advice and energetic management the works of the Company were at once greatly extended. In 1856, he reported that the river Ravensbourne, which had been the source of the Company's supply since 1688, could no longer be relied on to meet the increasing demands of the district; and he advised that wells should be sunk in the chalk which underlies the Company's works at Deptford. The supply of water from this source proved so abundant, and its quality so superior, that in the year 1863 the use of the water from the Ravensbourne was entirely abandoned. In 1864, the North Kent Waterworks Company was amalgamated with the Kent Waterworks Company, and to supply this additional district Mr. Morris sunk wells into the chalk at Crayford and at Shortlands, and from each point the Company are now pumping a large quantity of water. The total supply in twelve hours varies from 6,000,000 to 8,000,000 gallons, and is believed to be the largest quantity pumped from the chalk by any waterworks in England. Mr. Morris was no experimenting engineer, but he introduced many improvements in the general design and details of the sixteen pumping engines employed in the Company's works. He was the first to use the double-acting pump in combination with the single-acting Cornish engine for waterworks purposes, thereby avoiding the necessity of a standpipe. By the employment of surface condensers in combination with the engines, he was able, by passing the whole of the water pumped through the tubes of the condenser, to avoid the waste of the hot condensing water inseparable from the use of the injection condenser. On the passing of the Metropolis Water Act of 1871, he at once recommended the Company to proceed with the introduction of the constant supply to the smaller class of houses in their district.

In 1868, he experienced a slight stroke of paralysis, and though he rallied sufficiently to attend to his business engagements, towards the latter end of 1873 he became worse, and was advised to

leave the neighbourhood. This, however, he could not be prevailed upon to do, and on the 11th of January, 1874, he succumbed to a stroke of apoplexy.

The flourishing state of the Kent Waterworks, as compared with its position when he assumed the management, is the best proof of his ability. He was elected a Member of the Institution of Civil Engineers on the 1st of May, 1856, and was a Fellow of some other Societies.

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Sir JOHN RENNIE, the second son of the late Mr. John Rennie, was born at 27 Stamford Street, Blackfriars Road, on the 30th of August, 1794. After receiving the rudiments of education at home he was sent first to Dr. Greenlaw's school at Isleworth, and subsequently to the celebrated Dr. Charles Burney, at Greenwich. On leaving the latter, in 1809, his father determined to train him for the engineering profession under his own eye. Sir John, accordingly, entered his father's manufactory at Holland Street, Blackfriars, and was there initiated into the minutest details of the profession, even to sawing planks, planing, and turning. From thence he passed to the drawing office, and was afterwards taught practical surveying by the late Mr. Francis Giles.

In 1813, having obtained a tolerable knowledge of his profession, Sir John was placed under Mr. Hollingsworth, the resident engineer of Waterloo Bridge, the foundations of which he personally superintended through the severe winter of 1813–14. In 1815 the elder Rennie was appointed Engineer to the new Southwark Bridge Company; and, although nominating Mr. Meston resident engineer, he in reality confided the details to his son. On this occasion, Sir John, although a mere boy, was the first to introduce large blocks of Scotch granite from Portishead. With the exception of a short time employed with Mr. Giles in surveying the coasts of Scotland and Ireland, for the purpose of establishing a line of mail packets for the Government, between Portpatrick and Donaghadee, the superintendence of Waterloo, and particularly Southwark bridges, occupied Sir John until the opening of the latter, in 1819; after which Mr. Rennie, always anxious to promote his son's professional education in the widest and most liberal manner, sent him abroad, to afford him the opportunity of studying the works of ancient and modern engineers. How well young Rennie profited by the opportunities thus afforded him is attested by the note-books he has left, replete with drawings and descrip-