

character have been successfully carried out, under his supervision, for railways in Great Britain, France, Spain, Italy, Portugal, America, India, Australia, and other parts of the world. Mr. Harrison was, for a time, Manager of the Millwall Ironworks, London, and of the Humber Ironworks, at Hull. About the year 1855 he became a Commissioner for Birkenhead, and was the first to propose the introduction of the large saloon steamer at Woodside ferry, on the river Mersey; he never ceased agitating the question at the meetings of the Board until the present splendid class of steamers was placed on the station. The new portion of the great landing-stage at Liverpool was constructed at the Canada Works. When on the eve of completion this stage was destroyed by fire; the anxiety consequent upon this unfortunate accident preyed much upon his mind, he having a great desire to see the reconstruction carried out; however, his health failed before the work was accomplished.

Mr. George Harrison was elected a Member of the Institution of Civil Engineers on the 18th of May, 1852; and he was also a Member of the Institution of Mechanical Engineers. He died in London on the 2nd of June, 1875.

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MR. CHARLES INNES SPENCER was the son of Mr. Henry Spencer, of London, and Ann Phyllis, daughter of Sir William Beechey, R.A. Though born in England, his infancy and childhood were passed in France—the latter in Paris—his education being carried on at home, supplemented by lectures on science at the Sorbonne. As a boy, he displayed great power for acquiring languages, five of which he had mastered at the age of eighteen; but it was not until he was twenty years old that, on his removal to Fleetwood, he developed, under the care of his brother, the Mathematical Master of Rossall School, great mathematical powers. On entering as an engineer student at King's College, London, he carried off, in his first year, the second year's scholarship; following his success by winning the third year's scholarship in his second year. He then claimed his Associateship, which was granted by the Council, with a resolution that such an exception should never be made again. On the 1st of January, 1850, he sailed from Southampton, without any prospective employment, to seek his fortunes in India, and was for many months hospitably entertained by the late Mr. Meyrick Shawe, C. S. magistrate at Sylhet. He at length found active work at Serampore under the contractors for part of the East Indian railway, in which position he obtained

much knowledge of the value of different materials, having his hand at everything, from the building of houses on high poles to be above the inundations, to the burning of clay for ballast. This experience was of great use to him when subsequently appointed to an Inspectorship of railway works, a position he selected out of five offered to him within the week after leaving his former employment. His object, however, was not to inspect only, but to work; and as a consequence he soon found engineering occupation higher up the line, and established himself at Chunar Fort, nearly opposite Benares, trying the ground for stone, of which he discovered an excellent quarry, and spending months in the jungle in search of prickly plants, and bringing back from two to three millions of them for the railway hedge-rows. At Chunar, in 1857, he was one of the handful of Englishmen who persuaded the disaffected garrison of the fort that it was advisable to disperse quietly.

At a later date he was appointed Second Engineer of the Allahabad and Jubbulpore line, under Mr. H. P. Le Mesurier, C.S.I.; and here his engineering ability, resources in emergencies, and readiness of invention were abundantly testified. It was on this line that, finding his native workmen unable, or unwilling simultaneously to knock away the supports of the arches, he adopted the plan of resting the ends of the timbers on strong bags of canvas, filled with sand, to be emptied by turning a tap, regularity in this light action being secured by giving time with a flute. The result of his skill and care has been, that on a line crossing many streams and nullahs, no bridge or viaduct has ever failed.

On the completion of the line he was appointed District Engineer, and took up his abode at Jubbulpore. He arranged that when the Governor-General travelled over the line, double parties of men should be stationed at short intervals over the whole way, who, starting north and south, moved on till they each encountered another party coming in the opposite direction. While the railway was under construction he had lived at Ucharah, about halfway between the extremities of the line; and if, from the loneliness of the situation, he was unable to exercise that ever-ready kindness and hospitality he showed to Englishmen, it was still in the same spirit that hundreds of natives were daily fed, in the last famine, from his resources, aided by contributions. In the midst of the duties of his position as District Engineer at Jubbulpore, added to the voluntary duties attached to offices which his good nature forbade refusal, such as Municipal Councillor, Colonel of the Railway Volunteers, President of the Railway Institute, &c., he still found time to attend to improvement of details in railway working, his last inven-

tion being a new system of signalling. His death, which occurred on the 28th of November, 1875, was very sudden and unexpected. It is supposed that the severe shaking he received two or three months before in a railway accident at Kutnee, caused by the parting of a bolt of the cow-catcher, was the primary cause of it. The estimation he was held in, where he was best known, may be judged by the notices in the local journals. One writes: "A competent and learned engineer, a kind and just master, a great mover in public matters, a social and urbane member of society, and, above all, a true Christian—Mr. Spencer was liked by natives and Europeans alike, and his death is being lamented by all." Another writes: "The deceased gentleman was highly respected by all, but more especially by those who had the pleasure to serve under him, as testified by the universal sympathy expressed by both European and native: it would, indeed, be difficult to recall a single instance where he used even a harsh expression to any of his subordinates during the many years he served the East Indian Railway Company; he was ever ready to listen to any just complaint, and was equally prompt in administering redress." Such extracts might be readily multiplied, but these are sufficient to show that by the death of C. I. Spencer the East Indian railway has lost a good engineer; his acquaintance, servants, and colleagues a good friend; his family, a good man.

Mr. Spencer was elected a Member of the Institution of Civil Engineers on the 1st of April, 1862.

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MR. CHARLES BLACKER VIGNOLES was one of the oldest survivors of that class of eminent civil engineers who have, during the present century, raised the profession to which they belong to the highest distinction, and have at the same time conferred on their country substantial and enduring benefit. Mr. Vignoles was descended from a family of position in France, some of whose members embraced Protestantism in the seventeenth century, and one of whom, the Sieur de Prades, took refuge in Holland, eventually settling in Dublin at the beginning of the eighteenth century. The descendant of this refugee, Charles Henry Vignoles, father of the subject of this memoir, exactly one hundred years ago, served his country as an ensign in H.M. 43rd Regiment of Light Infantry, known as the Monmouthshire. In 1793 this gentleman—then Captain Vignoles—was stationed in Ireland, where his only son, Charles Blacker, was born, at Woodbrook, in the county of Wexford, on the 31st of May in that year.