

appointed him their Consulting Engineer in England, submitting for his personal consideration all new railway projects, and entrusting him with the provision of the material and equipment of the same. So entirely suited to the exigencies of the country were his designs for locomotives that, with the permission of the Government, they have been adopted throughout Japan in the railways built by private enterprise. The Japanese Government signalized their high appreciation of his services by conferring on him the Imperial orders of "The Rising Sun" and "The Sacred Treasure." He died at his residence, 14 Earl's Court Square, London, on the 30th April, 1903, aged 76.

Mr. Shervinton was elected a Member of the Institution on the 2nd April, 1867.

WILLIAM HARRY STANGER, born on the 24th September, 1847, at Pietermaritzburg in Natal, was the son of the Hon. William Stanger, M.D., who had been with the Niger expedition of 1840 as naturalist, and in 1845 became Surveyor-General of Natal. Dr. Stanger brought his family to England in 1851 and the subject of this notice spent his boyhood in this country, receiving his education at the Grammar School at Norwich and at King's College, London. Mr. Stanger obtained his early training as an Engineer at the works of the Hunslet Engine Company, Leeds, and afterwards at those of the North Eastern Railway. In 1870 he obtained the post of instructor of traction-engine driving at Woolwich and Aldershot, and, although quite a young man, showed considerable skill in demonstrating the capabilities of the road tractors of that day. Mr. Stanger was next employed in Brazil as Engineer to the Ceará Steam-Traction and Transport Company, which became merged in the Ceará Railway Company, and under that Company he held the post of Locomotive Superintendent during part of 1872. Unfortunately he contracted yellow fever, which undoubtedly left its mark upon him, and may even have contributed to his early death.

On his return to England his father's connection with colonial administration stood him in good stead, and on the recommendation of Sir William Sergeant he was appointed in 1873 Engineering Clerk to the Crown Agents for the Colonies and Inspector of Permanent Way Materials for the Trinidad Government Railway. The post carried with it no great emolument, but it was a stepping-stone to more responsible and remunerative appointments. After

a short time it was found convenient to separate the two classes of work, and, leaving the Colonial Office, Mr. Stanger established himself in Westminster, acting as Inspecting Engineer for much of the material bought by the Crown Agents on behalf of the Crown Colonies. Eventually he was entrusted with the inspection of such engineering materials as are commonly known as "stores." In order to appraise their quality it was necessary that they should be chemically examined, and Mr. Stanger sought the assistance of a chemist. For this purpose in 1886 he employed as his assistant Mr. Bertram Blount, and undertook the systematic examination of such stores as could be valued analytically. About this time Mr. Stanger, who was fully alive to the importance of chemical as well as mechanical testing, decided to establish a testing works and laboratory, and in 1887 obtained, enlarged and fitted premises in Broadway, Westminster, in which both branches of work could be carried on.

The early years of this enterprise were not without difficulty; testing came slowly, the work of inspection increased only by degrees and the chemical laboratory was not overcrowded. But in this probationary period good, solid, honest work was being done, and practice began to come from outside sources as well as from those that were official. In particular was this true of the chemical and analytical work, begun simply as an adjunct, but so increasing as to demand in 1891 the creation of the firm of Stanger and Blount, by whom it has since been carried on.

Meanwhile, Mr. Stanger's own engineering work continued to increase and his notable talents became more fully recognised. He applied himself to the testing and inspection of cement, and established so high a reputation for thoroughness and skill that in 1895 he was entrusted with the examination of the vast quantities of cement about to be used in the large national harbours provided for by the Admiralty Works Loan. It is satisfactory to know that no serious question has arisen, or is likely to arise, concerning the quality of the cement supplied to these important undertakings during Mr. Stanger's tenure of office; with his excellent system of inspection and careful mechanical tests and with the chemical control exercised by his coadjutor the quality of the material was beyond question, and it is not too much to say that the country, which often knows little of its benefactors, owes gratitude to W. Harry Stanger.

In course of time not only the Crown Agents for the Colonies, who were his first employers, but also numerous self-governing colonies, through their Agents-General and various departments of

the Admiralty, engaged Mr. Stanger to inspect and test structural materials, machinery and stores of all kinds. In the execution of this he was necessarily brought into close relations with contractors and manufacturers, and it was his duty to ensure that the material supplied was of high quality. In such a position difference of opinion is certain to arise from time to time, and nothing but a happy combination of firmness in essentials and reasonable concession in trivial things can prevent continual conflict. The possession of these qualities rendered Mr. Stanger peculiarly fitted for his post as government inspector, and while serving his official chiefs faithfully and well he remained personally and professionally acceptable to all but the most captious contractors.

In the early nineties the cement trade of this country felt it desirable to investigate the growing practice of adding foreign ingredients to Portland cement. The question was taken up by the Cement Trade Section of the London Chamber of Commerce in 1894, and the matter was fully investigated by Mr. Stanger and his partner, who reported against the practice in terms so definite that the members of the Cement Trade Section bound themselves to abstain from it, and to expel any member who contravened the resolution that cement sold by members of the section should be pure. A considerable triumph for honest trading was thus secured and the legitimate apprehensions of engineers were allayed. The matter attracted much attention at the time, and the results were embodied in a Paper by Messrs. Stanger and Blount read before the Society of Chemical Industry in 1897. The same Authors contributed various other Papers on subjects connected with cement to the Journal of the Society from time to time, and in November, 1900, they presented to this Institution a Paper on the "Rotatory Process of Cement Manufacture,"¹ which may be described as a complete exposition of this novel method of manufacture, and was awarded a Telford premium.

In character Mr. Stanger presented many admirable qualities. His unswerving probity, loyalty alike to those in whose service he acted and to his co-workers, generosity to his subordinates and staunchness to friends, by themselves constitute a fine record. He was a born director and organiser, was equipped with a sound knowledge of engineering ripened by long experience of the mechanical side of the profession, and was in all things practical. In general affairs he was capable of taking wide views and in judgment was rarely at fault. There was a side of tenderness

¹ Minutes of Proceedings Inst. C.E., vol. cxlv. p. 44.

and charity in his character which led him quietly and almost with concealment to aid and protect many who appealed to him for help; few but his friends ever knew of these kindly acts. They understood his generosity as fully as the outside world admitted his integrity. He died at his residence, 33 Ladbroke Grove, on the 13th February, 1903, aged 55.

Mr. Stanger was elected an Associate of the Institution on the 3rd February, 1874, was subsequently placed among the Associate Members, and was transferred to the class of Members on the 11th November, 1890.

EDWARD GRAY STRONG, born in Bruges on the 19th June, 1826, received his engineering training in the works of Messrs. Napier at Lambeth. He was subsequently employed on the South Eastern Railway at New Cross, and in the drawing office and works of the London and North Western Railway at Crewe, and from 1853 to 1865 he was in the service of the Caledonian Railway Company, at first as an Assistant Engineer and subsequently as District Locomotive Superintendent. In February, 1865, he was appointed Locomotive Engineer of the Ceylon Government Railway, from which post he retired in January, 1885.

At the time of Mr. Strong's arrival in Ceylon the railway between Colombo and Kandy was still under construction, and the whole line was not completed and opened until August, 1867. Mr. Strong in the meantime was engaged in the supervision and erection of workshop machinery, locomotive, carriage and wagon rolling-stock, and other details necessary in connection with the opening of a new line of railway, the materials for which were imported from England in sailing ships, the Suez Canal not then being opened. The heavy machinery and packages had to be unloaded in an open roadstead and landed and removed without the aid of the appliances now available, a work which entailed no small amount of responsibility and skill.

On the opening of the line to Kandy, Mr. Strong was appointed Resident Engineer, in which capacity he had charge of the engineering as well as the locomotive, carriage and wagon departments. The permanent way and works were maintained under contract for a stipulated period, on the termination of which the line was maintained departmentally. As Resident Engineer, Mr. Strong carried out several important works besides his duties