OBITUARY.

Sir ROBERT RAWLINSON, K.C.B., Past-President of the Institution, was not only eminent as a Civil Engineer, but was well known for his important work under Government and his general services of a public character.

He was born at Bristol on the 28th of February, 1810. His father, who belonged to an old Lancashire family, returned after this date to Lancaster, where the son received the rudiments of education. About 1823 the father again removed to Chorley in Lancashire, and became a general builder, contractor and millwright, the son, young as he was, often aiding his father to the best of his ability.

About 1831 Robert, then just come of age, entered the office of the Engineer to the Liverpool Docks, Mr. Jesse Hartley, so well known afterwards to the engineering profession as one of the ablest practitioners in dock and harbour work. There young Rawlinson, who had already had much experience with his father, undertook the work of draftsman and measurer of masonry, and showed such skill and usefulness that he soon became one of the chief assistants on the works. He remained there till 1836. About this date, when railways were beginning to be made, he removed to the service of Robert Stephenson, on the London and Birmingham line, and took charge of a large section of the works near Blisworth, where, by his industry and intelligence, he soon gained the approbation and goodwill of his employers.

After the completion of the line in 1840, he took the post of Assistant Surveyor under the Corporation of Liverpool, and three years later his old master, Mr. Hartley, recommended him to fill the important office of Chief Engineer to the Bridgewater Trust, superintending their extensive works in the same neighbourhood. This post he held till 1847. About this date he made his skill known in another way; the town wanted an additional supply of water, and long and angry discussions took place (as is not unfrequent in such cases) as to how it should be supplied. Looking forward to the probable increase of the population, Mr. Rawlinson proposed a noble scheme to the Corporation for bringing to their doors the pure water of the great Bala Lake in North

Wales. He was in advance of his time; but his scheme, by its boldness and its thoroughly excellent nature, has acquired for him almost as lasting a fame as if the work had really been carried out by him.

Mr. Rawlinson, though properly an engineer, had acquired a taste for architecture, which he retained through life; and he took much interest in the construction of that fine building, St. George's Hall, Liverpool, then being erected by a clever young architect, Mr. Harvey Lonsdale Elmes. It happened that about 1847 Mr. Elmes was attacked by consumption, and was obliged to go abroad, begging Mr. Rawlinson to take his place in the completion of the structure. This building is famed for the remarkable and novel feature of a hollow-brick arch ceiling—a perfect model of lightness and stability, for which, possibly aided by some suggestions by Mr. Elmes himself, Mr. Rawlinson has received great credit.

By this time Mr. Rawlinson's character for general ability had become so well known that his services began to be demanded for work not lying directly in the field of his engineering practice.

In 1848 the Public Health Act was passed, and Mr. Rawlinson was one of the first inspectors appointed by Government under that Act. He became afterwards head of the department, and held for seven years the direction of this great and useful branch of the public service. He gained much credit for steering a middle course among the conflicting views, which about that time had been agitated among sanitary engineers, and by constantly declining to side with any extreme or exclusive party whatever.

But he was otherwise singled out for special work of the greatest public interest and of the most difficult nature. In 1855 came the horrors of the War in the Crimea, where the British army was perishing. Lord Shaftesbury, who had belonged to the first Sanitary Board, knew Mr. Rawlinson's great ability, and induced Lord Palmerston, then Premier, to nominate a sanitary commission, headed by Mr. Rawlinson, to go out to the East, armed with full powers to see if the fearful state of things could not be remedied. The measures suggested by him and his colleagues contributed to stay the epidemics by which the British troops had been fearfully decimated. In performing this work he was wounded, while on horseback, by a cannon shot; but happily not mortally—and he did most valuable work. His labours have been recorded by Mr. Kinglake in the "Invasion of the Crimea."

About this time also he was extensively engaged in the design and execution of sanitary measures in many large towns in the king-

dom. A Paper published by him in 1856 gives the names of no less than fifty-two towns on which he had been consulted and had reported, and in many of which he had carried out the improvements recommended. Upwards of 100 miles of sewers had thus been constructed, independently of a vast mileage of minor branches. From 1858 to 1862 he was a member of a Royal Commission to inquire into the utilization of town sewage.

On Mr. Rawlinson's return from the Crimea he commenced practically his duties as Chief Engineering Inspector under the Local Government Board, and at once drew up and published some "Suggestions on Town Sewering and House Draining; for the instruction of Engineers and Surveyors to Local Boards." The system thus inaugurated was new, and on the correctness of these rules and principles the success of the department depended. They have been adopted not only throughout Great Britain but largely in the Colonies and elsewhere. Mr. Rawlinson was appointed as Parliamentary Secretary to the Poor Law Board to report on the subject of sewage disposal, in which capacity he visited many of the larger towns, both in England and on the Continent, with the view of collecting statistics which were subsequently published in a Parliamentary Paper.

In 1863 he was nominated a member of the Army Sanitary Committee, composed of medical and engineer officers, to advise as to sanitary works and regulations for the British army, both at home and abroad. The work of this Committee lasted a long time, and the results showed a great improvement in the health of the army and the saving of life.

He also made a valuable report to Government on "The General Regulation of Sanitary Works at Windsor Castle." This also has been published.

In April of the same year, during the fatal "cotton famine," Lord Palmerston sent Mr. Rawlinson, single-handed, to Lancashire to devise "works of relief" for the thousands thrown idle. This led to a gigantic amount of work, which occupied him more or less till 1869. The funds devoted to the work amounted to £1,850,000 spread over thirty years. A full account of this work has been published by Sir Robert Rawlinson.

In 1865 and 1868 Mr. Rawlinson was Chairman of the Commission appointed to inquire into the means to be adopted to prevent the pollution of rivers; and in 1876 he was one of the Commission on the modes of dealing with town sewage.

In 1883 Mr. Rawlinson received the honour of knighthood. The following was the letter conveying the information to him:—

"*24 July, 1883.*

"DEAR SIR,—I have the pleasure to propose to you, with the sanction of Her Majesty, that you should receive the honour of knighthood, in acknowledgment of your long and valuable services in connection with the Local Government Board.—I remain, Dear Sir, your very faithful and obedient

"(Signed) W. E. GLADSTONE."

Some years later he received from Mr. Gladstone's successor in the premiership a further communication:—

"*January, 1888.*

"DEAR SIR,—I have the pleasure to inform you, with the sanction of Her Majesty the Queen, that you shall receive the decoration of Knight Commander of the Most Honourable Order of the Bath in recognition of your long and valuable services in connection with the Local Government Board.—I remain, Dear Sir, yours very faithfully,

"(Signed) SALISBURY."

The knighthood was conferred on him by the Queen at Osborne on the 23rd August, 1883. The investiture was made by the Queen personally at Windsor Castle on the 14th May. The year 1888 also witnessed the retirement of Sir Robert from public life by his resignation of the appointment of Chief Sanitary Engineer to the Government, or, as it was called, "Chief Engineering Inspector to the Local Government Board," which he had held since the Board was formed forty years before.

On the 23rd April, 1890, Sir Robert delivered, at the Sessional Meeting of the Sanitary Institute, an address dealing principally with the Sanitation of Barracks and of other Public Buildings.[1] In 1896 he issued anonymously a little book entitled "Cosmos: a Study, by a Civil Engineer," printed by Messrs. Clowes and Sons. In a second title it was called "Thoughts on our Earth as part of the Universe." It gives many data as to the planets, &c., and contains some curious speculations on the universe generally.

Sir Robert Rawlinson's connection with the Institution began on the 7th March, 1848, when he was elected an Associate. Although fully qualified for the higher grade he took no steps to attain it until nearly twenty years later, when, on the 17th April, 1866, he was transferred to full membership. In December, 1878, he was elected a Member of Council, becoming Vice-President in May, 1889, and President in May, 1894, when he had attained the great age of eighty-four years. In the following November, at the first meeting of the new session, doubting his power to make a sustained speech of an hour's duration, he requested that the Acting Secretary might be allowed to read his Presidential Address on his

[1] Transactions of the Sanitary Institute, vol. xi.

behalf. This was done, but when the usual vote of thanks had been passed, he rose, and in a brief reply, which was cheered to the echo, he outlined the story of his life and the means by which he had raised himself from the condition of a labouring man to be the occupant of the Presidential Chair. Old frequenters of the Institution meetings have averred that the effect on the audience of this simple and unpretending bit of oratory has never been excelled, even if equalled.

In the course of his long association with the Institution, extending over half a century, Sir Robert Rawlinson made a very prominent figure in the proceedings of the society, being until a few years before his death a constant attendant at the meetings and a frequent participator in the debates. In 1852 he contributed a Paper "On the Drainage of Towns,"[1] which gave rise to a very animated debate extending over four evenings, and for which its Author was awarded a Council Premium. This, and the Presidential Address before alluded to, form the only "Original Communications" in the Minutes of Proceedings from Sir Robert Rawlinson's pen, but he contributed an immense amount of information on general engineering subjects in the form of contributions to the oral discussions on Papers written by others. In his pre-Crimean days he had frequently to defend the proceedings of the General Board of Health—a body which, rightly or wrongly, was regarded with much suspicion by many eminent engineers of that day. On his return from the Crimea the General Board of Health had ceased to exist, and with it the exhibitions of polemical acrimony which its proceedings periodically aroused in the Institution's meeting-room. Being a persistent inquirer into and observer of the phenomena of Nature, besides a deeply-read man, Sir Robert Rawlinson was a competent speaker on many subjects outside the range of his ordinary avocations, and his love of architecture led him to study the sister arts of painting and sculpture. His speeches were frequently adorned with similes drawn from the domains of art and poetry, giving evidence of the wideness of his culture. This was noted as somewhat unusual in a man mainly self-educated; but his delicate health obliged him to abstain from the ordinary distractions of busy men, and afforded him opportunities for reading and study of which he continued to avail himself till the close of his long life.

Sir Robert Rawlinson was a frequenter of art sale-rooms, and possessed a large number of valuable curios. Some of these,

[1] Minutes of Proceedings Inst. C.E., vol. xii. p. 25.

notably a unique collection of ancient Japanese ivories, he presented to the Institution; also several pictures, and a marble bust of the Queen, now placed in the main library. The Institution will further benefit by his will to the extent of £1,000.

Sir Robert was in the habit of speaking of himself as "delicate as a boy, delicate as a young man, and not robust as an old man." And he did not look strong; for he was frequently seen, even in calm weather, with a scarf tied round his throat, as if afraid of the mild breeze; yet he lived to the age of 88, and worked nearly to his last years. He died at his residence in the Boltons, South Kensington, on the 31st May, 1898.

He was undoubtedly a skilful engineer, for he was essentially the working author of the scientific system of drainage which has made London the healthiest as well as the largest city in the world. The *Engineer* (of the 17th August, 1883,) justly remarks:—

"It may be admitted that it is to his practical mind and untiring energy that the towns of a large part of the country are principally indebted for their modern system of sewerage, house drainage and sewage disposal, comprising, as it does, pipe sewers—instead of vast caverns of porous brick acting as noisome cesspools—for our sewer ventilation, our system of disconnecting soil pipes from street sewers, and for the treatment of sewage by irrigation."

No more fitting tribute to his work can be given than in the words of Lord Salisbury at the Annual Dinner of the Institution on Wednesday, March 27th, 1895, when Sir Robert as President occupied the chair. Speaking of the triumphs of sanitation during the past forty years, Lord Salisbury said, "They are triumphs of which any profession may be proud, and they have been begun and largely shared by your President, on whose brow rests a large part of the honour which such triumphs, in the minds of all who love their country, are accustomed to bestow."

But, after all, his great merit was his excellent practical knowledge of human nature and his great gift of managing men, which made him so successful in the difficult undertakings and missions personally carried out by him.

HARRISON HAYTER, the second son of Henry Hayter, of Eden Vale, Wiltshire, was born on the 10th April, 1825, near Falmouth, and died on the 5th May, 1898. He entered the Department of Applied Sciences (then called the Engineering Department) at King's College, London, completing the full course in the years