

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

1839 to 1841, when he received the diploma of Associate, and afterwards he became an Honorary Fellow of that College. He then served a regular period of pupilage under Mr. John Harris, who was Engineer to the celebrated Stockton and Darlington Railway—which with its branches was somewhat over 40 miles in length. During the time of Mr. Hayter's pupilage, Mr. Harris constructed an extension of the railway from Middlesbrough to Redcar; he also made the survey and prepared parliamentary plans for the Wakefield, Pontefract and York Railway, and was Engineer to that Railway in the passage of the bill through Parliament. After leaving Mr. Harris, Mr. Hayter was engaged for four years on a district of the Great Northern Railway under Mr. Joseph Cubitt, and after that he was for one year on the Harbour Works at Dover under Mr. James Walker, Past-President, during part of which time he had charge of the work as Acting Resident Engineer. From Dover he went to Inverness, where he was engaged on the Inverness Bridge Works under Mr. Rendel, Past-President, for about a year. From Inverness he was transferred to the Holyhead Harbour Works then in progress under Mr. Rendel, and there he remained for three and a half years as Assistant-Engineer under Mr. G. C. Dobson, who was at that time the Resident Engineer. On the death of Mr. Rendel in 1856, Mr. (afterwards Sir John) Hawkshaw, Past-President, was appointed Engineer-in-Chief to the Harbour Works, and he invited Mr. Hayter to become his chief assistant at Westminster. From that date for a period of forty-two years Mr. Hayter was associated with Sir John Hawkshaw and his son, Mr. John Clarke Hawkshaw, at first as chief assistant, and after 1870 as a partner with them until Sir John Hawkshaw retired from business in 1888, when Mr. Hayter continued in partnership with Mr. Hawkshaw. During this long period of professional work Mr. Hayter took an active part in the designs, estimates, specifications and parliamentary work connected with the numerous undertakings which were carried out under the superintendence of Sir John Hawkshaw, or in conjunction with his partners. Among those carried out in England may be mentioned—the Lancashire and Yorkshire Railway, the East London Railway, the South Dock and Warehouses for the East and West India Dock Company, the Millwall Extension Railway, Penarth Docks, the Albert Dock and other works at Hull, the Granville Dock at Dover, Maryport Docks, the completion of the Inner Circle of the Metropolitan and District Railways, between Mansion House and Aldgate (in conjunction

with Mr. now Sir John Wolfe Barry, K.C.B), Holyhead Harbour and Breakwater and a Pier for the accommodation of the postal service with Ireland, Fleetwood Docks, Parkeston Quay at Harwich, Londonderry Bridge, Clifton Suspension Bridge (in conjunction with Mr. W. H. Barlow, Past-President), the Victoria Bridge at Stockton-on-Tees (in conjunction with Mr. Charles Neate), Charing Cross and Cannon Street Railway—involving the construction of two bridges across the Thames—the Severn Tunnel, the Staines and Wokingham Railway, the foundations of Spithead Forts for the War Office, Brighton Intercepting and Outfall Sewers (7 miles in length), the Middle Level Drainage and the Witham Drainage.

The principal works constructed abroad were the West of India Portuguese Guaranteed Railway and the Harbour of Goa, the Nerbudda Bridge on the Bombay, Baroda, and Central India Railway, the Amsterdam Ship Canal, the Riga and Dünaburg and the Dünaburg and Witepsk Railways in Russia, the Avila and Salamanca Railway in Spain, the Midland Railway of Western Australia, the Mauritius and Jamaica Government Railways, and the Harbour Works at Buenos Aires in the Argentine Republic, including an extensive system of Docks which took ten years to construct and involved the expenditure of over £6,000,000 sterling.

In the course of his professional career Mr. Hayter visited many foreign countries. In 1864, when Sir John Hawkshaw was called upon by the Viceroy of Egypt to report on the practicability of making the first cataract of the Nile navigable, Mr. Hayter and Mr. J. C. Hawkshaw spent some time at the first cataract making the required surveys and investigations. In 1871 he visited Russia with Mr. J. C. Hawkshaw to report on the Moscow and Kursk Railway. He also went to Hungary in connection with the Francis-Joseph Canal, to Barbados in connection with proposed new harbour works, and he visited Buenos Aires during the construction of the port works. He was appointed Consulting Engineer to the Madras Railway Company after the retirement of Sir John Hawkshaw, and designed several important bridges on that line. He was frequently consulted by the Crown Agents for the Colonies in connection with various works in the Colonies of Mauritius, Jamaica, British Guiana and Barbados; also by the Board of Trade in connection with Holyhead Harbour; by the Belfast Harbour Commissioners and many other public bodies.

The great experience of Mr. Hayter in preparing and dealing with specifications and in arranging and settling contracts, combined with his reputation for probity and fairness, resulted in his being frequently appointed arbitrator to adjudicate the claims

of contractors. He was most painstaking in the investigation of such disputed claims, no detail, however small, being neglected, and his decisions were only arrived at after a great amount of labour and most careful consideration. He was on several occasions appointed umpire—notably in some recent cases where claims were made by contractors against the Manchester Corporation in connection with the Thirlmere Aqueduct and the Manchester Ship Canal.

Mr. Hayter was elected a Member of the Institution in May, 1862, became a Member of the Council in December, 1878, Vice-President in May, 1886, and in 1892–93 he was President. To the last he took the liveliest interest in the welfare of the Institution, and was a constant attendant at the council and ordinary meetings. He contributed Papers on the Charing Cross Bridge,¹ for which he received a Telford medal and premium in 1863, also on the Holyhead Harbour Works² and the Amsterdam Ship Canal.³ He was a Lieutenant-Colonel of the Engineer and Railway Volunteer Staff Corps, a Member of the Athenæum and St. Stephen's Clubs, and a Fellow of the Geological Society.

Mr. Hayter was a man of striking appearance, remarkably vigorous in mind and body, and had a strongly-marked character. He was an indefatigable worker, always thorough and painstaking, and ever keeping in view a high standard both in professional and private life. He exercised a judicious liberality in the support of many charitable and philanthropic objects, and was always glad to place his wide experience at the service of the younger members of his profession. He was respected by all who knew him, and his death evoked a widespread expression of regret.

Sir HENRY BESSEMER, F.R.S., died at his residence, Denmark Hill, near London, on the 15th March, 1898, in his 86th year. He was born on the 19th January, 1813, at Charlton, Herts. His father had migrated to Paris, and had become a member of the French Academy of Sciences, but when the Revolution of 1789 totally ruined him, he returned to this country and by untiring industry retrieved his fortunes. Henry seems to have inherited artistic tendencies. At the age of twenty he exhibited an architectural model at the Royal Academy, and until the end of his life he drew with rapidity and precision. He also made experiments and

¹ Minutes of Proceedings Inst. C.E., vol. xxii. p. 512.

² *Ibid.*, vol. xlv. p. 95.

³ *Ibid.*, vol. lxii. p. 1.