

he was presented by the employés with a tea and coffee service in silver.

In 1851 he joined the Low Moor Company, as consulting Engineer, a position which he retained to his death; and there he had ample opportunity of meeting all the Engineers of reputation, and this soon brought him a large practice. As a witness he had considerable facility for explaining mechanical details in a popular manner. His last professional engagement was from the War Office, having been appointed to settle the question of compensation to the Elswick Ordnance Company. During the attendance on this business in London, he caught a severe cold, which hastened his end. He died at Leamington, where he had for some time resided for the benefit of his health, on the 22nd of April, 1863, at the early age of 47 years. His remains were conveyed to Low Moor, where they were interred on Monday, the 27th of April, and were followed to the grave by the principals and staff of the Low Moor Iron Company, together with a large number of the leading railway Engineers, and of his friends from various parts of the country. Mr. Fenton's loss will be much felt by many young Engineers, as he was always ready with his advice and assistance, and he was deservedly beloved and respected. Mr. Fenton was elected a Member of the Institution of Civil Engineers in 1849, and he contributed to the Proceedings a "Description of an Improved Form of Safety-Valve, for Steam Boilers."¹ He was one of the originators of the Institution of Mechanical Engineers, of Birmingham, in 1847, in the management of which he took a very active part, and he was for five or six years one of the Vice-Presidents of that Institution.

MR. JOSHUA FIELD, F.R.S., was born at Hackney, in the year 1786. His father was largely engaged in the corn and seed trade, which he carried on in Lower Thames Street, where he had warehouses and a residence; but his family, which was large, chiefly resided at Hackney, then a village, quite separate from London. At seven years of age Joshua Field was sent to a boarding school at Harlow, in Essex, then conducted by the Rev. J. Brown, and he remained there until he was sixteen. He very early displayed a love for mechanical pursuits, collecting tools and learning to use them; and, as with most young mechanics, clocks and watches offered the readiest means of exercising this assumed vocation. The school clock being out of order, and Mr. Brown having heard of his pupil's skill on the watches of some of the neighbouring farmers, asked if he thought he could mend it, and on permission being given him to try, he made so

¹ *Vide Minutes of Proceedings Inst. C.E., vol. xv., p. 33.*

good a job of it, that his reputation became great amongst his fellow pupils.

On leaving school in 1802, he visited, as often as he could, the steam-engines and mills to be found in London at that time; and the natural bent of his mind no doubt became strengthened and confirmed by what he saw on these occasions, and which led him to desire most earnestly to be engaged in such pursuits. About this time the Government commenced the establishment of machinery in the Royal Dockyards. This was effected under the superintendence of the late General Sir Samuel Bentham, who, with a staff under him, began his operations in Portsmouth Yard. It was thought by his friends that an opportunity might there present itself for testing his mechanical inclination, and the father of young Field having applied to Sir Samuel Bentham, the son was admitted into the works at Portsmouth, where he remained about two years, under Mr. Simon Goodrich (M. Inst. C.E.), then chief Mechanical Superintendent, and Mr. Linahan, the Master Millwright, under whom he was chiefly engaged in drawing, but occasionally working with the millwrights. After remaining some time at Portsmouth Yard, Mr. Field was requested by Sir Samuel Bentham to come up to the Admiralty at Whitehall, to assist in the drawing department, and there he remained about a year. About that time the block machinery invented by Mr. (afterwards Sir Isambard) Brunel was being constructed by Mr. Maudslay, who, requiring some assistance in drawing, applied to Sir Samuel Bentham to recommend him a competent draughtsman, when Sir Samuel and Mr. Goodrich strongly recommended young Mr. Field. This accidental circumstance was the origin of the subsequent connexion of Mr. Maudslay and Mr. Field, in which their combined talents produced for the country many important improvements in marine engineering. An intimacy was also commenced with the late Mr. I. K. Brunel, which continued, without interruption, until the death of that gentleman. Mr. Field's new engagement with Mr. Maudslay commenced some time in 1804, at the establishment in Margaret Street, Cavendish Square, where there were employed about eighty men, who were chiefly engaged upon some of the best work of the period, requiring the use of the most perfect tools, and thus the attention of Mr. Maudslay was devoted to maturing improvements in them. At this period Mr. Maudslay's was about the only factory in which the slide rest was generally applied to the lathe. In 1810 the manufactory was removed to Lambeth, where a variety of mechanical operations were carried on. Steam Navigation was practically introduced in England about 1812, and the manufacture of marine engines was commenced by Mr. Maudslay, and has since been the principal, although by no

means the sole, employment of the establishment thus founded. For besides saw machinery, corn mills, block and mint machinery, in all of which much has been done there, Mr. Maudslay made the first shield used in the construction of the Thames Tunnel. But steam-engines, for land and marine purposes, have been what may be termed the staple trade of the works; and for the purposes of navigation alone this firm had made, up to Midsummer, 1863, engines of the aggregate nominal power of 90,790 horses. Paddle and screw engines made by Messrs. Maudslay, Sons, and Field, are to be found in operation in all parts of the world, as well in the naval marine of this and other countries, as in mail steamers and mercantile vessels.

The 'Enterprize' steamer, commenced by a private Company—of which Mr. Maudslay was one of the principal shareholders—first made the passage to Calcutta, and proved a good pioneer for more recent operations. Subsequently the 'Great Western,' between Bristol and New York, may be said to have given birth to the present constant steam communication between the mother country and America. To the design and construction of the engines of the 'Great Western,' Mr. Field early and late gave most particular attention. The regular navigation of the Atlantic by steam was then regarded as an experiment on a large scale, and many scientific men agreed with the late Dr. Dionysius Lardner in prognosticating failure. The 'Great Western,' however, proved a complete success, and it is believed that no engines ever went through such continuous and arduous work more satisfactorily, or with less expense in repairs. This vessel eventually passed into the hands of the West India Mail Company, and continued until a recent period to do good service. It should be remembered that these were the days of flue boilers and moderate pressure; but if engines and boilers on this principle lacked somewhat of speed, when compared with the results of more recent times, they undoubtedly had the advantage of a smaller consumption of coals, and of greater durability.

In 1822 Mr. Field was, with Mr. Maudslay's eldest son, admitted as a partner. On the 14th February, 1831, Mr. Maudslay died, and the works were greatly extended, so as to meet the expanding character of steam navigation.

Mr. Field, in conjunction with Mr. Lloyd, Mr. Penn, Mr. Apold, and Mr. Amos, was also consulted in reference to the laying of the Atlantic Telegraph Cable; and it was under their advice that the machinery was constructed by which the cable was actually laid in the first expedition, though the undertaking was not, unfortunately, equally successful in other respects. He was likewise called upon for his advice on many occasions by the Astronomer-Royal, and the time balls at Greenwich, at the South Foreland, at

Liverpool, and at Edinburgh, were made by the firm of which he was a partner.

Mr. Field was one of the founders of the Institution of Civil Engineers, the origin of which was very humble. About the year 1816, Mr. Henry Robinson Palmer, who was then a pupil of the late Mr. Bryan Donkin, suggested to Mr. Field the idea of forming a society of young Engineers, for their mutual improvement in mechanical and engineering science; and the earliest members were Mr. Henry Robinson Palmer, Mr. William Nicholson Maudslay, and Mr. Joshua Field. To these three were shortly added Mr. James Jones, Mr. Charles Collinge, and Mr. James Ashwell. They met occasionally in a room hired for the purpose, and to them were soon attracted others having the same objects in view. Mr. Field was the first Chairman of the Institution, being elected to that post on the 6th of January, 1818. Subsequently he became, in 1837, a Vice-President, an office he filled until he was elected President in 1848 and in 1849, and he continued to the last to be an active member and warm supporter of the Institution; constant in his attendance at the Meetings, and taking part in the discussions, and if not personally contributing Papers, procuring them from Members having more leisure.

It is to be regretted that, from a modesty that was in every way natural to him, many of the incidents of his early career are either not known, or only partially given. He was often pressed to note down some of his early recollections, as well concerning himself as of those with whom he was brought into contact; but it was only lately that he in part complied with the representation made to him. It was once remarked, by Lord Brougham, of an intimate friend of his, that those who knew him only in his external relation to society knew but half his worth, and the same may with equal confidence be said of Mr. Field. Unassuming to a degree in his personal demeanour, he was the embodiment of all that was courteous, considerate, and kind in his feelings towards others; and, indeed, he naturally presented so much of the true gentleman and benevolent kind-hearted man, that it was impossible to make his acquaintance without entertaining for him the highest sentiments of respect and esteem. It was a privilege to spend a social hour with him, when he would bring forth vast stores of information bearing directly or collaterally on his varied experience of men, and of mechanical and scientific pursuits, and the natural geniality of his nature then showed itself most conspicuously. Possessing an admirably balanced mind, he was never either unduly excited or depressed. His advice was often sought, even by strangers, and no effort wearied him in his endeavours to correct their views when wrong, or to confirm them when right; whilst to all appeals of a charitable nature, the hand of benevolence was constantly open,

and he seemed to feel a pleasure in materially aiding those that needed help. His charity was liberal, without a particle of ostentation, and discriminate, without a tinge of selfishness. In religious belief Mr. Field was a Nonconformist, but of such enlarged Christian views, that he frequently contributed to churches and schools in connexion with the Establishment. Few, indeed, were the cases of private or public want brought under his notice that he did not readily, and often liberally, respond to; and as a short summary of his character, it may be said, that he was a truly good man in private life and a great man in his professional career.

MR. JOSEPH GLYNN, F.R.S., was a native of the North of England, whence have proceeded so many men eminent in mechanical and engineering pursuits. He was the son of Mr. James Glynn, of the Ouseburn Iron Foundry, Newcastle-upon-Tyne, and was born in Hanover Square, in that town, on the 6th of February, 1799. To Mr. John Bruce, of the Percy Street Academy—himself a mathematician of considerable attainments, who taught the rudiments of mathematics to the late Robert Stephenson, and who turned out many pupils attaining eminence in many walks of life—is due the credit of the intellectual training which afterwards enabled Mr. Glynn to apply to useful purpose the mechanical talents which seemed to be innate rather than to have been acquired by after education. Mr. Glynn's career was nearly cut short in early life, by an accident which exercised much influence in turning his mind in a direction where it was afterwards most actively employed. His father was also a shipowner; and in a schoolboy visit to one of his father's ships, Joseph, with two of his brothers, was severely burned, and otherwise injured, by an explosion of gunpowder. He made several voyages to sea to recover his health, and thus acquired a knowledge of seamanship and of the construction and qualities of sea-going ships, which he afterwards turned to good account. He continued at the Ouseburn Foundry, as his father's assistant, until the year 1820, when he executed his first engineering work, which was the erection of a steam-engine for the Earl of Carlisle, to drain the Talkin Colliery, near Brampton, Cumberland. He was assisted in the execution of the work by two young mechanics, then workmen, who have both since attained great eminence, the late Sir Peter Fairbairn and Mr. Robert Hawthorn (M. Inst. C.E.) In the following year, 1821, the introduction of coal gas having rendered the inhabitants of Berwick-upon-Tweed discontented with the old system of lighting, Mr. Glynn was called in to design and execute the gas works for that borough, and from 1821 to 1859 the establishment served its original purpose without altera-