Mr. (now Sir Charles) Fox, to give his adhesion to it, and to join in proposing it to Prince Albert. How successful was that novel and unique construction need not here be mentioned; but it must be maintained that to Mr. Cubitt's good mechanical and constructive knowledge, his cool and mature judgment, and his confidence in the plans decided upon, the ultimate triumphant success was in a great measure due.

He became a Fellow of the Royal Society in the year 1830;—he was also a Fellow of the Royal Irish Academy, Member of the Society of Arts, and of other societies.

Labours such as have here been shadowed forth rather than described would suffice to wear out the strongest constitution, and Sir William Cubitt, who had never been a robust man, felt it necessary in 1855 to retire in some degree from the active exercise of the profession; and in 1858 he ceased to give any attention to business; he continued, however, to take an interest in the proceedings of the Engineering world until his final illness, under which he sunk on the 13th of October, 1861, in his 77th year, at his residence on Clapham Common.

Sir William Cubitt joined the Institution of Civil Engineers as a Member in the year 1823; he became a Member of Council in 1831, was elected Vice-President in 1836, and held the post of President in 1850 and 1851. At the period of the great changes introduced into the constitution of the Institution he took a very active and useful part, and throughout his career he was an earnest friend of the Institution, which he considered to be the great bond of union of the members of the profession.

Sir William Cubitt was among the last surviving self-made Engineers, and few men laboured more honestly and uprightly to obtain well-deserved eminence.

Mr. NICHOLAS OLIVER HARVEY was born in the year 1801. When young he was for a short time with his uncle, the late Mr. Henry Harvey, the proprietor of the Hayle Foundry, Cornwall. Subsequently he became a pupil at the Eagle Foundry, Birmingham, then managed by the late Mr. W. Brunton (M. Inst. C.E.), where he remained until he was about twenty-one years of age. He then returned to Hayle, to assist in the management of the foundry, where he had the advantage of working with Trevithick and with Wolff, and derived great benefit from this association; many of the improvements in steam machinery, introduced since that time, having been then discussed in advance of their present adoption. As an example, Mr. Harvey has been heard to relate, that Trevithick, whose tubular boiler is still the one universally adopted for stationary engines, discussed the advantage of using small tubes, in order to shorten the boiler, and

speculated how far the flame would extend along the barrel of a fowling-piece, before the heat of the ignited gas was absorbed. Mr. Harvey assisted in the construction of the first double-cylinder engine, designed by Wolff, and made at Hayle; and he took part in the experiments which were tried at the Great Alfred Mine, in Cornwall, and which convinced Wolff, that the combined cylinder engine was less economical than the single-acting engine for pumping water.

Mr. Harvey's health, at no time very robust, now failed, and he consequently visited London for relaxation and improvement. Whilst there he was introduced, by the late Mr. Samuel Seaward (M. Inst. C.E.), whose acquaintance he had made at Hayle, to the proprietors of the Fijnoord Engineering Works, Rotterdam, from whom he accepted a situation. Whilst in Holland, he was engaged in the construction of some of the first boats built there for navigating the Rhine. Many experiments were tried for adapting shallow boats to the river, both for towing and for passenger traffic. These included many varieties of form and of construction, both in iron and wood, and from the notes made at the time, in the infancy of that branch of Engineering, it would appear, that the amount of success attained, with the limited means at their disposal, was very remarkable. Almost everything in iron was the subject of experiment, both as to its durability, particularly for marine boilers, and as to its strength; and Engineers in those days had to design, with the pencil in one hand and the hammer in the other. It may be remarked, that Mr. Harvey there successfully applied the feed-heater around the funnel, which nearly thirty years afterwards proved so disastrous on board the 'Great Eastern.' After residing for about five years in Holland, he accepted an engagement with a Prussian firm, to establish works for boat-building and for the manufacture of marine engines in Sterkerade, now among the most important in Prussia. There he built several boats; and when the first of them was constructed, Mr. Harvey was compelled to turn hammerman, and to forge the paddle-shaft. He also introduced the Cornish pumping-engine into that neighbourhood, with great success, for draining mines.

When he was about thirty-three years of age he returned to Cornwall, to take the management of the Hayle Foundry. His attention was shortly after drawn to the machinery then employed for supplying London with water, and he endeavoured to introduce the Cornish pumping-engine, of the economical working of which he had such extensive experience in mines. After a time he succeeded in obtaining a contract, to erect an 80-inch cylinder engine for the East London Waterworks Company at Old Ford, and for this engine he, with Mr. West (M. Inst. C.E.), constructed their double-beat valve, which afterwards came into general use, and

without which, at that time, these large pumps could not have been employed, the shock being so great with the common valves then in use. This engine, an account of the performance of which was published by Mr. Wicksteed[1] (M. Inst. C.E.), proved very successful, the consumption of fuel being reduced more than one-half, and it is still at work. Subsequently, other engines on the same principle were erected, and before his death, Mr. Harvey had the satisfaction of seeing the Cornish system generally adopted; the greater number of these engines being manufactured at the Hayle Foundry, of which he had become the principal proprietor. He also erected pumping-engines for supplying Liverpool, Manchester, and several other towns with water; and the large engines for draining the Haarlem Lake were principally manufactured under his superintendence. All the work undertaken by him was finished regardless of cost, money-making being a secondary consideration. He was a man of great practical experience, both in designing and in manufacturing engines, and was very ready in invention. He was much beloved by those connected with him, and respected for his uprightness, hospitality, and truly genial nature. His death occurred in the year 1861, in his sixty-first year, leaving a widow and a family of young children to mourn his loss.

He joined the Institution as a Member in the year 1839, but his constant absence from London prevented his regular attendance at the Meetings.

MR. JOSEPH MAUDSLAY, the fourth son of the late Mr. Henry Maudslay, the celebrated Mechanical Engineer, and founder of the well-known firm of Maudslay, Sons, and Field, was born in London on the 17th September, 1801. It was originally intended to bring him up as a ship-builder, for which purpose he was placed with the late Mr. William Pitcher, at Northfleet; but circumstances frustrating that intention, he was taken into the establishment at Lambeth, where he eventually became a partner in the firm. He always retained his fondness for naval architecture, and his attention to the lines of vessels was of great utility, in the determination of the necessary motive power for their propulsion.

Mr. Maudslay was one of the first to perceive the advantages of direct-acting engines for marine purposes; and in 1827, he patented an arrangement for applying to the engines with oscillating cylinders, (introduced by the late Mr. A. Manby in 1819,) the ordinary slide valve worked by an eccentric. A pair of these engines was, in 1828, fitted on board the 'Endeavour,' a small

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[1] *Vide* "An Experimental Inquiry concerning the Cornish and Boulton and Watt Pumping Engines." By Thomas Wicksteed. Weale, London, 1841.