after ten days' illness, from blood poisoning, on the 22nd of October, 1876, having only been elected an Associate of the Institution in the month of February in the same year.

MR. ARDASEER CURSETJEE was born at Bombay on the 6th of October, 1808. He was a scion of the Lougee family, heads of the Parsee caste in India, and who for more than a century honourably served the East India Company as officials in the Bombay Dockyard. Continuing the traditions of his family young Ardaseer at the age of fourteen entered the Government, service as an assistant to his uncle, Mr. Nourojee Jamsetjee, who at the time was master builder in the dockyard. Having served in the department for six years, and qualified himself as a naval architect, he was in 1828 placed in charge of the shipbuilding yard at Mazagon, where he designed and superintended the construction of several fine vessels. While holding this office Mr. Ardaseer Cursetjee became imbued with an ardent desire to thoroughly master the theory and practice of steam engineering. With the high intelligence and acumen characteristic of his countrymen, he at once appreciated the immense benefits that would accrue to India from the general application of this means of developing its resources, and he resolved to further its introduction by every means in his power. As the best means of attaining this object he in the first place obtained permission from the Government to place himself with Capt. McGillvary, the Chief Engineer of the Bombay Mint, under whom he remained some time, though still retaining his appointment at Mazagon. He soon furnished a proof of his progress by producing a small steam engine and boiler of about 1 HP., made entirely by his own hands, and said to have been the first constructed in Bombay. This engine was set to work pumping water on Mr. Ardaseer Cursetjee's premises, where it continued many years, but it was principally intended as a means of conveying instruction, and its author sedulously invited the natives to study its action, which he took every pains to make clear. In October 1833 Mr. Ardaseer was made "Assistant Builder" at Mazagon, the office being expressly established for him, on the recommendation of the Superintendent of Marine, Capt. Crawford, who had been much pleased with the manner in which he performed his duties and his endeavours to popularise amongst his countrymen the scientific progress of the west. Pursuing his favourite idea he

induced his father to procure from England a 10 HP. marine engine, which arrived in Bombay in parts, and was completed and fitted by the son, without the assistance of any European, to a vessel called the "Indus," also specially built under his directions at his father's expense. Thenceforward the marine steam engine became the principal study of Mr. Ardaseer Cursetjee's life, and he began a long course of experiment and observation which culminated six years after in his being chosen from among numerous European competitors for the important post of Chief Engineer and Inspector of Machinery at the newly established Bombay Steam Factory. In 1835 he introduced gas lighting into Bombay by constructing, at his own expense, gas apparatus for lighting up his own house and garden, which he exhibited gratuitously to the public, who came many hundred miles on purpose to witness this, to them, novel triumph of scientific ingenuity. In carrying out this enterprise he had many disadvantages to contend with; there was no foundry for getting the work properly executed, so that he had to procure all sorts of tools and plant for making the tubes, cocks, &c. Notwithstanding these difficulties the apparatus was pronounced by competent judges to have been as complete as if constructed at any proper factory in England.

At the period when education was beginning to spread in Bombay, and professors of different branches were sent from England to encourage the natives in acquiring knowledge, Mr. Orlebar, Professor of Mathematics at Elphinstone College, cognizant of his anxiety to improve his countrymen, as well as of his acquaintance with practical mechanics, applied to the Bombay Government to allow Mr. Ardaseer Cursetjee to assist him in instructing the natives, especially in mechanical and chemical science, for which permission was gladly accorded. At the same time the rapid increase of steam navigation in Bombay had led to great difficulty in insuring the prompt repair of the engines of the numerous steamers. Towards obviating this state of things Mr. Ardaseer Cursetjee obtained permission from the Government to proceed to England for a year to make himself acquainted with the principal and latest improvements in marine engineering, with a view of afterwards imparting to his countrymen the knowledge so obtained. Arrangements had been completed for his passage on board the 74-gun ship, "Imaum" (afterwards H.M.S. "Liverpool"), which had been constructed at Bombay by the Sultan of Muscat under Mr. Ardaseer's superintendence, and was about to make her first voyage to England as a present from His Highness to the Queen. But sudden illness prevented this, and it was not until a

year after, on the 12th of September, 1839, that he actually started from Bombay. Though the visit of a native of India to this country is no longer remarkable, it was in those days a matter of considerable interest. The enlightened and patriotic motives which prompted Ardaseer Cursetjee to break through the trammels of a rigid caste, and perhaps incur the reproach of slighting the traditions of his countrymen, was thoroughly appreciated; and had he so willed it his sojourn in England might have attained to a continued ovation. But his object was to study the marine engine, and this purpose he steadily kept in view. He was, as a matter of course, presented to the Queen and the Prince Consort; but beyond this he resisted all attempts at lionising, and with the approval of the India Office made an arrangement to work in Messrs. Seaward's engineering shops at Limehouse, where also he took a house. The diary[1] of his life in England during this year (1840), and from which these particulars are extracted, is a most interesting record of the impressions made by western civilization on a highly-educated native of India. His mind was eminently receptive; nothing seems to have escaped his notice, and his comments and criticisms on what he saw evince considerable acumen. It was during this year that Mr. Ardaseer Cursetjee became connected with the Institute of Civil Engineers, having been elected an Associate on the 24th of March, 1840. He had previously been introduced to Mr. James Walker, the then President, and was also a regular attendant at the meetings with his friend Mr. S. Seaward. On one of these occasions he gave expression to his views on the relative advantages of long and short connecting rods for marine engines,[2] and subsequently illustrated them by an elaborate drawing which he presented to the society. He seems to have attached much importance to the privileges thus enjoyed; and as it happened considerable attention was at that time being drawn to the capabilities of auxiliary steam power for ships and the introduction of the screw propeller. In July 1840 he became a candidate for the newly established office of Chief Engineer and Inspector of Machinery at the Bombay Steam Factory, and backed by the powerful testimonials of the most eminent marine engineers of the day, as also of the personal interest of Mr. Walker, he was unani-

[1] "Diary of an Overland Journey from Bombay to England, and of a Year's Residence in Great Britain." By Ardaseer Cursetjee, C.E., F.S.A., Chief Engineer and Inspector of Machinery at the East India Company's Steam Factory and Foundry at Bombay. Tract 8vo. London, 1840.

[2] *Vide* Minutes of Proceedings Inst. C.E., vol. i. (1840), p. 68.

mously elected to the office. He returned to India in November, and about the 1st of May, 1841, took charge of the steam branch of the Navy, aided by one chief assistant, four European foremen, a staff of one hundred European engineers and boiler makers, and about two hundred native artificers. He was the first native of India who had been placed over Europeans, and no doubt his path was not one of roses for a long time; but his natural kindness soon made him a favourite with all those placed under him, as he meted out justice to all irrespective of colour or creed. In 1843 the steam factory was opened for carrying out repairs, of which he took charge. The strength of the service was augmented both with ships and men; consequently his work increased to a corresponding extent. In 1851 he was struck with paralysis, and his life despaired of; but he recovered and came to England, and was allowed by the then Court of Directors to visit various cities to see the different improvements in machinery, his great hobby being to introduce novelties into Bombay. At this time he visited America and selected various wood-cutting machines, which were sent to Bombay. He was also the first to introduce the sewing machine, and show its working; and was foremost in introducing photography and electro-plating into Bombay. He returned to Bombay in 1852, and carried on the duties of his office until 1857, when failing health again overtook him.

In July 1858 he retired on a special allowance of Rs.400 a month, being two-thirds of the salary attached to the office, and much higher than the ordinary pension. After coming to England he so far recovered that he entered the service of the Indus Flotilla Company as their superintending engineer. He proceeded to Kotree in Scinde, the headquarters of the company, and took charge of the steam branch and workshops; but in less than two years he was compelled by ill-health to give up the post, and settled down at Richmond, for the remainder of his life, esteemed for his benevolent actions by a large circle of friends both European and Indian. He died on the 16th of November, 1877.

MR. SAMUEL HOCKING was born under the shadow of Carn-Brea Hill, near Redruth, in Cornwall, on the 6th of February, 1807. He was one of a large family, and his father, being a miner, took his son Samuel, at a very early age, to work in the copper mines of Illogan. In these mines, especially in the cele-