in the island of Mauritius, which post he held for about two years. In 1872–73 he was employed in Italy as Manager of the Cesena Sulphur Works. Since that date he seems to have devoted himself chiefly to private work, remaining active and clear-headed to the last. He died on the 4th June, 1901, at the age of 84.

Mr. Huntington was one of the oldest members of the Institution, having been elected an Associate on the 7th April, 1846, and transferred to the class of Members on the 27th March, 1866.

CHARLES WOOD was born at Bramford, in the county of Suffolk, in 1834. At the age of 17 he was apprenticed to Messrs. Ransomes and May, now Messrs. Ransomes, Sims and Jefferies of Ipswich. In the autumn of 1853 his masters sent him to India to teach and employ natives in making railway chairs for the Madras Railway Company, also to erect machinery and take charge of the foundries of the East Indian Iron Company. In September, 1854, he embarked for India, and arriving at Porto Novo on the Madras coast set the foundry to work. He was then sent to Beypur, near Calicut, to take charge of ironworks and blast-furnaces belonging to the same Company. After remaining there more than a year he went to Poolamputty to erect blast-furnaces, which work he carried out successfully in the face of great difficulties—away from the main road, not a European within 45 miles, surrounded by tigers, without drawings, almost without tools, and thrown entirely on his own resources. But a particular feature of his character was resourcefulness, and he carried the work through, although his health broke down under the strain. He was then recalled to Beypur, where he remained to the close of his Indian engagement in 1857.

In the spring of 1858 Messrs. Ransomes sent him to St. Petersburg to look after their interests in the erection of machinery, &c.; and in the following spring he repeated his visit and was engaged on the erection of works on the estate of Graf Shadowski in Poland. The next year found him in the South of Russia in the service of the same firm. In the autumn of 1861 he returned to England and was charged with Messrs. Ransomes' interest at the Exhibition of 1862. In the July following he was sent by the firm to Bucharest to assist in some difficult erecting work there. At Bucharest he entered into partnership

with Messrs. Ransomes' agent and had very good prospects, having been presented with a silver medal by the Government and appointed Assistant Engineer to the City of Bucharest. During his absence in England a revolution occurred, which wrecked his works and ruined his prospects. He was advised not to go back, and looked out for something to do at home. At this crisis of his fortunes his life-long friend, Mr. Jeremiah Head, recommended him to Messrs. Wilsons, Pease & Co., whom he served well and faithfully as Blast-Furnace Manager until a few years ago, when he commenced business on his own account at Cargo Fleet, where he manufactured all kinds of railway appliances, especially those relating to light railways.

In the course of his service with Messrs. Wilsons, Pease & Co. at the Tees Ironworks, Mr. Wood built for them two of the largest blast-furnaces in Cleveland. He was always on the look-out for improvements and introduced several of his own, which were generally adopted—such as a new kind of incline drop for lowering trucks from the top of the kilns, and a gun, fired by pneumatic pressure from the mouth, causing a ram to strike a copper cap, inducing explosion, adopted extensively for the dislodgment of dust in Cowper stoves. He took a leading part in developing the slag industry, having patented in 1870 a machine for making slag sand, followed by other patents in connection with slag—slag wool as a non-conducting packing was one of them. As early as 1860 he invented a wages-calculating machine for Indian money, shown in the Exhibition of 1862. During that year he also patented a balanced rake for hay and corn, shown by Messrs. Ransomes and Sims in the same Exhibition—now in general use. In 1867 he patented a pyrometer for heats up to from 600° to 800°, largely used by bakers and for testing heat in flues. In 1878 he prominently interested himself in the experimental production of steel sleepers, showing their great economy for hot countries like India; and three years later he presented to the Institution a Paper on "Iron Permanent Way,"[1] embodying the results of his study of that subject. Mr. Wood drew the attention of ironmasters in 1885 to the value of silicon in pig iron, and in 1889 to the use of alloys for strengthening materials. During the last twenty years he carried out several hundreds of miles of portable and light railways in this country.

Mr. Wood's genial disposition won him many friends. He was always on good terms with his foremen and workmen, knowing

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

that success lay very much in the direction of harmonious co-operation.

He was elected a Member of the Institution on the 4th February, 1879. He was also a Member of the Iron and Steel Institute, and of the Cleveland Institution of Engineers, to both of which he communicated several Papers.

JOHN HOPWOOD BLAKE, born in the City of London on the 22nd July, 1843, obtained his preliminary engineering education at King's College, Strand. He was apprenticed to Mr. R. P. Brereton, under whom he worked for several years on railways in Cornwall and South Wales. During that period the interest he had taken in geology while at King's College was increased, and ultimately this led him to join the Geological Survey, of which he was an officer from April, 1868, until his death.

Beginning his geological work in Somerset, Mr. Blake was afterwards employed on the Drift Survey of the area north-west of London, and then spent many years in Suffolk and Norfolk. In 1884 he went to Reading, to make the re-survey of that district, and afterwards to Oxford, where he died suddenly, of *angina pectoris*, on the 5th March, 1901. His engineering training had a marked effect on his survey-work, inducing great precision and excellent draughtsmanship. Naturally too he was led to study the applications of geology to water-supply, &c., and he became an authority on that subject in Berkshire and Oxfordshire. At the time of his death a memoir by him dealing with the underground water-supply of the former county was in the press. He was President of the Norwich Geological Society in 1880–81, and one of his Addresses was chiefly of an engineering character, being on the Conservancy of Rivers, Prevention of Floods, Drainage and Water-supply.[1] His scientific work was done in a methodical, painstaking and conscientious way, and its results were always at the disposal of others. In private life he was kind-hearted and generous, a good father and a true friend.

Mr. Blake was one of the first Students of the Institution. He was elected an Associate on the 2nd March, 1869, and was subsequently placed in the class of Associate Members.

[1] This address is in the Library of the Institution.
