

EDWIN CLARK was born at Marlow on 1814 January 7. His father was a small tradesman, and manufacturer of the pillow-lace for which the neighbourhood was renowned—an industry which came to an end on the introduction of machinery. Edwin was the eldest of three boys. (His brother, Latimer Clark, F.R.S., is well known in the scientific world, and is also a Fellow of this Society.) After boarding at an old school in the town he was at the age of eleven sent to a French school in Normandy, where in three years he acquired such a thorough knowledge of French that his translation of the *Chronicles of the Canongate* into French was published in France. He returned home in 1828, and was placed in a solicitor's office; but scientific tastes seriously interfered with his application to this work. Such tastes were but little understood at the time, and the boy was regarded by all his friends as a ne'er-do-well. But his diligence and attention to science, especially in its practical aspects, ultimately bore fruit. He obtained a position as teacher in his old school, and one of his colleagues, who was reading for the University, strongly urged the advantage he would derive could he go up for honours at Cambridge. A small legacy of 130*l.* which his mother received at this time was devoted to this purpose. But at the end of two and a half years the legacy and the trade of lace-making had both come to an end, and his impoverished parents found it impossible to continue his maintenance at the University. After some engagements as schoolmaster, Mr. Clark resolved on an apparently reckless project. He had long wished to see something of the world, and with ten pounds in his pocket and a knapsack on his back he started on a wild and indefinite tour on the Continent. He visited the Rhine, Switzerland, and crossed the Alps into Italy, making observations on glaciers and meteorology, and various scientific collections. He became an artist, and continued his tour through Rome to Naples, Pompeii, Salerno Pæstum, and at length returned to his home at Marlow in 1839, to the great delight of his father and mother. He at once accepted a mathematical mastership at Coombe Wood, and then at Brook Green, Hammersmith, and collected a small library and a stock of scientific apparatus.

But this profession did not hold him long. In 1845 the railway mania had resulted in the great financial crisis which threw so many surveyors and engineers out of employment; and at this inopportune juncture he suddenly abandoned the school to assist in the survey of the proposed line between Brighton and Oxford. This project speedily collapsed, but Clark's determination to be an engineer was taken. With an introduction of the most slender character, he repaired to Mr. R. Stephenson's chambers in Great George Street, an office that was destined afterwards to become his own for so many years. Mr. Stephenson was at that time overwhelmed with work, especially in the great contest between the broad and narrow gauge, and Mr. Clark was at once informed of the hopeless improbability of a personal inter-

view. But, nothing daunted, he waited patiently for hours every day in the ante-room during a period of three weeks, and at last was rewarded by a chance interview. He was fortunate enough to be able to prove his abilities almost immediately, and the foundation of his career as an engineer was laid.

The problem on which he won his spurs was that of the Britannia and Conway Tubular Bridges, for the construction of which he was ultimately placed in absolute control as resident engineer. He was for many years chief engineer to the Electric Telegraph Company, and invented and patented the hydraulic graving dock and canal lift. He constructed the great dock at Bombay, and others at Malta and London. He was the designer of a host of bridges, including the great swing bridges at Arnhem, Lyons, and Rochester, the Aire Tubular Bridge, and the Scarborough Viaduct. He was the original inventor of the block system of signalling. Mr. Clark also laid the cable from Dungeness to Holland, and negotiated the agreements and erected the telegraph for the chief English railways. He was engineer to the Crystal Palace Company, and completed the building of the Palace after the fire.

Mr. Clark was singularly careless about money ; in early life he had known poverty, and in 1873 his contracts amounted in the aggregate to five millions and a half. The change of fortune affected him but little. He retired entirely from all business in 1876, travelled for two years in South America, and finally settled down in Cromwell House in his native town. His habits were of the most simple description, but he always enjoined the maxim "that a day had been entirely lost if at its close the practical power had not been acquired of doing something that could not be done before," and his genial, happy disposition was fitly represented by his favourite motto, engraven on his sun-dial, *Horas non numero nisi serenas*.

Mr. Clark was elected a Fellow on 1858 July 9, but contributed no papers to the Society. He had, however, a keen interest in astronomy, as in all other branches of science. He was the owner of a fine 8-inch refractor by Ross, and continually used it until within a year or two of his death. He had a good astronomical library, and kept a very careful meteorological record at Marlow.

In a public lecture at Great Marlow, such as he delighted to give, he has described his early astronomical education, which began with naked-eye observations of the Moon and stars as they appeared and disappeared among the tall chimneys from a window in the East End of London. These chimneys were his transit-wires. An old German in the neighbourhood lent a copy of "Ferguson's Astronomy," and "I soon calculated eclipses, and mounted a cardboard transit instrument and equatorial on a water-butt at the back of the house."

Mr. Clark died from internal cancer on 1894 October 22. He

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had suffered for some three years, and bore his long and painful illness with exemplary fortitude and patience until the last.

JAMES COCKLE was born on 1819 January 14, being the second son of the late James Cockle, formerly of Great Oakley, Essex. He was educated at Charterhouse (1829-31), and afterwards by private tuition. He left England in 1835 November, for a year's sojourn in the West Indies and the United States. On 1837 October 18, he entered Trinity College, Cambridge, graduating in 1841 (Stokes' year) as 33rd Wrangler. His subsequent eminence as a mathematician is thus a considerable encouragement to those whose position in the Tripos falls short of their expectations. Mr. Cockle was entered as a student at the Middle Temple in 1838, and practised as a special pleader, 1845-49; he was called to the bar at the Middle Temple on 1846 November 6, and joined the Midland Circuit at the Nottingham Spring Assizes in 1848. In 1862 April he draughted the "Jurisdiction in Homicides Act" (Imperial). From 1863 to 1879 he was Chief Justice of Queensland, and was knighted in 1869. He was Senior Commissioner for the consolidation of the Statute law of Queensland. He returned to England in 1879, and from that time till his death his leisure was devoted to the writing of mathematical papers and the affairs of several learned societies. He was elected a Fellow of this Society on 1854 March 10, and served on the Council from 1888 to 1892. He was elected a Fellow of the Royal Society on 1865 June 1, and of the London Mathematical Society on 1870 June 9, filling the Presidential Chair from 1886-88. He was President of the Queensland Philosophical Society 1863-79, and was an honorary member of the Royal Society of New South Wales.

His mathematical papers number more than eighty, and, with the exception of four on the motion of fluids, deal entirely with pure mathematics.

In the Savage Club (London), of which he was treasurer 1884-89, it was a familiar sight to see him quietly working at some algebraical research on the back of an envelope or some odd scrap of paper, though always ready to break off and offer a genial welcome to one of his friends. On committees or councils he was singularly reticent, rarely venturing a suggestion unless appealed to, but the regularity of his attendance testified to the keen interest he took in the management of business. He was a Commissioner for the Queensland Section of the Colonial and Indian Exhibition held in London in 1886; and was nominated to represent the Australian Colonies at the Washington Prime Meridian Conference in 1884, but was unable to accept the position.

Sir James Cockle died at his London residence on Sunday, 1895 January 27. He leaves a widow and eight children.