

girders to the centre of the floor, and of a method of trussing floor-plates to form a light economical bridge. Until within the last year or two, when considerations of health became paramount, he was an extremely hard worker, no detail of business escaping his attention. His evidence as an expert was requisitioned in several important arbitration cases. He was the proprietor and manufacturer of the "Hawksley" tread for staircases used at many railway stations and in public buildings. Mr. Westwood died on the 18th April, 1898, after a long illness. He was a Member of the Institution of Mechanical Engineers, of the Institution of Naval Architects and of the Society of Engineers. He was elected a Member of this Institution on the 29th May, 1877.

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GEORGE KIFT WINTER, who died in Madras on the 17th January, 1898, at the age of 55, was the second son of the late Mr. William Winter, surgeon, of Henbury, near Clifton, Bristol. He was born on the 7th March, 1842, and was educated at the Godolphin School, Hammersmith, where he showed great aptitude for mathematics. The first years of his professional career were passed in the service of the Electric and International Telegraph Company, and for some time before going to India he acted as assistant to Mr. W. T. Ansell in the construction of that Company's lines in the South of Ireland.

In January, 1864, Mr. Winter was appointed Assistant Telegraph Engineer of the Madras Railway, and shortly after became head of the Department, which position he retained until his death. He introduced numerous improvements in the instruments employed in, and in the working of, the Department, which became a model of efficiency and economy, with the result that when the Government of India Telegraph Department took over the management and working of all the Indian railway telegraphs several years ago, that of the Madras Railway was not interfered with.

Mr. Winter's active mind was always at work, and combining sound theoretical knowledge with much mechanical instinct, he brought out and patented between the years 1872 and 1895 many useful inventions, among which may be mentioned the following, in regular use for many years on the Madras Railway:—(1) A simple electric method of setting the clocks at the principal stations of the railway to correct Madras time at 1 P.M. daily. (2) A simple and inexpensive method of electrical communication between passengers, guards and drivers, using the side chains of

the rolling stock as electric couplings. (3) Block instruments and electric starting semaphore signals.

Mr. Winter contributed several Papers, containing the results of many of his experiments and investigations, to the *Philosophical Magazine*, the Institution of Electrical Engineers, the British Association, and various scientific journals.

Mr. Winter was for many years an examiner and Fellow of the University of Madras, and took much interest in technical education. With his brother officers and friends he was a great favourite, his good nature, kindness and hospitality being proverbial; he was also much liked by his staff and workmen, by whom he was presented with an address and a gold watch, as a token of their esteem and regard. He was a Fellow of the Royal Astronomical Society and a Member of the Institution of Electrical Engineers.

Mr. Winter was selected by the Government Astronomer of Madras to take part with Mr. W. N. Pogson in the eclipse expedition to Masulipatam in August, 1868, and in that to Avanashi in December, 1871. On the first occasion he observed the general phenomena of the eclipse, made an outline drawing of the corona, and a series of very valuable polariscope observations. At the 1871 eclipse he again made polariscopic observations, which fully confirmed his former results. Among other works carried out by him may be mentioned the apparatus for firing the Madras time-gun at Fort St. George, and for liberating a time- semaphore in lieu of a time-ball.

Mr. Winter was elected a Member on the 7th December, 1886.

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ARTHUR WILLIAM BISHOP, eldest son of Mr. M. Holman Bishop, of Undercliffe, Lewes, was born in Westminster on the 16th March, 1868. He was educated first at Eastbourne and subsequently at King's College, London, where, in his first year, he obtained mathematical and workshop prizes in the Applied Sciences Department. In 1886 he became a pupil of Mr. (now Sir) John Wolfe Barry, Past-President, and Mr. H. M. Brunel, and was for four years engaged on their staff in the construction of the Barry Dock and Railways. In February, 1890, he was appointed by Sir Charles Hutton Gregory, Past-President, an Assistant Engineer on the Cape Government Railways. His first employment in that capacity was on the completion of the line between Cape Town and Simon's Bay, after which he had charge of the construction of