

shot at both large and small game, and many a panther, bear and ibex have fallen to his rifle in the Coimbatore district. He was a keen naturalist, especially in the field of ornithology, and regularly contributed the results of his experience to the columns of "The Asian" and "The Field" under the well-known *nom de plume* of "Smoothbore." Lastly, he was a great lover of books, and was intimately acquainted with English literature.

Mr. Carter was a man of gifted qualifications, refinement and culture; but the prominent feature in his character was to be found in his vigorous personality, which infused itself in all his dealings with his fellow-men. Essentially right-minded, methodical to a degree, of strong and healthy instincts, he was clear, practical and decisive; conspicuously just, but unobtrusively kind, and of great quickness of perception. In private life he was simple, unaffected and unostentatious, and except to his family and intimate friends, perhaps somewhat reserved; he was punctual and exact in all his engagements, and required others to be the same; resolute in his adherence to his convictions, he yet held liberal views on all questions of social interest.

Mr. Carter was elected a Member of the Institution on the 13th January, 1880, and in 1896 his name was enrolled on the books as an honorary life subscriber.

WILLIAM SANTO CRIMP, born at Ringmore, South Devon, on the 18th June, 1853, was educated at home, being considered too delicate to go to a public school. He evidently had a natural bent for engineering—when only a youth he designed a small scheme of water-supply for the village of Modbury, adjoining the parish in which he lived; and this scheme was subsequently successfully carried out, and is still in operation. On the completion of his education he first served an apprenticeship with a firm of Agricultural Engineers at Modbury, and subsequently came to London as a pupil for two years of the late Mr. Charles Hyde. At the end of 1875 he became an assistant to Mr. Baldwin Latham, under whom he was engaged for a considerable period in making hydro-geological surveys in Surrey. During 1877 he went to Melton Mowbray, and took charge, as Resident Engineer, of the sewerage works for that town, designed and carried out by Mr. Baldwin Latham. In the following year he was engaged in making further hydro-geological surveys, chiefly in connection with the opposition to the Metropolis Water Bill, proposed by the

Metropolitan Board of Works. About that time he was also employed on various surveys in connection with works of water-supply and sewage in different parts of the country. In the same year he became Resident Engineer under Mr. Latham on the Wandle Valley sewerage scheme for the Croydon Rural Sanitary Authority. This scheme included an important outfall works at Merton, with large pumping station, described by Mr. Crimp in a Paper presented to the Institution in 1884.¹

Towards the end of 1881, on these works nearing completion, Mr. Crimp was appointed Engineer and Surveyor to the Wimbledon Local Board. At that time there were complaints of serious defects in the main drainage of that district, and great nuisance was caused by the sewage farm. So bad in fact was the state of the farm that an action was brought to restrain the Wimbledon Authority from continuing to treat sewage on a considerable area of the farm; and but for the steps taken by Mr. Crimp the plaintiffs in this action would doubtless have obtained the injunction they were seeking. The Wimbledon Sewage Farm, as first laid out, gave Mr. Crimp a great deal of anxiety, and it was only after he had altered the whole method of working which had obtained up to that time that he was able to get an effluent sufficiently pure to admit its being turned into the River Wandle. The farm consisted entirely of heavy clay land, and the whole of the surface had been drained by means of field drains laid close to the surface, so that the sewage when admitted for irrigation immediately found its way into the sub-soil drains, and passed out at a point of discharge in almost as bad a state as when first admitted. Mr. Crimp prevented this by placing a bed of puddle over each drain at such a depth as to be below any liability of disturbance from cultivation. He then had the siftings from the house refuse and road drift dug in, so as to prevent the clay from cracking in dry weather. These methods proved most successful, and are still being used; and, it may be stated that, during the last eighteen years, there has been a uniformly high class effluent from this farm.

The whole time he was at Wimbledon Mr. Crimp may be said to have been continuously experimenting on a practical scale with the treatment of sewage; and he doubtless acquired there that thorough grasp of this difficult subject which was of such assistance to him in after years. He also made many valuable experiments on the treatment of sludge and its disposal; and on

¹ Minutes of Proceedings Inst. C.E., vol. lxxvi. p. 317.

the movement of air in sewers. The results of many of these experiments were communicated by him to the Institution.¹ During his connection with the Wimbledon Local Board he prepared a scheme of water-supply for that authority, which was adopted by the Board; but, owing to one of the London Water Companies obtaining powers over the district, his scheme was not proceeded with. While at Wimbledon he carried out a large number of works, including the erection of two bridges over the River Wandle.

In February, 1890, Mr. Crimp was appointed District Engineer to the London County Council, where he had charge of the Barking Outfall Works under Sir Alexander Binnie. With Sir Alexander's concurrence, he introduced radical changes at Barking in the working of the precipitation tanks, and thereby was successful in reducing the labour involved in removing the sludge from the tanks; and in many other ways he improved the methods of working. In conjunction with Mr. Worth he presented to the Institution a valuable Paper entitled "The Main Drainage of London."² He was also engaged in several large street improvements in London, including the formation of Rosebery Avenue.

In July, 1894, Mr. Crimp joined the firm of Messrs. John Taylor & Sons, of Westminster; and from that time to his death continued to practise as a Consulting Engineer. During this period, Mr. Crimp, on behalf of the firm of which he was a partner, constructed many main drainage schemes, among which may be mentioned those for the districts of Woking, Ilford, Shrewsbury and Gillingham. He also acted as Consulting Engineer to the Corporations of Glasgow, Cardiff, and Bristol, in the matters of main drainage schemes for those cities; in each case acting in conjunction with the City Engineer.

In the summer of 1899 Mr. Crimp was invited by the Municipality of Bombay to visit India, with a view to report on questions arising out of the main drainage of that city, and on a number of other matters affecting the health of the community. He visited India for this purpose, and successfully dealt with many questions on which his advice was required. Whilst in India a number of other municipalities, including Simla, Surat, Cawnpore, and Poona, obtained his advice on numerous questions. He also

¹ Minutes of Proceedings Inst. C.E., vol. lxxxviii. p. 175; vol. xxvii. p. 383; and vol. cxxii. p. 198.

² *Ibid*, vol. cxxix. p. 49.

investigated for the Indian Government the question of underground water supplies within the Presidency of Bombay, and made a voluminous and valuable report thereon.

Mr. Crimp had of late years become an acknowledged authority on all matters of municipal engineering. He was an excellent Parliamentary witness; having so thorough a grasp of the subject that he was able to answer almost any question with precision. His services were in consequence retained for nearly all the Corporation Bills of recent years.

His death was sudden and unexpected. In general he enjoyed good health, although he was not particularly robust. While making an inspection of some lands in the north of England during the cold wet weather of April, 1901, he contracted a severe chill, which, developing into pleurisy and pneumonia, resulted in his death on the 21st of that month. At the early age of 47 he was thus cut off in the prime of his professional career and at a time when his reputation had become firmly established. It may be truly said of him that whilst he had hosts of friends, he never made a single enemy.

Mr. Crimp was elected an Associate Member of the Institution on the 6th May, 1879, and was transferred to the class of Members on the 13th January, 1891.

JOHN BARKER HUNTINGTON, born in 1817, began his engineering career in 1834 as a pupil of Mr. John Braithwaite. On the expiration of his pupilage he remained with Mr. Braithwaite as principal Assistant and as a Resident Engineer on the construction of the Eastern Counties Railway, now part of the Great Eastern Company's system. From 1845 to 1853 he was employed on general engineering work in connection with railways and docks, and in the latter year he presented to the Institution a Paper entitled "Observations on Salt Water, and its Application to the Generation of Steam."¹ In 1854 he went to Italy for two years to represent the interest of the English shareholders in the Lucca and Pistoja Railway.

From 1856 Mr. Huntington was engaged in private practice for about ten years, chiefly in connection with railways and waterworks. In 1866 he was appointed Inspector of Roads and Bridges

¹ Minutes of Proceedings Inst. C.E., vol. xii. p. 506.