Oxford Dictionary of National Biography

Bazalgette, Sir Joseph William (1819–1891), *civil engineer*
by Denis Smith

Bazalgette, Sir Joseph William (1819–1891), civil engineer, was born on 28 March 1819 at Enfield, Middlesex, the fourth child and only son of Joseph Bazalgette (1783–1849), naval officer, and his wife, Theresa Pilton (1796–1850). The family were of French origin: Bazalgette's grandfather Jean Louis (1750–1830), born at Ispagnac in southern France, arrived in England in 1784. Bazalgette was educated privately. He began his engineering career in 1836 when he became an articled pupil of John Benjamin Macneill, the eminent Irish civil engineer, acting as resident engineer for him on land reclamation works at lochs Foyle and Swilley in Londonderry. In 1842 he set up in private practice as a consulting engineer with an office in Great George Street, Westminster. In 1845 Bazalgette married Maria, daughter of Edward Keogh. The couple had six sons and four daughters.

During the railway mania years, overwork caused a serious breakdown in Bazalgette's health and during 1847–8 he left London to recuperate. Having recovered, he returned to London in 1849 and on 16 August was appointed assistant surveyor to the second metropolitan commission of sewers for London. Thus began his career in public health engineering. By 1851 the metropolitan commissioners, under their engineer Frank Forster (1800–1852), had clearly established the broad outline scheme of interceptor sewers to divert sewage from the Thames, with separate systems north and south of the river and with remote outfalls to the east of London. When Forster died in 1852 Bazalgette was appointed engineer, and remained so until the commissioners were replaced by the Metropolitan Board of Works (MBW), established under an act of 1855, which acquired its powers on 1 January 1856. Bazalgette continued to act in a temporary capacity as engineer until his formal appointment as engineer to the MBW on 25 January 1856.

Bazalgette held the post of engineer until the board was replaced by the London county council (LCC) in 1889 and his greatest works were undertaken during this period. He took with him three assistant engineers, John Grant, Thomas Lovick, and Edmund Cooper, who had each worked with him at the metropolitan commission of sewers. The first work of the new authority was to complete the design and implement the sewage commission's plans for the main drainage of London. In 1858 the MBW obtained its enabling act and work began on the northern sewer system on 31 January 1859. Work proceeded more rapidly south of the river and that section was completed in 1865. The northern system was delayed

by the complexities of integrating the low-level sewer, the Victoria Embankment, and the Metropolitan District Railway. The whole system comprised 1300 miles of sewers, 82 miles of the main west–east intercepting sewers, and four magnificent pumping stations, Deptford (1865), Crossness (1865), Abbey Mills (1868), and Western (1875). The northern system was running in 1868 and the whole completed with the opening of the Western pumping station.

As part of the main drainage scheme Bazalgette fulfilled the long-cherished plan of the embanking of the Thames in central London. Three major works were entailed—the Albert (1868), Victoria (1870), and Chelsea (1874) embankments—a total length of 3½ miles for which 52 acres of riverside land was reclaimed. The Thames River, Prevention of Floods Act of 1879 imposed on the board the duty of implementing its requirements which Bazalgette regarded as ‘one of the most difficult and intricate things the Board have had to do’ (‘Royal commission’); 40 miles of river frontage and every wharf had to be inspected and plans prepared after careful study of the nature of business at each site. In 1865 Bazalgette was joined by his son Edward who began four years as an articled pupil; in July 1870 Edward became assistant engineer, eventually with responsibility for metropolitan bridges.

An act of 1877 empowered the MBW to purchase the Thames bridges from the private companies and free them from tolls. To implement this Bazalgette had to survey and value twelve bridges. As a result, much maintenance work was undertaken and Bazalgette decided to replace three of the bridges with new structures to his own design. They were the present masonry arch bridge at Putney (1886), the steel-link suspension bridge at Hammersmith (1887), and the iron arch structure at Battersea (1890). The removal of tolls from the central bridges led to demands for new river crossings below London Bridge and Bazalgette was involved in three major design schemes, for Tower Bridge, Blackwall Tunnel, and Woolwich free ferry. Only the latter was built to his design. Although he submitted three designs for the Tower crossing in 1878, his preferred scheme being an innovative high-level single-span steel arch of 850 feet, the City eventually chose its own architect's scheme. The MBW was about to issue the contract for Bazalgette's Blackwall Tunnel design when it was replaced by the LCC. In addition to the Thames river crossings Bazalgette was concerned to ease the horse-drawn traffic congestion in the capital and initiated a programme of design and construction of new thoroughfares. The principal examples include Southwark Street (1864), Queen Victoria Street (1871), Northumberland Avenue (1876), Shaftesbury Avenue (1886), and Charing Cross Road (1887).

Another important aspect of Bazalgette's work as engineer to the board was to monitor the progress of private bills passing through parliament of works which

would have an impact on the public amenities of London. These would include railways, tramways, docks, water supply, and the energy utilities—gas, electricity, and hydraulic power. He produced a detailed annual report to the board on these schemes and he was a well-known and influential figure in the committee rooms of the houses of parliament. Bazalgette described his role in reply to a select committee in June 1874 saying: 'private individuals are apt to look after their own interests first, and to forget the general effect upon the public, and it is necessary that there should be somebody to watch the public interests' ('Select committee on the Metropolitan Buildings and Management Bill', 1874, 10.535).

While acting as a salaried engineer to the MBW, Bazalgette was allowed to take fee-paying pupils and to develop an extensive private practice as a consulting engineer. He was frequently asked to give his professional opinion on drainage schemes produced by other engineers, and to produce designs and estimates of his own for towns in Britain and abroad. Some thirty-two such reports survive from 1858 to 1875, including Epsom (1858), Oxford (1866), Windsor Castle (1868), Northampton (1871), and Margate (1874). In 1863 he was involved in advising on the drainage and street paving of Odessa and he produced a major report on the drainage of the city of Pest in Hungary in 1869. He also designed the masonry bridge over the Medway at Maidstone which was opened in 1879. Unlike many civil engineers, Bazalgette assumed a continuing responsibility for the works he designed and constructed and was responsible for maintenance, staff changes, development of operational techniques, and renewable contracts for the supply of materials.

Bazalgette's career, and the profession of municipal engineering, grew out of the public health problems which were first seriously tackled in the mid-nineteenth century. An engineering career in local government, involving huge capital expenditure of public money, provides many opportunities for alienating politicians, lay committee members, and ratepayers. Bazalgette's career with the MBW, spanning thirty-three years, reveals him as an able administrator of human and financial resources with a gift for selecting competent and loyal engineering colleagues. His career brought him into professional contact with the greatest engineers of his day.

He was elected a member of the Institution of Civil Engineers in 1846, was made a companion of the Bath in 1871, and knighted at Windsor Castle in 1874. Sir Joseph was elected president of the Institution of Civil Engineers in 1884, where appropriately his presidential address discussed 'those engineering works which promote the health and comfort of the inhabitants of large cities, and by which human life may be preserved and prolonged' (Bazalgette). In his office at the MBW he trained several influential public health engineers of the next generation, and to

him we owe the standards of municipal engineering now taken for granted in many parts of the world. He retired, as he said, 'after forty years of arduous and responsible work in the public service' (LMA, MBW minutes, 1889, 326), to his Wimbledon house in 1889. Within his 20 acres of land Bazalgette said 'I ride a good deal—usually two or three hours a day. I find it splendid exercise for counteracting the effects of a sedentary life' (*Cassell's Saturday Journal*, 30 Aug 1890, 1160–61).

Sir Joseph Bazalgette died at his home, St Mary's, Arthur Road, Wimbledon, aged seventy-one, on 15 March 1891. He was buried in a splendid neoclassical tomb at St Mary's Church, Arthur Road, where he was churchwarden for many years. Bazalgette was described as 'very slight and spare, and considerably under the average height; but his face, with its prominent acquiline [*sic*] nose, its keen grey eyes, and its grey whiskers and black eyebrows, gives you the impression of a man of exceptional power' (*Cassell's Saturday Journal*, 30 Aug 1890). Sir John Coode, the president of the Institution of Civil Engineers, paid tribute to his career, which was devoted to the 'public health and welfare in all the large cities of the world, and his works ... will ever remain as monuments to his skill and professional ability' (*PICE*, 105/3, 1890–91, 106).

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Denis Smith, 'Bazalgette, Sir Joseph William (1819–1891)', *Oxford Dictionary of National Biography*, Oxford University Press, 2004 [http://0-www.oxforddnb.com.wam.leeds.ac.uk:80/view/article/1787, accessed 6 April 2007]

Sir Joseph William Bazalgette (1819–1891): doi:10.1093/ref:odnb/1787