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Editorial

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Editorial

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History and heritage are especially important for any nation in shaping and moving the nation in right direction, and in making progress and understanding the failures and successes of the past. History helps us to understand the present and project the future. Engineering history provides us with the ingenuity of techniques and the decision-making process, and enables us to understand how projects were constructed without having access to modern tools. It is still difficult to understand how the Taj Mahal of India and pyramids of Egypt were constructed so neatly.

During the middle of the 19th century, London, UK, did not have a sewer system and each house used to have a cesspool beneath it, which all drained into the River Thames. The sanitary condition of the city was bad. The Great Cholera Epidemic of London started in 1854 and it took many lives. People at that time used to believe that cholera came from contaminated air (Wikipedia, 2020). During this outbreak, John Snow, a renowned physician of England, analysed the locations of the patients by ‘placing dots on a map of the area to show where cholera cases had occurred and noticed that they had one thing in common’ – that they all are taking water from the Broad Street (now Broadwick Street) pump (Wikipedia, 2020). The source of the water was a section of the River Thames where cesspools were drained. He identified that the water of the Broad Street pump was the cause of the cholera. At that time, it was an enormous task for Dr Snow to convince the city council that water was the source of cholera epidemic.

Ultimately, he convinced the city council and the handle of the Broad Street pump was dismantled. Within days, cholera incidences started to decrease. John Snow discovered that the source of cholera is water infected with faecal bacteria. This was a landmark discovery in public health and saved many lives. This discovery later helped the development of chlorine disinfection of water. Still today, chlorine disinfection practice is widely used by the water industry. Nowadays, Dr John Snow is regarded as the founding father of epidemiology (Wikipedia, 2020).

The city of Calcutta (now known as Kolkata) was established as a city in 1690 when Job Charnock of the East India Company annexed

three fishing villages separated by forests, creeks and canals and connected to the River Hooghly in the west and the salt lakes in the east. Calcutta, which was surrounded by creeks, swamps and salt lakes, used to have a natural drainage system. However, in due course, many creeks, wetlands, and tanks were filled, and as a result natural drainage was obstructed and the city water logging started (Neogi, 2017). The city of Calcutta had an issue with rainwater drainage almost since its inception. The city sloped down

Figure 1. John Snow memorial and the pump on Broadwick Street, London, UK (Wikipedia, 2020)

towards the east and away from the River Hooghly, resulting in difficulty in draining rainwater to the river by gravity. Initially, the city built a canal system to drain rainwater to the salt lakes in the east. After long deliberations for many years, the city decided to build its first brick sewer system in 1858 and the first sewer line was commissioned in 1868. By 1890, Calcutta had 300 km of brick sewer networks. In one of the papers in this issue, Dey and Downey (2020) document in detail the history of the development of the Calcutta sewerage system and its recent rehabilitations, which helps present and future generations of engineers to understand problems of the city drainage system.

The city of Calcutta, with its population of five million as well as an additional 2 million floating population, does not have any sewage treatment system. Instead the city has the almost century-old East Kolkata Wetlands (EKW). The EKW is an example of wonderful large wetlands, demonstrating that a city can have a large symbiotic ecosystem that provides sewage treatment, aquaculture and agricultural lands for the city, generating livelihood for thousands of people. Over the years, a unique management and operational system has been developed by the farmers and fishermen for proper management of the system. However, in recent times, due to high real estate prices in the area, the wetland was systematically encroached, reducing its size from 12 000 hectares to 4000 hectares (Nandeesh, 2002). The EKW is a big asset of the city of Calcutta, which eliminates the need for a formal sewage treatment plant, acts as a buffer for flooding for the city and, at the same time, produces fish and agricultural products for the city's population.

In 2002, the EKW wetlands were recognised as a Ramsar site for their benefit to society and in 2006, the EKW Management Authority was created to provide institutional oversight (Das Gupta, 2020). This all happened thanks to a huge effort by Dr Dhrubajyoti Ghosh, a renowned ecologist-cum-civil engineer of Calcutta, who pushed the cause of EKW through various international forums and through the state political process to receive these recognitions. In this issue, Das Gupta (2020) describes the history of development of EKW showing its social, financial and economic importance for the citizens of Calcutta.

Due to the large growth of Calcutta during the nineteenth century, the transportation system became a big issue. In 1874, to cope with the need for transportation to and from the city of Calcutta, a pontoon bridge was constructed across the River Hooghly to Howrah. In 1943, to facilitate increasing river boat traffic, a high-level balanced cantilever bridge – an icon of the city called Howrah Bridge – was constructed with limited tools and equipment available at that time. This bridge provided more than 75 years of excellent service to the city. It was designed in such a way that access for regular inspection was provided to facilitate easier maintenance (Ghosal, 2020a). Proper planning, design, construction and, importantly, making proper provisions of institutional and financial

arrangements in the Howrah Bridge (Amendment) Act 1935 for proper maintenance of the bridge provided an enhanced service life for the bridge serving about a million of people each day. Ghosal (2020a) provides details of construction of the bridge in third paper, which will be a complement to an earlier paper by the same author on planning and design (Ghosal, 2020b).

Calcutta is a resilient city and it has passed through many calamities, such as sudden growth of population after the partition of Bengal at the time of independence in 1947 and a temporary surge of 10 million population at the time of the war with Bangladesh in 1971. Its nineteenth century infrastructure provided great services to the city for a long time. It is time to understand the planning, design and construction aspects of the historical infrastructure of the city and to recognise the ability of the infrastructure to continue providing a good service for a long time.

It is expected that the three papers presented in this issue on history and heritage of the city of Calcutta, discussing the EKW, Howrah Bridge and the brick sewer system, will stimulate discussions leading to understanding the importance of history and heritage in helping and guiding the present and future generations of engineers working on the developments of the city in the right direction. The Institution of Civil Engineers did a commendable job in putting together engineering aspects history and heritage of the city of Calcutta in front of the engineering community of the world.

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