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Editorial

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> For years and years, even during the time of my last visit in 1962, it has been said that Calcutta was dying, that its port was silting up, its antiquated industry declining, but Calcutta hadn't died, it hadn't done much, but it had gone on. (VS Naipaul, Poet Laureate)

Human habitats grow traditionally in areas that provide an opportunity for the livelihood of intending settlers, water for survival and a promise of the availability of food in plenty. Rivers, which offer easy communication links, and therefore access to livelihood, potable water in plenty, and prospects of easy agriculture, used to be favourite places for the early settlers in search of a habitat.

The banks of River Hooghly, a distributary of Ganges, thus attracted Job Charnock, a representative of the East India Company who was entrusted to identify an ideal location for setting up a business hub in Eastern India, which had already proved to be a rich source of business for the company. The Hooghly is an easy flowing river in the plane lands of the Gangetic basin. It is only 144 miles (230 km) upstream from the confluence with the Bay of Bengal. Tidal flow variations of up to a twenty feet (6 m) during some days in the year allowed boats, with use of oars and sails, to move around with ease, and at the same time permitted ocean going ships of the seventeenth century to come and set anchor for loading/unloading operations (Figure 1).

The Hooghly created a meandering separation of mainland India from the eastern low-lying delta region, which is criss-crossed with flowing streams of saline water from the estuarine area. The mainland is more of a solid landmass with rising altitude and fewer water bodies and offered an easier settlement prospect. However, Mr Charnock, who arrived on a humid day in August 1690 with a small posse of soldiers, selected the eastern bank with its difficult terrain, full of marshy land and habitats of mosquitoes and insects. He made this choice to avoid unwelcome frequent visits by marauding, looting armies of rulers of small kingdoms, who used to survive by plundering traders and agricultural settlers. He had noticed during an earlier visit to the area that the landing ghat was deep enough for large ships to anchor and be serviced for cargo handling. The area, being difficult for human settlement, had little importance for the ruling Mughal dynasty at Delhi, and he was allowed to buy, from the local landlords, three villages in the area for an insignificant amount. Permission for unrestricted trade rights followed easily with an annual tax payment of few hundred pounds.

The East India Company started as a trading outfit dependant on imports of raw materials from affluent countries of the east and selling to them the products of the growing industries in Great Britain and Europe. The Industrial Revolution, which had started after the invention of the steam engine, textile machinery and the like, created both an unending demand for raw materials and a need for new markets, and Britain sought new shores for both. India, which was fragmented into small and medium kingdoms after the downfall of the mighty Mughal Empire, proved to be an ideal destination for the trading companies of the West, particularly the British who were expert mariners and clever traders.

Giant warehouses could be created on the low-lying lands by providing earthen bunds as protection against flooding, and the soft soil conditions provided opportunities for rapid growth of the needed infrastructure. Thus, across three small villages were sown the seeds of the great city of Calcutta, as an offshore settlement for the traders and sailors serving the Company. Mr Job Charnock welcomed local settlers in the new area without any restraint,

Figure 1. Loading/unloading operations taking place on the banks of the River Hooghly

prompting the entry of local traders and their settlements to develop side-by-side with the foreigners.

The company initially selected opium and indigo as their prize trading items, forcing local farmers to cultivate these unfamiliar items, and the fortunes of the company soared. In 1757, at the Battle of Plassey, the British East India Company won a decisive victory over the rulers of eastern India and started expanding its trading rights. The power to act as administrator of three large states in the east brought them the first opening for settlement of the colony that survived for two hundred years and made India an integral part of the British Empire. Calcutta benefited from this development and started growing as the centre of the emerging new ruling entity. Infrastructure growth, along with the establishment of new edifices and pioneer institutions, became the order of the day.

The city developed as a link between the local merchants, brokers and financiers and the British business houses that started large-scale trading in the country. It created an influx of enterprising people from around the country, seeking to grow their wealth in this newly developed city. Business divided between the firms of Britain, having a modern outlook, and the local Indian traders operating on traditional practices. Both flourished simultaneously and nurtured developments in both the modern part of the city around the Fort William, the seat of the armed forces, and the northern part that housed the Indian business community.

The growth of the city was further aided by the flourishing trade in the textiles of Bengal, a much-prized item in Europe, Africa, and North America. Their popularity reached a stage when Britain had to ban the use of Indian textile to save its domestic industry. Other industries that contributed to the profits of the company, and therefore the fortunes of Calcutta, were the tea and the coal industries, for both of which Calcutta was the main hub of activities and the beneficiary.

For more than 150 years, the unhindered economic growth of the company and, after the takeover by the British government in 1857, of the colony, made the city attractive enough to be termed the crown jewel of the British Empire and a desired destination of erudite tourists. Calcutta served as the capital of India, until its shift to Delhi following the declaration at the Delhi Durbar in 1911. After this, the city started losing its eminence, with the commercial centre of power gradually shifting to the centre of administrative power. However, the formation of the Calcutta Improvement Trust, through an enactment at the newly formed Bengal Legislative Council in 1911, continued the development process, although private investment declined.

Apart from the financial success and the growth of urbanisation that was the result of the Industrial Revolution, the development of Calcutta can be linked to the trait of the British, who had always acquired a second loyalty – loyalty to the place of service life (Tyson, 1952). This trait, which surprises other Europeans who had dominated foreign lands but never became integrated, had helped the all-round development of Calcutta, which was lovingly developed by the British and nurtured as their hometown, making it the second city of the British Empire, next only to London!

With soaring profits from Calcutta, many Company officials brought their families to settle in Calcutta and a decision was taken to turn the city into a hub of modern amenities. Calcutta attracted substantial foreign investment and achieved many a first in diverse areas: first to get a Medical College and multi-speciality hospital; first bank; first shopping complex; first luxury hotel, first Mint; and the list goes on (BCCI, 2018).

In infrastructure as well, Calcutta had the first tramways company; in Howrah Station, the largest railway complex; the first modern port; in Howrah Bridge, the longest span bridge; the first modern water supply system based on surface water; and the first scientifically planned drainage system.

Calcutta had the first Chamber of Commerce in 1834 and this was followed by the Bengal Chamber of Commerce in 1853, an institution that is still operating as the leader of all trade and commerce activities in the region. The significance of this event can be understood from the fact that the London Chamber of Commerce was inaugurated only in 1881 (Tyson, 1952).

The story of the development of Calcutta and its innumerable heritage structures and institutions, many of which have survived the toll of time, makes interesting study material. I believe that the Institution of Civil Engineers deserves universal compliment in publishing three themed issues in *Engineering History and Heritage* on eminent engineering structures and projects in Calcutta, which reflect the inherent capabilities of civil engineers to beat all odds and challenges.

This issue of the journal is the first in the series and includes four papers of different flavours, on topics that contributed to the growth and sustainability of the city.

The problems of drainage of the swampy land, that was wilfully chosen as the site for the creation of the city, was an inherent challenge right from its birth. The history of the formation of this system and its importance to the sustenance of the growing metropolis has been very well deliberated in the paper by Gangopadhyay and Patra (2020). The stage-by-stage development and the improvement measures initiated to keep the system functional makes interesting reading. The gradual decline of the water transport facilities that helped the commercial growth of the city and the need for the rejuvenation of the canals to share the challenges of the urban transport system have been highlighted. The importance of the paper lies in the skilful compilation of historical data, now almost out of bounds for researchers.

While drainage was an intrinsic problem facing development of the settlement on the marshy areas, supplying potable drinking water for the populace of the ever-growing urban settlement has

continued to be a challenge, even after 300 hundred years of its existence, despite the availability of a mighty river on its edge. Dey and Patra (2020) in their paper on Pulta–Tallah water supply system have described the development of the system, with a treatment facility 22 km away from the main storage tank at the fringe of the city. The gradual expansion of the treatment facility with changing technology from slow sand filters to the present advanced system within a limited land area and a rapidly silting riverbed makes absorbing reading. The transmission mains throw up regular challenges for engineers. There are six of them now, of various sizes, passing under a heavily used road that is the northern entry corridor from the suburbs. The strengthening of the system is vital for the sustenance of the mega city of today.

The livelihood of the city dwellers has always been, directly and indirectly, dependant on the port that has given Calcutta its identity. The river is recognised as the most valuable asset of the city, and apart from its life-sustaining function, it has given the city a riverine port that has been recognised as one of the best of its type in the world. Being the first modern port of the country, and functioning effectively after 150 years of its formation, this is the subject of the paper by Gardner *et al*. (2020). Starting as an anchoring facility of sail ships in the seventeenth century, it gradually developed into impounded dock systems at Kidderpore, N S Docks and also at Haldia, downstream on the river's western bank. The river is a meandering stream with varying water flow contributed by other streams joining midway and has a large tidal variation along its alignment. Maintaining the shipping channel by dredging and river training works, and piloting the ever-increasing size of ships and tankers are the challenges that have been analysed in the paper and conveyed with intimate detail. The study of future growth of the port and its efficient functioning by management of meagre resources will make the paper an important document for future researchers and historians.

The final paper in this issue deals with the history, planning and design aspects of the iconic Howrah Bridge (Ghoshal, 2020). The construction and maintenance aspects of the bridge are covered in another paper, which will appear in a subsequent issue. Howrah Bridge, even though a gigantic steel structure consuming 26 500 tons of steelwork, has remained the darling of the city populace for more than 75 years. A smarter looking cable-stayed bridge a kilometre away, built 30 years ago, has not been able to dislodge the older bridge in popularity. The paper explains historical factors and the unique structural aspects of the bridge and how it ushered in bridge building capacity in the country that has never needed to invite foreign constructors to build its large-span bridges over its wide rivers. The bridge was built during the Second World War and had been threatened with bombing by enemy planes. It had many dramatic developments, with the country eagerly moving towards its independence from two hundred years of foreign rule. Yet, through all this, the bridge was completed in five years, a very short time by present standards, and is still used by millions of city residents day in and day out.

These issues of the journal, with Calcutta as a theme city, will surely be enthusiastically welcomed by the Calcuttans, who are immensely proud of their city, despite all its deficiencies of urban system and services. The pride is reflected in the papers, largely authored by Calcuttans, and shows off their passion, in much the way of the Parisians!

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