

# The river front of Benares: between 'sacred' waters and sewage water

Savitri JALAIS

IPRAUS; Ecole Nationale Supérieure d'Architecture de Paris-Belleville, 78 rue de Rebeval, 75019, Paris, France

Email : [savitrijalais@yahoo.com](mailto:savitrijalais@yahoo.com)

## ABSTRACT

The *ghats* (steps and landings leading to water bodies) and palaces of Benares, built along the river Ganges between the end of the 17th century and the beginning of the 20th century, appear today as foremost references of monumental water-front constructions. This paper explores the role played by these constructions in establishing a relationship between the Ganges and the city of Benares. While integrating the river to the city they simultaneously protect the city from the river currents raising thus the question: were the palaces of Benares with their *ghats* and their foundations constructed to play this double role? Furthermore, they are regularly repaired to counter the erosion of the running river water, and the damages caused by leaking drains running along the *ghats*; sewage flows over them before discharging into the Ganges. We shall present the palaces and their *ghats* in association to both the running 'sacred' waters of the river Ganges and the sewage water of the city.

## KEYWORDS

Water-architecture, river, sewage

## INTRODUCTION

The palaces and *ghats* (steps and landings leading to the water) built along the river Ganges, in the state of Uttar-Pradesh, India (Fig. 1), have consolidated the banks of the river and have protected the city of Benares from river currents and annual floods. Yet, many of these *ghats* and palaces have, in spite of their grandeur, collapsed and are today in a state of ruin. There are numerous reasons which explain the causes for the damages to these structures, including lack of means to maintain and renovate them. This paper will limit its study to the role of water as a cause for damage: running waters, river water, streams and rivulets, flooded tanks and ponds as well as percolating sewer.

I shall initially present the different palaces and *ghats* in their historical context followed by the techniques used in their constructions. I shall then proceed to place these structures in their geographical context so as to understand their position in relation to the river and to the drainage system of the city. These structures will be questioned as to how effective they are and if during their construction they take into account the sources of running water which often happens to be the first cause for the crumbling of foundations. We shall discuss how on one hand the structure permits ready access to the river water, considered sacred and purifying for ablution; and on the other hand how the lack of efficient drainage structures pollutes this 'sacred' river.



Figure 1: Benares is built on the river Ganges, in the state of Uttar-Pradesh, India

## HISTORY OF THE RIVER FRONT

The palaces of Benares give to the water front a majestic greatness and beauty. Soaring up five to six floors high, these palaces, constructed in sand stone, red, rose or ochre in colour, seem like fortresses. The first few floors have very little openings (a single entrance, and few tiny windows) or none at all, and serve only as a base for the more open and inhabited floors. The river front unfolds in an arc form, more than six kilometres in length, compared by Havell in 1905 to 'an amphitheatre, glittering in the sunlight'. The palaces and *ghats* are constructed facing the Ganges and the morning sun. The other bank being free from any construction, they have no vis-à-vis with other buildings but stand erect in front of the seemingly infinite horizon. During the monsoon season, the river overflows and pours partly on this opposite bank.

It is frequent to read that the ancient Kashi (the luminous)<sup>1</sup> is the oldest continuously inhabited city. Historically, its date of origin is uncertain and there are doubts regarding the actual position of the ancient site and its correspondence with today's city. However, the city is mentioned in various ancient texts that confirm its importance as a cultural and religious site since 800 B.C. Till today, this city plays an important role as a religious and philosophical place as well as one of the most important pilgrimage sites in India.

The palaces and *ghats* (Fig. 2), that form today the riverfront of Benares, were built in more recent times. Most were built, in the 18<sup>th</sup> and 19<sup>th</sup> century, when the city began to be reconstructed. A renewed economic and political stability (after 400 years of Muslim rule) led to the construction of eminent residences and religious complexes. Rich personalities came from all over India and beyond, to build temples, palaces and shelters that would welcome pilgrims. It was prestigious for them to have a presence in the city and monumental constructions were a way to reaffirm their power (Freitag, 2006). They brought with them styles particular to their region and adopted techniques prevalent during the Mughal period in India. These numerous palaces, constructed between the rivulet Assi in the south and the river Varuna in the north,

<sup>1</sup> Another name for Benares.

reflect the power not of a unique monarch nor of a single culture but of many contributions and individual wishes of minor kings, rich bankers and patrons from all over India (Freitag, 2006).



Figure 2: View of the *ghats* and palaces

The city of Benares is closely associated to the Ganges and to the religious character of the river. In the Hindu conception, the water of the Ganges is sacred and purifying. The immersion and ablutions in its waters are an everyday practice for the inhabitants as well as for the pilgrims coming from all over India and beyond. The *ghats* enable an easy and clean access to the river, and their architecture, as pointed by Julia Hegewald (2002), is widespread all over India along sacred rivers, lakes, tanks and ponds. However, such a long stretch of *ghat* construction is particular to Benares. Here, *ghats* permit an easy access to the city constructed on top of a ridge of firm *kankar* (concentration of lime) filled clay. This high position is supposed to naturally protect the city from floods, and the *ghats* further reinforce the banks. This leads us to ask if *ghat* construction is a tradition or a novelty in its means to protect the city from the river?

### TECHNIQUES OF CONSTRUCTION

The foundations of these palaces and *ghats* are rarely visible as they are covered by the river and extend way below ground surface. One has to depend on different sources to have an idea about the forms and the materials used for their execution. For example, documentation on foundations of hydraulic constructions exist - forts, bridges and sluices, built in the same period as the *ghats* and palaces of the 18<sup>th</sup> and 19<sup>th</sup> century. These structures rested on piles of brick masonry, a tradition probably brought to India by the Mughals and used for the foundations of the *ghats* and palaces of Benares. Another current way to imagine old *ghat* foundations are by comparing them to those found in other cities. In Vrindavan, where the water of the river has reduced to a considerable length, *ghat* steps do not descend to the water's edge and foundation piles are exposed, enabling one to have an idea about the dimensions and forms of the ones in Benares (Fig. 3).



Figure 3: Masonry wells as foundation piles in Vrindavan

Medley in 1873 gives a brief description of foundations built along rivers (Medley, 1873). According to him, wooden piles were rarely used as timber was scarce and was prone to rot. Instead cylinders of brick masonry were used, three to twelve feet in diameter, sunk to firm stratum and safe from river erosions. 'A sufficient number of wells are designed to carry the super-incumbent weight whether it be a house or the pier of a bridge, and the whole series being sunk to the required level, and as close together as possible; the tops of the wells are arched over, the arches are all connected together by slabs of stones or other arches, and on this artificial platform the superstructure is raised' (Medley, 1873, p.15) (Fig. 4).

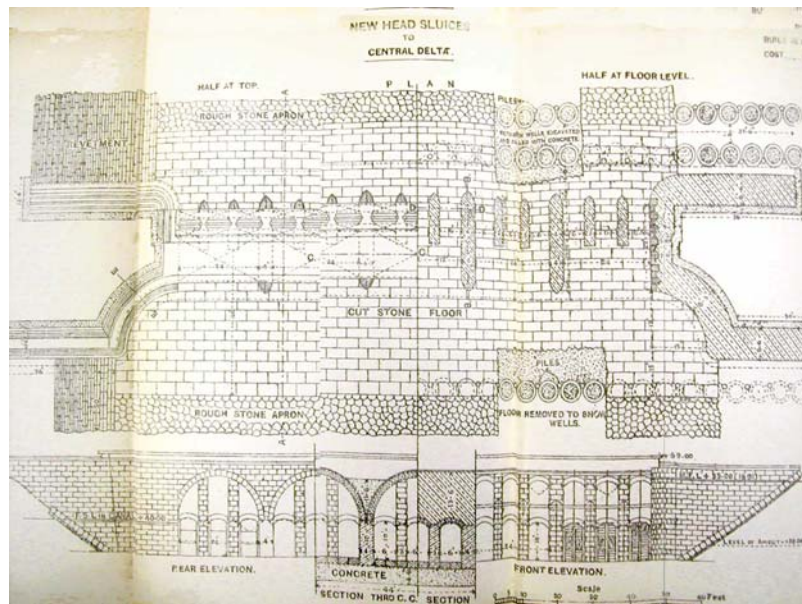


Figure 4: Foundations on piles of brick masonry called wells (example of a sluice in central India).

Today, many of the new *ghats* being constructed or the old ones getting repaired use five meters high RCC (reinforced cement concrete) piles placed every two meters. To further protect these piles from the water currents, huge boulders are heaped up in front. On the other side, a mixture of sand, broken stone and cement cover the surface of the bank on which stone steps are arranged.

Stone steps or *ghat* like structures are common today for the more important *ghats* (like Assi *ghat* where stone is used for each step - Fig. 8), however less known banks are often reduced to just a sheer expanse of steep retaining walls, now and then broken up into terraces. This kind of intervention is implemented to reduce expenses while at the same time insuring the protection of the *ghats*. Instead of stone, brick (much cheaper in cost and execution) is used on the surface.

A thorough survey on site will be needed to study more closely the structure of the *ghats* and palaces in their context. Primarily, it will be important to calculate how effective the new structures are and compare them to the old ones. Secondly, their permeability will be questioned in relation to the river and to the drainage and sewerage systems, especially in relation to the overflow of sewage.

### DRAINAGE AND SEWERAGE SYSTEM IN RELATION TO THE GEOGRAPHICAL CONTEXT

According to Singh, « just as the banks would most probably have been protected in the past thanks to the forest that covered this site, so today the stability of the bank is maintained by the construction of *ghats* and palaces » (Singh, 1955). Based on the map of Prinsep, Dr. R.L.Singh has drawn in his book a figure which illustrates the initial physiographic conditions of Benares. Along the river Ganges a high ridge can be seen, extending almost continuously from one end of the city to the other interrupted only at Dasaswamedh *ghat* by the *Godaulia nala*<sup>2</sup>. This high ridge, made of clay and *kankar* (lime concentration) acts as a solid natural barrier protecting the city from the river.

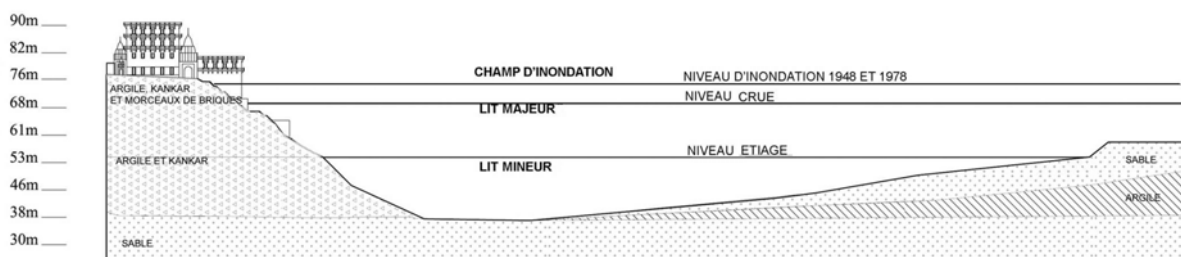


Figure 5: Diagrammatic section on the river bed in Benares, not to scale (drawn by the author)

The palaces and *ghats* of Benares have been constructed on this high ridge further consolidating the banks (Fig. 5). They form the extremity of the city and are mainly designed in relation to the river water and are thus very different from the rest of the buildings found in the city. This river front seems to be constructed independent to the city that spreads out behind. In Prinsep's map of 1828 (Fig. 6), the level of land on the other side of the ridge slopes down slightly and a series of ponds and tanks are found all along the ridge. Initially, these tanks were supposed to collect the drainage and direct it either through the Varuna river or through the *Godaulia nala* into the river Ganges. However, with the densification of the city, most of these ponds and *nalas* have been filled up.

<sup>2</sup> *Nala* : it can signify a big drain, a gutter, a rivulet or a watercourse.

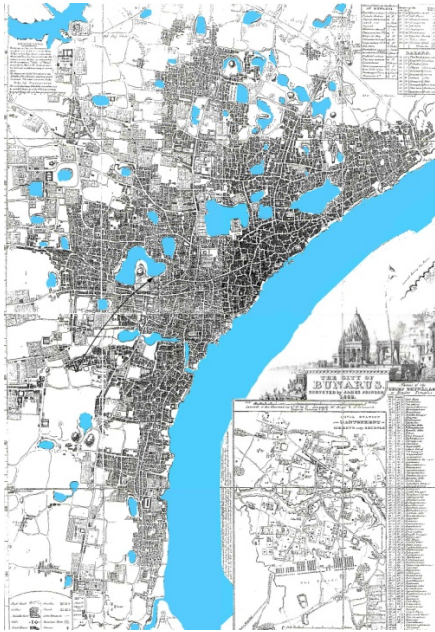


Figure 6: Map of prinsep, 1828



Figure 7: Overflow of sewage causing destruction of palatial houses

Till what extent were the construction of *ghats* and palaces linked to the infrastructure of the city? Actually, rich personalities were ready to pay large amounts for the development of religious structures in the city: *ghats*, temples, *dharamshalas* (shelters for pilgrims). To a certain extent, public welfare too was financed by the patrons of the city as an act of piety. However, the city spread in an unplanned way and there lacked a powerful coordinating body that would effectively work on the management of large infrastructures. A committee did form for a very short period. It functioned from 1826-1829 and began various works for the development of the city. Prinsep, who was its secretary, pointed out that « while resident pensioned noblemen and disinherited princes were embellishing the City in massive stone above ground the members of the committee would content to labour in humble brick underground » (quoted in Swami Medhasananda, 2002, p.435).

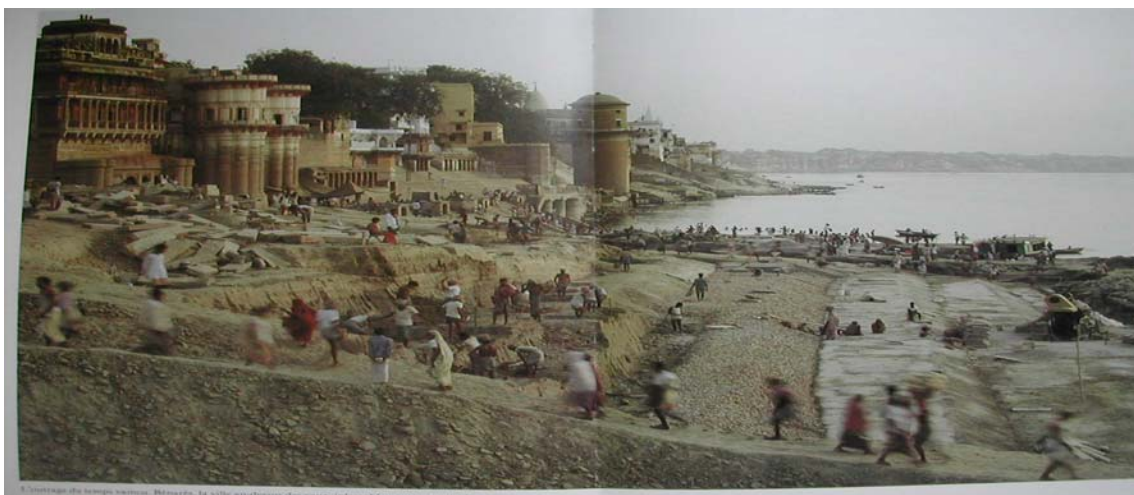


Figure 8: Construction of Assi Ghat (picture by Pierre Toutain in *Bénarès*, BNP Paris, 1985)

Before the beginning of the 18th century Varanasi had an extensive system of underground drains meant primarily for carrying rain-water. These were large drains unsuitable for the flow of sewage as they were rectangular in shape with irregular gradients. Made of brick and rough stone

work (from 1 to 6 feet wide and from 1 to 9 feet deep.) they ran at varying levels down the centre of the paved lanes, connected with courtyards of houses. They later played a role in the laying and development of a new sewer at their old site. Actually, the committee that worked for the improvement of the city in 1826 designed one main sewer, carrying the entire sewage of the city. It was built running down the stream and dropping the sewage into the Ganges near Rajghat (Singh, 1955).

Around 1867 a municipal Board was instituted that introduced improved sewerage and drainage facilities. However, an entire sewerage system was introduced in the city only in 1891 and completed by 1917. This must have been the time when most of the tanks and *nalas* were filled up, either for construction of buildings or for establishing new roads (eg. The Godaulia *nala* was transformed into a sewer with the Dasaswamedh road built over it).

With time this sewerage system installed became inadequate with the quickly expanding city. Furthermore, numerous leaks in the pipeline led to overflow of sewage directly into the Ganges at several places (Fig. 7). There are several records of palatial houses collapsing because of these leakages. Already in 1955, Singh mentions that « the reconstruction and improvement of the *ghats* as also the improvement of the drainage system are interrelated problems and need to be tackled at the same time » (Singh, 1955, p.44).

In 1971, to prevent the pollution of the river at the important *ghats*, a new sewerage system was added. This system, constructed on the bank of the river, intercepts the sewage discharges to the river and is called the “*Ghat intercepting sewer*”. The sewage discharge comes from a number of old drains from the ghat portion of the town and all the sewer that cannot be drained into the main sewer (Report, 1986).

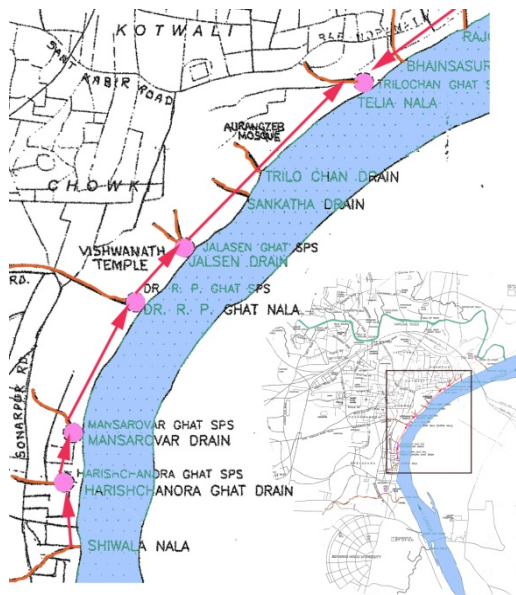


Figure 9: Plan of the *Ghat intercepting sewer*

Figure 10: Pumping station at Lalita *ghat*

Today, the scene of the *ghats* are much denatured by the presence of huge cylindrical often light pink coloured sewer pumping stations constructed along the entire river front (Figs. 9 and 10).. These structures are supposed to pump out the sewer drained towards the *ghats*, and take it towards a treatment plant. Six major drains, which pass through densely populated areas of the city before discharging into the river, are tapped and pumped at the 5 pumping stations. The problem is that these pumps work on high electrical means which the city cannot afford to invest

on. Therefore, during power cuts, which occur at regular intervals during the day, these pumps cease to function. The sewage then flows directly into the river over the *ghats*. In places where the river is used for domestic or ritual purposes there are some arrangements done to shift this same sewage, through pipes and manholes, a little distant off. But, this does not prevent the pollution of the 'sacred' river by the sewage water.

## CONCLUSION

In a city of over 1.2 million habitants, the pollution of the river presents a health hazard specially to those who bath in it and drink its waters. Many organisations have sprung up within the city to try and find a solution to the problems linked to the pollution of the Ganges. There is a contradiction in the fact that 'Ganga water' supposed to purify should have 'a fecal coliform count, in the religious bathing areas of the *ghat*, 10,000-100,000 times higher than acceptable level' (Kirchner, 1997). This short presentation tries to associate the lack of adequate sewage facilities to the architecture of the river front. It invites to study documents elaborated by the different bodies responsible for the maintenance of the *ghats*, the drains, the sewer, and the water pollution of the Ganges and question the existing links between these different bodies.

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The river front of Benares: between 'sacred' waters and sewage water – Savitri JAL AIS

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