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Editorial

The basic and most important unit of the society has been the family from the beginning. For the empowerment and development of the country, first of all it is necessary to pay attention to the moral, social, economic and cultural dimensions of basic institutions like family. Balanced development of the family is very important for the development of the society. Therefore, if we want to have a complete and balanced development of the country, then we need to lay maximum emphasis on the basic institution called family. It is necessary that we should not make any discrimination between son and daughter in the family and we must explain this to our sons and get them involved in their activities. Even today, those who belong to the old belief believe that a woman cannot get any freedom, she cannot go anywhere alone, she cannot roam anywhere alone, but today's youth refuse to accept these values.

Some people also say that the importance of the walls in the house, the same importance is given to the education of the boys in the society. But how is a house made? Who are in the base of the house? The base of the house is our daughters, our girls, that means they are related to the roots. If our root becomes weak in the society, then our house or house cannot be strong at all. There is a need to understand this social context in reality.

The extent of favoritism is reached when we see discrimination in small tasks. Some people think that a girl is someone else's wealth, what job she should do. That's why some parents discriminate between boys and girls and this discrimination is visible somewhere in our behavior, in feeding and dressing. This is sheer injustice. God has given the same brain to boys and girls and today girls are proving it by bringing better results.

Girls stay at their parents' house for only a few days, so it is our duty to pay deep attention to their education, upbringing, only then we can fulfill the concept of a strong society. God has made us the trustee of our children so it is our duty to treat all members equally with full justice because both boys and girls have same power, same soul. So we should give them equal opportunities for development.

The basic objective of women empowerment is the development of women and communication of self-confidence in them. Women empowerment is important for the overall development of the society. Empowerment of women is the most important social phenomenon because they are the creators. If you empower them, make them strong, encourage them, it is better for the society. Women and men are the basis of creation and human society. Both complement each other. These are the wheels of the chariot of life by which the journey of life runs

smoothly. The role of both has been equally important for stability in family and society. The basis of change and development in a society depends on the mutual interaction of men and women, walking step by step and equal mobility of both. A chaotic situation is created in social life when any one side lags behind. The history of mankind is witness to this that where women have been neglected, the development of the society has been stunted. The role of women in creation of creation, education of children, upbringing of family is much more important than that of men, thus her position becomes central in the society. Therefore, without the progress of women, there can be no upliftment of mankind and society. As far as India is concerned "Yatra Naryastu Pujayante Ramante Tatra Devta" means where women are worshipped. The deities reside there. With this ideal any Indian woman can feel pride in comparison to the western woman. The ideal of learning in Saraswati, the ideal of wealth in Lakshmi, the ideal of valor in Durga, the ideal of purity in Ganga, even the ideal of creation in the form of Jagad Janani we find only in India.



Professor Akhilesh Shukla
Chief Editor

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Public Health and the Disputed Issue of Subsoil Water in Colonial Bombay City: 1860-1900

• **Madhu Kelkar**

Abstract- *In 1860, the Vihar Water works introduced piped water supply in the city on Bombay. Even though the then Victorian sanitary paradigms, gave great importance to the removal of waste water, yet no effective drainage and sewerage were provided immediately after the entry of Vihar waters. Public health therefore continued to deteriorate. Measures to deal with these diseases, particularly malaria, plague and cholera, involved shutting down of tanks and wells, which not only gave additional land for construction but also entrenched the piped water supply system in the city. Further, the defective waste water systems, created again in the name of public health, only aggravated the problem of subsoil water leading to more death and diseases. This article argues, via a study of archival sources, that the issue of subsoil water, and the concomitant problems it produced, was neither properly understood nor dealt with seriously either by the Bombay Municipality or the Government. It asserts that the current problems of flooding and insanitation that the city faces can be traced to the faulty drainage and sewerage systems created in the colonial period.*

Keywords- *Bombay, Victorian, Public health, sub-soil water, tanks and wells*

Introduction- 19th century Bombay witnessed a rise in population due to rapid industrialization, particularly due to the employment demands of the cotton textile industry which increased from 13 in 1869 to 136 in 1900. Insanitation and diseases rampaged the city prompting the government to solve the problem partially by inaugurating a pure water supply in the form of Vihar water works in 1860. Though both, pure water supply through hydraulic systems and sewerage and drainage, were considered important pillars of sanitation, yet Vihar supply was not followed by commensurate planning or execution of the drainage system, since it was felt that water supply could take precedence over drainage. Even though it was acknowledged that the defective drainage of Bombay subjected a population of almost a million to malarious diseases and therefore was an evil of the first magnitude and despite the warnings of leading health officials, like W.J. Simpson, Municipal Health Officer, of Calcutta, and TS Weir, his counterpart in Bombay, of the urgent need for modern drainage and sewerage works, that the daily pouring of millions of gallons of water into Indian cities, without providing drainage, was inundating fetid subsoil with sillage and risked intensifying malaria and other deadly diseases, nothing was done. Weir greatly apprehended and feared the disastrous effects on public health from the extension of the water supply

with no commensurate increase in drains. Thus, as Ira Klein notes, the pure water movement contributed to circumstances which favoured the outbreak of plague. Gerry built quarters aggravated the spread of the disease.

The Trajectory of Drainage -1860- 1900- Drainage of Bombay city was a complex problem. Several drainage schemes submitted in the 1850s, were cast off on account of their cost, lack of perfection, or their sheer absurdity. The fact that drainage issues of the city were never considered independently but constantly and unfavorably compared with England did not make it easy either. In India, following the example of contemporary England, creation of drainage schemes proved to be difficult due to poor communication among various departments and differences among engineers regarding what would be the best for the country. While only a few select engineers were entrusted the task of designing, experience regarding the same was gathered via experimentation ultimately. Drainage and sewerage schemes of Bombay were referred to 'experts' in England who were least familiar with the city thereby resulting in gross errors. The drainage and sewerage of the island was even otherwise a difficult proposition since reclamations and its own geographical formation had made the island prone to flooding. Administrative procrastination, popular colonial prejudice against the available indigenous engineering talent in the city and delays in surveys further impeded performance in this area.

In the 1860s, schemes submitted by engineers such as Tracey and Russell Aitkins, suggesting the sewerage of the island with multiple outfalls on the eastern and southern sides, were rejected as it was feared that the harbor would be affected as a result. From the 1860s, the drainage and sewerage issues also came to be tied with the rising fortunes of the city as an important port and trading center. The sewerage issue, especially, hinged on the key factor of sewage disposal which was a knotty subject since it was difficult to decide the location of the outfall. The debates on this as well as the proposals for sewage irrigation, which received attention from engineers and doctors, indisputably bring out the experimental nature of sewage disposal, thought of by administrators at this time. The other disputed areas were underground drainage, type of drainage and night soil disposal. The Scoble Commission, appointed in 1869 to look into these issues precisely, maintained the status quo. But in the following decade, due to the spectacular growth of the city, especially towards the North, the need for additional land on the Flats (currently the area identified as Bombay Central), for building purposes and the insistence of the Army Sanitary Commission to remove the system of open drains which were associated with disease and death and costly to maintain, Governor Sir Richard Temple's reign saw the introduction of the new underground system of sewerage with the water carriage system, with the sewerage outfall at Love Grove in Worli. The choice of this outfall in 1877 was premised on the idea that it was a cheaper and flexible one; one where the sewage could be diverted elsewhere, if need be, or defecated if the project of sewage utilization materialized, although it was not known if the soil was compatible for such a plan.

Work commenced in December 1878 and was completed in May 1881. By the end of the first decade of the 20th century, the city contained about 200 miles of underground storm water drains and about 116 miles of sewers. By 1897, Mazgaon, Agripada, Parel and Chinchpokli were sewered on the Shone system at a cost of 13.24 lakhs. Malabar hill was also sewered at a cost of about 6 ½ lakhs, a portion of the sewage being dealt with by biological treatment. The effluent was discharged on the sea, west of the hill. More than 200 latrines were constructed mostly based on the water carriage system. By 1889, however, C W MacRury, Sanitary Commissioner reported that the drains laid in Bombay in the late 1880s were without any foundations. But since they were hidden from public view the latter was not aware of their condition. The subsoil of the most densely populated parts of the city as a result was excrement, sodden and water logged. He considered the then state of drainage and sewerage of the city a reproach to the municipal administration of the city. Far from being self-cleansing, Bombay drains, at this time were sewers of deposits, causing cholera. The abnormal rains of 1896 (the year in which plague broke out) bore testimony to the flaws of drainage system when 5 million gallons of water, which could not be drained, welled up through the manholes in places where it had never been seen before. In that year, fevers which stood at 6404 or 7.79 per 1000 of population were attributed to high levels of subsoil water. The report of the health officer for 1896 clearly indicted the insufficient drainage caused by an increase of sewage, subsoil water and the absence of connections between buildings and sewers; overcrowding; disposal of refuse on the flats; imperfect provision in the Municipal Act regarding rebuilding of houses on old foundations without space for ventilation and drainage being left on one side and the obstruction of sea currents around the island by the causeways and embankments at Bandra and Kurla, for the epidemic conditions in the city. Since 1892, with the onset of water from Tansa, the water to the island had increased from 16 ½ million gallons to 29 million gallons or more daily and no commensurate increase in drains. Even, T.S. Weir the health officer looked at the future of the health of the city with anxiety. At this time a complete drainage of the city and prevention of waste of water were deemed imperative for the health of the city. Colaba too witnessed the most extraordinary rise in subsoil water. Similarly, the north side of the Marine Lines had a huge reserve of subsoil water while the Tramway authorities grumbled about exactly the same on their ground opposite to Victoria Gardens. Evidence about the rise in subsoil water was the difficulty experienced in examining some of the water mains, without resorting to pumping, though the mains were laid only a few feet below the surface!

Defective Drainage, Public Health and Subsoil Water- High subsoil water favoured the creation of malarial conditions in the city and also set the stage for the attack of Plague. By the end of the nineteenth century, among the 7 wards of Bombay, the highest mortality was displayed consistently B and C wards consisting of Mandvi, Chakala, Umerkhadi and Dongri in B ward, Market Dhobi Talao, Fanaswadi, Bhuleshwar, Khara Talao and Kumbharwada in C

ward. Kamathipura though recently sewered also surprisingly, showed a high mortality rate as also Byculla and Parel. This high mortality was attributed to the problem of increased levels of subsoil water, the drainage of which, many felt, had been neglected. This subject had been the focus of discussion since the introduction of Vihar waters. Water logging, a characteristic feature of the city, had been rendered much worse ever since then.

The issue of subsoil water and its alleged impact on public health excited much argument. But since it was vague, misunderstood and lacked satisfactory data to go upon, opinions on it were characterized by lack of unanimity among engineers who questioned whether the problem existed at all; the number of drains required to remove this water and whether they were required at all. Complaints had been made as early as 1865 by Mr. Walter Cassels, a councilor, who had steered the Act of 1865 through the Council, against the extravagant waste of Vihar supplies. Engineers like Mr. CB Braham endorsed Braham's views since the new hydraulic system fostered underground leakage, due to defective joints in the water mains, watering of gardens and so on. Others like Hector Tulloch and Rienzi Walton, who did not concur with the idea, ascribed it to storm water accumulation. Indian members of the Bombay Municipal Corporation attributed the water logging in the city to three probable reasons. Greater quantity of water being brought into the city than could be disposed of by the naturally and artificially constructed outlets; the obstruction caused in these outlets or a combination of both. The Impediments to the outlets were present in the form of the natural rocky prominence ahead of the outlet channels of the sluices at Love Grove, silting up of the storm water reservoir by the side of the race course, filling up of the Flats, construction of the Causeways, Vellard, and Harbour works.

The policy of filling tanks, which were considered fecund grounds of Malaria and cholera, was also held responsible for the problem. Filling in of the tanks had been done without any understanding of the subsoil streams of water that originally fed them. Consequently, the space thus created resulted in constant flooding as was evidenced by the road created on the Khandia tank. Engineers reluctant to fill the tanks had, opined that *'hesitation should always be exercised before filling up tanks and making reclamations throughout the city.'* The tanks were sinks to which surface and sub soil waters gravitated and therefore performed a very useful function which could not be 'lightly disregarded'. James Smith, special drainage engineer stated categorically *"I am convinced that no presently existing tank can safely be filled up until the drainage system be greatly improved and extended."* Bombay's public backed the opinion. Agitatedly it appealed to the government that *"wells and tanks besides being of constant use ordinarily and specially under emergencies are natural reservoirs or places for the accumulation of subsoil water whenever that nature of land is watery.... and Bombay land is watery. If they are filled in or the places of accumulation done away with, the sub soil water must naturally rise to the surface and do much harm and mischief to the general health."* Even the Parsis who were the most impacted by malaria protested against the measure. but all protests went unheard.

Baldwin Latham and Santo Crimp- Representations made to the Corporation and the urgency of the issue resulted in the visit of eminent sanitary engineer Mr. Baldwin Latham in 1890. After studying the drainage system of the city, he opined in his report 'Report on the Sanitation of Bombay' that the filling in of the Flats with kachra (solid waste of the city) had blocked the most important channels for the escape of the underground water, resulting in the rise of the ground water level in the lowest parts of the affected district. Latham confessed that *'it was a misfortune that the early sanitary works there were not designed in a better way.'* European rules had been applied to Indian towns which, in his judgment, were not sufficient for the purpose. Further he condemned, the outfall at Love Grove along with the engines, which caused the problem of silting of the main sewers and also showed the fallacy of the float experiments of engineer Mr. Jagannath Sadashiv. Since the main sewers had already been laid with a fall towards Love Grove, he recommended that all sewage should first flow to that place and from there be pumped into a high-level gravitating sewer running from Parel to Colaba and discharged at the latter place, at ebb tide only, beyond the Prongs Light House. But Latham's proposals were impossible to execute as they recommended the relocation of the sewage outfall at Colaba the bastion of the Navy!

By the last decade of the nineteenth century from the earlier 16 ½ million gallons to 29 million gallons a day, thanks to Tansa lake, without a concomitant increase in drains. Water logging, a characteristic feature of the city, was rendered much worse as a result and contributed to the city's unhealthiness. Curiously however, experiments carried out by a small sub-committee appointed in 1898, of three of the best European experts and a native expert to investigate the subject, discovered that the level of sub-soil water in the city was lower instead of being higher than before. The appointment of two more Committees of the Corporation did not resolve the matter. Confounded by the contradictory evidence on the issue, the Corporation ultimately authorized the Commissioner to engage the services of Mr. W Santo Crimp to report on the whole question.

In 1899, Mr. Santo Crimp an authority on sanitary engineering, visited the city on the request of the Bombay Municipality, to advise on the various drainage questions, particularly, that of the disposal of the surface-water of the city, and that of the discharge of the sewers at the Love Grove outfall. For a long time, loud complaints had been made by public regarding the sewage discharged at that outfall, the smell being perceptible, particularly at the time of the ebb tide, all along the eastern foreshore of the Malabar Hill. Float observations taken by him showed that sewage discharged here was carried by the tide towards the coast in the direction of the Malabar Point. In order to remedy the nuisance, he recommended the extension of the existing outfall to deeper waters, treatment of the sewage, discharged during the first four hours of the ebb-tide, with electrolyzed sea water and Permanganate of Potash and extension of the outfall sewer to Worli Point, discharging at that point, all the sewage during the ebb-tide, and at the Love Grove outfall during the flowing tide. Although he discarded the

theory, of the unhealthiness of the city due to the lack of subsoil drainage, he however voiced the possibility of the introduction of Tansa water without adequate drainage as a distinct possibility for the state of affairs. Therefore, he advocated that the most important works that were required in the city was the completion of the drainage system, to prevent the moisture from sinking into the soil which would also prevent the recurrently increasing saturation of the soil with all types of filth which then escaped and soaked into it. Cementing of the gullies and side channels in the streets was also expected to accomplish the same. He approved of the proposal of carrying off the storm waters from the higher levels into the sea, to keep them from running on to the low-level area. These financially unviable suggestions were bound to be disregarded by the government and the BMC while the city continued to expand unabated in the next century.

Conclusion- It is evident from the above description that the drainage and sewerage of the city was a neglected area right from colonial times and works executed then were highly flawed in nature. The issue and gravity of subsoil waters was neither understood nor acted upon as the one and only principal of drainage, then, was to remove the sewage of the city to the outskirts of the contemporary core city, viz Love Grove. The foundations of the waste water systems laid then along with haphazard development continued to aggravate the problem and the city, once described as 'urbs prima in Indis' remains, till date, insanitary and flood prone.

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