



BESNAGAR AND BHON : TWO PARADIGMS OF ANCIENT CANAL STRUCTURES

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Canals are the artificial water channels which are dug out to serve two basic purposes primarily to supply water for fulfilling the basic needs of human life and for irrigating the field crops to secure the agricultural production. The field irrigation of crops is the basic need for which the canals were made. Normally, these canals begin at a point where the lower portion of the ground helps the upper portion of the channel to flow naturally to the field area. Structurally, a canal is a long and deep digging on the earth surface of which upper portion is comparatively wide open while lower portion is narrow and deep. Its walls are kept slant. Construction of such water structures are known to us since the early historic period.

In our earliest literary text Veda as the terms like *khantirima apah*, *surmi*, *susirah and kulya*, *setu*, *apā* and *āhāva* have been referred for this water structure.¹ During the rule of Nandas a canal named as Tanusui was constructed by one unknown king of this dynasty in Kainga region (presently Odisha).² Traces of a canal of Mauryan period has been brought to light by Kumrahar excavation at Patna.³ The records of Junagadh inscription record that Ashoka Maurya brought out canals from the lake Sudarshan.⁴ King Kharvel in his Hathigumpha inscription credits himself that he extended the Tansui canal of Nanda to his capital Kainga Nagari.⁵

Similarly, evidences of two more canals have come to us through the archaeological excavations. One among these two is Besanagar, while the second one is Bhona. These two are altogether diverse models of canal structure of early historic period. Indeed certain notional features are common between these two such as both were fed by river, drained the field adjoining to these and increased the ground water level for securing the water in wells constructed in their proximity. Further, Besanagar and Bhita, which have been explored through archaeological evidences.



Although the inscriptional evidences of canal irrigation are found from the Mauryan period, the archaeological remains of both Besanagar and Bhita signify the importance of canal irrigation present at that time. The Mauryan kings were the vanguard of canal irrigation, and the inscriptions present at Junagadh attest the maintenance and cleaning of these canals during this period.

The ancient site of Besanagar found near Vidisa in MP, is located between the rivers Betawa and Ves. This site is particularly notable in the history of Indian archaeology (it was) here in decade of 1840 Sir Alexander Cunningham under took a pioneering study of monuments and their associated material culture and published it in a monograph. The site is well known for a stone column of Garuda dhvaj which was placed here around 165 B.C by a person named as Heliodorus. He was a greek ambassador of the Indo-Greek king Antiochidas in the court of Sunga king Bhagabhadra.

The reference to the Besanagar canal has been found between the villages of Brahmanpura and Bhonra near Vidisha, located in Madhya Pradesh. The irrigation system of this canal might have supplied water to the nearby agricultural fields. Here, at the instance of Heiodorus an important Prakrit inscription was engraved on the pillar crowned by Garuda image . Historically, it is the first known inscription related Vaihnvism in India. Very little is known about Antialkidas, Heliodorus and Bhagabhadra, but their names live on today because of the Garuda column and this inscription.

During his stay at Vidisa, Heliodorus is said to have adopted Hindu religious belief and become a staunch devotee of Bhagawat sect (Associated with lors Vasudeva / Vishnu).⁶ as said above he erected this column which had a garuda figure on the top and it stood in front of Vasudev temple. The image of Garuda, which crowned the Besanagar column is presently housed in the Gwalior Museum. The local people of the village refer to this column as Khambha Baba or very ofen Kham baba. They bear the faith that this column is sacred god and bringer of good fortune.

Here, the excavation was conducted under the supervision of Devendra Ramkrishna Bhandarkar,V. Singh, Brijesh Singh, and Bhagwat Prasad Bhatt (1913–15 A.D.). Bhandarkar⁷ exposed here the remains of an ancient canal structure which not only provides the importance of irrigation in this part of landbut reflects the superb structural



skill of hydro – engineering of by gone era too. Going through the structural remains of this canal remains, Bhandarkar analysed that the river Bes flowing hardly two furlongs from this site was dammed at a ford. Further, from this point the river water was brought in to this canal for various use when it was in functional.

As the structural remains are concerned these have been traced out in the north of Heliodorus column . There were two brick walls measured nearly three and half feet in height. After clearing the soil through excavation it was exposed as a canal of which both walls were running straight in east – west direction. Excavation at final stage cleared that at the first stage, both the walls of canal ran parallel to each other in east – west direction. But, in the second stage, at the west end of east- west canal it joined another segment of this canal. This segment of canal was called by Bhandarkar as north south segment. However, at the junction where both these segments were attached to each to other, some part of northern wall of east-west segment was destroyed.

The length of north wall of east-west canal was 185 feet 4 inches while that of south was 182feet 3 inches and 7 feet in breadth. Its maximum height was measured at a point 5 feet 6 inches.. On the eastern end both the walls of it joined each other by a cross wall . So it was a terminal point of this segment of canal.

The walls of that segment of canal which ran in north-south direction could be traced up to 19 feet in length only. Hence its rest portion was broken off so it was not possible to measure its exact length. There can, however little doubt originally they continued as far as 92 feet for which distance a trench had been dug on this side.

As per the expectation of Bhandarkar, bricks of exactly the same size colour and texture as those of which the walls were constructed were found in the trench the same level through perhaps not in such quantities. There is also another and such much stronger reason for supposing that the walls were originally running over at least the whole length of the excavated trench. These like north and south walls of east- west segment stand on yellow soil, which rises in undulations behind them but is of one level between over the space of seven feet which separates them. The yellow soil in trench maintained a uniform level over an area approximately equal in width to the space between the walls and in alignment with them, undulated immediately beyond at sides, showed clearly that this level area was flanked by walls which was found to be destroyed but which originally were



the same as the east and west walls of north-south segment, continuing here. The maximum height of east wall was found to be 2 feet 2 inches, while that of its west wall was 2 feet 10 inches.

The two striking features observed about the entire canal are one deliberately provided slight slopes on either sides which is intelligible in case of a canal to counter the act the pressure of water prevalent in it and smooth flow of it. Secondly, on the walls of the canal there was application of superior quality of plaster. Such kind of plaster was essential for preventing the percolation of water as well as for securing the permanency of this structure. On its chemical analysis, it has been found that such plaster could be compared with that of the then Roman plaster only.

As per Bhandarkar's observation, there was a cross-section on its eastern end which joined both the north and south walls of the canal so this is considered as a storage canal. The water stored in the canal must have been raised by some suitable lifting appliance or any lifting device, for irrigating the field in its neighborhood. Hence, the area on the right side of this canal was occupied by the inhabitants so the possibility can not be ruled out that the city might have availed the water of canal for domestic purposes too. Prof. R.S. Sharma⁸ considered this canal as an inundation canal ; for rivers in south India overflow their tanks in rainy season and dry up in summer. No doubt this canal was smaller in size but main idea behind its construction was to store the water in rainy season and use it in later season.⁹

To assign the date of this canal, both inscriptional evidence and structural remains were taken into consideration. The Heliodorus inscription which is found close to the Vasudev's Sankarshan Temple inscribe the date circa 165 B.C. Stratigraphically, the canal's wall was at a lower strata than the temple structure and there was some gap of time between the destruction of canal and construction of temple. Further, the canal of such solid construction must have served for a pretty long time before it fell in to ruins. Thus the date of this canal as suggested by Bhandarkar goes back ot Mauryan (3 cen.B.C.) or probably a little earlier to that.



Bhon (Talluka Sheogaon, Maharashtra)

This is an early historic site situated in the Purna basin of Vidarba region of Maharashtra, is at a distance of about 30km. north – of Sheogaon on Mumbai – Nagpur rail route. The excavation conducted at Bhon¹⁰ in the early decade of twenty-first century, by the team led by Bhaskar Deotare of Deccan College, Pune has brought to light the structural evidence of a brick built ancient canal.

To trace out the details of the canal, like its direction, length, slope and associated structures, five cuts were excavated on the whole (Pit I-V) starting from its source *i.e.*, river-side total length of this canal which was exposed here is measured 100 meters. It was fed b river Purna, flowing in its close proximity. The alignment marks of this ancient canal shows that at first stage , it ran in north west direction from its origin point *i.e.*, from the river. But after 21 m. distance *i.e.*, in the second stage it turned in north direction. The walls of this canal were constructed by bricks of large size (50 cm × 25 cm × 8 cm). The thickness of the wall measured 75 c.m., and the height 100 cm. It also had a sloping gradient.

Its slope, voluminous water containing capacity, over all gradient (*i.e.*,30c.m. from its beginning to inland area) and its stretch lead us to believe us that it was a canal structure. Besides these, the patina formed on the surface of the basal bricks due to running of water for long duration of time in it confirms that it was an irrigation canal. Apart from all these, finding of charred grains and husk impression from the adjoining area leave us no doubt that it was an irrigation canal which was used specially for cultivation of paddy.

The study reveals that the river beds of Purna might have been at least 3 to 4 m. above the present bed during the early historic period. This is reflected in the form of gravel exposed in the river cutting at four m. above the present river bed. Thus, it must have required some means or devices for lifting water by which flow of water remained in it un-interrupted in the canal. Besides these, the parallel alignment of canal structures on the surface of the habitation debris of elevated ground and ash-impressed soil, along with the adjoining area which is of hard lateritic nature, confirms that the canal was used for irrigation purposes.

The Bhon canal possessed other interesting features too. A super structure built of bricks, square in shape (3.35 m × 3.35 m), was positioned on the north wall of the canal. It measured four m.in height and had a opening of 1x1 m. in its central portion at its top. In other words, a superstructure was based on the canal walls laid parallel to each other about



the north and south directions at a depth of 2.7 m. Though nothing is clear about the purpose of this super structure but possibly there must have been manually operated equipment fixed on this super structure in order to regulate the flow of canal water according to the need of the time. On the basis of construction work it appears to be a later phases construction. Exposing and tracing out the structural remains of canal walls, which is 1m.high, it was found that it rest on a brick basement which continued almost whole length of the canal.

The water of this 100 m. long canal was mainly utilized for agriculture purposes, more particularly for paddy production. This is evidenced by finding of charred grains and husk impression from the adjoining to it. A complete exposed structural remains of this site comprises 16 brick wells, 10 ring wells and remains of this canal. The other important findings at this site are charred food grains, 80 unscribed copper coins, N.B.P. sherds, terracotta objects etc. All these prove that the settlement of Bhon had mixed economy i.e.,its economy was based on both agriculture and trade. Further, their well planned structural features show not only their highly skilled engineering but expertise in irrigation practices so that agriculture production was done in an area of 12 to15 hectares by means of water bodies.

On the basis of the large-size bricks utilized for its construction, it is found that it resembled to those which are used in Navadatoli and Kesarwad in Madhya Pradesh. Such bricks were very common in Gangetic plains during the Mauryan period. Considering the identical size of the bricks, antiquities like NBP ware, unscribed copper coins, terracotta human figures, typical Mauryan polished saddle querns Bhaskar D. Deotare assigned the date of Bhon to be Pre-Satavahana or Mauryan period settlement.¹¹

Thus, we see that both the above-mentioned canals, i.e., Besnagar and Bhon, even having different constructional features were meant for the common purpose of irrigation. The time of their existence was the same. Both these canals raised the ground water level, which ultimately enhanced the water of level of wells located in the neighboring localities. These paved the way for the construction of canals which were built by the kings and nobles of the later period.

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