

Landscape of Mandu. A living heritage in Central India

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ABSTRACT

This contribution, part of an in progress PhD study on forms and design of architecture and landscape of the central Indian Mandu plateau, focuses on a bird eye view of the human structures getting the landscape of the XV century onward study case in order. The research is methodologically based on the Muratori's achievement of territories as living organisms where philosophy, economy, history and aesthetic meet together building a permanently transforming reality that reflects the cultural identify of a civil society. The study identifies the categories of the designing thought acting on the natural structure to build the XV century cultural landscape . The interpreting categories reflect the habit of a heritage to be preserved for next generations, where the spontaneous action-building of endogenous players has always been merged with the critical contribution of exogenous interpreters as rulers, scholars, travellers and anonymous designers. The study is based on a preliminary high resolution satellite imagery survey and further measurements and documentation on the field. The extract we are presenting to the 2nd ICAUD Conference will pay special attention to the hydraulic network of kundas, dams and tanks providing water to the heritage site of the so called Lal Mahal complex. Water architectures have always played a key role in building the artificial landscape of hundreds of historical sites, embodying a clearly identifiable north-western Indian territorial type. There, lands, water, architecture and gardens have supported for centuries the construction of an organic landscape where the hierarchies of forms, the relationship between elements, the way of transforming an identity thought in formal principles, has provided us a talking palimpsest merging functions, symbolic meanings, religion and day life style. The XV century gardens and architectural complex will be investigated in their role within the territorial organism.

KEYWORDS: India, Water, Territory, Hindo-Muslim architecture, Sustainable Thought.

1 INTRODUCTION

This paper is but a short extract of a still in progress doctoral research made by the author at the Department of Civil Engineering and Architecture (dICAR) of Politecnico di Bari (Italy). The research is supervised by prof. Claudio D'Amato Guerrieri, coordinator of dICAR Phd Course, full professor of design and Director of dICAR, and prof. Attilio Petruccioli, former full professor of landscape design at dICAR, former Aga Khan professor at MIT, and now Msheireb Property Chair at Qatar University in Doha. The research is focused on the analysis of the close relationship between landscape and architecture in a site where the construction of an artificial nature is nothing but the condition to adapt human requirements to the identity of the territory. The case study is based on the architectural survey made by the author in February 2014 of the Lal Mahal Khalji complex lying in the eastern edge of the Mandu plateau.

2 METHODOLOGICAL NOTES

2.1 Technical Equipments and Theoretical Framework

This contribution is mainly based on the result of an accurate architectural survey carried out on February 2014 and on the theoretical analysis frame as resulting from the Saverio Muratori's studies on territories and human habits.

The architectural survey has been conducted by means of simple technical equipments, that is a Leica DISTO A5, tape measures and photography; the accuracy followed by the author does not exceed the 1% of error per measure, each one taken referring to the stone structure where possible or not completely plastered.

The theoretical framework requires a more detailed discussion. Most of the references to the Muratori's contribution are related to the introduction of a renewed concept of "type", free from a taxonomic perspective and deeply rooted into the spontaneous *common sense* of the architecture and building culture. The large amount of researches developed by Muratori, his assistants and heirs in last forty years has often been the object of a rude criticism based on the assumption that those studies were invading the field of the art historians, historians tout court and archaeologist, with ambiguous and unfruitful contribution by the authors, mostly architects. Even Alessandro Giannini (Giannini, 1995), one of the clearest and less academic representative of the Italian school of typology does not avoid to go through a self-criticism where saying that *today Muratori is extremely important. But, be careful: Muratori as theorist of the system, the outworn, the wretched follower of Benedetto Croce, the one who was most wrong; and, if one needs, the artist; the other, the technical practitioner of architecture and urban planning, the creator of the "operating history" and of the building type, in my opinion, he does not serve anymore, is definitely useless.* This paper is going to be developed avoiding any reference to the reconstruction of the historical processes of Mandu plateau, choice coming from the specific subject, since the case study is related to a very short age of Mandu history and the abandonment of the plateau as capital of the Khalji sultan rulers, making the *city of joy* (Yazdani, 1929) a sort of frozen archaeological site from the very beginning of its life, and from the effort to concentrate the analysis on the evidence of the building reality as witnessed by its own evidence. According to Muratori, the study follows four categories of the designing thought, that are expressing the way of building relationship between elements of any building scale, from structures to landscape (Muratori, 1967). The four, also referring to specific habits of the human behaviour, are labelled with four alphabetical symbols, *s*, *S*, *o* and *O*. The first describes the so called *occasional serial* structures, showing a very low level of hierarchy, strictly depending on what is spontaneously accessible into the reality. The second, that Muratori calls *systematic serial*, shows a stronger aptitude to built relationship between elements by measuring them and placing them side by side to figure a paratactic complex structure; a new order is given to the environment transforming its natural rules. The third, the *episodic organic*, requires not only an order, but even a strong hierarchy, where the relationship between elements requires the contribution of each of them to the life of the system in such a hypotactic way that no one could be removed without damage to the entire. The fourth and last one, the *total organic*, shows that rather than the balance between the components and the proper working of the entire, what most matter is the contribution of the individual within the organism.

The research of a comprehensive understanding of the reality press Muratori to elaborate a not obvious and often misunderstood matrix of *asymptotic* approach to the reality, synthetically shown through the so called "board" of relationship between objects and actions, where elements and designing thought, that is the way those elements are in use, are strictly related through a 256 square chessboard. In ordinate one it may read the 16 possible aptitude variation of the elements, while in abscissa the 16 ways to use them. Both the possible set of 16 variations on each of the Cartesian axes come from a subdivision of two main sets, each one further subdivided in four, then eight and finally sixteen fields. From the second level onward Muratori attributes to each group of four character the four codes-symbols we have already seen above, the sequence of "s", "S", "o", "O". In such a way structures and nature are connected

giving existence to a rich range of quaternary codes from the “ss-ss” to “OO-OO” which are expressing respectively the most serial and most organic value of the board. The investigation about the nature of the relationship between the component of the matrix is so not just a taxonomic list, but instead an evaluation of behaviour, of complexity and finally of coherence between the two data. In this way the maximum level of coherence will be shown by those combination aligned on the main diagonal of the board (the one from left up to bottom right) while as far as one detached from the same diagonal the level of incongruity goes up. This boards of coherence have been developed by Muratori in four distinct sheets, each one related to a different scale of actions and reactions. The first is the one where “objects”, with their own nature and characteristic, are relate to “material”, that is the way those object are joint together to form a primary level of aggregation. The second links “material” to “structures”, so a larger level of relationship; the third the “structures” to “organisms” and the latter the “organisms” to the “language” of architecture. Of those board of coherence we are illustrating the third one only, because more adherent to the subject of this presentation; reference will be provide to the plain explanation by Menghini and Palmieri (Menghini and Palmieri, 2009) who gave a detailed description of terms and structures of all the four Muratori’s boards. In the third one, that is referred to the relationship between structures and building organisms, the first level of the ordinates shows a dual description, that is *superficial structures* and *linear structures*. Both of them are further subdivided in *structures on continuous abutment* and *structures on discontinuous abutments*. Once again the combination of the two first levels generates the fourth categories of “s”, “S”, “o”, “O”. The third level is introducing a new dyad: *linear or simple warping* and *crossed warping*; the fourth follows the same of the previous fourth in both the boards. Finally, the combination again gives “s”, “S”, “o”, “O”. In abscissa the firs dyad refers to *building leaning on the soil* and *building wedged into the soil*; both of them are further subdivided in two more levels, the one of *covered or continuous structures* and the other of *open or discontinuous structures*. The two levels generates the four “s”, “S”, “o”, “O”. The third and fourth levels refers first to the dyad of *monidirectional* and *multidirectional structures*, and further to *homogeneous, heterogeneous* and *hierarchic homogeneous structures*. The combination of the four dyads in abscissa and ordinates generates the quaternary codes describing habit and cultural thought expressed by the object of investigation.

2.2 Case study. The Lal mahal complex in Mandu

Mandu used to be capital of the Khalji sultanate of central India from the beginning of the XV century to the 1562 when it was captured by the Mughals (Day, 1965). Most of the building heritage of the site is related to this era, even though Paramaras remains are scattered everywhere within the boundary of the defensive walls. The city used to play a strategic role for its location, being at the very southern edge of what one may consider the extension of the Hindustan proper facing the Deccan, just beyond the Narmada river, flowing down the hills of the Vindhya range. The plateau takes advantage of the uneven structures of the terrain integrating steep and rocky slopes with massive stone masonry walls. As for all the Indian settlement a great attention has been paid to the water supply and construction of an artificial fluid landscape. Most of the natural springs are located below the line of the plateau-wall, so outside the inner territory of the so called *city of joy*. The access to water sources is so generally obtained within the plateau, through wells, kundas and tanks intercepting the water-bearing stratum, or dams as storage system taking advantage of rare higher natural springs.

Most of the Khalji complexes shown a close relationship between architecture and water, building structures around or along with water basins and tanks; that is the case of the Darya Khan complex, the Khalji palace built by the Munji and Kapur talao (*talao* stands for lake), the Baz Bahadur palace just above the Rewa kund sagar (*sagar* is a synonym of *talao*) and the Lal mahal, that is the object of this presentation. The complex lies on the eastern fringe of the hilled plateau, on the last end of a route starting close to the central area of the Jami masjid and Ashrafi mahal.



Figure 1: Lal Mahal. Site plan showing the complex and the adjacent big artificial basin exploiting the natural spring located on its south-western corner. On the easternmost side a dam controls the water storage from a further spring. Fields of wheat surround nowadays the architecture

By the left and western side of the architectural compound stands a large squared water basin some about 1,7 ha in surface, artificially designed by massive stone walls on three sides and providing water to the agricultural fields of the area (Figure 1). Size and shape of the stone blocks, some about 100x40x40 cm, suggest that the structures could be related to an era previous to the Khalji, since no one of the Muslim buildings shows such an impressive size of the building construction elements. Nowadays a stone well is dug on the water basin bed in order to get water during the post-monsoon time when the water level into the lake goes down up to be completely dry. Water ponds are also dug into the impermeable terrain to provide temporary water storage.

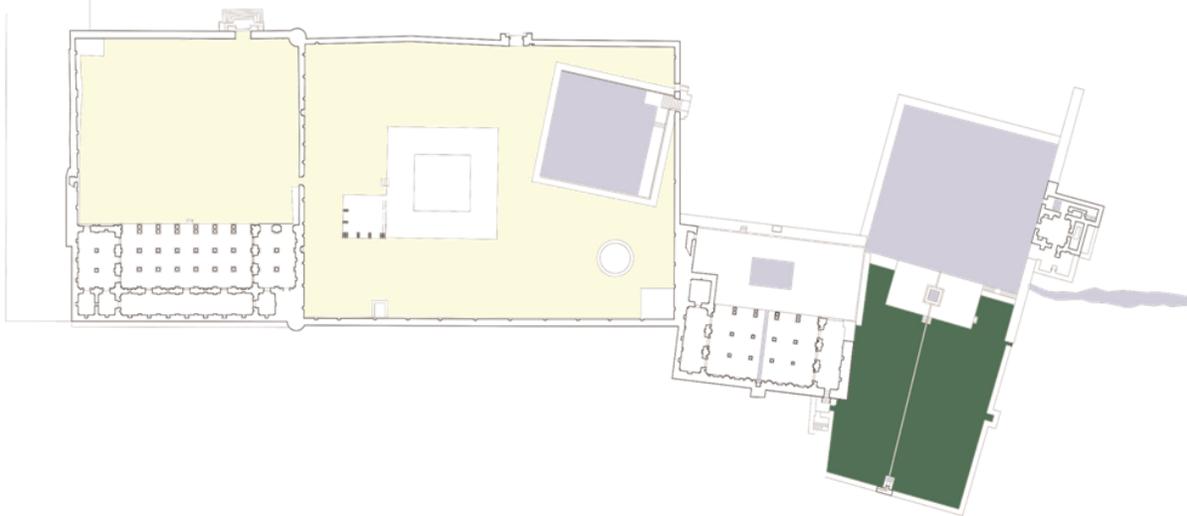


Figure 2: Lal Mahal. Ground level plan showing the aggregation of the two western compounds and the rotated eastern pavilion adjacent to the garden area and the second water tank which a domed structure has been built by its eastern side. Architectural survey by the author and Fabrizia Dragone (February 2014)

The Lal Mahal complex proper lies on the right eastern side of this first water structure, at its southernmost corner (Figure 2). The local refer to the complex as Lal bungalow (Web-1), possibly a distortion of Lal Bagh, name coherent with the significant presence of gardens within the compound. The complex can be assumed as the paratactic aggregation of four main elements: the first being the western court with a large pavilion, abreast by a larger compound where a square *baradari* (pavilion) by the bottom-left side of a square platform and a water tank stand as isolated objects. By the right eastern side of this compound stands the smaller *baradari* lying by side of a further water tank and a geometric garden. All these four elements requires a further discussion. Unlikely than the larger water basin, the courts of the complex show a north-south orientation; the first court is filled up by a large pavilion on seven aisles and four bays open on its northern side (Figure 3). The construction module is a square plastered cross vaulted element on stone pillars, that is a *linear structure on discontinuous abutments, crossed warping and leaning on the soil* (SO-SO that is the most serial structures aggregate in the most organic way).



Figure 3: Lal Mahal. Western pavilion; main pillared hall based on the paratactic iteration of organically vaulted modules. (Photo by Fabrizia Dragone. February 2014)

The building is flanked by two more pillared and symmetrically disposed rooms that seem to be the result of a later transformation of the structure as for the lacking of brackets on the front side and the draft shape of the pillars on the façade. The open main hall of the pavilion is further flanked on its southern

side by an elongated closed room that takes light and air from embrasures opening on the plastered stone wall. The inner side of the western wall shows traces of a vaulted chamber possibly never built, since the springers of the arches are still visible but not the supporting elements within the courtyard.

The second courtyard, larger than the first and designed on a $\sqrt{2}$ rectangular ratio, host three main structures: the remains of a square *baradari* on double pillared arches (the corner pillars are doubled) likely vaulted and on a stone platform, flanked by a larger square podium by the left side of a water tank. As for most of the Khalji building of Mandu plateau this structure shows a composite stone masonry work with two faces, one external and one internal, of pink sandstone *smooth surface* and *sharp edge* slabs and an inner nucleus of roughly chiselled grey calcareous stones. The sandstone faces could be likened to a roman *opus vittatum*, where the same material, in different shape, is arranged to form large course of slabs laid edge alternatively layout with a row of 20-25 cm depth slabs laid flat; in this way the latter works as a horizontal guide line for the upper and anchorage to the inner nucleus, as a partial bondstone. The nucleus is a core of rubble stone masonry work, made by ashlar in different shape and size and mortar, comparable to a roman *opus caementicium*. (Rubini, 2014). The water structure, square in plan and accessible from outside the compound, lies on a 12° clockwise rotate direction, unlikely the pavilion and the podium that stand on a north-south direction. The inner wall of the compound, originally plastered in white colour as for the remaining evidences on the western side, show a sequence of niches, all of them coherently plastered, and further decorated through blue glazed tiles and red painted sun symbols; the western side only is provided with two larger niches starting from the ground level. On the floor of the south-eastern corner of the compound a circular stone canal likely related to the production of the impermeable *cocciopesto* used to plaster the inner surfaces of the retaining wall of the water tank, lies.

The eastern five aisles and three bays *baradari* stands on the south-eastern corner of the central compound, oriented according to a 7 degrees clockwise rotation. For this structure too, as for the previous one, the construction module is a square plastered cross vaulted element on stone pillars, that is a *linear structure on discontinuous abutments, crossed warping* and *leaning on the soil*. The main hall opens towards north facing a large platform where a rectangular pond stands. The pillared main space is flanked by two symmetrically disposed rectangular chambers; the eastern one, outside the building, connects the main structure to the remains of two small rooms, likely a bathroom. The southern inner wall of the main hall is provided by a *sabil* (fountain) made by a sloping stone chute collecting water in a small rectangular pond supplying a pavement canal most likely providing water to the basement pond. The *sabil* protrudes from the external wall of the pavilion, but no evidence of any water supplying structures has been found on the field at a first investigation. At the foot of the platform standing in front of the pavilion a further rectangular ponds has been found, most likely providing water to a further canal running in the same direction of the hall's pavement one and getting a second transversal conduct that reaches the western retaining wall of the tank adjacent to the *baradari*. This transversal canal, subterranean and made by stone blocks, is further supplied by the water flooding from the ground level of the main courtyard through a stone slope located on the north-eastern corner of the central tank.

Adjacent to the pavilion stand the poor remains of a garden, that too related to the eastern water tank. The structure had to be conceived according to Persian garden type, close by a stone wall, provided by canals, platforms and water ponds. What remains today is a small section only of the southern wall where a further *sabil* in form of a sloping chute still survives; the upper part of its retaining wall shows a terracotta canal that has to be related with a storage structures providing water for the fountain. The water flooding on the chute was collected in a common square pond where was directed to the western water tank from. It is not clear, and further archaeological excavations are required, the way water was getting the tank, but what seems to emerge is a seasonal use and functioning of these structures, likely related with the water availability during the monsoon time. This would not be the only case of such a way to use the meteoric water source; in the Mughal Nilkanth pavilion the functioning of the water mechanism, through stone chute, water channel, water ponds and storage tank, is clearly depending on the availability of the monsoon flood that activates the fluid device. Unlikely coeval and later more artificial structures this garden seems to accept the rhythm of the nature as main player of the game. A platform hosting a further rectangular pond marks the northern side of the garden as border of the eastern water tank. This

last water structure comes from an accurate hydraulic engineering work, since, being square in shape, its eastern retaining wall plays the role of a dam (its length is largely exceeding the size of the three remaining sides) preventing the dispersion of the spring water down the adjacent valley. On the dam stand a domed pavilion most likely datable to a later period (Figure 4); it may be referred to those structures built on the occasion of the Mughal emperor Jahangir's visit in 1617, when 'Abd al-Karim Mi'mar, architect of the Emperor *repaired some of the old buildings ... and ...altogether rebuilt some places* (Beveridge and Rogers, 1968). The brick dome is finely decorated with *rasmi bandi* geometrical motifs made by plaster only according to the style of a more organic and definitely Persian way to set structures and spaces. According to Muratori's board the building shows a *linear structure on continuous abutments, crossed warping wedged into the soil*, that is the OO-OO way to combine organic elements in the most organic shape. The pavilion optimizes the use of water even if small in size. Two rectangular spaces are located on the eastern and northern side of the main square chamber; both of them are provided by canals that used to collect water from the external eaves. The further could be related with a small domed chamber hosting a small rectangular pond; the latter most likely with the drainage of the meteoric water from the open dome and the disposal of the ones coming from an adjacent bathroom. The structure seems to have played the role of a bath facing the water tank.



Figure 4: Lal Mahal. Domed pavilion on the eastern retaining wall of the garden tank of the complex. (Photo by Fabrizia Dragone. February 2014)

3 CONCLUSION

The intricacy of the Muratori's boards we have referred to as investigation tool, has not to discourage the reader interested in a cultural understanding of a subject of investigation from a perspective that is not only the historical one neither the anthropological nor the technical, but instead a wider and synthetic description of qualities of landscapes, architectures, building techniques and materials from a humanistic point of view. Building materials and structures, the shape and aggregation of the elements combining spaces, interpreted through the lens of the reality-thought grid-board, provide a wide range of clues about the shapes of the human thought, where art historians, conservation architects, planners and managers of historical sites could find a road to operate coherently to the cultural identity of a site. The description codes introduced by Muratori, are nothing but a way of a post enlightened mind to penetrate the complexity of the real avoiding its breaking down and the amnesia of the laws holding the single parts. At the centre of the investigation stands the interpreter as humanist reader aware of the complexity and of the dialectical relationship between designing thought and matter. The synthetic description of the above structures developed through the Muratori's *board* has shown a substantial

dominance of the “O” character, so a prevalence of an organic behaviour in terms of coherence between aptitude and use of the building elements. A significant distinction has emerged while referring to the certainly Khalji buildings and the likely Mughals ones. The further are still feeling the effects of the Hindu aptitude to combine elements according to a paratactic, that is a serial, way, while the latter, the domed pavilion, clearly refers to an organic and hypotactic world. The clearing of the serial law is most evident in the use of organic modules, that is the cross vaulted structures, instead of the trabeate systems and flat roofs made by slab stones as some of the earlier Khalji buildings. The organic face of the palace confirms the integration of a culture of masses on a previous of frames, which is the intimate character of the Indian subcontinent syncretism. This description claims the challenging contribution of all the actors involved in the present transformation of Mandu territory, where a deeply integrated and sustainable action should take into account the forms of Mandu architecture and landscape – synthetically described by Muratori’s codes - and operate coherently with them.

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REFERENCES

- Beveridge, H. and Rogers, A. (edited by). 1968. Jahangir, Nural-Din Muhammad. Tuzuk-i Jahangir. Munshiram Manoharlal, Delhi, I, pp. 364.
- Day, U. N. 1965. Medieval Malwa: A Political and Cultural History 1401-1562. Munshiram Manoharlal, Delhi.
- Giannini, A. 1995. Ventitré anni dopo, Pienza. Hands on material for the meeting MESSA A PUNTO DI UN QUADRO METODOLOGICO PER UNA SCIENZA DELL'AMBIENTE COSTRUITO in Pienza on 13/14 October 1995. Centro Internazionale per lo Studio dei Processi Urbani e Territoriali.
- Menghini, A. B. and Palmieri, V. 2009. Saverio Muratori. Didattica della Composizione architettonica nella Facoltà di Architettura di Roma. 1954-1973. PoliBaPress, Bari.
- Muratori, S. 1967. Civiltà e Territorio. Centro studi di storia urbanistica, Roma.
- Rubini, C. 2014. Masonry Stone Structures in XVI century Khalji Mandu, proceeding of the 9th International Masonry Conference 2014. Guimarães.
- Yazdani, G. 1929. Mandu: the City of Joy. Oxford University Press, Oxford.
- Web-1: www.asibhopal.nic.in/monument/dhar_mandu_lalmahal.html#fac, website of the Archaeological Survey of India, Bhopal Circle, 2014.