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Research

The Turkish Baths in Elbasan: Architecture, Geometry and Wellbeing

Abstract. The two Turkish baths in Elbasan have been object of a remarkable survey as part of a vast international research. The original system of the two public baths dates back to the mid-sixteenth century. In the Albanian typology of the *hammam*, the various environments of increasing temperatures are located along a longitudinal axis ending in the cistern area where the boiler is located. The Albanian baths reveal their Ottoman roots in the complex concept of the vaulted structures. Different types of vaults in a same space are placed side by side in order to realize more complex compositions; the inner surfaces of the vaults are embellished by elaborate decorations that resemble stalactites. The complexity of the plan and the decorations reveal a rigorous geometric pattern that dominates the space and underlies its composition. All seems the product of a centuries-old wisdom where each element contributes to a complex system aimed at comfort and pleasure of the human being.

The architecture of hammam in the Islamic tradition

The tradition of the bath – *hammam* – was born and spread throughout Islamic society from the seventh century on, and performed a fundamental role up to the first half of the twentieth century. In addition to reasons linked to the care and cleansing of the body, the *hammam*, generally connected to mosques, represented the place where the user could complete the rites of purification imposed by the Islamic religion several times a day before prayer. The intimate pairing of the spheres of religion and comfort, and its availability to various levels of society, was determinant – in various regional forms – for the capillary diffusion of these structures in all Islam, so that some Moslems became true interpreters and successors of Roman and Byzantine thermal traditions.

A new interpretation of the Roman model is found in all the public baths in Islam. If they preserve in substance the systems of heating by hypocaust and by water adduction, the functional configuration of the environments appears to be substantially new. While the classical typology is organized along a spatial sequence formed by *apodyterium* (dressing room), *frigidarium* with swimming pool (*natatio*), *tepidarium*, *calidarium* and *laconicum* (steam bath), in the Islamic baths there is no *frigidarium* and swimming pool.¹ The *apodyterium* – the Turkish *cemekân*, the entry where the users could undress and relax after a thermal treatment – assumes a great symbolic importance.

The *cemekân*, which is generally square in shape and covered by a dome, is equipped on four sides by lofts, with benches and niches to guarantee guests' privacies. The entire

environment is oriented around a fountain set almost exactly in the centre in order to preserve the centrality of the compositional genesis of the space.²

The *soğukluk*, the medium-temperature room, allowed the user to gradually get used to the rise in temperature during the passage from the unheated entry to the heated rooms. Directly connected with the latrines and the washrooms, it also functioned as a dressing room during the winter.

The *calidarium*, called *sicaklik*,³ constituted the true heart of the entire spa. The smaller rooms for the steam bath – the *maghtas*, where temperature could exceed 40°C – are located over it. In several other models, the *gobektasi* – the “stone umbilicus” – is located at the centre of the *sicaklik*; this is a generally octagonal-shaped platform where the guests could lie down to relax or for a massage and shave.

The arrangement of the space mainly conforms to two general types of systems. In the first, typical of the *hammam* of the lower Western Mediterranean, the rooms are distributed along an axis that extends from the unheated entry through the rooms where the temperatures gradually increase and finishes with a cistern and boiler room.⁴ In the second type, mostly developed on the Eastern Mediterranean, the distribution of spaces is less rigid, with polycentric models in which other rooms branch off from the central nucleus of the *sicaklik* which is surrounded by small exedrae.⁵

Although the types of *hammam* may differ according to the various regional traditions, they inevitably reflect purely technical rules of distribution, placing the higher-temperature rooms in direct contact with the technical rooms for the cistern and the boiler.

The Turkish baths at Elbasan

The city of Elbasan is situated in the Shkumbin river valley in central Albania. It was built on the remains of the ancient city of Skampa, a fortified centre founded in the first century B.C. on the Via Egnatia, the road which was the natural extension of the Appian Way and connected the harbour of Durazzo to the city of Byzantium. The historical city centre (*Kala*) makes the military origin of the location evident (fig. 1). In fact, the road system and the defensive perimeter of the ancient Roman fortress are preserved substantially in their original form today. An important commercial centre during the Ottoman domination, the city underwent significant interventions of modernization, establishing itself as a military outpost in the politics of expansion of the boundaries of the Ottoman empire towards the West.⁶

The two *hammam*, which represent two of the last existing models in the entire nation, are outstanding among the monuments built during the Ottoman period. The two structures were the subjects of an architectural survey performed by a general group of ten civil engineering/architecture students of the University of Pisa coordinated by Roberto Castiglia, teacher of Architecture Design of the Faculty of Engineering.⁷ The surveys of the two baths, together with other monuments of the city of Elbasan, are part of the MIUR 2006-2007 research project entitled “Pilot scheme for knowledge, conservation and improvement of Kala Fortress in Elbasan, Albania” coordinated by Prof. Roberto Pierini of the University of Pisa.

Fig. 1. The *Kala* fortress of Elbasan, Albania. In evidence, the most important monuments: 1) “Shen Maria” Orthodox Church; 2) “Xhamia Mbretërore” Imperial mosque; 3) *Kala*’s *hammam*; 4) “Sahati” clock tower; 5) Bazaar’s *hammam*

The first bath, within the fortified perimeter of the *Kala*, is set on the eastern side of the axis of the road that today marks the ancient *decumanus* of the Roman fortress. The second is found outside the walls, in the place where the ancient Bazaar was located and next to the mosque of “Agajt”, to which the bath was closely connected. The first reports regarding the presence of the two structures date back to the second half of the twelfth century,⁸ although it is possible to attribute their construction to the century before that.

The two *hammam* show plan systems quite similar one another, with the various rooms located along an axis. The bath of the Bazaar preserves in large part the characteristics of the original system, and underwent several restoration interventions between 1973 and 1977 [Shtylla 1979: 83-90]. The main spaces are identified in fig. 2: The great entrance room – the *cemekân* (1) with the central well and the wooden gallery – leads to the vaulted medium-temperature room (2), the *soğukluk* (3) with the washing room, and the latrines (4, 5). Access to the *sıcaklık* (6, 6a) was originally possible exclusively from the intermediary room. The direct connection between the entry and the room was in fact opened during the restoration works of last century. Finally, from the heated room are accessed the two *maghtas* for the steam baths (7a, 7b), placed side-by-side and adjacent to the cistern (8) with the boiler (9).

Fig. 2. The architectural survey of the *hammam* of the Bazaar. Plan, vertical sections and facades.
Drawing by A. Cartei, F. Degl'Innocenti, J. Farsetti, A. Ferrara

Fig. 3. The architectural survey of the *hammam* of the *Kala*. Plan. Drawing by M.G. Bevilacqua

Fig. 4. The architectural survey of the *hammam* of the *Kala*. Vertical sections. Drawing by M.G. Bevilacqua

The plan of the baths of the *Kala* is more complex (fig. 3). It is possible to identify at least two constructive phases. The typological characteristics of the bath with the axial distribution of the spaces can be seen in the central nucleus comprising the *soğukluk* at the entry (1, 2) with the attached sanitary fittings (3, 4), the *sıcaklık* (6, 7, 8), the steam bath area (10, 11, 12) and finally the cistern with the water heating systems (14). The second phase of construction to extend the baths can be probably be identified in the total rearrangement of the *cemekân* (15, 16) and in the construction of the two heated rooms (6, 9) reserved for women.⁹

Space, geometry and decoration

The two *hammam* of Elbasan clearly reveal their Ottoman origins even if they show a general simplification of the architectural language. A careful reading of the survey drawings clearly shows that the set of formal elements making up the architecture is dominated by a purely geometric design. The geometric genesis does not pervade the two structures in their entirety, but appears relegated to the formal definition of each individual, independent space. The architectural composition of the whole composition therefore proceeds by juxtaposing many spaces which are formally enclosed. Square or rectangular spaces each have their own spatial identity, created almost exclusively by attention to the spatial and decorative value of the brick vaults that cover them. The only characterizing element of the space is the vault, towards which every decorative intent is addressed (figs. 2 and 4).

The vaults appear to have been chosen on the basis of geometric-constructive reasons and representations. The square plan is generally reserved for the most representative spaces, appropriately roofed by a simple or compound system of hemispheric domes. Barrel vaults are used in spaces with a rectangular plan, while in the rooms with a lengthened rectangular shape feature cloister vaults (in Italian, *a schifo*) or similar shapes.

In both baths, the *sicaklik* are realized by joining three regular vaulted rooms mediated by the presence of great convex pointed arches. The division of the space by three occurs frequently in different baths and in Islamic architecture in general.¹⁰ But in the *sicaklik* of the bath of the Bazaar the trisection appears more coherently applied, perfectly realizing a symmetrical space, with barrel vaults that end in cloister vaults placed on each side of a higher central dome. In contrast, in the bath of the *Kala* the succession is composed of a dome on pendentives, with a cloister vault and a half-cloister vault.

In the rooms of the bath of the *Bazaar*, which actually seem to respect the formal standards of Islamic architecture faithfully,¹¹ the passage from the circular profile of the spring line of the vault to the square plan is mediated by an octagonal perimeter created by a system of *trompe*. It is really in the study of the connecting surfaces that mediate between the octagon or circle squaring, that the genesis geometric of the composition emerges in total clarity. It is made with a two-dimensional design system and is based on the rotation of regular polygons inside a circle. This plan geometry, when referred to a three-dimensional space, appears when the observer places himself exactly at the centre of the composition.

The decorations are also part of the purely geometric design, even though they are limited to the intrados of the vaults. Especially in the domes, the decoration conforms to the formal technique used to set the vaults on the walls, thus increasing the geometric complexity of the surface that joins the circle to the square, in a composition which is comprehensible only when it is projected onto the plan.

In the *maghtas* of the bath of the Bazaar and in the small internal room of the bath of the *Kala*, honeycomb-like shapes are found in the decorations of the vaults. These are similar to the most complex decorative technique of *muqarnas* but do not achieve the complexity and the stereometrical wealth typical of the most mature examples of Islamic architecture.¹²

A series of oculi, *jamat*, embellishes the intrados surfaces of the vaults and is in keeping with the vault geometry: along the parallels in the hemispherical surfaces, along the generating lines in the cylindrical surfaces or in the top of the cloister vaults. Generally round or hexagonal in shape, the oculi provide the only source of light inside the rooms.

However, regards for formal decoration appears on the interiors. Outside, the structures appear bare, the building masses deprived of all architectural pretension. The only meaningful element is given by the silhouette of the vault, which declares to the outside world the compositional genesis "by juxtaposition of the spaces" and is the only element that marks the two monuments in the urban scene.

The geometry of the arches and vaults

The two *hammam* of Elbasan are characterized by arches and vaults that fall well within the tradition of the Ottoman architecture. While not representing paradigmatic examples in the international culture, they constitute a significant patrimony for Albania. Further, it should be underlined that Elbasan's Turkish baths of the Ottoman period have not been object of in-depth studies. As regards the different typologies of the arches and vaults used in the structures under examination, the geometric analysis proposed here represents only a synthesis of the knowledge acquired during the architectural survey. For this reason, this present study refers to the arches and vaults located in the *hammam* inside the *Kala* (figs. 3 and 4). This synthesis does not consider analogous structures that have been surveyed in other monuments of the fortified citadel of Elbasan, among which the orthodox "Shen Maria" church and, with reference to the arches, the mosque "Xhama Breterore" are worth to be mentioned.

Measurements carried out on arches A2 and A3 indicate an ogival pointed or inflected arch whose development is found within a segmental arch (fig. 5). For the two arches under examination a very slight angular point can be observed; as a result, the centers of the two arches that converge at that point do not line up.

The geometric characteristics of arches A1 and A4 refer to the Persian arch surveyed by Dieulafoy-Choisy (cf. [Docci and Migliari 1992]). Here the distance from the center of the arch that precedes the angular point to the center of the clear span is equal to 1/8 of the length of the span itself. The overlay of the geometric construction of the Syrian arch with the arches surveyed has shown a significant difference in the case of arches A1 and a substantial correspondence in case of arch A4, except for a slight alteration in the right profile. In case of arch A1, after having reduced by successive attempts the construction of the Syrian arc for a quota equal to 1/12 of the span, a good correspondence was obtained. It should be noted that the imposed drop corresponds to the fraction which in the construction of the Syrian arch brings to the graphic determination of the two centers corresponding to the arches that from the angular points arrive to the vertex of the ogival pointed profile.

As regards arches A2 and A3, the measures carried out show an ogival pointed profile. Arch A2, as well as constructive imperfections, has been identified in a pointed arch at the fourth point, but with the centers reduced by 1/10 of the clear-span. The profile of arch A3 does not diverge from a pointed curvature at the third point with centers dropped by 1/10 of the span, as is the case for arch A2.

Fig. 5. Geometric analysis of curvatures in the arches of the hamman of the *Kala*, Elbasan. Drawing by R.B.F. Castiglia

An over-arching geometric analysis of the system arch-cornice-abutment with reference to arch A1 brought to light the following conclusions:

- the relationship between the height of the vertex of the arch and the clear span corresponds to $10/(6-1/2)$;
- the relationship between the height of the vertex of the arch and the opening light is $10/8$;
- the height of the cornice is $1-3/16$.

Fig. 6. Geometric and modular analysis of the vaults 10 and 11 in the *hammam* of the *Kala*, Elbasan. Drawing by R.B.F. Castiglia

The vaults covering the rooms of the two *hammam* are described in their essential characters in tables 1 and 2. The barrel vault with number 2, corresponding to the *soğukluk* of the *hammam* of the *Kala* is set on circular profile. The link between the walls and the impost provided by spherical pendentives deformed in such way so as to connect the perimeter of the impost of the dome to the circumference. The intrados of the spherical pendentives are decorated with *muqarnas* that play no structural role (figs. 3 and 4). The dome, which according to the measurements corresponds to a semi-ellipsoid, is pierced by

13 oculi, to be interpreted as intersections of the dome with right circular cones whose axes do not converge in an unique and significant point.

Vault number 10, which is found in one of the three *magthas* of the *hammam*, corresponds to the type *a schifo*, that is, a barrel vault ending in cloister vaults with an elliptic curvature and cut by a surface that is basically flat. There are four oculi inserted in the plain part of the vault; these are conic surfaces with axes perpendicular to the room flooring and parallel one another. The vault is set on two frames, with flaring toward the inside that determine a general projection of 4 cm. The frames are joined to the walls of alveolar *muqarnas* with simple sketch (fig. 8). The *muqarnas* realized in terracotta alternatively foresee the composition of three orders of niches staggered and projecting the one on the other determine a middle general projection of 35 cm. The tallest and external points of every line of niches belong to an arch of circle with the convexity turns toward the outside of the room. The transversal dimension of the room is 145 cm, the smaller diameter of the ellipse section of the vault, in such direction, is reduced to only 75 cm. The relationship between the width of the room and the diameter of the ellipse is therefore about 2 (fig. 6). The relationship between the ideal height of the vault (without cut with the horizontal plan) and the width of the room results equal to 3. Assumed as module M equal to half width of the room, it is observed that impost of the *muqarnas* is found to a height of 5M and that the impost of the vault corresponds to 7M and therefore its higher point to 9M.¹³

The vault number 11 is characterized by a hemispherical dome and presents the same number and typology of oculi in comparison to vault 2 (figs. 3 and 4). The link among the impost circumference of the dome, mediated by three ring frames attaining a height of 27 cm and project of 8 cm, is characterized by a composition in three-dimensional forms similar to crystals, determined by the intersection of prismatic surfaces and conic and/or fluted surfaces for a height of 70 cm (K) and set to the quota of 275 cm (L) in comparison to the floor plan. Such quota of impost corresponds to the diameter of the dome (279 cm). Assumed as module M the height corresponding to K it is observed that the impost corresponds to $3+10/16$ M, while the top of the vaults reaches $7+10/16$ M. The median section of the dome covered room corresponds, without the frames, to a rectangle whose relationship among the sides is equal to $\sqrt{3}$. The interspaces between the four series of such compositions are identified by bows of different profile around four sides and left plane. The orthogonal projection of such geometries reveals that the four groups of the compositions in form of crystal lean on an octagon, so that the determination of the circumference of dome impost includes further spherical joining of modest surface extension.

It should be noted that the octagon is found in the vaults of the *hamman* of the *Bazaar* (fig. 2) with a different constructive characterization. The regularity that marks the functional spaces of the *hammam* of the *Bazaar* is not found in the Turkish bath located inside the citadel. This condition is transferred to the different geometry of the vaults. In the three domes where an octagonal layout is observed, this is concretized by more frames sustained by *trompe* or ogival niches to the sides of the lateral arch, also with an ogival profile.

The orthogonal projection of the said compositions as for the *muqarnas* of vaults 2 and 10 of the *hamman* of the *Kala*, shows an aspect of a certain interest and faced, for instance, from I. I. Noktin (1995) about the possibility to move the two-dimensional representation

to three-dimensional constructions of a certain complexity. In the case of the *hammam* of Elbasan it seems reasonable to affirm that, more than a rigorous transposition of the sketch, the construction has seen an empirical application of elements founded on operational criterions codified by local workers.

Fig. 7. The architectural survey of the *hammam* of the *Kala*, Elbasan. 3D digital model by V. Bertola, V. Cardini, A. Cartei, A. Miano, G. Romeo, G. Simonelli, D. Tofanelli and C. Verdini

Fig. 8. *Muqarnas* decorations in the *hammam* of the *Kala*, Elbasan

n	TYPE OF VAULT	PLAN OF THE ROOM	PENDETTIVES	TROMBE	MUQARNAS	FRAMES	OCULI	
							NUM.	TYPE
1	"A schifo"	Imperfect rectangles	no	no	no	yes	2	Square pyramid
2	Ellipsoidal dome	Imperfect square	yes	no	yes	yes	13	Right circular cone
3	"A schifo"	Rectangles	no	no	no	yes	4	Hexagonal pyramid
4	Barrel vault with cloister heads	Rectangles	no	no	no	no	4	Hexagonal pyramid
5	Barrel vault	Imperfect rectangles	no	no	no	no	8	Right circular cone
6	Ellipsoidal dome	Imperfect square	yes	no	no	yes	13	Right circular cone
7	Cloister vault	Rectangles	no	no	no	yes	12	Right circular cone
8	Half cloister vault	Rectangles	no	no	no	yes	3	Hexagonal pyramid
9	Ellipsoidal dome	Imperfect square	yes	no	no	yes	9	Right circular cone
10	"A schifo"	Rectangles	no	no	yes	yes	4	Right circular cone
11	Ellipsoidal dome	Imperfect square	no	yes	no	yes	13	Right circular cone
12	Ellipsoidal dome	Imperfect square	no	yes	no	yes	13	Right circular cone
13	Barrel vault	Rectangles	no	no	no	yes	8	Right circular cone
14	Barrel vault	Rectangles	no	no	no	no	-	-

Table 1. Synthetic analysis of the vaults in the *Kala's* hammam of Elbasan, Albania

n	TYPE OF VAULT	PLAN OF THE ROOM	PENDETTIVES	TROMBE	MUQARNAS	FRAMES	OCULI	
							NUM.	TYPE
1	-	-	-	-	-	-	-	-
2	“A schifo”	Rectangles	no	no	no	yes	20	Hexagonal pyramid
							3	Star-form pyramid
3	Cloister vault	Rectangles	no	no	no	yes	6	Hexagonal pyramid
							1	Star-form pyramid
4	“A schifo”	Rectangles	no	no	no	yes	5	Hexagonal pyramid
5	“A schifo”	Rectangles	no	no	no	yes	5	Hexagonal pyramid
6	Hemispherical dome with lantern	Square	no	yes	no	yes	24	Hexagonal pyramid
							1	Star-form pyramid
6a	Schifo	Rectangles	no	no	no	no	6	Hexagonal pyramid
7a/b	Hemispherical dome	Square	no	yes	no	yes	18	Hexagonal pyramid
							1	Star-form pyramid
8	Barrel vault	Rectangles	no	no	no	no	-	-

Table 2. Synthetic analysis of the vaults in the *Bazaar's* hammam of Elbasan, Albania

Conclusions

These observations are based on the results of the architectural survey carried out in 2006/2007 in the city of Elbasan, especially in the fortified Ottoman citadel of the fifteenth century (the *Kala*), once a Roman Castrum. The three-dimensional modeling of the most significant monuments of the *Kala*, partly discussed in the present article and as yet not published in its entirety, constitutes a contribution to the knowledge of those structures in light of their maintenance and use. From this point of view the present publication is aimed at promoting further initiatives in other cities of Albania in order to develop the knowledge of the monuments.

Notes

1. The reason there is no swimming pool in the public baths is due to the Koran, which prescribes a complete washing of the body by immersion exclusively after contaminations and the sexual relations. Before prayer, the believer must generally wash his face, then his arms up to his elbows, then rub his head and his feet up to his ankles. Nevertheless, a basin for immersions is found in some healing baths as those in Cefalà Diana in Palermo, Sicily, or Khirbat al Majar near Jericho [De Miranda 2005: 344].
2. The *cemekân*, also known as *maslah* [Micara 1985: 114-15] was often used as a reception room where the authorities organized parties with music and dancing.
3. The *calidarium* is also known as *bayt al-harara*, while with *bayt al-awwal* can be identified as the *tepidarium*, which is referred to in the text as *soḏukluk* [Micara 1985: 114-15].
4. Recall the Moroccan *hammam* “al-Mokhfiya” in Fès from the first half of the fourteenth century or those of “Chelia” and “el-Alou” in Rabat, and the Alhambra bath in Spain, all in the first half of the fourteenth century [De Miranda 2005: 350-353].
5. For instance refer to the baths “Sitti Adbra”, “al-Buzuryya” and “al-Zan” in Damasco respectively of the twelfth, thirteenth and fourteenth centuries [De Miranda 2005: 350-353].
6. In fact, in 1466 the fortification of Elbasan was reconstructed by the Ottoman sultan Mehmet II on the ancient Roman plant Roman in the configuration that is seen today.
7. Architectural Survey of the *Hammam* of the Kala, April 2006: Professor: R.B.F. Castiglia; collaborators: M.G. Bevilacqua, B. Ruggieri, L. Salotti; students: F. Cinquini, D. Gemignani, N. Pagni, S. Turchi; Architectural Survey of the Hammam of the Bazaar, March 2007: Professor: R.B.F. Castiglia; collaborator: M.G. Bevilacqua; students: A. Cartei, F. Degl’Innocenti, J. Farsetti, A. Ferrara. The 3D graphic digital processing of the Turkish bath of the Kala was undertaken with the assistance of V. Bertola, V. Cardini, A. Cartei, A. Miano, G. Romeo, G. Simonelli, D. Tofanelli and C. Verdiani, students of the Laboratory for CAD Applications, first degree technical courses in Civil Engineering-Architecture at the University of Pisa; professor: M.G. Bevilacqua.
8. The presence of the two structures is given by Turkish Evlia Çelebiu in the chronicles of his 1672 voyage [Shtylla 1979a: 83].
9. Both sexes were permitted to use the bath of the *Kala* at the same time, unlike the *hammam* of the Bazaar, which was reserved for women on Thursdays at the last.
10. The successive and symmetrical partitioning for three architectural spaces is frequently found in other Turkish baths in particular and in Islamic architecture in general. According to Creswell, it would have originated in the housing units of the *omayyadî* buildings of the eighth century [Creswell 1966: 185-192].
11. A deeper analysis of the results of the survey shows some differences between the two baths. In particular, the bath of the *Kala* does not show the same geometric and constructive precision observed in the other *hammam*. A study still in progress may justify these “deformities” on the basis of the hypothesis, not still verified, that the *hammam* of the *Kala* was built on the remains of or as an amplification of more ancient thermal structures of Byzantine or perhaps Roman origin.
12. The term *muqarnas* refers to the stalactite-like decorations of the domes, very characteristic of Islamic architecture. The decorative system consists in arch-shaped overlapping projections of prismatic cells. They can be very hollow and formed the keystones leaning vaults, hence the name “stalactites”.
13. It should be noted that the geometric relationships that refer to the floor level can be voided by the possible prominence of the same plane.

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