

Stone as a determinant of architectural identity in the Florence of Renaissance

Nilüfer SAĞLAR ONAY*¹, Massimo RICCI**

* Istanbul Technical University, Faculty of Architecture, Istanbul, TURKEY

** UNIFI University of Florence, Florence, ITALY

Received: September 2011

Final Acceptance: October 2012

Abstract:

The use of local materials together with the enlightenment of Renaissance reached to its peak in the Florence of the Early Renaissance. For Renaissance architects, the nature of material was the basic element that determined constructional principles and beauty was the result of the logical proportional relations and constructional principles that respected the nature of material.

The purpose of the paper is to analyze the strong relation between material and architecture through the examination of local stones and their particular uses in the Florence of Renaissance. The re-examination and re-evaluation of the use of local materials in Renaissance Architecture can make important contributions to contemporary architecture as the most important deficiency of today's architecture can be regarded as the disengagement of architecture and material.

In this study three most common local stone types of Florence were examined starting from their quarries. The first one, "Pietraforte" with its strong nature, becomes an element that expresses vertical constructional strength and it characterizes the facades of the city. The second, "Pietra Serena" with its dark color and homogeneous texture becomes the material of framings in order to strengthen the affect of architectural form and order. And the third, "Pietra Bigia" characterizes the horizontal surfaces of the city and becomes typical of Florence squares and streets.

The study aims to underline that, architecture that does not respect local materials and techniques become a consumer good and lack identity. The buildings all over the world lose their context and tend to be similar. In order to evaluate today's architecture it is essential to look back to Renaissance and analyze it profoundly.

Keywords: *Architectural identity, local stones, Renaissance architecture*

1. Introduction

Material is one of the most important elements that create architectural identity. The use of every material in architecture depends greatly on its particular nature. Until the ancient times, from the first moment when natural material was taken to the area of construction, the uses and forms that the

material could assume was one of the most important concerns of architecture.

By the ancients, stone was regarded as the material to reach immortality. The resistance and massive character of stone was appreciated to create the most appropriate forms that could resist to time. The creators of the Egyptian Pyramids were undoubtedly the first genius architects of history. The right material was used in the right place and right form to create hand-made immortal structures that reflected the aims of its constructor, the emperor.

Leon Battista Alberti in *L'Architettura* mark that it is essential to observe ancient buildings in order to understand the nature of materials. In this way it can be figured out that in general; a light-colored stone is easier to work than a dark-colored one; a transparent stone is more tensile than an opaque one; a stone looking like salt is less soft. If a stone is composed of glittering sand, it will be resistant; if strokes of sparkling gold can be observed on the rock, it will be considerably hard; if it is full of black points it will be indomitable.

Brunelleschi, considered as the starter of Renaissance by many architecture historians, have observed all the Roman ruins in ancient Rome to examine the effects of material on architecture and to understand the reasons of degradation on various buildings and materials. For him the nature of material becomes one of the basic elements that determine constructional principles.

Florence, the focal point of Renaissance is unique with the architectural language created by the togetherness of proportional logic, order, rhythm and harmony mostly realized with local materials. So, the city can be regarded as one of the best examples where we can observe the effects of local materials on architectural identity.

2. The Florence of Renaissance

Among all Renaissance cities Florence had particular importance. What gave Florence, its early lead in the arts and letters was first its particular strong economic position based on industry, second the early and violent establishment of the republican government and third, the early development of a humanist culture (Ackerman, 1994, 320). According to Goldthwaite (2009), the strength of Florence in international commerce and finance was in its network abroad. From the fourteenth century on, the textile industries, first wool and then silk provided the major dynamic that extended and strengthened the commercial network. While wealthy merchants and bankers sought prestige and status through their patronage of arts and letters, artists and architects displayed this support through their development of new forms in painting, sculpture and architecture (Moffett and others, 2004).

In the Florence of Early Renaissance space was organized by proportional logic, its form and rhythm subject to geometry, rather than being created by intuition as in medieval buildings (Saalman, 1993). Most of the architectural elements were created by absolute geometric forms. The use of round (semicircular) arch was one of the most important characteristics of Early Renaissance. According to Pescio (2005), the round arch becomes protagonist in creating a regular sequence of identical volumes in relation

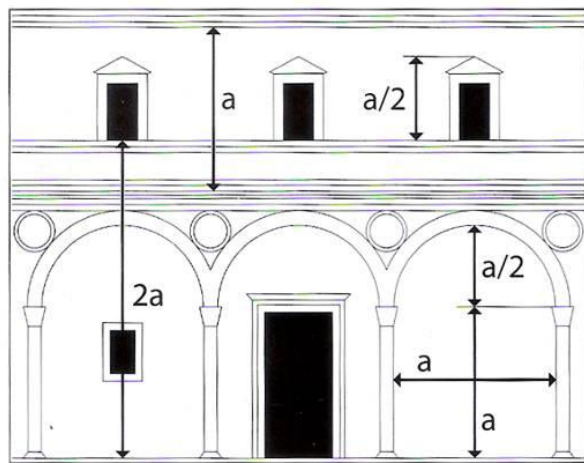


Figure 1. The proportional relations created by the round arch on the facade of Ospedale Degli Innocenti.

with the openings and the architectural elements. The diameter of the arch repeats itself in both plan and section, creating a three dimensional module. Therefore all spatial proportions; width, depth and height are determined by the specified overall proportional system. This kind of proportional logic can be easily figured out in the works of Brunelleschi and his followers (Figure 1).

During Renaissance proportional relations do not only concern architectural elements but also human scale. Spatial dimensions are determined according to functional and psychological needs.

During Early Renaissance in Florence nothing was done without purpose. While

determining spatial forms, material was evaluated by all its physical and aesthetic aspects. Moreover, Florence also had the luck to make use of high quality quarries located around the city. The right use of local materials especially local natural stones was one of the strongest determinants of architectural identity.

2.1. The local stones of Florence

The Apennine massif of Pratomagno runs between the cities of Florence and Arezzo and reaches an attitude of 1590 meters. During the lower Pleistocene Period (between 1 and 2 million years ago) the whole area between the chains of Pratomagno and the Mountains of Chianti was filled by a huge lake. The alluvial material due to meteoric erosion dragged downstream by the impetus of flooding torrents that furrowed the slopes of the two massifs. Commonly defined as "sandstone" the rocks of Pratomagno are formed by the erosion of ancient emergent lands (Fabbri, Francioni, 2003). These lands were sedimented in an oceanic graben starting about 200 million years ago. These rock formations (Figure 2) formed of altering strata varying in thickness from one centimeter to a few meters were used as structural material until the ancient times. Thanks to the structure of the formations they were easily extracted along the River of Arno that runs through Florence. Especially the sedimentary rocks that can be classified as Pietraforte, Pietra Serena (Macigno) and Pietra Bigia (macigno bigio), which were abundant along the river Arno, had a more local use in Florence. Among these 3 stone types Pietraforte had additional importance because of its constructional strength. As 90% of Florence is built of Pietraforte, it can be regarded as the material that determines the overall character of the city. The facades of Pietraforte hit by the twilight were considered to create "the golden glow of Florence" (luce d'oro di Firenze).

Other stone types were used for more specific purposes. Especially public spaces and the surfaces surrounding them were enriched by the differentiation of local stones. For example in the square of Santissima Annunziata which is beside Ospedale degli Innocenti, all the conceived surfaces are realized with local materials:

- The pavement of the square in Pietra Bigia
- The stairs and pools in Pietraforte
- The porticos in Pietra Serena

After the realization of façade of Ospedale degli Innocenti by Brunelleschi, all the other interventions were realized in harmony with it so the square of Santissima Annunziata can be regarded as the first square of Florence planned and conceived as a unified entity (Fanelli, 2002). This harmony is created by the togetherness of proportional relations and the use of distinctive material surfaces. Here Pietra Serena plays an essential role in order to underline the geometric frames of the porticos and other façade elements (Figure 3).

The most diffused types of stones were extracted from the quarries along the river of Arno very near to the center of the city. Some of the quarries like the quarry of Pietraforte of Palazzo Pitti were even inside the city walls. While Pietra Serena and Pietra Bigia were more abundant in the north of Arno, Pietraforte was extracted commonly in the south of the city.

The straits of sedimentary rocks in order to be used for construction were removed from the mass of rock by the help of wedges and levers. The wedges were introduced through the veins of discontinuity in order to provoke the detachment of straits. The gigantic elements like the monolith columns were transported by the help of the river. For example the monoliths of Santa Spirito were extracted from the quarry of Gonfolina beside the river of Arno in order to facilitate the transfer (Bargossi, Felli, Gurrieri, 2008).

After the extraction of stone, the blocks were placed on the square of the quarry. In his book "De Re Aedificatoria" Leon Battista Alberti advises to extract stone in summer, to lay it down under the open sky and not to use it before 2 years. In this way the extracted stone undergo many atmospheric affects and the stones which can not resist to these affects are separated from the others. The simple reduction of blocks into the desired dimensions called "sgrossatura" takes place on the square of the quarry. This helps to reduce the load to be transferred to the field of construction. But the finishing



Figure 2. The rock formations of Pratomagno, Maiano, Florence (author's photo).

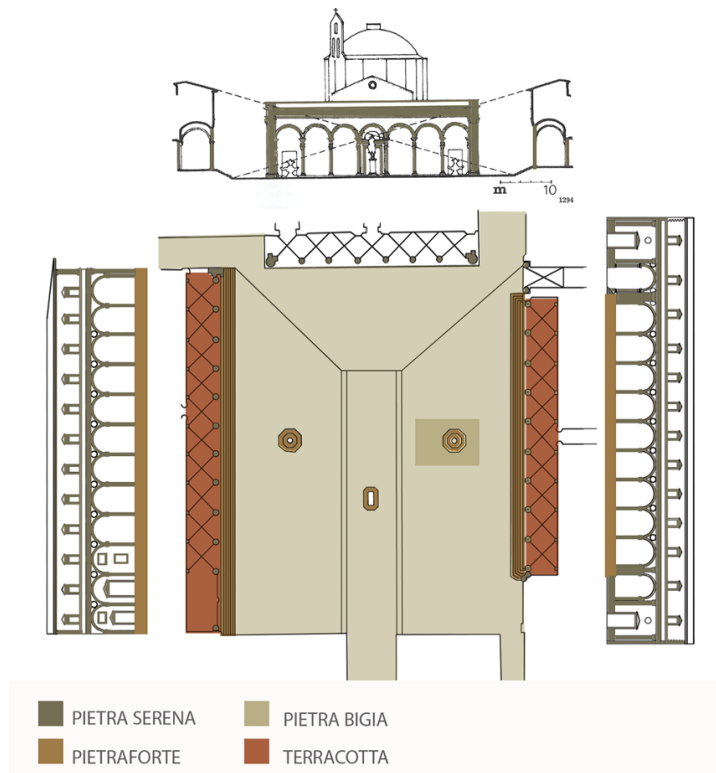


Figure 3. The use of various local stones on the facades and pavement of the square of Santissima Annunziata (author's drawing).

touches called “compimento” are never done there as during transport the fine finishings could be damaged.

Below, the characteristics of the three most common rock formations of Florence shall be examined through examples created during the Early Renaissance in order to discuss their appropriate uses and their roles in creating architectural identity.

2.1.1. Pietraforte and the rusticated façades of Florence

Pietraforte is a kind of sedimentary rock composed mainly of sand-sized minerals and carbonic cement (Sartori, 2002). In English Pietraforte means “strong stone” as it has a perfect breaking load of approximately 1400 kg/cm. Because of its particular resistance to compression and atmospheric effects, it has been the basic structural material of Florence and all the other villages in the valley of Arno. As grand part of the city of Florence was constructed of Pietraforte, the color and particular aspect of the rock have become an element that characterizes the city (Martelli, 1964) (Figure4).

The name of Pietraforte was first used by the noble famous architect Giorgio Vasari in 1546. Vasari in “Le Vite” describes Pietraforte as follows; *“Pietraforte stands still in uncovered against water, sun, ice and against every torment and it needs time to be worked... it has a yellowish colour with some very thin white veins that gives a lot of pleasure... from this stone are walled up the Palazzo dei Signori, La Loggia Orsanmichele, all the internal body of the Santa Maria Del Fiore, all the bridges of Florence, Palazzo Pitti and Palazzo Strozzi...”*

Thanks to the stratification of the rock, until the ancient times Pietraforte was extracted easily from the quarries spread along the River Arno. The thickness of strata varies from a few centimeters to 1 meter (Praer, 2007). When extracted Pietraforte has a bluish gray color, but then gets a light brown color because of the presence of biotite; a iron-rich phyllosilicate mineral within the mica group.



Figure 4. The texture of Pietraforte (author's photo).

The crucial disadvantage of Pietraforte is its particular hardness that makes it very difficult to be sculptured. So when architectural elements need to be realized with precision, Pietraforte does not give optimum results. Pietraforte finds its most advantageous use for

the realization of rusticated façade elements called “bugnati” in Italian. To realize these rustifications the stone was left with a rough external surface and only the edges were deeply-cut and worked with precision to secure the horizontality of the massive stone blocks. The alterations of the degree of precision during the realization of different floor facades, was typical of Florence palaces (Figure 5).



Figure 5. The façade of Palazzo Medici Riccardi with the exceptional masonry work (author's photo).

The weakness of Pietraforte is the veins of calcite which increase the porosity and permeability of the rock especially during acidic rain. As acidic

rain hits the vertical veins of calcite on the surface of Pietraforte, the veins turn into cracks (Figure 5). While rain hits the veins parallel to the façade, the external part of the block is detached from the vein and the surface of the block becomes smooth following the flat veins of calcite (Figure 6, Figure 7). But all these degradations are mainly superficial and they are only seen on the rough external surfaces of the rustifications. So these rough surfaces become solutions that also tolerate superficial degradation while the inner parts of the blocks still keep their solid character and structural strength.

2.1.2. Pietra Serena and the geometric frames of Florence

Pietra Serena means, “calm stone” in Italian. It is a grey sedimentary rock with a variable grain size. In other words the grain size of the rock differs from medium to large particles in the quarry. Its texture is pleasingly homogeneous and uniform characterized by lamination and degradation of particle sizes in single elements (Sartori, 2002). It is a kind of feldspathic rock with clayey and calcitic origin with a breaking load of approximately 700 kg/cm² (half of Pietraforte). Vasari describes Pietra serena as follows;

“The one that is called Pietra Serena is a kind that tends to blue or rather grey; it is found in many quarries in Arezzo, Cortona, Volterra and through all the alpine region; on the mountains of Fiesole (Florence) it is very beautiful, it is extracted in very big dimensions as it can be observed on the buildings in Florence realized by Filippo di Ser Brunellesco, the one that has extracted all the stones of S. Lorenzo and Santa Spirito and other infinities that can be observed on the buildings all over the city. This kind of stone is very beautiful.”

Pietra Serena was used by the Etruscan civilization for the construction of the city walls of Fiesole overlooking Florence. Then it was used by the Romans for the construction of the Temple of Mars. In fact as mentioned above through the description of Vasari, it finds its ideal use by Brunelleschi by realization of the columns of the churches of San Lorenzo and Santa Spirito (Figure 8). In the works of Brunelleschi and his followers, Pietra Serena is used in order to underline architectural form through the discrimination of structural and ornamental elements and its dark color serves as a contrasting element that defines geometric frames and finishings.

Pietra Serena and Pietra Bigia that will be mentioned later on are extracted from the same quarries and in Antiquity they were called “macigno” in common. Because of the morphologic character of “macigno”, the straits of the rock present straits of considerable dimensions. As Pietraforte presents straits of limited potential (max 1m), the straits of macigno can reach to height of 10 meters and even more (Bargossi, Felli, Gurrieri, 2008). Because of this reason, the monolith columns of renaissance churches were realized in “macigno”.

It is known that stones even from the same quarry can differ greatly from each other. In the case of Pietra Serena these



Figure 6. Degradation along the vein of calcite on the façade of Palazzo Strozzi.



Figure 7. Detachments along the vein of calcite on the façade of Palazzo Medici Riccardi (author's photos).



Figure 8. The monolith columns of San Lorenzo in Pietra Serena (author's photo).



Figure 9. The architectural elements and details realized by Pietra Serena in Biblioteca Laurenziana (author's photo).

differences are dependent to the dimensions and uniformity of granules and the nature and quantity of cement connecting them (Bargossi, Felli, Gurrieri, 2008). Rodolico (1953), makes a kind of classification according to the particles and cement of the rock. The first type is formed of clastic particles of different sizes connected by a cement of pure calcite. The porosity of this type is considerably low so its resistance to atmospheric effects is very high. The Etruscan city walls of Fiesole are made of this

kind of Pietra Serena and portions of the wall which are standing still are evidence to the strength of the stone. In the case of ordinary Pietra Serena with rough clastic particles not uniform in size, the quantity of cement is very high but the dominant component of the cement is clay with a lower percentage of calcare which renders the material less resistant to atmospheric affects. While high quantity of calcare in the cement causes the rock to be harder, high quantity of clay renders it gellier. The third type of Pietra Serena called Serena Gentile is composed of small and uniform clastic particles tied by a clayey cement with very low percentage of calcare. This type of Pietra Serena can last very long when used indoors.

As mentioned above, the decrease of dimensions of the particles increase the capacity to be sculptured while the increase of the percentage of calcare in the cement increase the resistance to external factors. So Pietra Serena gentile with small particles was regarded as the best material for the internal finishing touches, internal decorations like capitals, cornices etc. (Figure 9) (Vannucci, Fredianelli, 2006). On the other hand its external use was not very common because of its low resistance to atmospheric effects especially to rain.

The use of Pietra Serena for columns, cornices and arches of the colonnades facing the cortiles and squares was indispensable during Early Renaissance. In this case the more resistant type of Serena was used in order to obtain structural strength and elements of Pietra Serena were often protected by wooden roofs or eaves (Agostino Del Riccio). As veins of calcite could become provocateurs of a total splitting (Bargossi, Felli, Gurrieri, 2008) and cause structural discontinuity, especially for constructive elements blocks with veins were not used.

2.1.3. Pietra Bigia (Macigno Bigio) and the squares of Florence

Pietra Bigia is chemically similar to Pietra Serena and the two similar stones are extracted as portions of the same rock formation. At the hills of Fiesole

Pietra Bigia was extracted before and after Pietra Serena. While going deeper through the quarry, just before the formations of Pietra Serena, Pietra Bigia was getting better in quality (Baldinucci, 1681).

The particles of Pietra Bigia are tied together by the help of a cement based on calcite so its resistance is superior than Pietra Serena which has clayey cement as mentioned above. (PRAER, 2007). Pietra Bigia has a brownish color and it was used a lot between the 15th and 17th centuries because of its similar appearance to Pietraforte, its inferior cost, its possibility to be sculptured and its superior resistance when confronted con Pietra Serena (Sartori, 2002).

Although the resistance of Pietra Bigia to pressure and atmospheric effects is lower than Pietraforte, it was commonly used for the realization of pavements, squares and streets because of its capacity to be worked. The surfaces of the huge and thick blocks in Pietra Bigia were worked carefully in order to drain rain water. Most of the streets and squares of Florence were covered with slabs of massive Pietra Bigia with a thickness of 30-40 centimeters. The edges of rectangular blocks were worked with precision only for a thickness of 3-4 centimetres and the rest of the blocks were roughly shaped with a tool called “accapezzino”. The inclination for drainage was arranged by sand and then the slabs were positioned (Figure 10). The surfaces of the slabs were worked with a sharp ended tool called “subbia” which was used to create shallow-cut lines called “petti di pendenza” on the stone to facilitate the flow of water and to maintain a surface less slippery.

3. The effects of local stones on defining architectural identity in Florence

Before the Early Renaissance the use of stone was reserved only for the construction of towers (Mandelli, 89). These towers were built by wealthy families of the medieval period in order to show their wealth. The rest of the buildings were constructed in wood. During the early Renaissance, the opportunity to join several residences in one unique body of vast dimensions, bring a different understanding of relation between private property and city (Mandelli 89). This opportunity was the result of new regulations of land register formed in 1427. As a result, the prosperous families intended to show their wealth through the construction of family palaces that could resist to time. In time the palaces of Florence became one of the most important elements of the urban fabric and particular mason work of these palaces became a strong expression of the power and prosperity of their owners.

According to Mandelli, the family palaces were characterized by three important elements:

- The cortile: generator between halls and central stairs serving to maintain distributive sequence
- The façade: a system of orders based on the relation of the parts and the openings.
- The internal front of the cortile: the encounter between the classic orders and the existing local language

The peculiar role of the façade was to diaphragm the inner part of the residence from the public street by means of a stone curtain that was characterized by the particular masonry in stone especially Pietraforte or by plaster reinforced partly by stone.

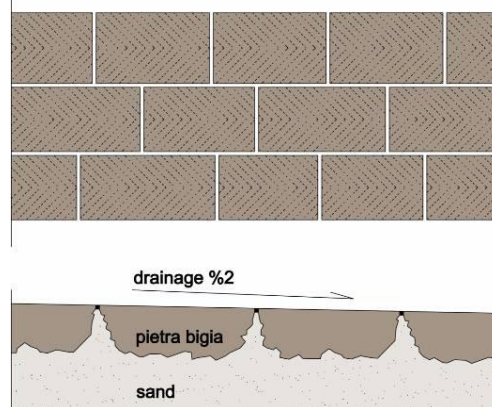


Figure 10. The section and plan of typical renaissance pavements of Florence (author's drawing).

In the first case the palace is called “munito” (fortified) and in the second case “fiorito” (flowered) (Mandelli, 1989). The fortified (munito) palaces express a graduated and diversified character of masonry between the floors.

The concept of “faccia a vista” intend to show out the use of stone to mark the variation of surfaces in order to create a sense of structural lightening as going up the floors. Additionally, the cornices and the massive seat surrounding the palaces create a sense of horizontal order. For the fiorito (flowered) palaces, the variation of mason work reappear around the openings and on the corners of the building. In every palace the variation of mason work is interpreted in a different way according to its particular design and dimension.

The walls of many Early Renaissance palaces were composed of horizontal strings of stones all with the same height. The strings were in fact the straits maintained directly from the quarry. The thick straits were commonly used for the ground floor because of two basic reasons:

- the need for resistance to compression under the load of massive upper floors
- the intention to create a sense of structural lightening as going up the floors.

The depth of stones was determined when the stones were extracted from the quarry while their height and length were determined by the nature of material. Once found a high-quality strait with a height between 20-50 centimeters, it was removed in portions as long as possible. In Palazzo Strozzi, stones with a length of approximately 3 meters can be observed (Figure 11). The use of stones from the same level of stratification in order to form a strait of blocks had many advantages:

- The stratification of the rock permit to maintain stones with the same height which are used for the realization of perfect horizontal strings. Therefore the structural resistance of the mason wall result very high.
- As the stones on the same string are extracted all together from the quarry, their chemical and physical properties are very similar to each other. As a result the strait work under load as a unique body
- The horizontal strings create a sense of order
- As the height of the stones is perfectly predetermined it becomes easier for the mason master to work the stone.



Figure 11. *The strings of stone on the façade of Palazzo Strozzi (author's photo).*

The facades facing the interior cortile also reflected the principle of structural lightening as going up the floors (Figure 12). The columns were usually monoliths made of Pietra Serena. The cornices, and fine ornaments were also in Pietra Serena while the surfaces in between were simply plastered in white.

The portico was usually covered by cross vaults, tuscan type vaults with lunettes or overhang vaults with lunettes constructed in bricks and plastered in white. The flooring of the upper floors is usually made of wood. Examining the example of Palazzo Strozzi it can be observed

that the coverings of the ground and first floors are Tuscany type vaults with lunettes while the upper floor is in wood . Therefore it can be understood that the construction of the coverings and floors also reflect the principle of structural lightening. A constructional fact becomes an aesthetic element and serves to create architectural identity. The variations of proportions and dimensions together with the variations in material create a logical entity. The outer façade in Pietraforte with the alteration of rustifications and the contrasting inner façade surrounded by fine elements in Pietra Serena create the differentiation between public and semi-private space. While the outer façade in Pietraforte serves to create a strong solid interface indicating the power and prosperity of its owner and, the perforated inner façade reflects the high quality of spatial relations and social life.

As discussed above Renaissance rustifications on the facades, the fine finishings in Pietra Serena, the courtyards in Pietra Bigia and the architectural orders created by the differentiations of these materials were not simple inventions of the architects or the stone-masters. They were clever solutions that appreciated the nature of material to create a unique sense of order, visual and structural strength and an exceptional architectural quality.

Conclusion

In the Florence of Early Renaissance every constructional form and detail had a reason. Material was much more than a follower of form. It was the strongest instrument of the architect in order to create a unique architectural language. Its structural capacity, physical and aesthetic aspects determined constructional principles, dimensions, and even architectural forms. The columns of the Ospedale degli Innocenti in Pietra Serena were only thick enough to carry the load of the arches below them, the arches only wide enough to carry the façade above and so on (Figure13). Beauty was the result of the logical proportional relations and constructional principles that respected the nature of material.

In Florence, Pietra Serena with its dark color and homogeneous texture becomes the material of framings in order to create contrast with white plaster and strengthen the affect of architectural form and order. While Pietra Bigia characterizes the horizontal surfaces of the streets and squares of the city, Pietraforte characterizes the Renaissance facades. With its strong nature, Pietraforte becomes an element that expresses constructional strength and it determines the Renaissance

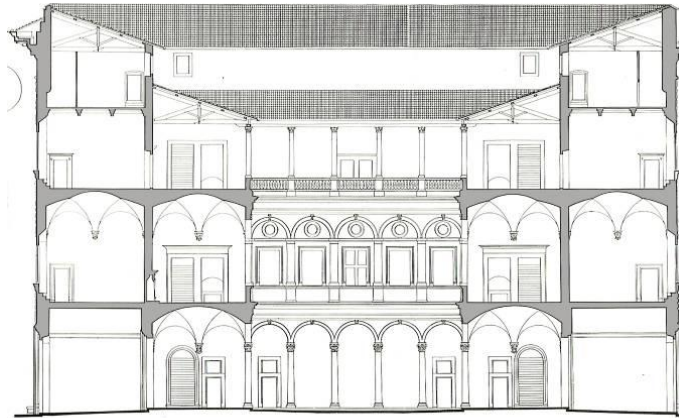


Figure 12. The section of Palazzo Strozzi (Mandelli, 1989).



Figure 13. The façade of Ospedale Degli Innocenti (author's photo).

rustifications. The alterations of the degree of precision of the mason work become typical of Pietraforte and consequently of Florence palaces. Constructional facts guided by the potentials of local materials and stones also become aesthetic elements and they serve to create architectural identity.

Renaissance architects have observed ancient structures and they have interpreted ancient principles with the new way of thinking making use of local facts. With the enlightenment of Renaissance, most of the Renaissance cities have created their own architectural languages through the use of their local materials.

Today, buildings all over the world tend to be similar. During the last decades, every year new materials are introduced to the great market of materials. Many materials especially those used indoors are considered as consumer goods of short periods. Facades, interiors, pavements are changed in periods of 5-10 years or even less. Thus material becomes not more than a simple element that follows architectural form and satisfies certain architectural needs. Thus, the most important deficiency of today's architecture can be considered as the disengagement of architecture and material.

Architecture that does not respect local materials and techniques become a consumer good and lack identity. In order to evaluate today's architecture it is essential to look back to Renaissance and analyze it profoundly. The most important revolution in human sciences can tell us much more than we imagine.

¹ *Corresponding author*

References

- Ackerman, J. (1994), *The Regions of Italian Renaissance Architecture*, **The Renaissance Architecture from Brunelleschi to Michelangelo**, Thames and Hudson, London
- Alberti, L. B. (1966), **De Re Aedificatoria 1450**, Il Profilo Editrice, Roma
- Baldinucci F. (1681), **Vocabolario Toscano dell'arte del Disegno**, cit. p. 123
- Bargossi, G. M., Felli, P., Gurrieri, F. (2008), **Pietra Serena: Materia Della Citta**, Edizioni Aida, Florence
- Fabbri, C., Francioni, P. (2003), **Loro Ciuffenna**, Aska Edizioni, Florence
- Fanelli G. (2002), **Firenze Architettura e Citta**, Mandragora, Florence
- Goldthwaite, R., A. (2009), **The Economy of Renaissance Florence**, The John Hopkins University Press, Baltimore.
- Pescio, C. (2005), **La Vita D'artista Brunelleschi**, Giunti Editore S.p. A., Florence
- Ricci M. (2010), **Dispense: Materiali ed Elementi Costruttivi**, Universita Degli Studi di Firenze, Edizione centro A-Zeta, Florence
- Rodolico, F. (1953), **Le pietre delle città d'Italia**, Le Monier, Florence
- Martelli, R. (1964), **La Pietraforte Nell'Architettura Moderna Fiorentina**, Universita degli Studi di Firenze, Dipartimento di Progettazione, Florence
- Mandelli, E. (1989), **Palazzi del Rinascimento: Dal Rilievo al Confronto**, Alinea Editrice, Florence
- Moffett M., Fazio M., Wodehouse L. (2004), **Buildings Across Time**, Laurence King Publishing, London

Saalman, H. (1993), **Filippo Brunelleschi: The Buildings**, Zwemmer, London
Vannucci M., Fredianelli A. (2006), **La Firenze del Rinascimento**, Newton Campion Editori, Roma
PRAER, (2007), **Piano Regionale delle Attivita' Estrattive di Recupero delle Aree Escavate e di Riutilizzo dei Residui Recuperabili**, Materiali Storici

Erken Rönesans Floransa'sında mimari kimliği belirleyici olarak doğal taş kullanımı

Bu çalışmanın amacı, Rönesans Dönemi'nde Floransa'da kullanılan yerel taşların yapısal bütün içindeki yerlerini tartışarak, malzemenin mimari kimlik üzerindeki etkilerini vurgulamaktır. Çalışma kapsamında Floransa'da Erken Rönesans Dönemi'nde kullanılan 3 temel taş çeşidi, ocaktan çıkarılma, işlenme ve yapısal elemana dönüşme süreçlerinde incelenerek, örnekler üzerinden değerlendirmeler yapılacaktır.

Rönesans mimarları için malzeme, yapıların tasarım ve yapım aşamalarını doğrudan etkileyen çok önemli bir unsurdur. Pek çok Rönesans kentinde mimari kimlik oluşturma adına bilinçli olarak yerel taş kullanımına büyük önem veriliyordu. Rönesans'ın başladığı yer olarak kabul edilen Floransa'da Ortaçağ'ın sonlarından itibaren yapıların neredeyse tamamında yerel doğal taşlar ve doğal taş türevleri kullanılarak üretilen tuğla çeşitleri kullanılıyordu.

Pek çok mimar ve tarihçi tarafından Rönesans'ın başlatıcısı olarak kabul edilen Brunelleschi, 2 yıl boyunca Roma'daki Antik Roma yapılarında kullanılan taşların bozulma şekillerini ve nedenlerini inceleyerek, mimari form ve malzeme ilişkilerini dikkatle analiz etmiştir. Günümüzde pek çok Rönesans uzmanı, Brunelleschi'nin başarısının yaptığı bu inceleme ve analizlere bağlı olduğunu savunmaktadır. Yani Rönesans'ın özünde eski yapıların bilinçli analizi sonucu ortaya çıkan değerlendirmeler vardır.

Floransa'da meydanlar, avlular, cepheler ve iç mekanlar kullanılan yerel taşların farklılaşması ile karakterize edilmiştir. Yani kentsel ve mimari anlamda her malzeme en doğru yerde en doğru şekilde kullanılmaya çalışılmıştır. Malzemenin fiziksel özellikleri, dayanımı, işlenebilirliği ve yüzey özellikleri, estetik ve yapısal anlamda irdelenerek, farklı taş çeşitlerinin potansiyelleri en iyi şekilde değerlendirilmeye çalışılmış, çoğu zaman taşın özellikleri yapım tekniğini, strüktürü ve mimari formu belirlemede birinci unsur olmuştur.

Floransa, yakın çevresinde bulunan kaliteli maden ocakları açısından oldukça zengin bir coğrafi yapıya sahiptir. Floransa ve Arezzo şehirleri arasında uzanan Pratomagno Platosu ve Chianti Dağları arasında Buzul Çağı'nda çok büyük bir gölün bulunduğu bilinmektedir. Yüzyıllar boyunca dağlardan koparak gelen alüvyonların göl tabanında sedimenasyonu sonucu oluşan kum taşı esaslı farklı tabakaların yüksekliği 1cm ile birkaç metre arasında değişmektedir. Ortaçağ ve Rönesans Dönemi'nde gölün çekildiği yerde bulunan Arno Vadisi boyunca çıkarılan ham malzeme, Arno Nehri yardımıyla şehir merkezine kadar taşınabilmiştir. Floransa'da yaygın olarak kullanılan 3 taş çeşidi, Pietraforte, Pietra Serena ve Pietra Bigia olarak sınıflandırılabilir.

Floransa'da en çok kullanılan taş olan "Pietraforte" yani "güçlü taş" yüksek basınç dayanımı ile Floransa Saraylarında ve kagir yapıların neredeyse tümünde düşey gelişim için en uygun malzeme olarak değerlendirilmiştir. Sarımsak bir renge sahip olan Pietraforte taşından inşa edilen sarayların cepheleri, sokak bütünlüğü içinde sürekli kent duvarlarına dönüşmekte, söz konusu duvarlara vuran akşam güneşinin yarattığı parlak ışık, "Floransa'nın altın ışığı" (Luce d'oro di Firenze) olarak nitelendirilmekteydi.

Pietraforte, Rönesans saraylarını karakterize eden rustik cephelerin inşa edildiği taştır. Taşın çok sert olması strüktürel anlamda olumlu olsa da, işlenmesini çok zor kılar. Dolayısıyla mimari elemanların hassasiyetle işlenmesi gereken durumlarda Pietraforte çok iyi sonuçlar vermez. Bu anlamda taş yüzeylerinin kaba bırakılıp sadece birleşme noktalarının yani derzlerin işlenmesi, taşın şekillendirilmesini kolaylaştırmış ve taşın fiziksel özellikleri ve dayanımı yapım tekniğini belirleyici bir unsura dönüştürülmüştür. Böylece, Pietraforte taşının yüzeyinin farklı biçimlerde işlenmesi sonucu oluşan kademelenme Rönesans cephelerine kimlik kazandıran çok önemli bir unsura dönüşmüştür. Söz konusu uygulamalar, mimarın ya da taş ustasının keyfi seçimleri değildirler. Tam tersine, malzemenin doğasını gözетerek gerek görsel gerekse strüktürel anlamda yapıları güçlü kılan ve eşsiz bir düzen anlayışı getiren çözümler olarak öne çıkarlar.

Erken Rönesans Dönemi Floransa Saraylarında cephe duvarları aynı yüksekliğe sahip taş blokların yan yana gelmesi ile oluşan yatay taş dizilerinden ibarettir. Bu yatay dizileri oluşturan taşlar aslında taş ocağında aynı katmandan çıkarılan doğal oluşumlardır ve aynı tortul katmandan çıkarıldıkları için yükseklikleri ve fiziksel özellikleri aynıdır. Taş ocağındaki kalın katmanlar daha çok sarayların zemin katında kullanılır. Bunun başlıca nedenleri, üstteki masif katların ağırlığına karşı koyacak basınç dayanımını sağlamak ve yukarıya doğru çıktıkça strüktürel hafifleme hissi yaratmaktır. Üst katlara çıkıldıkça taş bloklar ve yüzeyleri inceler ve zerafet kazanır. Böylece strüktürel hafifleme prensibi statik, fiziksel ve görsel anlamda kent duvarlarını şekillendiren bir unsura dönüşür.

Floransa'da yaygın olarak görülen ikinci taş çeşidi olan Pietra Serena, koyu rengi ve homojen yüzeyi ile özellikle beyaz sıvalı yüzeylerde kontrast oluşturmak üzere kullanılmıştır. Rönesans'da yeniden yorumlanan oran ve düzen kavramlarını vurgulamak adına sütunlar, çerçeveler, plastırlar ve kornişler Pietra Serena'dan inşa edilmiştir. Pietra Serena'nın diğer taşlara oranla çok daha kolay işlenmesi de, onun daha ince işçilik gerektiren mimari bitiriş elemanlarında kullanılmasını gündeme getirmiştir.

Brunelleschi, Pietra Serena'yı, mimari formu vurgulayarak strüktürel ve dekoratif yapı elemanlarını ayırma amacıyla kullanmıştır. "Ospedale degli Innocenti" nin cephesindeki Pietra Serena kullanımı, yapının bütününe hakim olan oran sistemlerinin bir dışavurumu niteliğindedir. Santissima Annunziata meydanını çeviren yapılardan biri olan "Ospedale degli Innocenti" den sonra yapılan tüm yapılar ve düzenlemeler onunla bütünlük sağlayacak şekilde inşa edilmiştir. Bu anlamda Santissima Annunziata Floransa'nın planlanmış ve bütünsel olarak ele alınmış ilk meydanıdır. Bu bütünlük orantısal ilişkiler ve farklı doğal taş yüzeylerinin bir araya gelmesi ile oluşturulan harmoninin bir ürünüdür.

Sert taş yani Pietraforte doğal katmanlarının yüksekliği taş ocağında 1 metreyi geçmezken, Pietra Serena katmanlarının yüksekliği 10 metre hatta daha fazla yüksekliğe ulaşabilir. Bu anlamda monolit kolonlar, sütunlar vb. çok büyük mimari elemanlar Pietra Serena'dan inşa edilmiştir. San Lorenzo ve Santa Spirito kiliselerinde orta nefi çeviren monolit kolonlar, Pietra Serena'nın fiziksel potansiyelini tam anlamıyla ortaya koyan mimari elemanlar olarak göze çarparlar.

Floransa' da en çok kullanılan 3. taş çeşidi olan "Pietra Bigia", ile "Pietra Serena" esasen aynı taşın farklı porsiyonlarıdır. Taş ocağının merkezinde "Pietra Serena", onu çevreleyen kısımlarda ise "Pietra Bigia" çıkarılmıştır. "Pietra Bigia", "Pietra Serena" ya göre daha dayanıklı, "Pietra Forte"ye göre ise daha yumuşak ve işlenebilir olduğu için, çok tercih edilen bir taş çeşidi olmuş ve Floransa'nın meydan ve sokaklarını donatan yegane taş olarak benimsenmiştir. Yağmur suyunun uzaklaştırılması ve kaydırmazlığın sağlanması için teraziye alınan taş blokların yüzeyi taraklanarak, tüm meydanlar ve sokaklara hakim bir taş dokusunun oluşması sağlanmıştır. Böylece, taşın doğasını gözетerek şekillenen mimari detaylar, kent mekanında ortak bir mimari dilin yaratılmasına aracı olmuştur.

Rönesans şehirlerinde malzeme, istenen mimari etkilere ulaşmak adına kullanılan bir araç olmaktan çok öte bir yere sahipti. Malzeme her aşamada mimari form ve strüktür üzerinde belirleyici bir unsur olarak değerlendirilmekteydi. Yerel malzeme kullanımı da her anlamda yöresel farklılıkları getirmekte ve her şehirde ya da bölgede farklı bir mimari kimlik geliştirilmesinde çok önemli bir rol oynamaktaydı. Her taş, kentsel ve yapısal bütün içinde en doğru yerde ve şekilde kullanılmaktaydı. Bu da taşın ve dolayısıyla yapıların dayanımını arttırmaktaydı. 500-600 yıllık yapıların halen günümüzde sapasağlam ayakta olmasının en önemli nedeni de aslında malzemenin tüm potansiyellerinin en iyi şekilde değerlendirilmesi olarak görülebilir. Bu anlamda günümüz mimarlığı ile Rönesans mimarlığı belirgin bir şekilde farklılaşmaktadır.

Floransa'da Erken Rönesans yapılarında her mimari form ve detayın bir nedeni vardır. Ospedale Degli Innocenti'nin Pietra Serena sütunları sadece üzerlerine oturan kemerlerin yükünü taşıyacak kalınlıktadır. Kemerler ise yalnız ve yalnız üzerlerindeki cepheyi taşıyabilecek derinliktedir. Güzellik sezgisel ya da rastlantısal bir form arayışı değil, mantıklı orantısal ilişkiler ve malzemenin doğasını gözetken strüktürel ilkelerin doğal bir sonucudur.

Son yıllarda, her geçen gün büyük malzeme piyasasına yeni malzemeler eklenmektedir. Bunların çoğu, kısa dönemlerde kullanılmak üzere piyasaya sürülen tüketim malları olarak göze çarpmaktadırlar. Cepheler, iç mekanlar, döşemeler, kaldırımlar her 5-10 yılda bir yeni malzemelerle tekrar yorumlanmaktadır. Böylece malzeme, yapılar ya da mekanlara istenilen etkileri ve özellikleri kazandırmak adına kullanılan yüzeysel bir unsura dönüşmektedir. Bu anlamda günümüz mimarlığının en zayıf noktası, mimari form ve strüktür ile doğal malzemenin ilişkisinin koparılması olarak görülebilir.

Doğal malzemeleri ve yapım tekniklerini gözetmeyen mimarlık, kimliksizleşir ve sonuçta bir tüketim aracına dönüşür. Dünyanın her yerindeki yapılar birbirinin aynısı olmaya başlar. Günümüz mimarlığını değerlendirmek için, Rönesans Mimarlığına bakmak ve onu anlamak gerekmektedir. İnsanlık tarihinin en önemli devrimi, bize düşündüğümüzden çok daha fazlasını söyleyecektir.