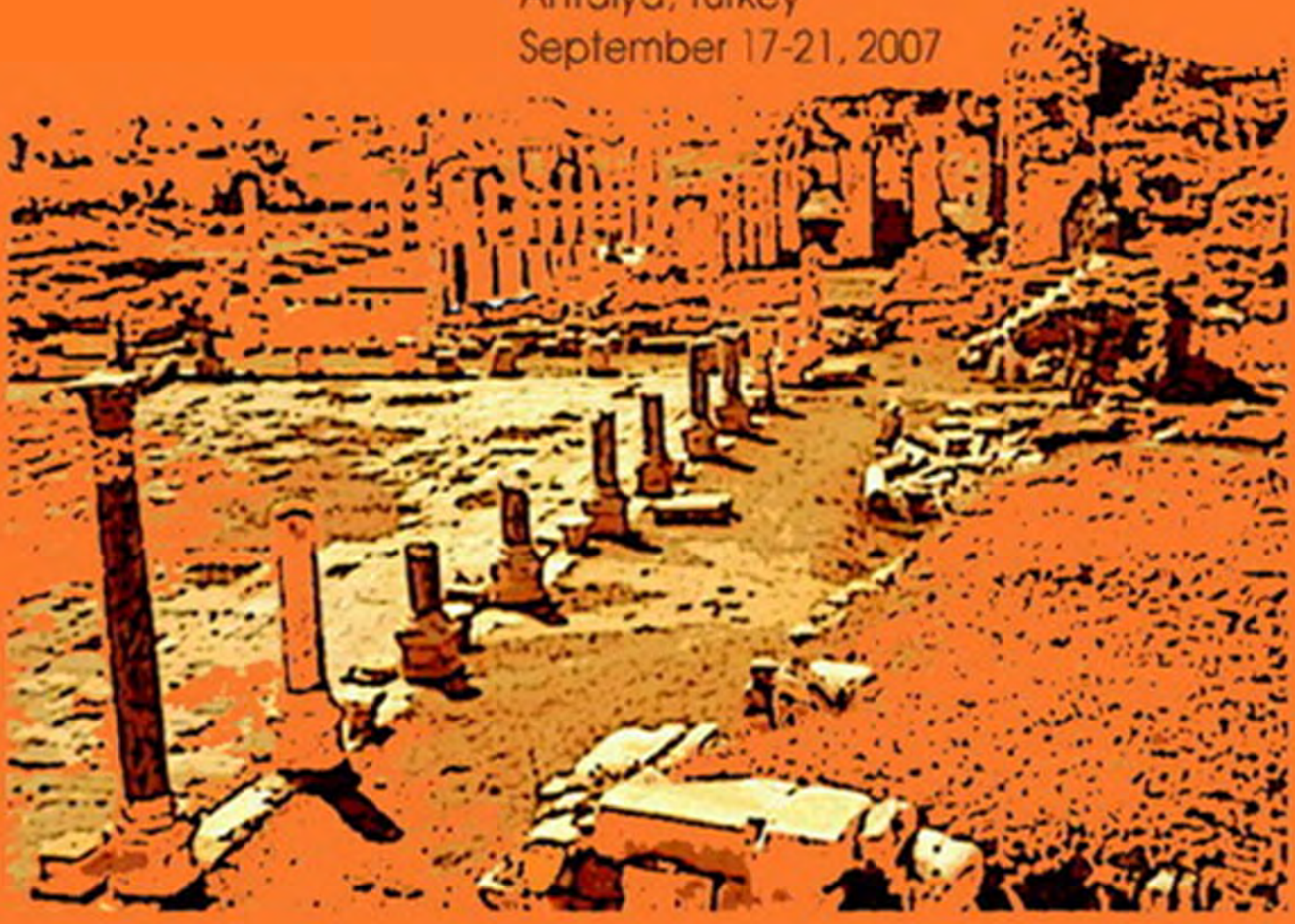
SHH07

STUDIES on HISTORICAL HERITAGE

Proceedings of the International Symposium

Antalya, Turkey
September 17-21, 2007



Edited by Görün ARUN

Organized by
YILDIZ TECHNICAL UNIVERSITY
RESEARCH CENTER for PRESERVATION of
HISTORICAL HERITAGE
TA-MİR

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The papers herein are published in the form as submitted by the authors. Minor changes have been made where obvious errors and discrepancies were met.

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Cover Design and Layout: S. Emre Pusat

ISBN: 978 - 975 - 461 - 433 - 6

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PREFACE

Historical heritage that contain the architectural forms and the artistic values are under the danger of deterioration through the crucial environmental problems of urbanization and pollution, natural hazards, ignorance and new demands of the society. Safeguarding the continuously deteriorating material and construction of a historical complex, city or archaeological site with their natural and manmade environment necessitates integrated management and harmonious work of a multidisciplinary team of specialists dealing with history, urban planning, architecture, archaeology and different fields of engineering. Besides the interdisciplinary language the conscious participation of the society is also required so that the proper political decisions can be assured.

The International Symposium on "Studies on Historical Heritage" in Antalya, Turkey on September 17-21, 2007 is organized by Yıldız Technical University, Research Center for Preservation of Historical Heritage. The symposium is as a continuation of the previous international symposia entitled "Studies in Ancient Structures" held in Istanbul in 1997 and 2001.

The symposium provides an international and interdisciplinary forum for researchers, leading experts and people from application to exchange their experience and knowledge and disseminate information on preservation of historical heritage. Its aim is to enhance knowledge, increase awareness of the current technology and methodology and encourage studies of different disciplines working on historical heritage.

Studies on Historical Heritage highlight the state of the art in the diversity of professional skills, experience and knowledge necessary for preservation of historical heritage. Contributions of different disciplines from 22 countries contribute their own experience and attempt to express in interdisciplinary way the new concepts, technologies, methods and materials for the conservation and management of historic cities, sites and complexes.

These Proceedings containing papers sent by the specialists of different fields to the SHH07 Symposium is grouped according to their content, rather than according to their presentation, in order to make it more useful as a reference text. The Chapters are on: Historical Aspects and Documentation of Architectural Heritage and Their Environment; Archaeological Studies; Future of Historical Heritage- Heritage Management; Experimental Methods and Test Results of Materials; Structural Concepts**;** Intervention, Restoration And Preservation Techniques and Methodology. The author index is at the end.

The proceedings contain the papers that are reviewed. We wish to acknowledge and express our sincere gratitude to the Scientific Committee for spending their precious time in reviewing, editing and making significant recommendations to the authors. Special thanks to or keynote speakers; L. Binda, A. Galla, K. Kawaguchi, E. Madran, P. Roca, Y. Schaffer and T.P. Tassios whom we greatly appreciate their views on preservation of historical heritage. Of course, without the timeless efforts of the organizing committee members, this

symposium could not have been realized. Many thanks go to our sponsors and supporters for their invaluable and generous financial and technical contributions which indeed provide important link between the people in application and academia.

Finally warm thanks to all the authors from different parts of the world that have made considerable scientific contribution from their ongoing research activities. It is hoped that these contributions may be useful for professionals and researchers engaged in the problems of preservation and for those who have interest in the Studies on Historical Heritage

Dr. Görün Arun
On behalf of the SHH07
Organizing Committee
August, 2007

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CHAPTER I

Historical Aspects and Documentation of Architectural Heritage and Their Environment

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ARCHITECTURAL ASPECTS OF HISTORICAL HERITAGE AND THEIR ENVIRONMENT

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ABSTRACT

The main theme of this presentation called **"Architectural Aspects of Historical Heritage and Their Environment"** is the contribution of architectural works to historical heritage being the most important part of this heritage. Under this main theme, firstly, the local / traditional aspects of architectural products are discussed and the factors within this definition are listed. The roles of buildings in their environment and their place in the construction of the urban memory are addressed in the second subtitle called **"Architectural Products in the Formation of Urban Memory**". **"Multi-culturality / Multi-layeredness"** is the third subject of this presentation. The qualities of settlements inhabited for thousands of years are discussed in this section. All buildings are affected by the physical environment they are located in and also form and change them. Various aspects of this relationship are examined under the title **"Building / Environment Relationship"**. The final title, "**Sustainable Functionality**" aims at determining positive and negative aspects of the process of adapting architectural edifices as part of historical heritage into contemporary life.

1. INTRODUCTION

Settlements emerged out of architectural products and social common spaces when old societies began to settle. The built environment of cities and towns that have been used for thousands of years, regardless of their scale and quality, contain the products of past societies, which are described as historical heritage. The most widespread and tangible of those products is architectural works. For a work to be defined as '**heritage'**, among other values there are architectural, historical, aesthetical, memory, economical, functional, continuity, plurality, uniqueness etc values. Based on these values, various aspects of historical

heritage and its environment are tried to be examined under separate headings and the importance of this type of heritage is explained.

2. LOCALNESS / TRADITIONALNESS

When discussing the architectural aspects of historical heritage, the '**local**' and '**traditional**' level of this heritage is one of the first subjects to deal with. In other words, the degree of representation of the conditions and requirements of the physical and social environment within the architectural works is among the pre-conditions of being local and traditional.

Within this context, the relations between actors of architectural production, traditional building techniques and wise use of building materials, the degree of meeting the economical, social, political and cultural requirements of life etc. are inputs of localness. Upon examining Anatolian settlements described as 'historical heritage', it is seen that localness is emphasized with the following manners:

- Especially in the production process of traditional buildings, there is an organic relationship among the owner, local inhabitants, building masters and the person responsible from building works of the settlement, based on mutual descriptions and meetings of demands and requirements. This relationship creates a final product that every actor is in agreement with. For example, 'privacy', which is an important element of traditional life, and the resulting 'seeing without being seen' concept are reflected in the design of buildings through this agreement.
- The selection of traditional building techniques and building materials is founded on principles such as maximum usefulness, economy and rationalism. Designs and building craftsmen utilise the experience of hundreds of years and know quite well the possibilities of each material.
- Harmony with the conditions of the environment and prioritisation of climate / building relationship are important factors in the production of environmentally compatible buildings in various parts of Anatolia. Open, semi-open and closed spaces to be used in different seasons are created within the same building, and this variety has produced functionality as well as architectural richness. For example, the solutions to problems of settling on a sloping area, such as bending and twisting of floors in accordance with the forms of the site and street, smoothening of the obliqueness to more geometric forms in upper floors, resolving of inter-floor relationships through transition elements such as projections and buttresses, have all been defined by a researcher as the 'soft civilising of nature'.
- The socially dominant production methods are taken into consideration during the design of architectural works that form the historical heritage.

Individual dwellings were adorned with distinctive spaces and architectural elements to store and process agricultural and animal products, while storage spaces, shops and *han*s were built for trade purposes in urban scale.

3. THE ROLE OF ARCHITECTURAL PRODUCTS IN THE FORMATION OF URBAN MEMORY

The overwhelming structural changes and behavioural patterns observed in the last couple of years throughout the world are bringing the danger of dissolution and disappearance of social identities in its wake. Historical heritage and its components are gaining importance in the preservation of cultural sustainability and cultural identity. Correlation between memories and spaces and the creation of symbols in this way, carry a vital significance in strengthening the 'city/building/human' relationship and for the person to embrace his environment.

Buildings have an important place in the history of settlements due to their architectural qualities and the physical environments they form. It is architectural products that describe in most clear and appraisable terms a city's status at a certain period and the knowledge, tastes and skills, social, cultural and economic relationships of its inhabitants. The meaning and importance of these products in the national and urban memory can be summarised as follows:

- Regardless of the type of architectural products, they are designed and formed to meet the requirements of the society. The quality and scale of these requirements play an important role in the shaping of a town.
- The programme, number and quality of architectural works are also indicators of the political situation of the period. For example, the fact that important complexes (*külliye*) of Bursa (Yıldırım: A.D. 1399, Emir Sultan: first years of the 15th century, Yeşil: A.D. 1419-1424 and Muradiye: A.D. 1424-1426) were constructed between 1380 – 1430 is closely related with Bursa becoming the capital and the development of Ottoman Architecture in Bursa.
- Buildings are the most solid / tangible documents of important events in the lives of a city, region or a country.
- Buildings, with the changes that they undergo since their construction, are documents of local history. Among the most widespread examples are the conversions of many churches and chapels to mosques by the new culture that arrived in Anatolia starting from the 12th century, without altering their original design, and the assignment of contemporary functions to building that had lost their original functions, such as religious schools (*madrasah)*), schools for children (*sıbyan mektebi*) during the Republican

period. These changes are parallel to the social and cultural transformations within the settlement that the building is located in.

Buildings take on various roles in the formation of urban memory. Buildings defined as **'landmarks'** can become reference points in describing a certain settlement and enable people to remember that place later on. Hagia Sophia and Süleymaniye for Istanbul, Yivli Minare for Antalya, The Castle for Bodrum, Çifte Minareli Medrese for Erzurum are landmarks of those cities. Internationally, Eiffel Tower / Paris, Statue of Liberty / New York, Opera House / Sydney are uildings that are remembered together and are associated with one another.

'**Memory buildings'** are constructed to commemorate a certain event in a settlement. This memory may have positive or negative aspects. For example, the Baghdad Pavilion in Topkapı Palace was built to mark the Baghdad campaign of Murat IV., Ahlat Elti Hatun Tomb to commemorate the death of the wife of the sultan. Istanbul Harikzedegan Apartments were built for the victims of a local fire.

'**Witness Buildings'** are buildings that have witnessed an important event in the life cycle of a settlement. They are remembered together with the event they witnessed even though they do not have high architectural significance. The "Atatürk Houses" in Turkey's various cities and towns take their meaning from Ataturk's short stays in them, although some of those buildings do not have high degrees of historical and architectural significance. The First National Assembly Building in Ankara witnessed the establishment of the Turkish Republic.

Besides the abovementioned building groups, almost every building has a documentation value. This value is determined by whether the building contains the lifestyle and the relevant architectural elements of the period. Being an important trade city and the considerable increase in olive oil production in the 19th century necessitated almost every building in Ayvalık to have a separate 'shop/storage' unit at ground floor. 'Saraçoğlu (Namık Kemal) Neighbourhood' in Ankara is an important document of the first planned public lodgements of the Republic.

The decorations used in buildings are also the most tangible elements of a society's taste, dominant understanding of art and in certain cases of artistic trade through international relations. Use of materials and building techniques are evaluated as documents as well, not only in depicting the technical level of a society but also in areas such as qualities, numbers and ethnic origins of builders, methods of material production and sale.

4. MULTI-CULTURALITY / MULTI-LAYEREDNESS

The changes that a building undergoes (on the condition that they are correctly broken down and defined) are as important as the original design and formation of the building. Because these alterations reflect the architectural interpretations, tastes, skills, fashions and users of various periods. In that respect, they are documents providing continuity in urban memory. When this architectural scale is transmitted to the settlement scale, a settlement comprising buildings and surrounding urban elements designed and constructed in different periods will acquire a '**multi-cultural'** and '**multi-layered'** quality. The quality of layeredness can vary according to the quality of the settlement. For example, the layers of prehistoric sites are determined stratigraphically, whereas in still inhabited settlements this layeredness can be directly ascertained through the buildings. In other words, the periods and qualities of the historical heritage of a settlement can be analysed through '**reading architectural products'**.

For the buildings in a city to sufficiently define each period of the city's life, it is essential that they exist uninterruptedly and there should be enough samples from each period. In that respect, most Anatolian cities have a very rich context. For example, Ankara, the capital city of the Turkish Republic, emerged in 8th century BC as an important Phyrigian settlement, and was continuously inhabited throughout the Galatian period in 3rd century BC, the Roman period in 1st century AD, the Byzantine period that followed, Anatolian Seljukid period from the 13th century onwards, Ottoman period after the 15th century and has been a city of the Turkish Republic since 1920. The witnesses of this lifecycle are the architectural products.

5. BUILDING / ENVIRONMENT RELATIONSHIP

There are important relationships between architectural products that form historical heritage and the environment where this heritage is located. These relationships can be examined under two headings. The first is the visual and physical relationships with the environment where the buildings emerge and continue to exist. Almost every building contributes to its environment whereas the environment adds different values to the buildings.

For example, the town of Hasankeyf is situated next to a river in the southeastern region of Turkey. Inhabited since the 11th century, with its rock-carved spaces, monumental buildings and traditional dwellings, the town merged itself with the rocky plateau stretching along the river utilised the various spaces within the diverse levels of this plateau and obtained its richness from this topography. The dislocation of the architectural works in Hasankeyf due to the Ilısu Dam Lake is meaningless as the building / environment relationship cannot be replicated and

since they will loose the organic and unseparable relation with their natural environment, these buildings will loose their values to a great extent.

Another example is the ancient city of Pergamon in western Anatolia. During its founding and development process, this city integrated itself with the hill on top of which it is located, and the urban areas and buildings of various qualities situated in the upper, middle and lower city were formed according to the topography. City Walls of İznik a town in Marmara region, constructed on a completely flat land and has an organic relationship with its physical environment. The magnificent and picturesque quality of the ancient bridge located on Köprülü Canyon in Southern Anatolia is derived solely from the topography. The same thing is valid forfamous Ottoman architect Sinan's bridge in Mostar. The building which ultimately became the symbol of Bosnia has contributed to the value of its environment as well as receiving values from it.

This relationship can also be discussed in connection with the definition of cultural landscape. Virtually all landscapes have cultural associations, because virtually all landscapes have been affected in some way by human action or perception. "**Cultural Landscape**" means a way of seeing landscapes that emphasizes the interaction between human beings and nature over time. It is a geographic area (including both cultural and natural resources and the wildlife or domestic animals therein) associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.

Most of the public discussion about cultural landscapes is about preserving special or historic places. Yet the definition of 'special' varies over time, among different cultures, and in different places. A landscape valued by one group may be simply invisible, or even offensive, to another. Next to an official historic district may be a neighbourhood that is not eligible for any special treatment but has deep meaning and associations for the people who live there.

For example, the village settlements located in the rural part of the Eastern Black See Region of Turkey were shaped according to the conditions of nature as well as agricultural activities peculiar to the local nature both in terms of their rural fabric and their architectural features.

6. SUSTAINABLE FUNCTIONALITY

Buildings of heritage quality are designed to meet various needs of the community who constructed them. This '**functionality**' or '**functional value of heritage'** can be clearly traced since the earliest human settlements. The single spaced dwellings in Çatalhöyük an ancient site dating from 7000 B.C. in Central Anatolia, with their functional sections, incorporated all activities of the inhabitants in that

period. Liva Paşa Mansion in Kastamonu, on the other hand, provides a spatial history of the lifestyle of a grand family in 19th century.

Will architectural works, which are home to lifestyles that not longer exist, be treated only as documents? The universal and national assessments put forward the necessity for the functionality of this historical heritage to continue, in other words, for them to be re-used through new and contemporary functions. This vision brings along change and transformation. The strategy to be followed during this process should be to prevent the values that earn a building its 'heritage' quality to be lost.

The selection of the function is closely related with the main principles to be used for utilization purposes. In that respect, the main principles that are determined are listed below:

- All environmental, architectural, spatial and ornamental features of the building should be preserved. Especially in dwellings and industrial buildings, where many technical and architectural details of their original functions remain, the harmony of the new function with such details should be considered as a design problem.
- It should not be forgotten that cultural heritage buildings can adopt only a certain number of functions and that these functions should be closely related with the potentials of the buildings.
- Buildings should not be overloaded with excessive amount of materials and information to be presented. It should be kept in mind that the building itself is also an element to be exhibited.

Based on these principles, the following criteria can be mentioned in determining new functions for cultural heritage buildings:

- In interventions necessitated by both original and new functions, denying the environment and preparing decisions for the building only will cause the new function to remain alien. For this reason, the knowledge of which basic functions the environment assumes as well as what sort of transformations are expected in which process gain importance.
- The new function should not harm the mass and spatial integrity of the cultural heritage building. This matter includes not only the main mass of the buildings but also the original open spaces as well.
- The new function should preserve and enrich spatial qualities. The best example is the approach towards the space hierarchy frequently encountered in the original designs in traditional dwellings where 'open' (courtyard, garden etc), semi-open (sofa, colonnaded portico

etc) and ‘closed’ spaces exist. Especially the desire to gain new closed spaces and the constraints of circulation should not remove the open, semi-open quality of the spaces.

- The functions in the close environment are important factors to be taken into consideration. In other words, the level of positive reception in the urban environment of the new function should be examined.
- The programme should contain optimum standards required by the function. There is an important matter here. The correct method is seen as preparing a comprehensive programme and moving on to less comprehensive programmes based on the potentials of the building.

7. CONCLUSION

As mentioned above, the architectural products are the most valuable parts of the historical heritage and their environment. The main reason is that they serve for the daily social, economical, cultural, political etc. requirements of the inhabitants of a settlement. This mission of buildings, group of buildings and their close environments, makes it compulsory to examine the characteristics , to analyse the various aspects of them and to integrate them into the contemporary needs of the societies.

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THE JÄRFÄLLA PYRAMID: THE USE OF ANTIQUE CONSTRUCTION TECHNIQUES IN AN 18TH CENTURY SWEDISH PYRAMID

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ABSTRACT

This paper studies features of the construction techniques used by antique Egyptian and Roman builders with the Swedish 18th century Järfälla pyramid. However the design of the Järfälla pyramid places it in Egyptian tradition it shows many construction features of Roman development.

1 INTRODUCTION

During 2005-06 the Järfälla pyramid underwent thorough technical studies and a major restoration. Due to problems with corroding iron cramps and weathered concrete the casing stones had begun to separate from the core. It was deemed necessary to dismantle all the casing stones and reconnect them to the core. Through this work the exact construction of the pyramid could be examined and documented. Since the Järfälla pyramid is the one and only true pyramid in Sweden I found it worthwhile to try and place it in a construction historic context.

2. EGYPTIAN PYRAMID CONSTRUCTION

Designwise the main design features of a pyramid is its inclination. This was measured in fractions of cubits and differed somewhat but usually the Egyptian pyramids had an angle around 52º. Constructionwise most of the pyramids from around 2600 B C and on were erected with three clearly distinguishable units of masonry (figure 1). From the outside in we first have the casing, often of large

height and depth. From this time on they were usually laid with horizontal beds as opposed to earlier pyramids with casing laid with inclined courses.

Between the casing and the core we find a layer of roughly squared backing stones. In some cases the backing stones are of the same dimensions as the casing but more often they were smaller so that two backing stones had the same height as a casing stone. In some pyramids the backing stone unit were built of smaller fieldstones. Generally only the outer sides of the casing stones rested on each other whilst the rear rested on the backing stones. The layer or layers of backing stones reached back to the core, sometimes with smaller packing stones to fill unwanted voids. Regardless of the size of the backing stones the connection between the casing and backing stones were very close with backing stones dressed carefully to follow the shape of the rear of the casing stone. The backing stones connected to the core which were built of roughly dressed or undressed field- or quarrystones embedded in layers of mortar. The early cores often were built as accretion layers with inclined faces whilst the later mainly were stepped. Sometimes the outsides of the core were smoothed with mortar. The mortar was mainly gypsum based and had weak adhesive powers [1].

2.1 Connection of blocks

The Egyptians early developed different techniques for connecting blocks. Bronze or wooden dovetail cramps and cramps and dowels of stone were used mainly to secure the stability of the constructions, sometimes mortise and tenons were used. Dovetail cramps are known to have been used in the casing of pyramids and cases exist where the pyramidion (the crowning pyramid shaped stone) were fixed with mortice and tenons. Sometimes casing stones were fixed with a combination of mortises and tenons and dovetail cramps. These methods seems however mainly to have been used to stabilize the casing stones sideways, not to connect the casing transversely to the backing stones and/or the backing stones with the core [2].

3. THE CESTIUS PYRAMID

The Egyptian pyramids have always made an impact but few have followed by erecting “true” pyramids. One of the few examples however can be found in Rome. The pyramid of Gaius Cestius, believed to have been erected sometime between the years 18-12 B C is a sharply pointed 36 meter high pyramid with a 30 meter square base.

The Romans revolutionized construction technique, mainly due to the introduction of roman concrete and the development of complex vaulted and domed structures. Effective quarrying and stone working techniques together with extensive use of iron paved the way for the use of thinner slabs of stones.

According to Piranesi the core of the Cestius pyramid is made of regular courses of lava caementas set in lime and pozzolan with thin layers of marble chippings in between. Due to this feature some place the pyramid as one of the

first monuments where the concrete core was made in intervals as opposed to earlier techniques where the concrete was poured in a more unsystematic way [3].

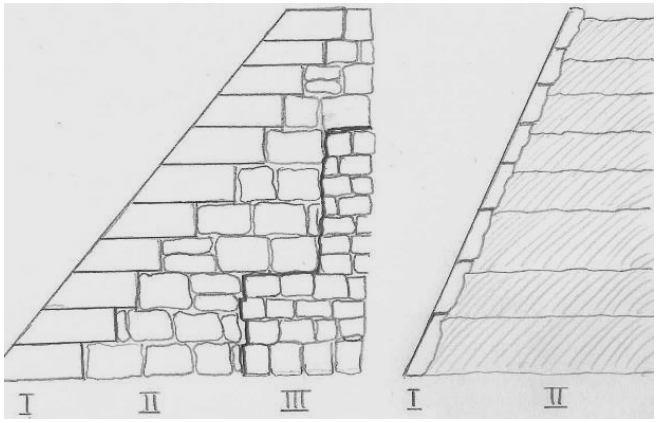

Figure 1: To the left an Egyptian three unit construction with casing, backing stones and core (after Arnold) To the right the Cestius pyramid with a two unit construction with thinner casing stones and a core of concrete (after Piranesi). Drawings M. Traung

Instead of the Egyptian construction technique with three units the Cestius pyramid according to Piranesi consists of two units (figure 1). The two units consists of casing, more in the shape of orthostats than thick ashlars, and a core of concretum. From Piranesis engraving it looks like all the casing are stretchers. Interestingly the height of the concrete courses do not correspond exactly with the heights of the casing. This seems however to be the case in the base of the somewhat earlier erected grave monument for Cecilia Metella On the Metella monument both header and stretcher casing are used.

3.1 Connection of blocks

The Romans had rich resources of iron and knew how to temper it by putting the red hot iron into cold water. They had also learnt that a coat of lead, gypsum or tar worked as a corrosion inhibitor. From the first century BC iron was widely used for cramps connecting blocks of marble and travertin. In Rome mainly two types were used; the Egyptian style, swallow tailed cramp and the metal bar bent at right angles at the ends held in place by lead. The later was frequently used for connecting the casing stones with the core, something that for instance Vitruvius recommended [4].

4. THE JÄRFÄLLA PYRAMID

The Järfälla pyramid was erected during 1758-62. It is the only natural stone pyramid erected in Sweden, this far! The pyramid was probably designed by the Architect Jean-Eric Rehn who at the time just had arrived back after a trip to

Rome where he, amongst other objects studied the Cestius Pyramid. By erecting the pyramid around 1760 he preceded the pyramid shape as a major theme for grave monuments within Europe with about 20 years. The pyramid is of a rather modest scale, with a base measuring about 5, 85 meters and a height about 4, 4 meters, the sides slope with 52°.

The Järfälla pyramid is erected just outside the walls of the medieval Järfälla church. To enter the grave chamber one has to lift a large lime-stone epitaph laid in the church floor, doing this a brick stair is revealed which takes you down under the church foundations. The square grave-chamber has at least 1, 5 meters thick walls of roughly cut large gneiss and granite field stones set in mortar. In two of the foundation walls there are ventilation shafts for incoming air.

The chamber has a cloister-vault built of smaller sandstone fieldstones with a vertical ventilation shaft close to the apex. Between the extrados and the finely chiselled casing stones there are horizontal layers of what best could be described as a Swedish version of roman concrete consisting of subhydraulic lime, aggregate and larger stones/caementas. Compared to the roman concrete it has weak adhesive powers. The caementas, consisting of sandstone of the same type as in the casing and in the cloister vault are laid out in an orderly way packed closely to the irregular backside of the casing. The height of the concrete courses corresponds to the height of the casing and the courses are separated by thin layers of lime.

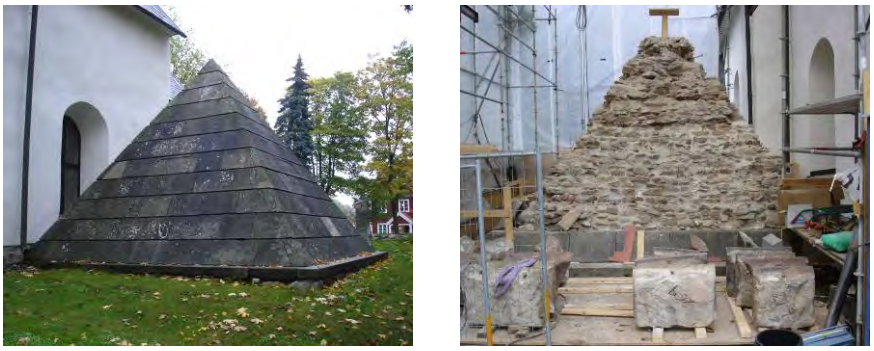

Figure 2: To the left: the Järfälla pyramid after restoration 2006. To the right the pyramid after all but the first course of casing had been dismantled (photos M Traung).


Figure 3: To the left the first course of casing at the Järfälla pyramid with leaded iron cramps along the sides and iron bars running transversely into the concrete core. To the right the base of the tomb of Cecilia Metella at Via Appia with concrete courses with heights corresponding to the remains of the headers. (photos M Traung)

When the work to dismantle the casing stones had started an additional vault above the grave chambers cloister vault were discovered. The function of this upper vault is believed to be twofold A) to releave the chambers vault of load and B) to act as a ventilation chamber which with its four ventilation exit shafts on each side gives the self draught an extra push. The incoming air comes through ventilation shaft in the foundation walls. To withstand the horizontal thrust from the vaults heavily dimensioned tension bars of square iron 50 x 50mm had been imbedded in the concrete

4.1 Connection of blocks

All the casing stones were rather thin stretchers cramped along the sides and transversely into the concrete. In both cases with iron cramps set in lead. The transversely cramps were in the shape of metal bars bent at right angles at the ends. The tension bars by the vaults were fixed to the casing stones with iron dowels and as an extra stabilizing measure the first course of casing stones were secured with vertical iron bars fixed in the ground walls. See figures 3 and 4. There were no usage of mortice and tenons.

5. CONCLUSIONS

As opposed to other 18th century pyramid shaped monuments who often were more pointed like the Cestius pyramid. The design of the Järfälla pyramid with its side sloping at 52º places it in the Egyptian tradition. Constructionwise the Järfällapyramid has an overall egyptian like structure with a grave chamber with an relieving chamber.

At a closer look however most of the construction techniques used in the Järfälla pyramid turn out to be of roman development. First we have the two unit construction with a thinner casing against a core of concrete. The systematically laid out caementas in courses with heights more or less corresponding to casing stones has its origin in 1st century roman monuments like the tomb of Cecilia Metella and the Cestius pyramid. The connection of the casing stones to the concrete core is dependent on leaded iron bars cramped transversely to the core and adhesive powers of the mortar, also this is roman features. At the Järfälla pyramid only stretchers in the casing were used which is in accordance with Piranesis engravings of the Cestius pyramid, however, as seen on the Metella tomb the Romans also used headers for bonding.

The system with an upper relieving chamber over the grave chamber is of Egyptian origin but the Egyptian only mastered the barrel vaults and that was as late as around 750 BC [5]. The cloister vault has been said to be of roman origin just as the usage of iron tension bars hidden in the concrete[6].

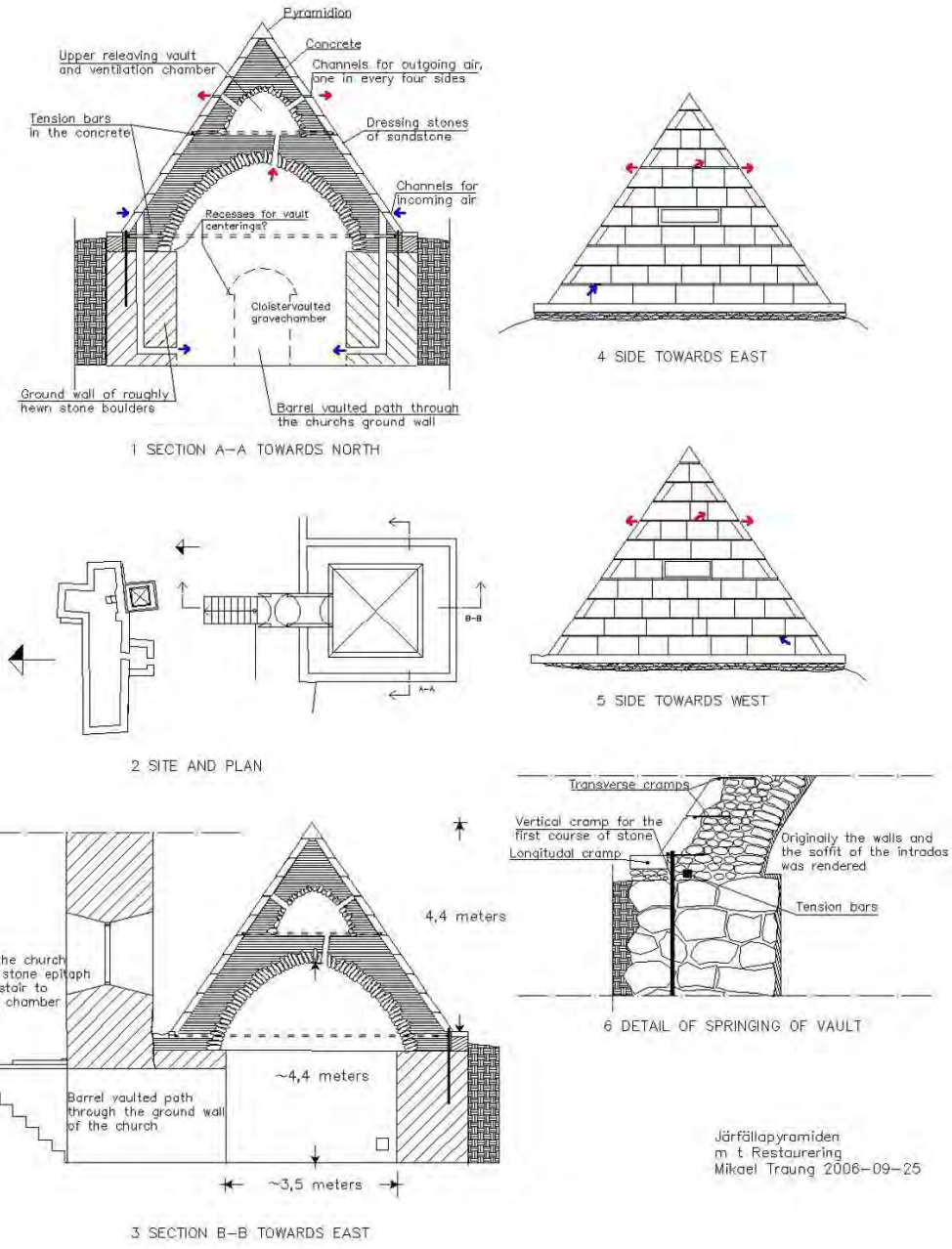

Figure 4: The Järfälla pyramid: Elevations, section and details

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HISTORICAL MONUMENTS AND THEIR FOUNDATIONS

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ABSTRACT

Historical structures typically are more massive than contemporary structures and the structural resistance depends on the geometry of the structure, shape of the structural components and the characteristic strength and stiffness of the material used. Generally, the old foundation systems that support the historical structures are different from the current practice in terms of materials used, foundation-structure connections and the functionality. Ancient building masters had introduced special techniques to make the structure withstand the lateral forces and to control the underground water level and humidity.

The aim of this paper is to investigate the different components of the foundation system for different historical structures. The method of construction of standard foundation systems and the importance of the different components of the foundation system: wells, galleries, gates or tunnels and Orthostat stones are emphasized.

1. INTRODUCTION

The restoration and sometime strengthening of historical structures is vital in order to save them for the next generations. For proper intervention, understanding of the structural behavior and good engineering judgment with sufficient experience of the old construction techniques and concepts and correct interpretation of the analysis results of comprehensive structural analyses are needed.

The great challenging of understanding the behavior of these structures, is that the master historical structures was designed not only for complex load carrying system and continuous interaction of domes, vaults, arches and pillars, but also for architectural concepts and for enough light and proper acoustics. They were designed to carry their actions primarily in compression due to their massive

characters, but tension occurs due to gravity and lateral forces in different structural components. To take care of these tensile stresses a special kind of tension element were introduced and located at the necessary locations (Figure 1). Generally these tension elements are composed of timber or iron. To prevent the deterioration of such elements in long term, the humidity resulted from underground water movement should be controlled. This leads to the most important issue to keep such structures alive for long time span. The key is the proper foundation and underground wells, galleries and gates systems.

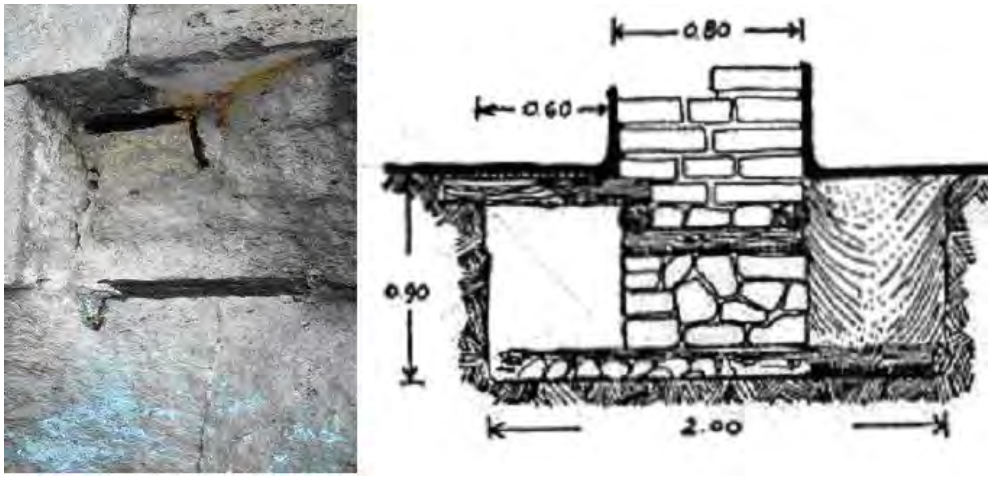

Figure 1: Tension elements

The ignorance of the accumulation of master builder's knowledge and construction technique may lead to incorrect intervention and long-term harmful effects on the structure. Recently, in the literature some researchers studied the traditional design concepts of different types of historical structures [1].

It has been noticed that in seismic areas, the master builders tried to introduce special techniques to make the structure withstand the lateral forces in substructure and superstructure because earthquakes have affected historical structures tremendously. For example in superstructure, Ottoman historical structures in general had special lateral resisting systems depending on sufficient horizontal diaphragms and vertical frame resisting systems. Ottoman mosques, Süleymaniye, Selimiye, and Sultan Ahmet were generally constructed considering different horizontal layers strengthened by special tension elements and a vertical frame resisting systems.

2. FOUNDATIONS AND RELATED ELEMENTS

The characteristic thickness of the masonry structural components should be able to resist compression, tension and shear stresses resulting from the structures' own weight and those imposed by wind and earthquake. From all these elements, loads are transferred to the foundations.

2.1 Method of Construction

The method of construction of foundations in Anatolia extends to the Hittite's period (B.S. 1700) and continues for several millenniums and also in Byzantine and Ottoman Empire. It can be claimed that the primary aim of any construction was mostly focused to withstand earthquake. Different types of foundations were developed according to the needs and necessitation. Since the walls were thick, the foundations were also wide accordingly. During the process of time as the wall thicknesses became thinner consequently the smaller sizes of foundation construction were adopted.

In the area inside the city walls of Istanbul, wooden grillage could be found in the walls. They are also mounted under the foundations of old masonry buildings such as Hagia Sophia, Byzantine churches and Ottoman mosques. The Suleymaniye Mosque footings get larger with depth and adapting to the rock layer via wooden grillage filled with mortar.

In the archaeological excavations and some studies made down to the foundation of monuments, the construction methodology of foundations show similar characteristics. The soil is excavated till a good ground is reached. In the middle of the construction area two or three water wells were dogged down to the underground water level. Then 20 cm of khorasan mortar is laid at the bottom of the foundation where some timbers are put above this mortar as grillage and covered with 1-1.5 arshin (Turkish yard =78cm) thick kargir (the mixture of lime-soil-sand-etc) mat. The timber grillage here works as tension members in the foundation like reinforcing bars in concrete. The similar timber grillage is also mounted on the top layer of foundation to form a flexible foundation base. Then the building is constructed. If the foundation is rock, all the above mentioned items are only done underneath the walls or columns.

To prevent and control the moisture from underground to the structural elements in long term, ancient masters constructed proper foundation and underground wells and gallery/gate systems.

2.2 Wells and Gallery-Gate Systems

The aim of having wells underneath the foundation was to collect underground water so that the building doesn't get moisture (Figure 2). These wells under the foundation were interconnected to each other from top with small gates (tunnels or galleries) and then are opened to air from side of the land as chimneys or connected to other wells of neighbor's lands, which later they go to open air. This way taking of moisture from ground to the walls or ground floors was prevented.

The size of galleries where wells are connected to each other varies from 30-40cm to 1-2.5m depending on the size of the building. These are generally constructed of stones or bricks with mortar binding (Figure 3). If these gates or wells are closed, moisture will penetrate the building as capillary force and disintegrate the mortar and spoil brick.

Figure 2: The well of 30 meter deep under the foundation of a two storey small wooden building in Fatih district, Istanbul.

If this issue is not recognized by the restorator, the building will suffer problem of moisture. The investigation for foundation, the position of galleries and wells has to be done in details for the future life of the building.

Figure 3: The Galleries or underground gates below the mat foundation (left). The gallery that is filled with soil about 80% during 2 centuries (right)

The gates or tunnels where the galleries open were constructed mostly within the foundations i.e. just below the foot touch (Figure 4). These tunnels served to keep the structure warm in the winter and cold in the summer and also removed the moisture from underground water. The size and length of these gates varied according to the need and size of structure and air ventilation of structure. Some of these exceeded several times of length of foundations out of the building. For example the galleries under Hagia Sophia extended several meters outside of

building toward Sultan Ahmet Mosque [2]. It seems that these are mostly closed in one section during the works of road constructions in the past.

Figure 4: The gates under the Sultan Selim Mosque in Fatih, Istanbul

2.3 Orthostat Stone Layer

Another function of foundations is that they can resist earthquake forces. In earthquake prone areas of Anatolia, even if the area of construction was on rock, first some flat small stones like pillow were laid to absorb the first shock of earthquake forces on the pre-prepared soil over the gates and galleries (Figure 5). Then the big foundation stone layers were put over these small stones where the normal construction of the walls was constructed. During earthquake, with the movement of these small stones a small slip occurs. It is interesting to note that in the areas where the seismicity is low or with no earthquake as in Konya, such type of foundations are not present. These big foundation stones are called “Orthostat” stones. For flexibility of the foundation, the surroundings of the orthostat stones were left empty. They also prevent moisture penetration into the structure.

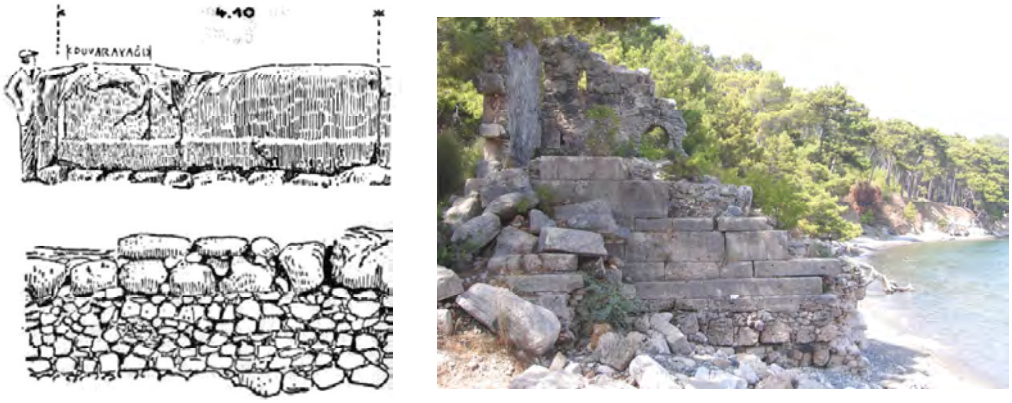

Figure 5: Orthostat stone layer

3. FOUNDATIONS OF OBELISKS

There are two obelisks on Hippodrome of Sultanahmet in Istanbul, Örmetas and Dikilitas erected during Byzantine era.

3.1 Örmetas

Örmetas is actually a pier constructed of dry dressed stone of 32 meters. It is thought to be erected in 4th century AD and was repaired by Constantinos and his son Romanos.

The Örmetaş Obelisk is placed on a marble base over three layers of orthostat stones. In 1856, the soil filling the area around orthostat stone layer in due time was opened by C.T. Newton [3].

The diffraction of earthquake waves under the ground and come up with inclined or vertical direction and hit on ground surface has a complicated mechanism when arrives at orthostat stones. These three layers of orthostat stones serve to absorb the earthquake waves, which are concentrated at the primary time causing less movement to be transferred to the superstructure.

Figure 6: The orthostat stone layers of Örmetas Obelisk

3.2 Dikilitas Obelisk

Dikilitas is a block stone of 19.59m high carved during III. Tutmosis reign in 1450 BC. It was brought from Egypt by Iulianos and erected during I. Theodossios reign in 379-395 AD. The obelisk is placed on 4 square (50x50cm) bronze feet over a 3x3x3 meter cubic marble base that sits on marble orthostat stones. In 1857, the soil filling the area around orthostat stone layer in due time was opened by C.T. Newton [3].

At the corners of the marble base of Dikilitas, there are 4 cubic red granite stones with rounded edges. Could these be seismic isolators of Byzantine era?
When earthquake hits the marble orthostat layer, these granite stones can slightly rotate causing a slight rising of the base and stop the shock of earthquake (Figure 7). Otherwise how these structures that must have experienced many earthquakes could stand without any failure for more than 16 centuries.

Figure 7: The base isolation of Dikilitas Obelisk

4. CONCLUSION

It is important to understand the structure in order to identify the main causes of the failures and design their restoration projects. Direct observation of the structure with good judgment is an essential phase of the study. As the historical structures engineering systems are different than modern structures it is necessary to investigate such monuments according to their own engineering point of view of their construction time.

The investigation of the foundations systems is critical part in rehabilitation and consolidation project of the historical structures. Since the foundations of historical structures are difficult to excavate and very few information are available, it is important to understand how the foundation of a building could carry loads for very long time without any problem. The differences between the foundation systems of historical structures in terms of components and functionalities should be well considered and the existence of wells, galleries,

gates or tunnels as a part of the foundation systems should be investigated before any intervention to the foundations.

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THE ANCIENT UFRJ'S BALNEARY HOTEL SETE DE SETEMBRO: ECLETIC ARCHITECTURE OF CLASSICAL TREND

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ABSTRACT

The ancient balneary Hotel Sete de Setembro is an architectonic complex built in Rio de Janeiro City, in 1922, in the atmosphere of Brazil Independence Centenary Celebration, and constitutes part of the Rio de Janeiro Federal University's –UFRJ - asset. Its unique architecture stands out, nor only for the style adopted or for its privileged localization - along Guanabara Bay, facing The Sugar Loaf – but also, for the special circumstances of its construction, by then, together with its balneary typology.The present study, aims to discourse about the typology of the mentioned balneary hotel, which refers to the French balneary hotels of Côte D'Azur, especially those located in Cannes. In addition, it will work with a little of its ornamentation, whose repertory of elements and representations are very similar to those in that European region. For that matter, it will work with the theoretical issue of the critical revaluation of the architectonic Ecleticism.

1. INTRODUCTION

The Ancient Balneary Hotel Sete de Setembro had a temporary and practically unknown function as a hotel. It was dismembered in 1924, so that part of the buildings could become a shelter hospital for children, denominated: Hotel Abrigo Arthur Bernardes: (Shelter Hospital Arthur Bernardes). In 1926, the remaining buildings were conceded to The Internato da Escola de Enfermagem Anna Nery (Anna Nery Nursing Boarding School), which worked there until 1973. As a nursing boarding, it also developed a pioneer center of professional qualification on tropical diseases, such as malaria and yellow fever, whose courses were supported by Fundação Rockefeller [1] (Rockefeller Foundation) that also occupied part of one of its buildings, while in Brazil. From 1973 to 1995, the buildings became the Casa do Estudante Universitário - CEU (University Student

House), name by which the architectonic complex was known from 1987 on as it was declared historical patrimony of Rio de Janeiro city, by the state tutoring organ, named INEPAC. In 1995, the University took over the ownership of the property, and, in 1997, a University technical team implemented revitalization and restoring process, so that the complex could serve different purposes. Later on, in 2000, the project gained the support of the federal law of fiscal incentive named Lei Rouanet (Roaunet Law). Right after, field and metric surveys were taken, as well as those concerning floors, window frames, roofs, ceilings etc, in order to obtain the register of the constructions, the architectures and details, prior to the interventions previewed in the architecture anti-project of modification, dated of 1997. At that time, the buildings kept the original architectonic style; on the other hand, they were very badly preserved.

A brief historical survey of the hotel was presented on the research of 1999, as a part of the document named Projeto de Restauração e Uso do Hotel Sete de Setembro [2] (Previous Restoring Project of the Hotel) but, during the works of the Projeto de Restauro RB 762 UFRJ (RB 762 UFRJ Restoring Project), from 2001 to 2004, the typology subject didn't take placeIn spite of the extensive technical background on the monument doubts were raised, as a result of the investigations, and of the deep and attentive observation about its architecture and the time of its construction. In addition, a couple of references published on the subject -a lot distinct from one another- ratified this feeling of uncertainty. Concerning the style, one refers to it, as being eclectic-academic [3];and the other, as being neo-greek [4]. One says that for lacking a central span, the building faces were clumsy; while the other one claims that the building has proved to be inadequate for the hotel function, and for that reason it was eventually discontinued[5]. So, at that time was the right moment to question and try to obtain some answers about the building, typology and the reasons for the hotel function failure.

Thus, a research was done intended to comprehend and reveal the real estate construction as well as the reason why the mentioned building didn't keep its hotel function, by means of discoursing on the architectonic complex classification, and on its valuation as a part of the urban memory. Just now, the architectonic complex is going through a restoring process which led to the interest of studying it again more accurately, together with the city in the 20's - the period when the complex was built.

2. THE ECLETICSM AND THE BALNEARY TYPOLOGY

The issue of the critical revaluation of the architectonic Eclecticism is introduced in the current stud aiming at weaving a theoretical net to support the intended valuation increase of the architectonic complex. To achieve this goal, it works with texts by Jean-Pierre Épron [6], François Loyer[7] and Luciano Patetta[8]. The clippings of these authors focus on three essential aspects for the research: First, the search for ensuring the belief that the architect is the ideal coordinator

for the field work, assimilated from Èpron, second, the social and economical urban issue experiencing the fast unrolling of the Industrial Revolution, clipped from Loyer; and third, the analyses of the *bourgeois's* demands, constituting a fragmented period, which is nevertheless united, by a very subtle, but perceivable line, presented by Patetta.

Confirming the Èpron text, statements by professionals on demands and interferences of clients with the projects, as well as a piece of work by the Architect Central Society, regulating municipal postures were found during the thesis [9]. Such fact evidences the lack of architect's participation in the ruling urban life, which is experiencing great effervescence and deep transformation on the 20th decade. So far, architects were not entitled to participate of the city planning.

The greatest of those transformations is the historical levelling of the Morro do Castelo (The Castle Hill), which was considered the cradle of the city, for the creation of a huge esplanade resulting from the embankment over Guanabara Bay. Its most immediate purpose is to host the International Exhibition of Brazil Independence Centenary, in 1922. After the exhibition it is expected to negotiate those new commercial areas close to downtown for expressive value, in order to compensate for the high investments. For that matter, the executive power borrows large amounts abroad, subjected to further currency flotation.

Based on the discussion presented by Patetta, the demands of a new elite, in the issue of the hotel business development were clipped. Those demands, inspired in the French life style, claim not only for the adjustment to new technologies, but also for the comfort to enjoy the status, so far, only experienced by the aristocracy. In the effervescent Rio de Janeiro, the new ideas echo promptly. In fact, since the first decade of the 20th century, which can be seen through some not executed projects of hotels and casinos, and yet through the support and incentive (fiscal incentive included) given by the public authorities to the construction of luxury hotels, as well as, in the demands of clients, importers and great investors. The urban transformations call for a peculiar bond with the monumental spirit, which intends to reflect to those visiting the Exhibition, the grandiosity of a city that is hygienic, airy and modern. Perhaps aiming at equalling the status Buenos Aires had show 10 years before.

Loyer's text presents the dialogue between the city and its urban elements with its architecture, through the lenses of the socioeconomical issue. For extanding his eyes further on, and for viewing the architecture as a "privileged reflex " of a context, he eventually became the most expressive reference in the course of the research.Chiefly, for his considerations regarding Rio de Janeiro city, its transformations and executive planning in the 20th decade. Assimilating this sort of analysis has proved to be vital to the valuation of the complex, as one the shiniest reflex of this period, in this carioca balneary city.

It is also used the rearticulating of the theoretical issue of the "type and model" concept, presented by Argan [10], according to Quatremère de Quincy, which

identifies the “type” as being an idea, a concept – thus, vague and imprecise – and the “ model” as being a thing, an artefact.

Once with this piece of information, the type to which the object of the study belongs to is figured out, and the research heads towards the trajectory of the hotel business in France, focusing *Côte D'Azur*. Increments concerning hotel business service rendering, resulting from migrations and travels, are shown, as well as migrations and travels multiply at a speed never dreamed before, thanks to the development of train lines, goods trains, machinery and a whole demand for goods and services, which emerge with the Industrial Revolution. The long distances are shortened, the distant villages become nearer. Locations searched only for health care reasons, are now reached more easily, resulting in more developed and attractive villages. Thus, limiting the field of the research to that mentioned region, identified by such denomination, since the Ligury, it is noticed a great demand for general development, improvements, confort, infrastructure, as well as, for supporting infrastructure and updating, according to the latest trends of big cities, such as London and Paris.

Then, tuned to this expansion scenery and to the families's migrations, are the hotels, the health care and the balneary stations, which point at new routes, and which start to consider a series of services, never available before, out of the big cities.

In this context, distinct villages located in the French coast develop, especially those of the Mediterranean region of *Côte D'Azur*. As mentioned before, the clipping of such scenery will support the present study, as the inspiration and typology for the Hotel Sete de Setembro, in Rio de Janeiro city, which is, by then, the capital of Brazil.

Actually, at that moment, Brazil is strongly influenced by the French *savoir vivre,* by its habits, fashion, products and possibilities, which are surrounded by such a simbology that moves towars the dream of the desirable and updated. Consequentely, it comes naturally to assume the referred influence over the architecture and the constructions, to the detriment of which existed before, in the Brazilian capital and big cities.

Hence, in order to build a comparative chart, several *hôtels de voyageurs* were researched, based on the France Patrimony Service list. From which, a complex belonging to the late quartering of the 19th century and first quartering of 20th century, in the city of *Cannes* are clipped. A few samplings are chosen for analysis, such as, *Hotel Carlton, Hotel Gonnet et de la Reine, Hotel Majestic, Hotel Éden* in *Cap D'Ail, Hotel Saint Maurice*, among others. This choice aims at electing a complex that can present the typology and morphological aspects of the ornamental representations, and of the Eclecticism repertory of classical trend, existing in the object of study, in Brazil intending to verify the possibility of intersecting the French and the Carioca aspects.

The balneary typology selected is mainly horizontal and face the landscape. Moreover, their distribution on the plan emphasizes the rooms that promote the interconnection between the inside and the outside. For this matter, belvederes,

terraces, balconies, gazebos, varandas, internal patios and roofed porticos were elected. The design lines of the buiding faces are organized in woofs, according to their internal distribution; which is associated to the structure, in an articulated woof, typically *beaux arts*. The apertures turn to the landscape and to the circulation areas, allowing for the social performance of the watching and showing off game, so that the guest can undergo the experience of being – according to Bernard Toulier [11] – " between the prolongation of his original life and its antidote"

3. THE BALNEARY HOTEL

3.1. The Construction of the Hotel

The openning of Avenida Central (Central Avenue) in Rio De Janeiro City, has been acclaimed as a huge success, either for its dimensions and constructions, in eclectic style, or for the essencially commercial occupation of the area. It is mentioned that those lands have increased its value, in more than thirty times, in 20 years [12]. This picture levers the idea that the commercial and saleable area of downtown Rio de Janeiro could be enlarged, if it is added with leveled and urbanized lands. For this matter, one of the possibilities considered, is the debated demolition of Morro do Castelo (the Castel Hill), located in a contiguous area with Central Avenue, by means of levelling. Since the Castle Hill is considered the creation craddle of the city, there are divergency and opposite opinions on the issue. In spite of that, nothing can stop the executive, municipal and federal powers's determination to implement such a great taskwork in record time. Actually, in time to build on this very area, the pavillions for the Brazil's Independency Centenerary Exhibition, in 1922. Wrapped in the same parcel there are dispossessions, not only of popular residences, but also, of enterprises and other establishments.

In order to support the improvements, huge amounts are borrowed from abroad, between 1920 and 1921 during Carlos Sampaio's and Epitácio Pessoa's administrations. Among other important taskworks, the mentioned levelling and the creation of the Castle Esplanade, in the downtown area, are the greatest achievements of those administrations. The embankment resulting from the Castle Hill needs a great number of stones to be used in the construction of an extensive wall to support it. To achieve this goal, it is allowed the withdrawal of such stones from Morro da Viúva (Widow's Hill), in the Flamengo neighborhood. The transportation to downtown is made by the sea. The withdrawal of the stones consigns the construction of an avenue surrounding the stone-pit – The Contour Avenue - (Fig. 1), where also the Hotel is then constructed, on the foot of the Widow's Hill, and according to Mayor C. Sampaio, as a consequence of the idle area created by the stone extraction. He also claims that, the need for hosting those visiting the Capital during the Independence Centenary, also determined such construction, which by its turn, serves as a parameter for the other buildings

that comes afterwards[13]. Some time after it, the Contour Avenue is denominated Avenida Rui Barbosa (Rui Barbosa Avenue).

Figure 1. The Widow's Hill, 1922.


Figure 2. Hotel Sete de Setembro, 1922.

To build the hotel, whose construction is rejected by the Municipal Council, in the early November, 1921, the Mayor signs his agreement in the drawings of the Hotel building faces confirming through this taskwork, the achievement of goals and of a coordinated planning in the preparations of the Centenary event. The Mayor justifies his deliberation, by alleging that the city lacked luxury hotels or lodges to host the visitors properly. Moreover, the Mayor states that the pieces of land resulting from the digging along the avenue, in a fascia "with a variable depth from 35 to 40 meters", in the Flamengo neighborhood would be sold afterwards, in order to compensate for the expenses regarding the construction of Contour Avenue. Parallel to the public authorities' initiative, other interests - held by private sectors with the government approval - are in the plot, all of them aiming at the construction of luxury hotels in the city. All proposes contain a common recommendation: the hotels should have balneary installations. Such initiatives confirm a new perception and the political willing to consolidate another image to the city – littoral and balneary – which is also made evident, through the strategic planning, designed to urbanize the new residential areas stretching over the south part of the city.

According to the research, the Hotel Sete de Setembro is inicially constituted by at least four different buildings, part of them, constructed in the Commendatory Jannuzzi's establishment, a very renowned Italian constructor, who was the author of the Hotel project and construction. Today, the architectonic project, owned by UFRJ is composed by only two out of the four earliest buildings.

The installation of the Balneary Hotel offers electrical energy and telephone facilities in all of the 275 rooms, besides terraces, a barbershop, a noble salon and a restaurant[14]. The Hotel also owed bathing cabins on Contour Avenue, now destroyed which, in addition to its single localization, bordering the Sugar Loaf, grant it odd notability, regarding the newly built balneary image of the city. Not to mention, its perfect adjustment to the unique landscaping - over the Widow's Hill.

3.2 . Eclectic Repertory and Ornamentation of Classical Trend

The typology of the balneary hotel is uniquivocally present in the buildings, both in the horizontal party, and in the perception and conjugation of its architecture, within the littoral environment. Its implementation counts on the exuberant view, especially designed to be uncurtained from the noblest facilities, as well as, from the luxury rooms, terraces and circulation areas, as the bordering *loggia* of the hotel, which protects and distinguishes the guests. The buildings are raised beyond the ground level, by means of a wide stone staircase.

At the first instant, one lingers his/her eyes over it, observing the organized and symmetrical disposition of the innumerable window frame niches of the Hotel, which are arranged in a three-floor stretched block,as well as in the belvederes located on the huge terrace, in the Restaurant – of somewhat squared proportions – and in the small balconies. In the restaurant building, a critical look could see the prevalence of the empty over the full, thanks to the huge flat arch squares of the noble salon. Nevertheless, a more attentive observation of the whole, reveals that the bricklaying panel, also stands out, for its rusticity, ornamentated by columns of ionic heads, with their colossal order, arranged in two symmetrical woofs. Eventually, the Hotel shows a balance between the empty and the full, as well as a delimitation of the central building, which leads to the main entrance. Such delimitation is fixed, both by the stone staircase and by the *loggia.* The consoles under the balconies present lion muzzles and vegetal garlands, balustrades and windowsills made of Carrara marble.The Restaurant building, (almost 1/3 of the whole Hotel), is an almost 1000- square- meter construction that stands out, for the pompous ornamentation and for its repertory of varied motives, both outside, in the building faces, and inside, in the salons. The distinction of this building is granted by the form of its construction, terrace, balustrades, and by its majestique squares, either in flat arch or in drip moulding. Such distinction yet results from the symmetry of the two woofs of the main building faces.

The two floors as a single body is 16 - meter high. Without the crowning balustrade, the rectangle figure is reinforced, though restrained to its perimeter, and smoothed by the pedestals adorned with palms in the *acroterium.*

It is then verified that the filed original drawings had been made on drawing paper, with colourful tints, representing the type of the material to be used on the building faces.

Both the drawings and the buildings display a rigid modulation, which shows wholes, halves and fractions, as well as a precise alignment of the ornaments, not only in the drawings, but also in the construction itself. Consequently, it is from the aware exploration of an explicit orthogonal woof, that the ornamental party of the composition becomes in charge of providing moviment, shadows and contrasts to the building. Being discreet and austere, the moviment of the building faces is noticed through the subtle different levels employed, in the architectonic elements and in the shadow and light contrasts. As those contrasts of the balustrades, of the balconies supported on consoles, as well as those of the

columns of ionic heads. Regarding morphology, the elements and ornamental representations observed, are very similar to those clipped from *Cannes*, France.

CONCLUSIONS

It was confirmed the increase in value of The Hotel Sete de Setembro, which was insufflated by its meaningful role in the history of Rio de Janeiro city, tunned to Loyer's proposal as "[...] the ambition of contamplating a reading axis, that could go beyond the merely stylistic classification of the form, in order to establish a dialogue of the socioeconomical phenomenon with different mentalities, of which, the architecture is a privileged reflex" [15].

The discrepancies on the issue of the eclectic architecture of the Ancient Balneary Hotel Sete de Setembro are present on the review of the Eclectic Architecture Guide, as well as in the justification for its preservation by the historical patrimony[16]. Such discrepancies couldn't be conjugated, after the disclosures and revelations of the study. The monument should be classified as eclectic architecture of classical trend, for its similarities with other eclectic monuments of *Côte D'Azur* balneary architecture.

It was ratified that the Hotel Sete de Setembro was inicially a much bigger architectonic complex, almost twice the size of the buildings today owned by UFRJ.

Although the Hotel can not be considered the most luxurious sampling, if compared to Copacabana Palace Hotel, its environment, salons, rooms, services and facilities can distinguish it, as an establishment able to fulfill the luxury expectations of the upper classes of Rio de Janeiro. Adding this high standard level, to its unique localization (fig. 3), the Hotel was considered ready to carry out the mission of actuating within the bourgeois life, and at the same time, of being its antidote.

Figure 3. Hotel Sete de Setembro, backyards view from Widow's Hill with Sugar Loaf. Font: FMIS, 1922

While the critical revaluations aid to consolidate the Eclecticism legacy in Europe, there is an increase in the interest and sensibleness for this sort of patrimony built in Rio de Janeiro. Its revitalization inovates, as it observes the recomendations prescribed on the Venice Letter.Thus, the researsh about the Ancient Hotel Sete de Setembro, enrols on the consolidation of the architectonic Ecleticism, as a part of the carioca and of the Brazilian indentities, as well as of the memory and the history of the city.

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DOORS AND WINDOWS: FROM PEDRO II ASYLUM TIMES TO THE PRESENT

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ABSTRACT

The building erected to become Pedro II Asylum is named nowadays University Palace, belonging to the architectural heritage of Rio de Janeiro Federal University. It is listed by Artistic and Historic Heritage National Institute since 1972. The typology and constructive techniques of this 19th century neoclassic monument original doors and windows are the leitmotif of this paper.

1. INTRODUCTION

The Pedro II Asylum was built in neoclassical style from 1842 to 1852, meant to be the first Brazilian psychiatric institution ever to take care exclusively of the mentally ill. One of the most remarkable features of this historical monument is the harmonic rhythm of its façades original windows (Figure 1). These consist of three window balconies sets, alternating with seven breastwork windows framed by vaults and lintels at the edges. Moreover, its sturdy original doors impart luxury and elegance.

This survey displays the original patterns still present in the building and analyses its constructive techniques.

Figure 1: Pedro II Asylum façade, c. 1859.

2. PEDRO II ASYLUM

In analyzing doors and windows, as well as any other constructive elements, one must investigate the building primary role. Constructed to become the first Brazilian psychiatric institution, Pedro II Asylum paved the way to a rather humanitarian treatment of the mentally ill, in spite of the prevailing strict control of the insane regimen at that time. The rails and iron bars were fixed in the outer face of the gneiss doorpost of the primitive wood and glass windows (Figure 2). These contention elements were only taken out when the building was granted to Brazil University, nowadays named Federal University of Rio de Janeiro.

Figure 2: Breastwork window and balcony window with rails, c.1948.

The first Brazilian psychiatric hospital architects, disciples of Grandjean de Montigny, might have been inspired by French contemporaries in planning this monument, originally spreading over four courtyards overlooking multiple and interconnected galleries.

Notwithstanding being constructed as an asylum, the amount of interspaces in the façade is remarkable (eighty just in the main one). These wall openings promote cross ventilation with the uncovered inner gardens, granting environmental comfort, indispensable in a tropical country as Brazil.

The area accrued in 1904, in order to assist a growing number of inpatients embodied two new inner courtyards, giving rise to six of them altogether. The constructed area nowadays is 11.000m^2. As a consequence, new doors and windows were inserted. Figure 3 displays a building recent aerial view.

Figure 3: University Palace, aerial view, 2005.

3. ORIGINAL DOORS AND WINDOWS

The floor plan of this edification is symmetric from the central axis. Six distinct window and twelve door pattern have been classified. They are all in wood, with two single independent doors opening in the French way, and wickets controlling the passage of natural light through the glasses. They are located in the building central axis and are in two or three wooden wings. One of the patterns is formed by the subdivision of the two of them, making it four altogether.

The single wooden wing type, that gave access from the patients' wards to the ground floor galleries was discontinued and replaced by a double wing model (Figure 4). By the time the building function became the University, this swap was justified, the reason being to allow the creation of further space to the classrooms furniture.

Nevertheless, in general terms, the lack of registering in historical edifications hinders the understanding of the model replacements. The mortises of the discontinued panel doors were substituted by a less elaborated system, consisting of juxtaposed frames. When opting for a simpler procedure, budget curtailing might have challenged the rectory. The alternative could be new and less refined execution types, aiming to making them stand out from the primitive patterns.

Figure 4: Extinct door (left), 1946 and existing replacing pattern, 2007.

The original doors are sturdier and more refined than the newer ones in this neoclassic heritage. A set is comprised by the three most important samples of the edification (Figure 5). It is located in the porch, allowing access to the atrium. These are luxury doors, a feature of 19th century constructions in Brazil, whose techniques embraces wood-framed glass on the top and the blending of panels and skirting boards in the bottom and upper wing. These doors are protected by oil paint on the outside and varnish on the inner side.

Meant to administrative use of the former psychiatric hospital, this palace rooms are designated to ceremonies, concerts and congresses. These noble spaces display rather refined doors.

Figura 5: Portas do pórtico central, 2007.

The Red and Golden Rooms, so named for their furniture colors, intercommunicate by a conspicuous door. Figure 6 shows its two surfaces, whereof two vertical boards form each wing and six crossbars are inserted in the same lower level. Not even contemporary Brazilian luxury constructions, described by Bellegarde (1848, p.107), exhibit so much tastefulness: one most commonly comes across with doors with at most three crossbars. Overlooking the Golden Room (left), the most refined doorframe linings stand out; rims, frames and cornices compose with the door decoration. On the Red Room side, its door skirting is formally simplified.

Figure 6: Golden Room door (left), Red Room door (right), 2007.

The Red Room door panels are the raised and fielded pattern, inserted by mortises and decorated with frames in either cannelures or fillets finishing, aiming to impart additional relief and refinement, underlining the building sumptuousness (Figure 7, right and left). Details providing high technical and decorative standards are friezes over frames and raised panels superimposed over each other.

Figure 7: Red Room door: detail of friezes, raised and fielded panels and frames, 2007.

Sometimes the original doors are embedded in the walls, creating staves in the interspaces (Figure 8); one of these connects the Red Room to a corridor. When opened, it is hardly noticed, forming an extra frame.

Figure 8: Closed (left) and opened door, embedded in the wall depth, 2007.

Saint Peter of Alcantara chapel is located inside the palace. It was accomplished soon after the former psychiatric hospital inauguration. This space is used for weddings and religious ceremonies until today. Three entrance doors

show raised panels superimposed over each other. These differ from the others by cannelures in their composition center, as well as by a copper sheet that protects its bottom (Figure 9).

Tough locks, hinges and copper molten bars are present in the former windows and door models (Figure 10), aiding in the original types identification. This is due to their robustness and high welding standards. They are only found in the building original samples.

Figure 9: Chapel door, 2007.

Figure 10: Locks, hinges and copper bars, 2007.

4. CONCLUSIONS

In the study of doors and windows of this neoclassic palace, its constructive techniques stand out in creating samples of high execution standards and unusual beauty. Its constructive elements are sturdier than contemporary equivalents, to which they can't be compared, for the most recent ones are way less refined. The most important room doors show an excellent conservation status, although the construction had been accomplished in 1852. The want of historical documentation relating to the doors and windows replacement brought about the analysis of the building itself as a primary documentation source. Neither the exact moment of some samples replacement could be pinpointed, or the reason why these transformations took place, which could indicate historical fraud in the analysis of techniques and constructive materials. The original doors and windows contain raised and fielded panels and frames in delicate cannelures shape, exhibiting a refined finishing. This feature winds up distinguishing these from the remaining doors and windows of this monument.

ACKNOWLEDGEMENT

Roberto German, for the English version of this paper.

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CURRENT CONDITIONS OF SINAN'S ARCHITECTURAL HERITAGE IN ISTANBUL

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ABSTRACT

Sinan's (d. 1588) architectural legacy in Istanbul constitutes one of the most important cultural heritage assets of the city. From 333 of his works he has built in Istanbul, 154 of them have preserved their original character that can reflect his style to a certain level. Works of Sinan share an exceptional geographical proximity in Istanbul, as well as a unity of style and identity. Nevertheless, continuous loss of Sinan's architectural heritage continues to be a serious concern. Complex mixture of the problems, which expectedly includes many of the common conservation challenges in Turkey, threats the unique identity of Sinan's architectural heritage. This paper aims to present a comprehensive analysis of current condition of Sinan's architectural heritage and elaboration of the problems arising from these conditions.

1. INTRODUCTION: ARCHITECTURAL HERITAGE OF SINAN

Sinan (d. 1588) is the most renowned Ottoman architect, whose prolific tenure between 1538 and his demise in 1588 formed the classical style of Ottoman architecture. Sinan built most of his works in the Ottoman capital of Istanbul and left a strong mark on the character of the city. During his half-century tenure as the chief court architect, Sinan has designed 333 structures in and around Istanbul. 154 of them are still extant, albeit many in poor maintenance conditions. His architectural legacy constitutes to be a significant part of Turkey's cultural heritage, particularly of Istanbul. There is a considerable scholarly work done on Sinan's architecture, despite the numerous gaps in the literature regarding building techniques, restoration documentation, and monographs on single buildings. Literature to this date offers a comprehensive picture of Sinan's architecture.

Sinan's architecture or the so-called "classical style" in Ottoman architecture was product of an impressive architectural and organizational activity of the royal court of architects that was headed by him for almost half a century. Regarding authorship of the works, the boundaries of Sinan's personal architectural genius and the role of corps of royal architects are problematic [1]Nevertheless, even if his works are considered as shared products, formation of the "classical Ottoman style" and its distinctiveness from other periods are indisputable. In this regard, Sinan's name has to be conceived not only as an individual mark but also as imprint of an architectural culture.

Creation of classical Ottoman architecture as a distinctive and consistent style is impressive when the diversity of the works is recalled. Sinan has reached a broad diversity by continuously and innovatively reinterpreting Ottoman architectural vocabulary. Particularly if the mosques are concerned each of Sinan's work has a unique place as a milestone in his architectural portfolio. Harmony, careful proportioning and meticulous detailing became basis of the character of Sinan's architecture. Most noticeably, he artistically and technically mastered "architecture of the dome". He also engaged in a refined dialogue with the past. In several prominent works, such as Kılıç Ali Pasha Mosque, historicism was essential part of his designs. The diversity of Sinan's architecture reflects the culture of its era in different dimensions. As Necipoglu convincingly asserts, Sinan's architecture constituted a medium of decorum for the Ottoman elite.[2] In architectural terms, Sinan's architecture was reflection of the Ottoman civilization from scale of the city down to the details. Sinan has built most of his works as part of complexes [külliye], which were strongly defined by their relationship with the city. These complexes had been social and physical nucleuses of the quarters [mahalle], which were the basic Ottoman administrative units. Sinan's major works were "complete works of art" or displays of Ottoman arts and crafts at one of its mature stages. Meticulous design and execution of the architectural ornamentation, namely glasswork, tile work, marble craftsmanship, and woodwork, was characteristic.

Certainly, Sinan's architectural style cannot be reduced to a sum of certain characteristics. Nevertheless, recognizing these characteristics forms preservation priorities of Sinan's architectural heritage.

2. BRIEF HISTORICAL ACCOUNT OF SINAN'S ARCHITECTURAL LEGACY

In the two centuries after Sinan's demise, preservation of his architectural heritage was largely ensured thanks to the organizational continuation of the waqf institution and the royal court of architects. The classical Ottoman architecture continued to be the norm despite deviations in style. By 18th century, advent of the western influence brought new architectural styles to the Ottoman Empire. For Sinan's heritage, it meant the introduction of the western architectural elements by

restorations as early as 1740s. Moreover, Modernization has affected the organizational structure of the Ottoman institutions. In early 19th century, parallel to the centralization of the bureaucracy, properties of the foundations (waqfs) brought under central governmental control through a directorate - later ministry - of religious foundations. [3]

It was by foundation of the Turkish Republic that the most significant changes regarding preservation of the Sinan's heritage have occurred. First, several Ottoman-Islamic institutions, namely madrasas, Quran schools [darülkurra], hadith schools [darülhadis], and dervish convents [tekke] were legally abolished. Therefore, historic functions of a large number of buildings had been suddenly lost. Second, ownership of historical buildings, as well as the responsibilities for their preservation, was reallocated among various state institutions. Following their takeover, historical buildings were generally unused or reused in an unorganized and inappropriate ways. Moreover, division of responsibilities between numerous institutions caused over-partition of scare human and financial sources. General Directorate of Foundations [Evkaf Umum Müdürlüğü] took over most of the Sinan's architectural heritage in terms of preservation responsibility and ownership.

By the foundation of the republic, the burgeoning interest of the 19th century on Sinan went much further. A complex process of constructing Sinan's identity, which would cross boundaries of architectural, cultural and political history, began with his acclamation as a national hero. By 1950, urbanization and the large-scale rural migration prompted by liberalisation in economy and politics began to transform the historical urban pattern of Istanbul. In these years, ambitious transportation development schemes, which were indifferent to the historical urban pattern, took its toll on Sinan's heritage. Numerous buildings of Sinan's heritage were demolished, and more became susceptible to hazards of heavy traffic. Ironically, a board, semi-autonomous and semi-academic in its character and publicly known as 'the Board' [Anıtlar Kurulu], was founded in 1951 to form conservation regulations, policies, and to oversee the restoration practice on historical monuments. Since after its foundation, the board played a crucial role in preservation of Sinan's heritage through single cases and general resolutions.[3] Beginning in 1960s, many historical quarters, where Sinan's heritage was mostly located, faced demographic changes and urban deprivation. Historical peninsula in general was losing its prominent role as the commercial core.

By 1980s, the synthesis of Turkish Islamic identities became central to the official cultural policies and prompted parallel readings of Sinan. Furthermore, increasing pluralism and democratization prompted alternative and even reactionary readings of Sinan. Today Sinan's heritage is reclaiming a prominence for preservation in the public agenda. As a positive development, local initiatives for preservation in the level of municipalities and civil organizations have been emerging.

3. SITES OF SINAN'S WORKS

3.1. Building sites

In contemporary Istanbul, Sinan's works are mainly located in the historical peninsula of Istanbul (Figure: 1), on the shores of the Golden Horn and on the coastline of Bosporus facing historical peninsula. There are also clusters of works of aqueducts and water reservoirs in the vicinity of the Alibeyköy Dam, and of a variety of works in Küçükçekmece. In such a large urban and suburban area, works of Sinan are concentrated in over 40 quarters, which can be examined in several groups according to the social and urban characteristics.

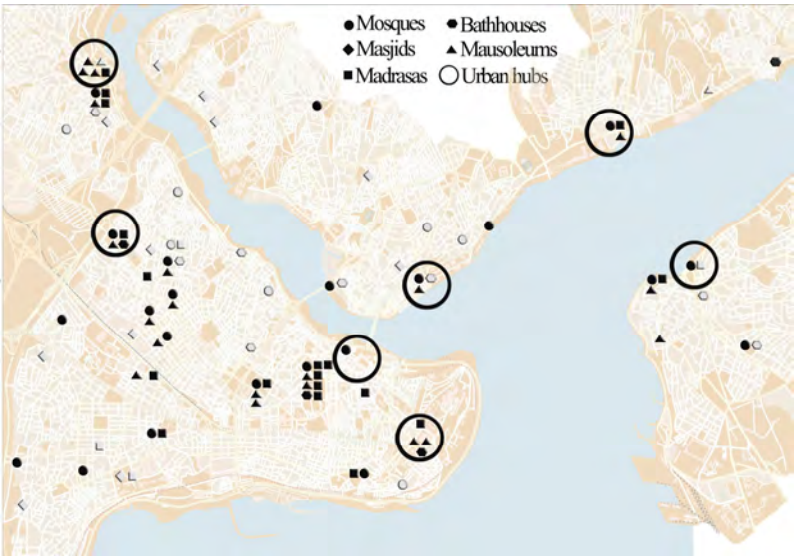

Figure 1: * Gray marks on the map indicate the works that could not preserve their original character.

107 out of 154 works of Sinan are located in residential areas of Fatih, Eyüp, Beyoğlu and Üsküdar. (Figure: 1) Sinan's heritage in these quarters consists mainly of mosques, masjids, madrasas, and bathhouses. To a certain extent, these mosques have retained their function as social centres like in the Ottoman period. A permanent congregation of local residents regularly attend the prayers. Congregation also constitutes the basis for local initiatives for preservation through local associations [Cami Koruma ve Yaşatma Dernekleri]. However, successful adaptive reuses for madrasas have not been developed. Similarly, bathhouses are either obsolete or function in poor conditions. Closer to the main traffic arteries, it is possible to observe more successful adaptive reuses of madrasas due to their accessibility. On the other hand, being on main traffic arteries makes 23 of the buildings susceptible to heavy air pollution and vibration due to the traffic. Architecture of the mentioned residential quarters has been almost totally converted into concrete blocks. Only single and sporadic examples of traditional residential architecture, which were once embracing architecture of

Sinan, have survived. As a result, in most of the cases Sinan's works have been surrounded by out of scale buildings indifferent to its architecture.

A significant number of Sinan's heritage, namely 22, is also located in quarters, which have been facing slumization. Most of the buildings of Sinan's heritage that remain in ruins or suffer misuse are located in these areas. Particularly in the quarters in Eminönü and on the shores of the Golden Horn, mixture of pollutive small-scale industries, bachelor and new rural immigrant houses have replaced the historical residential and commercial quarters. The two most monumental works of Sinan in Istanbul, namely Süleymaniye and Şehzade complexes, are surrounded by these quarters which are to a certain level slums. Despite the dramatic loss of the timber vernacular architecture, density of the pre-20th century religious and commercial architecture is still high in the area. Recently there are efforts of the municipalities for implementing urban renewal schemes in these areas, although they could not go beyond physical face-lifts.

25 buildings of Sinan's heritage are situated at 7 urban centres where tourism areas, transportation hubs and commercial activities overlap. Such centres are occupied by tourists, commuters and customers during daytime, but almost deserted at night. Particularly in Sarayburnu and on the coastline of Bosporus, the expanding gentrification directly affects the adaptive reuses and prompts tourism oriented reuses of the Sinan's works. High volume vehicular and mass transportation traffic constitutes both an advantage and problem for the buildings.

4. ANALYSIS OF THE ARCHITECTURAL HERITAGE

4.1. Mosques, Masjids

Among 47 mosques and 51 masjids built by Sinan, only 23 of the mosques have been preserved in their original character. (Table: 1) In contemporary Istanbul, mosques constitute majority of Sinan's works and it is mostly through them Sinan's architecture is interpreted. Consistency of the main function of Sinan's mosques as prayer space has ensured their continuity. Nevertheless, changes in social role of the mosques and technological developments are causing several common alterations in mosques. As imams officially became clerks, tiny and makeshift offices for them have are being provided in the mosques. Practical but inappropriate enclosing of narthexes is a common practice. Installation of the modern heating systems destructs the authenticity of the buildings considerably. Crucial choices in the restoration process emerge as another controversial issue. Because Sinan's architecture is considered as the golden age of the Ottoman architecture, there is a tendency among the experts to reconstruct Sinan's period by cleaning later additions. This approach is problematic not only because it rejects cultural continuity and suggests superiority of certain periods over others, but it also bases on little evidence for restorations. There is not a clear policy or policymaking process of General Directorate of Foundations regarding this issue.[4] These and similar further problems stem from certain pitfalls in the preservation process. Ownership and responsibility of the mosques and masjids

belong to the General Directorate of Foundations, whereas they are used by Presidency of Religious Affairs. However all cases restoration of the mosques are initiated by the local associations headed by the imam, which have good intensions but lack the expertise for sound restoration practices. The cultural and professional gap between these associations and the restoration experts hinder vital cooperation.

Table 1

Type of the building	Number of the buildings recorded in the manuscripts	Number of the buildings that stand today	Number of the buildings that have been lost	Works that still preserve their original character
Mosques	**47**	**30**	**17**	**23**
Masjid	**51**	**12**	**39**	**0**
Mausoleums	**40**	**29**	**11**	**25**
Bathhouses	**42**	**14**	**28**	**4**
Aqueducts	**6**	**6**	**0**	**6**
Madrasas	**52**	**23**	**27**	**18**

4.2. Mausoleums

From 40 of the Sinan's mausoleums 29 of them still stands. (Table: 1)They reflect a broad diversity from modest open-air structures to monumental buildings, while the majority is single domed buildings. Conditions of the mausoleums are closely linked to their magnificence and visibility. While the mausoleums located within tourist areas are regaining significance, modest examples of mausoleum architecture slide into oblivion and decay. Furthermore, in the majority of the cases, mausoleums have lost the setting of the "culture of burial" as their interior decoration and furnishings have been lost. Ownership and preservation responsibility of the majority of the mausoleums belongs to General Directorate of Cultural Heritage Assets and Museums, whereas the preservation responsibility for the cemeteries belongs to the General Directorate of Foundations. Division of the responsibilities of preservation between stakeholders is a deficit in organizational structure, which should ensure holistic conservation of the funeral context including mausoleums and mosque cemetery.

4.3. Bathhouses

Among the 42 bathhouses that Sinan built in Istanbul, 14 in number still stand.(Table: 1) Once the bathhouses have lost their significance as places for sanitary and socialization by 20th century, a significant number of them became obsolete. However, the recently growing cultural and tourist interest in bathhouses prompted revitalization. The bathhouse and the bathhouse culture have been long symbols of the Ottoman Istanbul. Now, 8 of Sinan's bathhouses are in use. Their conditions are closely linked to their proximity to the central areas. Close to the tourist areas, they are restored and well maintained, whereas the rest are used in poor conditions. Unlike other works of Sinan, overwhelming majority of the

bathhouses belong to private owners. Therefore, it is more the economic benefits that determine the prospect of restoration and reuse.

4.4. Bridges

From four of Sinan's bridges in Istanbul, all are preserved. Until 2000s, they were still in use and congested by heavy traffic. Recently, due to the inadequacy of the bridges for the increasing traffic, they were bypassed by new bridges. This development brought the question of what will be the future use of obsolete bridges. In only one case, the Küçükçekmece bridge, the bridges is a living historical monument in a rich urban context. However, rest of the Sinan's bridges are now simply swallowed by heavy traffic arteries. The responsibility of preservation of the bridges belongs to the General Directorate of Highways [Karayolları Genel Müdürlüğü], which has little expertise on conservation and revitalization of historic monuments. Lack of cooperation between the related stakeholders that can initiate revitalization or even relocation of the bridges constitutes a significant problem.

4.5. Aqueducts

There are six aqueducts of Sinan within Istanbul province. With the advent of modern water delivery structures, aqueducts and the water carriage systems that they were part of became obsolete. Only some parts of the Kırkçeşme water conduit system still supply water to some districts of İstanbul. Thanks to their durable structures and good engineering, aqueducts are preserved in good condition. However, recent urban development threatens their future particularly by the roads bypassing under them. The owner and responsible institution for their preservation is the Istanbul Water and Sewerage Administration.

4.6. Caravansaries

From 11 caravanserais built by Sinan in Istanbul, there are only seven of them left. Caravanserais lost their originals function in the Ottoman era, and began to be used either for commercial activities or as storage spaces depending on their location. Today, three of them virtually function as khans. Their ownership is divided among numerous stakeholders who own the unit spaces of the building separately. On the other hand, the rest of the caravansaries have single owner, which is General Directorate of Foundations. There is a need for innovative reuse schemes, which can not be ensured by the clumsy bureaucratic structure of the institution.

4.7. Madrasas

More than half of the madrasas built by Sinan in Istanbul has been lost. (Table: 1) There are now 23 madrasas of Sinan in Istanbul. As the madrasas were closed down by the foundation of the republic, they began to acquire new and irrelevant functions. The architectural type of the madrasas, whether they were built independent or surrounding a mosque courtyard, is significant regarding the contemporary use. The madrasas that are adjacent to mosques continue to be seen

as religious spaces and in numerous cases be used as Quran schools [Kuran kursları]. Independent madrasas can adopt a wide range of uses. As a result, the architecture of the independent madrasas is adopted to modern uses with in many cases inappropriate interventions.

CONCLUSION

Problems in Turkey's heritage conservation structure also emerge as significant threats for the future of Sinan's architectural heritage. Over partition of the preservation responsibilities, division of ownership, and slumization of the building sites are prominent problems. In addition to these, Sinan's role as a national hero in Turkey is a matter that both strengthens and complicates preservation process of his architecture. Attempts to reconstruct a golden age through restorations undermine the cultural continuity, which was one of the core tenets of Sinan's architecture.

ACKNOWLEDGEMENTS

I wish to thank Prof. Metin Sözen and Rachel King for their kind and patient assistance. I also owe my sincere thanks to my friend and colleague Görkem Kızılkayak with whom I have enjoyed countless site visits.

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DETERMINATION OF AN INVENTORY OF HISTORICAL AND CULTURAL ASSETS OF NİGDE-BOR TOWN

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ABSTRACT

Enlargement with concrete blocks of Bor town, Nigde due to population increase and migration has been observed. This town which has a special place as it was in every phases of Anatolia contains historical and cultural assets. These assets, which remain as heritage from the nature and history, are pressed between visual and spatial pollution. Currently, they are under the risks of annihilation.

A project has been proposed to Research Council of Nigde University, one aspect of which aims at preparing an inventory of historic and cultural assets of Nigde starting from Bor town.

First, we followed up publications and the records of Nigde Museum Administration and Nevsehir Protection Commission of Natural and Cultural Assets. These publications and the records were added in our database. In Bor, all assets, which were either registered or not, were photographed, and their locations were determined by using GPS. Production of a rigorous inventory has been aimed at by suitable database software.

The preliminary results of above-mentioned study were presented. Furthermore, precautions and suggestion against risks which stem from distribution of the historic and cultural assets in the city center were presented.
Keywords: Inventory, Historic and Cultural assets, protection, database

1. INTRODUCTION

Historic places reflect the information and products conveyed by the civilization of societies lived in the period beginning from sometime in the history up to now. Cities earn their identities with these assets. This witness of the past ought to be

respected in the view of primarily the historic and sentimental values. Historic places are accepted as heritage to mankind. In present days, physical environment and thus historic places have been changed in a negative way because of increase in unqualified buildings as a result of awry urbanization. Annihilated historic assets and devastation of the environment brings along the importance of protection [1].

According to first paragraph of Venice regulations [2], context of historic monument includes not only one architectural work but also a country residential area. This notion contains not only big art works but also simple ones which gained significance as the time pass by.

At the general assembly of UNESCO in 1976, it was stated that every historic area and its surrounding, its properties and balance, the buildings which connect one another, and spatial organization as well as human activities can be considered as a whole [3]. Zeren [4] considered this whole to be the assets carrying cultural values such as documentary, historic, archeological, aesthetic, architectural, civic view, natural view values, inspiring curiosity, admiration and praise as sensational values, and holding functional, economical, social and political values.

In Turkey, the assets were defined by 2863 numbered Protection Law of Cultural and Natural assets (T.R Official Press, 18113) as “cultural and natural assets” including “natural assets” such as aesthetic and scientifically valuable things, geological formations, plants, water constituents, and wild living areas as well as historic garden [5].

In Turkey, one of the major problems is mostly incomplete inventory of cultural and natural assets. Therefore only works to be done by the Ministry of Cultural and Truism will not be efficient to complete the tasks at the possible shortest time. Therefore, the inventory of architectural heritage of Turkey has to be completed in the possible shortest time by the help of local governments, universities and societies [6].

A project has been proposed to Research Council of Nigde University, one aspect of which aims at preparing an inventory of historical and cultural assets of Nigde starting from Bor town.

In this paper, the proposed project will be introduced and the risks that the assets face will be discussed.

2. PROJECT DEFINITON

The proposed project titled “Preparation of an inventory of historical and cultural assets of Nigde” aims at preparing an inventory of historical and cultural assets of Nigde starting from Bor town, which will lead protection plans.

Town of Bor, Nigde cultural and social structure of which has been alive through the historical journey of Anatolia, has a number of cultural and natural important assets which need protection. The assets, indicator of evidence of

historical culture of Nigde, historic homes, baths, mosques and churches etc. need restoration to serve major part of the civic life.

In eighteen-month time, studies to produce the inventory of cultural and natural assets of Nigde-Bor consist of three phases, preliminary studies, field work, and office work. In the field work, photographs of each asset from different side will be taken as well as determination of the location of it by means of GPS receiver. For documentation, a form to each asset will be filled out and a dairy will be kept for daily activities.

Documentation includes traditional homes along with their architectural elements if any, roads, aerodromes, fountains, monument trees within the city etc. Obtained from the field work, all the documents will be archived within a database system.

Comprising documentation of necessary information for restoration and rehabilitation of unused cultural heritage that the city own, this study which is within the context of documentation to serve as a background to protection projects will provide opportunity to give them function again. Distribution of assets of Bor town is shown in figure 1.

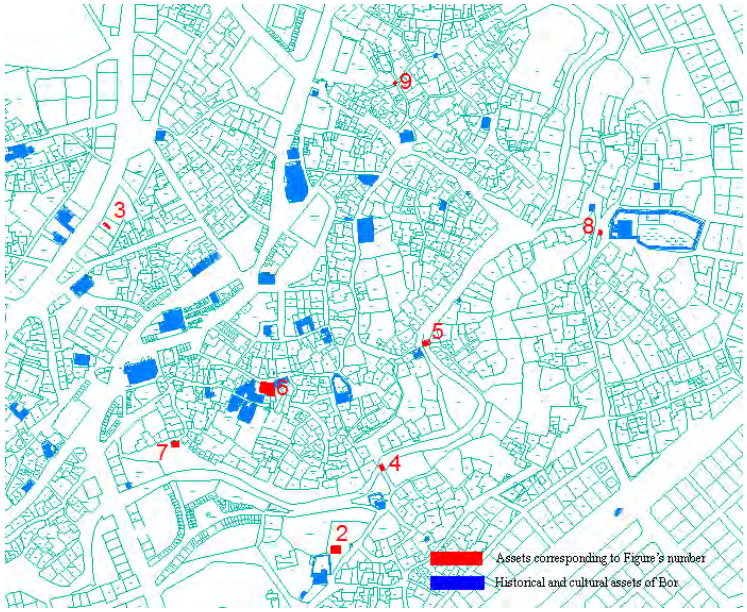

Figure 1. Distribution of assets of Bor Town

3.RESULTS AND DISCUSSION

In preliminary studies of preparation of inventory of the cultural and natural assets within the vicinity of Bor, summary of registered assets was given in table 1.

Table 1. Summary of Cultural and Natural Assets of Bor Town

Asset Type	Number of Assets	Photos	Photos(taken)
Mosque	21	119	15
Shopping Area	1	2	
Fountain	25	58	29
Official Buildings	2	22	
Turkish-Bath	3	73	4
Church	1	9	25
Home	81	518	179
Bridge	4	10	8
Cemetery	2	4	
Chapel	1	3	
Shrine	2	4	3
Road	1	4	
Lot	1	18	
Trees			21
other	1	2	

There are 7 representative examples, locations of which were given in the Figure 1, highlighted in red, selected to be introduced in following paragraphs, which are in common with being traditional types of 19th century late Ottoman architecture, and considered them to be the assets carrying cultural values such as documentary, historic, aesthetic, architectural, civic view, inspiring curiosity, admiration and praise as sensational values, and holding functional, economical, and social values. They are under the risks of being annihilated.

Located in Dink parish, Blind Ismail Mosque Side Road, the structure consisting of a basement floor, ground floor, and a penthouse has corners, windows sides made of cut stone and rubble masonry walls coated with mud plaster (figure 2).

Figure 2 A Typical House from 19th Century late Ottoman

Located in Sokubasi parish, Kunkbasi road, the structure known as priest house is attached to the church behind it. The building contained in courtyard has a hall type plan. Two-floor house was plated with local stone, and in the first floor, horizontally located there exist a stone jamb surrounding the building. Penthouse in the up stare contains three rail windows (figure 3).

Figure 3 Remnant of a Church Premises (Priest house)

The bridge on Ozden(Yunak) stream composes with Dombulca Mousque and Fountain (figure 4)

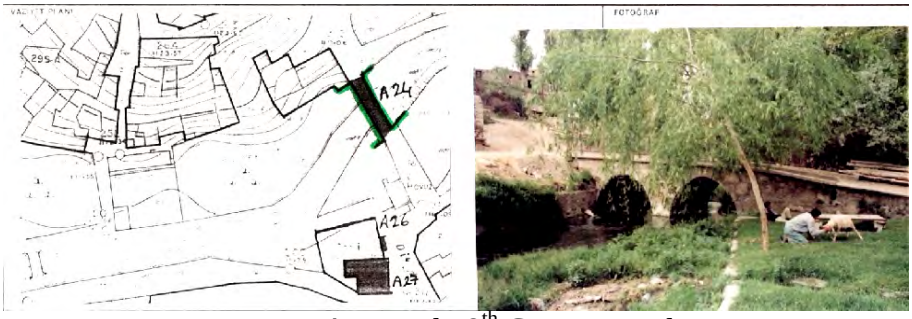

Figure 4 A typical 19th Century Bridge

Figure 4 is the second coping bridge on the Ozden stream.

Figure 5 A Bridge from 19th Century

A church locally called Cigiz's home reflects 19th century late ottoman style (figure 6). The location of the building on the lot is a side courtyard, and the building is a rectangular shape in the direction of east-west. The building has local stone walls. Its surrounding has authentic texture.

Figure 6 Remnant of a Church Premises (locally known as Cigiz's home)

Located in the courtyard of a house in Orta (Middle) parish, Guyer road, the chapel consisting of two parts can be accessed through rectangular opening.

In one of the two parts there is a well, in the other, a niche of abscissa and a candle niche (figure 7).

Figure 7 A Typical Chapel Enterence

As another example, located Kale (castle) parish, kale steep, the fountain founded in 1558 constructed with cut stones. It has a iwan shape, and on the inside of the iwan part there are three mug niches with jamb made of pointed arc shaped stone. There are two gutters around the left one of which there is a plant patterned stone (figure 8).

Figure 8 A Typical Arc Shape Covered Fountain

Finally, located in Cumhuriyet parish, Acipinar Road, a fountain has two side arc shaped covered with cartridge belt. In its epigraph, 1218 is read (figure 9).

Figure 9 A typical Fountain

Some of the assets in Bor town as seen from above were transformed into different functionality while others undergone structural changes. Considerable numbers of them were left alone among the condensed constructions in the city texture.

Considering some examples given above:

As seen from figure 6, a floor of Cigis's home was added (in 1930) after it had changed its possession to a person. Some of the buildings were separated removing vertical and structural relations between them as reason of possession through inheritance of the recorded ones while others unlike undergoing structural changes were transformed because of different usage.

As seen from figure 2, It is currently being used as a residential home which was also used as jail in the past. Thus it underwent considerable changes in its interior plan. Therefore authentic relations were removed.

As seen from figure 3, historic assets were facing annihilation among the absurd, multi-floored, unqualified constructions unfitting in their environments, due to city plan changes.

CONCLUSION

In this paper, preliminary results of proposed project were presented.

Most of the assets investigated within the preliminary studies in Bor Town are under the risks of being annihilation whether they were registered or not. Therefore these structures need to be restored as a well protected example in the city texture reflecting proprieties of its locality.

It can be seen that apparent changes one by one taken long period of time in city texture due to social and economical changes make the assets difficult to be restored with their authentic properties.

A method other than traditional ones is needed for a more efficient protection of the assets for the cases in Bor Town.

Would an inclusive project aiming at more than one application including city transformation be a method?

or

Would a city culture park construction within or near a preserved land if any into which these assets considered within recover context are moved be a method?

Or what else?

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FROM THE PAST'S TRACKS TO FUTURE SPACES RENOVATION OF MONUMENTAL BUILDINGS AS A METHOD FOR URBAN IDENTITY SEARCHES

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ABSTRACT

In this paper the transformation of the monumental buildings, which carry on the cultural, and the historical values of the past to nowadays usage by the help of rehabilitation projects will be discussed. **As a case study; the rehabilitation projects held in city Izmir during the recent years will be exampled as the methodology of urban identity searches.**

1. INTRODUCTION

Cities reflect our common cultural heritage. The architectural building culture, environment and monuments-as defined in the first group, having monumental features, build by societies common needs (social, religious, economic, cultural, etc.)- that the cities own are the values that were produced in the past, exist today, form challenges for the future, and identifies the cities.

The monumental buildings differ from the single ones by their values like being a landmark, being unique, and being a symbol among the city, and have potential inputs. Today the buildings, which are the most important products of a significant culture, and have artistic, historical or social features, are considered as monumental buildings. A historical street or quarter or even a historical building in Istanbul can be a monumental building as well as Saint Pietro Basilica and the Süleymaniye Mosque.

Monuments as the witness to the creativeness and imagination of human being, as the cultural and the historical values of the past can be rehabilitated as the qualified-constructed environment, and the identity of today's cities, and can form future's living qualified spaces. Today's developed preservation regulations enable possibilities to renovate our cultural heritage as today's qualified-constructed spaces, and carry them to future. The local authorities are aware of the

importance of the historical and the cultural values, and use them for the benefits of their cities as the identity of the settlement, as the living qualified spaces.

2.THE RENOVATION PROJECTS HELD IN IZMIR

The renovation projects for the transformation of the architectural heritage values of Izmir have been initiated in the recent years. Historical values of the past started to be rehabilitated as the qualified-constructed environment, and the identity of today's cities, and obtain to form future's living qualified spaces. These renovation activities are more valuable when a pattern of architectural heritage is sustained. Izmir now consists of both the preservation of urban texture examples and both the singular preserved samples. "Goztepe Tram Administration Building" which has been transformed into todays "Akademi Building", and "The Former Fire Department Building" which has been transformed into a "City Museum" are the singular preserved samples that have been representing their period characteristics. On the other hand, the renovation of Konak Pier, Pasaport Pier, and the historical unique square, Konak Square can be defined an urban renewal projects. Even if they were not planned as a whole in the design process, but after the renovation process have been completed, these three parts combined with each other. The local authorities are now aware of the importance of the historical and the cultural values, the values of the architectural heritage, and use them for the benefits of their cities as the identity of the settlement, as the living qualified nowadays spaces, and the examples mentioned below are the representatives of these transformed living qualified nowadays spaces.

Goztepe Tram Administration Building is located between Mithatpasa Boulevard and Mustafa Kemal Boulevard, and was constructed in 1880's. The building had changed its function in 1930s and started to be used as the Counter Factory of the Municipality. Starting with 2000 the building has restored and refunctioned as Akademi-IKSEV.[1] This building is the one of the remaining architectural heritage examples of 1880's. With its symmetrical façade effect, its significant clerestory windows and the glass roof tiles, this building symbolizes the life occurred in Izmir in that period of time.

One of the most striking renovation projects is the transformation of Former Fire Department Building into Ahmet Pristina Izmir Museum and Archieve. This building was originally established in 1932 as a central Fire Department Building following the Great Izmir Fire of 1922. Mesut Özok, afirst generation local architect of Izmir, has designed the building. This building is one of his significant buildings constructed in Izmir. After the Fire Department was relocated, this building was restored in 2003 and functioned as the Izmir City Museum and Archieve. This building is a significant and unique building representing its period, and with its fire tower, it has turned out as a landmark, a social arena among the city. This building represents the pre-war architecture heritage of Izmir.

Figure 1: Izmir City Museum and Archieve Building

One of the significant renovation and refunctioning project is the restoration of the Custom Buildings locating on the old pier of Izmir dating to 1854 into a shopping center of a developing city. These old buildings were constructed on the sea, by getting permission from the Grand Vizier, in 1854 and finally the coastline where Basmane Train Station opens to the sea has been filled and used as a storage area for goods subject to customs. The building had some extensions in the years 1860s, 1870s and 1910s. The most recent fill and construction have taken place between 1905 and 1913. Circular cast iron columns, steel U section columns and roof trusses produced in Belgium have been used to enclose the great hall. Considering the geometrical resemblances in the form of steel, it is claimed that the structural design belongs to Gustave Eiffel School. The building is very unique because of the steel structural system it consists. It is the most significant steel structure example dating to 19th century in Izmir. After the restoration and renovation of the architectural heritage dating back to 19th century unique with its steel structure, the urban project related to Konak Square, was initiated, and combined with this new shopping center. What had happened to this piece of land was the transformation of these places into firstly nowadays spaces, and transformation of the architectural and cultural heritage, the identity of this region to future.

Figure 2-3: Konak Pier view from the sea-Entrance of Konak Pier Shopping Center

Figure 4-5: Entrance of Konak Pier Shopping Center-The Bridge combining the Plaza in front of Konak Pier Shopping Center with Konak Square

Izmir, being the centre of a rich and large hinterland in the middle of Aegean shores in Western Anatolia and with its much important geographical and strategically position, has been a large city throughout the ages. “Konak Meydanı (Konak Square)” is the most important city centre of Izmir. And it is also one of the oldest squares of Izmir, which had been diverted during the past 100 years, from an Ottoman Empire city centre to a modern republican city centre. Sarıkısla (The military Barrack) shaped by an organic process and morphology defined the border and the urban scale of the square. Following its demolition in 1955, numerous ideas, projects and urban visions have been developed during the past 50 years in order to overcome the spatial and emotional void left from “Sarıkısla”. “Konak Meydan”and this void is one of the meeting spaces of the city, which carries out all the needs of the city such as serving for general traffic, or for meeting places, for markets, for approaches to prominent buildings, such as city halls, churches, mosques, theatres, museums of art and of natural history, or else since two centuries. “Kemeraltı” serves as a market/shopping place; municipality and government buildings are the one of the most striking points of the square; a picturesque clock tower dated to 1901 is the meeting point for thousands of people during a daytime; AKM and Sabancı Convention centres are the cultural parts of the Square with the historical opera house. And a historical central library building of Izmir stands beside the opera house. Also “Konak Meydan” serves as the intersection point of the general traffic routes. The square has been rehabilitated and evaluated during the historical process after the republication of Turkey for the modern republic city in order to elevate the urban quality. During these evaluation processes, the square started to loose its definition and identity.

Figure 6-7-8-9: Konak Square

Despite having all the facilities that are first acknowledged and than sampled above, although “Konak Meydan” has distinct recreational values, these values do not have a definite relationship with each other even they were located side by side. Open squares in cities supposed to have distinct connected recreational values, because they usually serve as the "heart of a great city." From that time on, a questioner was raised in order to make this city centre, a living modern square. As an answer to this questioner, a project has been maintained for “Konak Meydan” to modernize Izmir’s new image and face for the new Millennia. Subsequently, the urban project designed by Ersen Gürsel in 2004 was initiated. In order to make the Plaza gain its identification and definition, the needs of the square was obtained due to the cultural and social needs of the inhabitants. The architectural heritage values that the square has are related to each other after the maintenance of the urban project.

The renovation of the Kantar Police Station into a Pasaport Pier had constituted a significant landmark in Pasaport Region. The Customs Building and the Quarantine Building dating to 1865s in Pasaport Region was renovated in the year 2004, Quarantine Building and the Customs Building was replaced by the new Passenger Hall with a transparent structure that ensures visual connection. The Pier lying down the sea is the visual symbolization element of that territory. Represents the commercial activity once lived in the history of the city, and serves as the most common living architectural heritage as transformed into nowadays space.

Figure 10-11: From Custom and Quarantine Building to Pasaport Pier

These three projects, the restoration of Konak Pier, the restoration of Pasaport Pier, and the urban renewal project of the Konak Square, later on combined with each other due to their close locations with each other, and formed a living qualified urban spaces of nowadays use.

3.CONCLUSION

These renovation projects that have been sampled in the text, and many others which have not been mentioned in the text held in Izmir, helped to show how big the history of this city is. These samples are the living evidences coming from the past representatives of their periods. They are the pasts tracks, and todays living qualified spaces because they were renovated, and will be carried out to future because they sustain today.

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ANALYSING BUILDING CONSTRUCTION IN TIME THE ABC🕗 RESEARCH MATRIX

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ABSTRACT

Past, present and future are all relevant to the buildings. Three levels of analysis have been used to cover these phases. Where buildings are concerned, we have to look at creation, existence and preservation/decay. The objective of my research was to identify the qualities of a building which are relevant when trying to shift from decay to preservation. Main issues for redevelopment are: space and structure. The influence of construction engineering, the way we can learn from it now, and the way in which a building is able to accommodate change determine the chances of a building's long term survival – the outcome of the interaction of continuity and change. Research can provide data for careful and imaginative observation and analysis. The conclusions which can be drawn in this way may help us make discoveries to understand a building when either designing or redesigning it.

The method starts with the contextual aspects: commission; location; architect; typology and design process. The information obtained in the observation stage is reduced to the contextual information which affected the design, creation, existence and preservation/decay of the building.

The later sections, which consider the building itself in greater detail, are initially ordered by time: creation, existence, and preservation/decay. Within these, the elements of the building are analysed at three levels: space (interior and exterior); structure (load-bearing elements and elements which determine the structure); matter (shaping the space through materials which affect light, colour, texture, surface, sound, impression, smell, size and weight); building services (climate control, comfort, maintenance and communications). In this way the ABC🕗 Research Matrix was created.

1. INTRODUCTION

In 2006 I finished my dissertation named: Building Construction in the Netherlands 1940-1970, Continuity + Changeability = Durability. This resulted in the research method: Analysing Building Construction in Time. This method was guided by the following themes: Observation - with an engineer's eye, Research analysis and Regenerative conclusions. It is a method to analyse the existing before changing it. That is the only way to regenerated buildings, parts of cities and urban landscapes with conscience. The main result of my research was this new research method. Also one of the conclusions of this research maintains that a new building typology will be needed to develop a sustainable environment including our heritage.

2. RESEARCH THEMES

Architecture is about more than just constructing buildings. Architecture adds meaning to buildings created by technology. In principle, buildings should be durable (in terms of time as well as finance) objects and therefore changeable, flexible. The lifespan of buildings, i.e. architectural objects, is inextricably linked with their ability to accommodate change. Being aware of this, learning from this, considering this when working on completely new design commissions or commissions concerning existing buildings (where technology will always be needed to implement the design) are all challenges associated with modern building practices which take a long-term view.

2.1. Observation - with an engineer's eye

I considered engineering and technology and the views of both architectural critics and practising architects about technology by studying the relevant literature and sources. Technology evolved after the Second World War as a result of the use of new materials, changes in legislation and standards, and the industrialisation of the construction process. Comments about the contribution, or lack thereof, of technical progress to a higher architectural quality were always personal visions primarily shaped by personal taste and habits. Architects developed from supervisors to architect-managers of the entire construction process. Time schedules became an important instrument and working together with structural engineering and building services consultants became steadily more important. The best results were developed on the basis of synergy between the different disciplines.

2.2. Research analysis

When designing either completely new objects or objects to be incorporated into an existing structure it is important to learn from the past. Not to copy it, but to analyse it and apply the lessons learned while respecting the present context. We have to evaluate knowledge and methods and develop our own design method. This learning aspect is emphasised when a design commission concerns an existing building, but even a new build project always has a context. When dealing with an existing building that building provides the primary context and immediately becomes an element of the key points of the architect's brief. In my view, studying criticism, experiences and interviews, and thoroughly analysing the work of others is not adequately included in the education and training of architects as designers yet.

2.3. Regenerative conclusions

Regeneration concerns changes which add a new period, a new generation, to the lifecycle of a building. Life means change and the past means that we progress in a spirit of tradition and memory. Furthermore, change cannot happen without continuity. Changes to buildings are affected by both financial and technical considerations. The existing adds a layer of history which can never be created in a true new build project. During the design and construction of the Trade Union Museum in Amsterdam, housed in the building of the former Dutch Diamond Workers' Union (ANDB), I was introduced to issues related to National Monuments and making changes to such buildings. The examples by architects such as Piano, Foster and Herzog and de Meuron demonstrate that leading architects can produce excellent results when regenerating buildings [4]. (Figures: 1 – 2).

The opinions aired by the original architects whose buildings are being changed make it eminently clear that some of them object to any changes to their buildings. Around 1950, architecture critics still felt that architecture amounted to an inviolable work of art. Optional changes were therefore considered an anathema. Architects also resisted changes to their work and event went to court to defend their copyright - it appeared that demolition was not prevented by this copyright but that changes to a building were.

Views about changes also changed themselves. In some cases the original architects are engaged to regenerate their own work. This requires them to take enough distance from "their building" to be able to accept it as a new commission. Of course, this is more likely to happen under legislation which allows listing after 30 years, than under the Dutch system where the period is 50 years.

Figure 1
The ANDB building in Amsterdam.

Figure 2
The Tate Modern in London.

‘*Refurbishment is the hard-headed business of making use of what is usable in the ageing building stock; the skilful adaptation of a building shell (which is valuable in its own right and not due to any historic mystique) to a new, or an updated, version of its existing use. The existing building, once refurbished, should be equally as efficient in its new role as a purpose-designed building would be, given the usual number of restraints which always impede the designer realising the ideal in new or refurbished merit and will, by its preservation, improve the amenity of the environment, so much the better.*’[3]

To give regeneration a real opportunity, it is particularly important that those initiating projects are prepared to consider regeneration and do not automatically choose demolition. Bringing about this change in attitude is particularly relevant with respect to buildings dating from after 1940. There are definitely opportunities for such buildings in both the near and distant future.

Demolition amounts to a waste of energy and is neither durable nor sustainable, while reuse, changes in use and regeneration of buildings are. A good example is provided by the Stationspostkantoor (station post office) in Amsterdam which in 2003, after demolition of part of the building, was repurposed as the Stedelijk Museum CS and offices for architects, designers, etc. Perhaps this good example will inspire others (Figure 3).

Without a past there can be no future, and changes can only occur if there is continuity. The “creative re-use” advocated by Latham can produce a built environment stratified in time and therefore rich in appearance and the way it is experienced. [1] Demolition is sometimes the best option and there is no need to preserve everything. However, a careful assessment which gives serious consideration to repurposing, reuse and regeneration provides many opportunities for creating a rich spectrum of buildings.

Figure 3
The Stations Post Office in use as Stedelijk Museum Amsterdam.

3. ANALYSING BUILDING CONSTRUCTION 🕗 (IN TIME)

Past, present and future are all relevant to buildings. Three levels of analysis have been used to cover these phases. Where buildings are concerned, we have to look at creation, existence and preservation/decay. The objective of my research was to identify the qualities of a building which are relevant when trying to shift from decay to preservation. Main issues for redevelopment are: space and structure. The influence of construction engineering, the way we can learn from it now, and the way in which a building is able to accommodate change determine the chances of a building's long term survival – the outcome of the interaction of continuity and change. Research can provide data for careful and imaginative observation and analysis. The conclusions which can be drawn in this way may help us make discoveries to understand a building when either designing or redesigning it.

My research didn't only result in relevant conclusions, but also in a research method which will be applied to the subjects covered by the Faculty of Architecture of Delft University of Technology and could be used on international scale. It is a method to analyse the existing before changing it. That is the only way to regenerated buildings, parts of cities and urban landscapes with conscience. Analysing Building Construction in Time aims to discover the qualities of a building, rather than its value. Observation, the first stage of the research, aims to obtain information from the literature, the building itself, archives and interviews with stakeholders. The second stage, analysis, includes structuring, analysing and interpreting the information. In the third stage, conclusions can then be drawn on the basis of the research themes discussed above. The information is structured in accordance with the research brief. In the long term, it will be possible to identify connections (concerning both buildings and building construction) between the results of Analysing Building Construction in Time, using the research themes defined by me. The information obtained in the observation stage is reduced to the contextual information which affected the design, creation, existence and preservation/decay of the building. Context is the title of the first section in which the contextual aspects are discussed: commission; location; architect; typology and design process. The later sections, which consider the building itself in greater detail, are initially ordered by time: arising, continuing and expiring. Within these, the elements of the building are analysed at three levels: space (interior and exterior); structure (load-bearing elements and elements which determine the structure); material (shaping the space through materials which affect light, colour, texture, surface, sound, impression, smell, size and weight); building services (climate control, comfort, maintenance and communications). In this way the actual research ABC🕗 Research Matrix was created. (Figure 4).

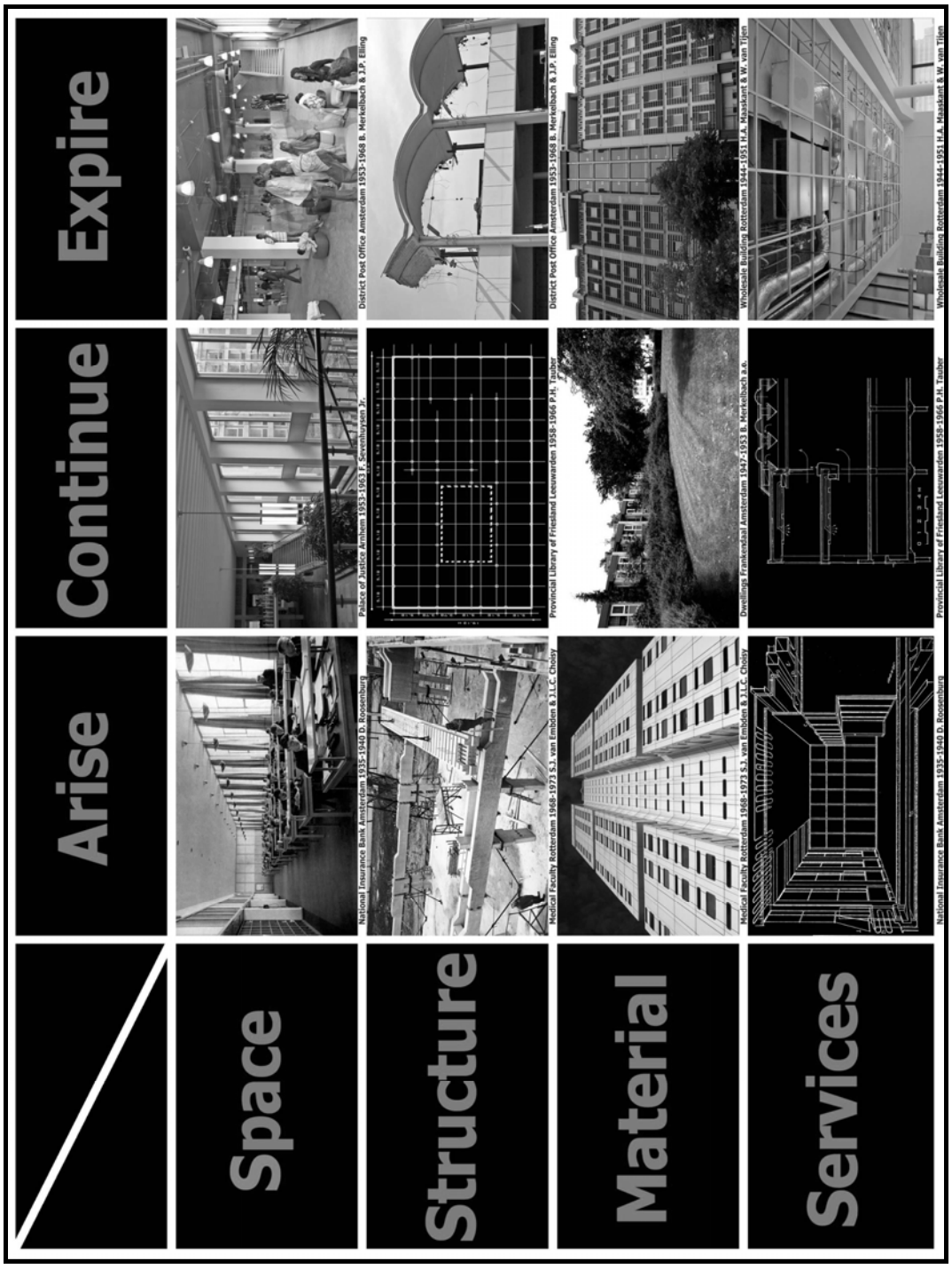

Figure 4
The Analysing Building Construction in Time Research Matrix (ABC🕗).

4. CONCLUSIONS

The influence of Analysing Building Construction in Time, the way we can learn from it now, and the way in which a building is able to accommodate change determine the chances of a building's long term survival – the outcome of the interaction of continuity and change. Research can provide data for careful and imaginative observation and analysis. The conclusions which can be drawn in this way may help us make discoveries to understand a building when either designing or redesigning it.

Past, present and future are all relevant to the buildings I have investigated so far and those which I will be investigating in future. I use three levels of analysis to cover these phases. Where buildings are concerned, we have to look at creation, existence and preservation/decay. The objective of my research is to identify the qualities of a building which are relevant when trying to shift from decay to preservation.

Change and durability appear to be intimately linked to guarantee a degree of continuity of our built environment:

CONTINUITY + CHANGEABILITY = DURABILITY

ACKNOWLEDGEMENT

Figures 1-6 by the autor.

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MONITORING THE HISTORICAL ASPECTS OF PLACE EXAMINING THE CITY OF SANANDAJ, IRAN

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ABSTRACT

Historical sites are special places which housed the most important cultural heritage of different periods. They can be considered as irreplaceable assets representing the investment of centuries of knowledge and lessons which weave the various physical elements and spatial units together in particular contexts. Many such sites are in a danger of losing their historical aspects if relevant studies are not put in place to measures those aspects. This paper is concerned with the historical aspects in the city of Sanandaj considering two leading questions: What historical aspects the city of Sanandaj contained which gave birth to its character? Theses will be dealt through document analysis, observation of the built form of the city and physical survey of existing built form and its natural context (taking photograph and analytical drawings). The outcome of the case study is that its main structure sprang from the castellated cities, which has the potential for cultural resource-management plans.

1. INTRODUCTION

Historical sites are special places not only due to the cultural heritage that they house, but also due to their natural resources. They can be considered as irreplaceable assets representing the investment of centuries of knowledge and lessons which weave the various physical elements and spatial units together in particular contexts. For this reason, such environments are “a treasure house of human experience – of successes and failure” [12], good examples of “problem solving a total response to the challenge of climate and topography” and demonstrating an adaptation of man to the ebb and flow of social and political history of particular nations in a long process of trial and error [1]. Many such sites are in a danger of losing their historical aspects if relevant studies are not put in place to measures those aspects and ensure the continuity of their qualities.

This paper is concerned with the historical aspects in the city of Sanandaj considering two leading questions: What historical aspects it contained which gave birth to its character? Theses will be dealt through document analysis, observation of the built form of the city and physical survey of existing built form and its natural context (taking photograph and analytical drawings). The information has been collected from 2003 to 2007.

2. HISTORICAL BACKGROUND

The city of Sanandaj is the capital of Kurdistan, the province which contains a majority of the Kurdish people in Iran. It gained its peculiar character due to its well known location within the Zâgros mountain range – the mountains which define the western edge of the Iranian plateau – and to the cultural background of the Kurdish people. It was a majestic border between two rival empires: on the one side the Ottoman Empire was part of the Hanafite (Sunni tradition) and on the other the Safavid Empire was a part of the Shiite sect, which has had a major role in the formation of castellated city structures, often located on inaccessible places. Within these rival empires, the majority of Kurdish Muslims adhered to the *Shâfi'ite* Sunni rites contrary to both empires to distinguish their identity from the surrounding lands.

The nature of the challenges between those empires and the independent status of castellated city structures in the "Perso-Turkish" frontiers [8] contextualized the idea of departure from that structure to a new city to some extent capable of control by the Iranian side. Considering this point, the city of Sanandaj was founded in 1639 by the Ardalân family with an unusual form distinct from other Iranian cities. Its structure to some extent shows a particular character which no other traditional Iranian city had shown during the Islamic period. Its main structure sprang from the castellated cities, which contained three layers of urban spaces; the citadel or Qalâ on the top of a hill in the centre of the city's setting was surrounded by a wall (Figure: 1), the quarter occupied by the ruling class was again enclosed by a wall, and, beyond these two parts, is the rest of the city comprising three main quarters and one newer quarter free of man-made walls. Moving on beyond the historical background of the city, we now look at each urban element in detail.

3. CITADEL

The seat of power was located on the higher part of the site in the southeast corner of the quarter, overlooking all around and surrounded by its own battlemented wall to secure greater privacy (Figure: 1). An impression of this castellated structure can be found in the words of Kinneir [6], a visitor to the City in 1810:
The *Wallee*, who seldom quits this place, resides in a sumptuous palace, built on the top of a small hill in the centre of the town, where he maintains a degree of state and splendour superior to anything I have seen in Persia, except at court.

According to Gaube [4], such location of the government's court at the highest point of the settlement is one of the characteristics of early Iranian cities in general and Izady [7] makes the point that it is a basic design of cities in Kurdish culture which was adopted into the architecture of other cultures.

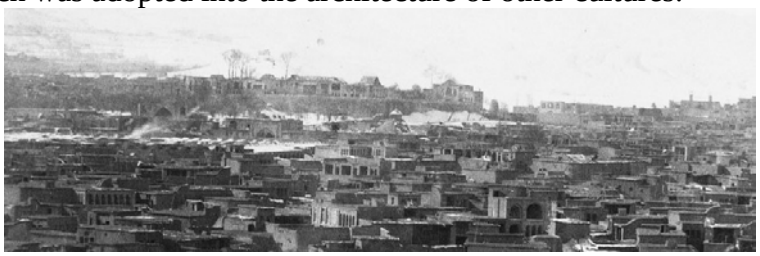

Figure 1. The seat of power on the top of a hill in the centre of the city, source *Sâzmân-e Mirâs-e* Kurdistan

More recent study concerning the *Qalâ* reveals that its site contained a geometrical notion of square; "a concentrated form of centre flanked by four *Tâlârs* oriented to the cardinal points of the campus" [10].

Considering the function of citadel, the first public space of the city can be conceived of as being the open space in front of the fortified wall of the citadel. It was a rectangular square named Maidân-e Wâli (Arg square) (Figure: 2). The presence of this square is in line with the points of Sultanzadeh [13] and Habibi [5] together with what the historical analysis revealed; in particular the act of moving from the mound cities (castellated cities) to the relatively low-lands, and what the main reason for the city foundation implied – the creation of a strong shield against the Ottoman Empire. It was the place of military activities and execution of sentences, where the ruler paraded their troops for war and official ceremonies.

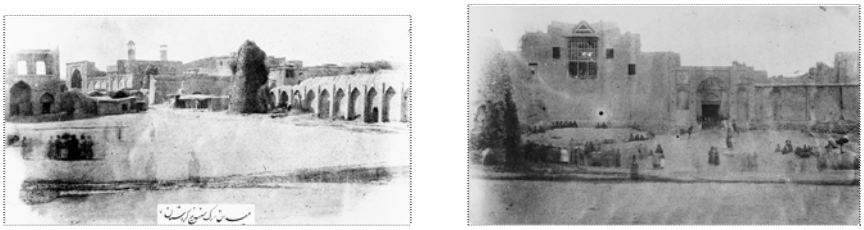

Figure 2. Two old photographs of the *Maidân-e Wâli*/*Arg*, source: *Sâzmân-e Mirâs-e* Kurdistan

4. BAZAAR AND MAIDĀN-E ALĀF-KHĀN

The bazaar can be recognised as a common feature of public space in different cultures. Most literatures recognise the image of bazaar, in the traditional Islamic city, as a linear form leading from the city gates towards the city centre where the *Jumaa* mosque is located as a prominent feature in the vicinity of the main *Maidân*. In contrast, the city of *Sanandaj* was not so structured. It contained an unusual organisation which is a rare feature in the Iranian city and even in the

Islamic world. For example, in the work of Morris [9], three basic configurations are defined for the *Suq*/Bazaar in the Islamic city, however, none of them match the form of the bazaar in *Sanandaj*. Even two forms of bazaar; linear and centralized, were conceptualised by Sultanzadeh [14], do not match the structure of the bazaar in the city of *Sanandaj* because the shops arranged face to face along the pedestrian walkway between them (figure: 3). The bazaar of *Sanandaj* was built in a solid rectangular form (Figure 3) outside of the city walls so that its longitudinal axis is in an east-westwards direction without any direct lines to the caravan roads and even the principal route of the city. More importantly, nor is it in the vicinity of the *Jumaa* mosque and the *Arg* square neither does its continuation touch them.

Figure 3. Rectangular for of the bazaar, source of aerial photo: *Sâzmân-e Naghshe-Bardâry* 1957

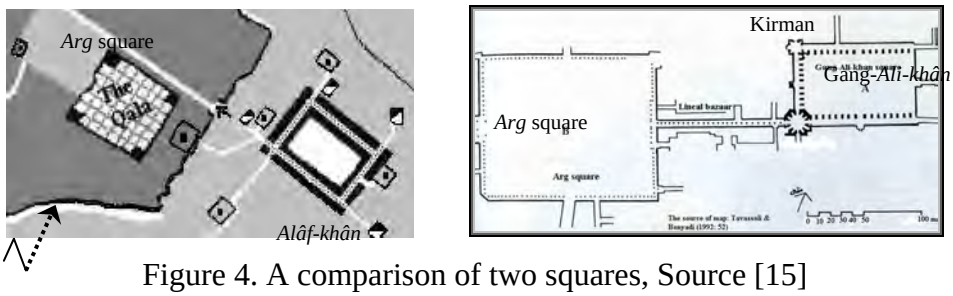

Figure 4. A comparison of two squares, Source [15]

The origin of the rectangular form of the bazaar and its adaptation to the compact form of the settlements and their maze pattern of streets can be traced backed to the new concepts of city design in the period of *Safavid* dynasty. As Habibi [5] indicated, in that period (*Shâh Abbâs*, 1587 – 1629), 'two patterns of organic and rational were [juxtaposed] in order to project a new concept in design principles of the city'. The physical manifestation of this idea can be viewed in the spatial crystallization of the *Maidân*-e Imam in Isfahân and *Maidân*-e *Ganj-Ali-khân* in Kirmân. It can, thus, be claimed that the structure of the bazaar and its interior *Maidân* derived from these two *Maidâns*. It is more comparable especially with the *Maidân-e Ganj-Ali-Khân* because of its size, the configuration of the bazaar and *Maidân*, and its location in relation to the *Maidân-e Arg* (Figure: 4). The main difference relates to the continuation of the bazaar towards the *Maidân-e Arg*. This movement was not maintained in the city of *Sanandaj* because the

wall of the inner-*shâr*/city and the topographical conditions of the city setting limited and contextualised the bazaar in its fixed structure comprising four lines which formed or embraced the *Maidân-e Alâf-khân* as the focal point of the socio-economic life of the city – within a site 92m long and 70m wide.

5. JUMAA MOSQUE

The city of *Sanandaj*, similar to other Islamic cities, possessed the buildings of a *Jumaa* mosque. But its location was changed by political conflicts over history. The previous *Jumaa* mosque, close to the seat of government and the bazaar, was destroyed and the existing one was erected elsewhere far from the bazaar and core of the city in the quarter of ruling class close to the west gate of the city. Due to this movement, a separation was created by its location within the second wall of the city. This is somewhat in contrast to that of the Islamic city in general and Iranian one in particular, where either the bazaar was adjacent to the *Jumaa* mosque or its continuation created a spatial structure for their interaction. This feature of the Islamic city is made evident in the words of Falamaki [3]:

"The *Jumaa* mosque can not be separated from the bazaar or maintained in further distance from it because it is the main pillar of the city religious power".

Its location is in a relatively higher part of the city where it could be seen from surrounding areas as a main landmark building in the City (Figure 5a). In the words of Ardalan [2], this means an emphasis on the "symbolic value" of the mosque. Similar to other Iranian mosques, it was surrounded by streets.

Figure 5. *Jumaa* mosque's image as a main landmark, Source: *Teashk* photo

Its structure comprises three main parts; the prayer hall (*Shabistân*) in the west of the site, the courtyard in front of the east *Eyvân*/porch or great porch which was flanked on three sides by the chambers of teaching as the third part. While the main orientation of its overall plan is towards the east, the rectangular form of the prayer hall was directed towards the holy *Qibla*. The prayer hall contained two porches; one towards the southeast the great porch was flanked by two *Guldasteh* (minarets) (Figure 5a), this was recognised as the main orientation of the city mainly towards the sacred hill of *Toos-nauzar*, the second towards the southwest, the holy direction of *Qibla*. The main gateway was also highlighted by a small

porch from the southwest side linked to the *Kuché Derâz* now Imam Street (Figure 5a). More importantly, it was maintained in the latitudinal axis of the courtyard directed to the court of ablutions. This is an important symbolic notion of mosque architecture which informs people of their first duty before proceeding towards the spiritual space (the prayer hall). From this point, the court of ablution was located in the centre of the courtyard where the axis of the gateway and the great porch, which contained the entrance to the prayer hall, intersected at right angle. In these gestures, the great porch acts as a symbol communicating the importance of the spiritual space.

Most of the local historians explain that the southwest *Eyvân* (porch) was due to creating the second courtyard of the mosque in order to contain more educational chambers and possibility of link to the Arg square similar to the other Iranian cities (Figure 5b). This can be observed from the small dimension of the entrance door and the southwest facade of the mosque, facing to the public thoroughfare, because it implies more an interior than an exterior façade.

6. RESIDENTIAL QUARTERS (MAHALLĀT)

As has been shown, the city of *Sanandaj* was formed and evolved from the concept of mound-cities which established the walls around the palaces and the ruling houses as the symbol of the *Khân's* authority. This diverged from the general pattern of quarter formation in Iranian cities, which was usually bound to the linear form of the bazaar as the backbone of the city, to a typical form of "self-centred" and self-contained" character in line with the *Khâns'* interests. To some extent, the centre of gravity of the city was based upon the source of power (*Qalâ*) instead of on the bazaar. Therefore, the course of the principal route was formed consistent with the centre of gravity being within the inner-*shâr* (*Miyân-qalâ*) leading from northeast (where a parade of troops usually accompanied the new *Wâli* and other Iranian authorities to the inner-*shâr* and then to the square in front of the *Qalâ*) to the southeast (where the summer house of *Wâli* was located on the slope of the *Âwear* Mountains) along which most of the quarters evolved and the bazaar was excluded and maintained as a point (instead of as a line) within the maze pattern of streets outside of the city walls. This orientation made the quarters centripetal cells of the city. Generally, such focused power (within which the political importance of place outweighed its economic importance) and the features of the city's geophysical settings (intermountain location) highlighted the concept of concentrated centre rather than that of the line.

In other words, the quarters were organised as a collection of villages which circled the nucleus of power in the form of satellite quarters according to their social backgrounds and professions (Figure 6). This partitioned the city into four main quarters so that the central part was occupied by the seat of power and ruling house (Miyân-qalâ) which formed the inner-city, the outer-city comprised the quarters of *Jawr-âwâ* to the north as the servants' quarter, *Mahalla-ye* bazaar (*Âqâ-zamân*) in the east as the location of the merchants (*Bazaaries*) and *Mahalla-*

ye Qatâr-chyân in the south as the place of muleteers (who transported the goods) (Figure 6). These four quarters embraced the core to supply the needs of the ruling class and what a medium size city needed to function. Each *Mahalla* was in turn divided into subsections which were also called *Mahalla*.

7. CONCLUSION

The perceived structure of the city to some extent shows a particular historical aspect which no other traditional Iranian city had shown during the Islamic period. In the perceived structure of the city, the court of Khân on the hilltop had priority in polarizing the spaces around, rather than the bazaar and the Jumaa mosque. This means that the quarters of commoners as a collection of villages circled the nucleus of power and were partitioned mostly based on the professions to build the third layer of city walls and to supply the needs of the ruling class and whatever else a medium sized city needed to function. This also affected the course of principal route was directed alongside the poles of power instead of the bazaar. The seclusion of the seat of power and the ruling class quarter from the city of commoners outlined the structure of the satellite quarters as each contained the element of Bazaarché and no direct line linked to the site of the bazaar. Therefore, as a founded city it can be recognized as an important built form which presents the Kurdish understanding of the environment.

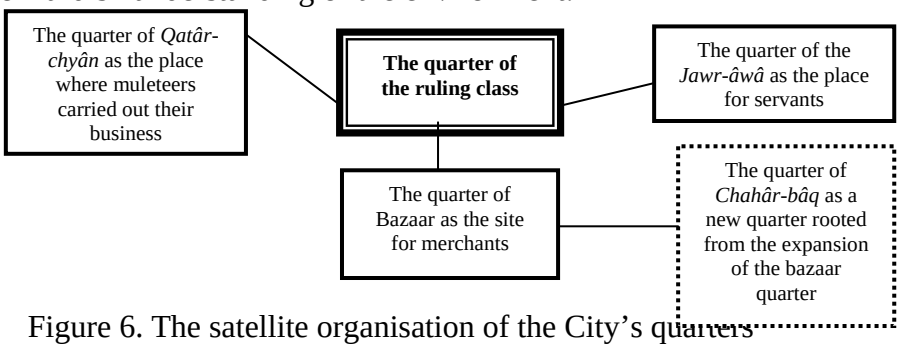

Figure 6. The satellite organisation of the City's quarters

Considering those ideas mentioned, it can be seen that the concept of the city structure was perceived in advance by its founders as a whole with the design principles serving the interests of Khâns/ruling class. This means that the concept of planned can be applied for the city of Sanandaj. The outcome of this review is that the historical site of Sanandaj has the potential for cultural resource-management plans, qualities that should be protected and enhanced. These findings will also be a useful base in recognizing the roots of urban form elements, and further research concerning the city's conservation plan.

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THE EFFECTS OF RELIGIOUS, CULTURAL AND ETHNIC IDENTITIES ON URBAN DEVELOPMENT OF FAMAGUSTA IN 14TH CENTURY

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ABSTRACT

After the arrival of crusaders, all the social, cultural and commercial relations changed in Eastern Mediterranean lands. One of the areas, influenced dramatically especially after 1190s, was Cyprus. Crusaders' reign was very late in Cyprus comparing with Syria-Palestine lands, however it was the longest. Being the last Crusaders' land, Cyprus benefited very much from the trade relations already settled in the region.

Famagusta, as the main port after the middle of 13th century and the second city after Nicosia in the island was the frontier city for all the refugees and merchants from the Holy Land and Western countries. The city gained its cosmopolitan character in a short while, especially after the loss of last lands in Holy Land in 1291. Various different Western and Eastern cultures came together with local population in Famagusta, and the small fishing town constructed fragmentally under the guidance of Lusignan kings of Cyprus. Papal ban on trade with Muslim ports and being a refuge for refugees were the main reasons for Famagusta to become an entrepot for Eastern Mediterranean trade with a commercial capacity close to that of Constantinople.

The aim of this study is to re-read Famagusta in 14th century in its inner borders and intercommunication areas. Borders formed by the religious, cultural, and ethnic diversities, will be studied in its location in city -reflecting the efficacy of each group-, in urban and architectural creation comprised (loggia, statione, fondici/ fondouk, volta, hospital, monastery and church), comparatively with the identical groups' political and social relations with the sovereignty and other groups. Historical documents, both written and visual, were used for the definition of the borders and zones in the city. For this aim various maps were produced, initiating the jurisdiction and activity areas, zones (political, military, commercial), physical characteristics and elements of the city.

1. RELIGOUS, CULTURAL AND ETHNIC GROUPS SETTLED IN FAMAGUSTA IN 14TH CENTURY

The process changing the fortune of Famagusta during the 3rd crusader has begun as a result of English King Richard the Lionheart's conquest of Cyprus in 1911 [1] and sale of Cyprus to Lusignans in 1192 [2]. Crusaders' reign was very late in Cyprus comparing with Syria-Palestine lands, however it was the longest.
Famagusta was a small and unimportant settlement at the beginning of 13th century, when it was passed to Lusignans. There was nothing else than a tower, a Latin bishopric, an Orthodox pilgrimage for the honour of St.Ephiphanus and famous tomb of St.Barnabas [3]. Pilgrim Count W. von Oldenburg's [4] notes on Famagusta in 1211 describes the city 'Hence we reached Famagusta, we saw a city built close to the sea, with a good harbour and slightly fortified'.

In 1291, the conditions were changed in favour of Famagusta, when the last Christian lands in Syria-Palestine were passed to Mamluks. Many leading families in Jerusalem had bought possessions in Cyprus as early as the 1240's, however many refugees immigrated there after the Muslim Conquest of Acre in 1291 [1]. Famagusta sprung up as a medieval fortress city of the first rank about the year 1300, when the refugees from Syria and Palestine were offered an asylum by the Lusignan King Henry II [5].

There emerged Western merchant nations like Genoese, Pisans, Venetians, Anconitains, Italians of south, Catalans, Proveçaux, military orders of Holy Land like Templar, Hospitalier, Benedictine, Cistercian, Franciscan monks, Augustinian, Premonstratensian canons, Franciscan, Dominican and Carmelite friars [6]. Many of the non-Latin inhabitants from the Christian ports in Syria like Chaldeons, Armenians, Gregorians, Nestorians, Jacobites and Copts who came to Cyprus also crowded into Famagusta. All these different cultures brought their cultural identities into the city. The ports of Cyprus have taken over the function of lost Syrian ports, and Famagusta became an important stop in Levantine trade [7].

The most flourishing period of Famagusta was from the last quarter of the 13th century, to the Genoese invasion of the town in 1373. In a period of nearly a century the limits of urban settlement of the town formed, the main piazza and the main axes emerged, the urban and private spaces settled. Cultural identifications took their part in this urban development, especially as religious edifices in different districts. The existence of 26 churches/ruins of churches, mostly built between the years of 1300-1400 [3], and 30 lost religious buildings mentioned in historical documents are interesting in showing the ethnic and religious diversity of a town of this size.

Improving the defence and commercial privileges are the consequences of economic and demographic development of Famagusta rather than the causes of its prosperity [8]. Although, the superiority of Famagusta Port is the main reason for its preference and development, there are some other important reasons like large concentration of population from the Levant before 1291 and their trade

activities in Famagusta [8], its closeness to old Frank settlements in Syria-Palastine and Ayas, the port city of Cilician kingdom of Lesser Armenia [8] and the papal boycott imposed on trade with Muslim countries, a ten year ban on all trade with the lands of the Mamluk Sultanate. In the 1330's and early 1340's, Famagusta's commerce would appear to have remained buoyant. The evidence for the Venetian state galleys in this period shows that the numbers of ships and the level of investment on the Famagusta route were only slightly less than on the rote of Constantinople [1]. Custom taxes paid, described as commerc [9], in Famagusta Port became the foremost income for the city and the kingdom. There are two important functions that the city gained as a border between Christian and Moslem orders during this period: city refuge and customs centre [9]. Famagusta preserved its characteristics as a border city until the end of 14th century.

2. THE EFFICACY OF DIFFERENT RELIGOUS, CULTURAL AND ETHNIC GROUPS IN FAMAGUSTA

Commercial privileges were given to merchant cities. Genoese, having colonies in Pera, Chios and Caffa and counters of circumference of Black Sea, Cilicia and Alexandria, attested their first privileges in 1218, increased in 1232 [10]. Other merchant nations in Eastern Mediterranean than Venice and Genoa also obtained commercial privileges in the island including Pisans, Anconitains, Italians of south, Catalans, Proveçaux [11].

Although, the registers of Genoese notaries Lamberto di Sambuceto and Giovanni de Rocha between the years of 1296-1310 are mostly about Genoese population, they also supply an important profile of the ethnic composition of the period. From 3008 names in notarial acts from 1296-1310, 865 Genoese, 501 Ligurians, 615 Italians, 506 not Italians were indicated out of 2487 names with an ethnic origin remark [11]. Greeks and Jews do not appear in this composition which includes numerous and active Florentins, Pisans, Languedociens and Catalans [11]. Genoese community of Famagusta, which is the main group in notarial acts, more consists of temporary migrants than residents of Cyprus. A small number of them are called 'habitataores' or 'burgenses' of Famagusta in comparison with the long list of the citizens of Genoa [11]. There are also family names of aristocrat Genoese in records [11]. From the notarial acts of Lamberto di Sambuceto and Giovanni de Rocha, origins of 210 people from 3008 are identifiable and they are Acre (66), Tripoli (27), Gibelet (21), Tyr (17), also Beirut, Tortosa, Botron [9]. Moreover, documents on Franks, Syrians, Armenians and Armenian, Nestorian, Jacobite and Maronite Churches also exist [9].

'Suriens', Arabic speaking Christians, came to play a major part in Famagusta's rise as a commercial centre at this period [1]. They had advantage of language and local relations in trade with Syria-Palestine ports. Suriens had their own churches and a court 'Cour des Suriens' for their legal problems [12].

Greeks were prohibited to take place in ‘Cour des Bourgeoisie’ or ‘Cour des Suriens’ in 13th century [12]. In 1220’s the Greek bishops in Cyprus, reduced in number from fourteen to four [6] and Greek bishops were banished from their sees to remote country villages. For example, Greek bishop of Famagusta was sent to the east, to the Kizokarpaso. The church’s intolerance was one factor; another was the sophisticated feudal system which the crusaders brought with them [13]. Greeks have not been able to improve their social conditions before the end of 14th century through Latinization. [14].

3. THE LOCATION OF DIFFERENT RELIGIOUS, CULTURAL AND ETHNIC GROUPS THROUGH THEIR EFFICACY AND RELATIONS WITH THE URBAN FUNCTIONS

Famagusta in 14th century can be defined as intercommunication areas for different identities like the main piazza, the main axis ‘Decumanus’ from ‘porta di limisso’ to ‘porta di mare’ passing through the main piazza, and the port area with all its utilities like ‘commerzium’, ‘fish market’, ‘loggias’, and ‘arsenal’. On the other hand, there are identical areas separated according to national, social and cultural diversities.

There are two different sources used for the definition of Latin Period districts: Location of the existing churches and Gibellino engraving of 1571 (Figure: 1). The main communities in Famagusta after 1291 can be described as Latins, (Italians, Franks and Catalans), Eastern Christians (Nestorians, Maronites, Syrian Jacobites, Copts and Armenians), native Greeks and Jews. The zones of different ethnic and religious groups can be found out from the styles, names and historical documents of Latin Period churches in Famagusta.

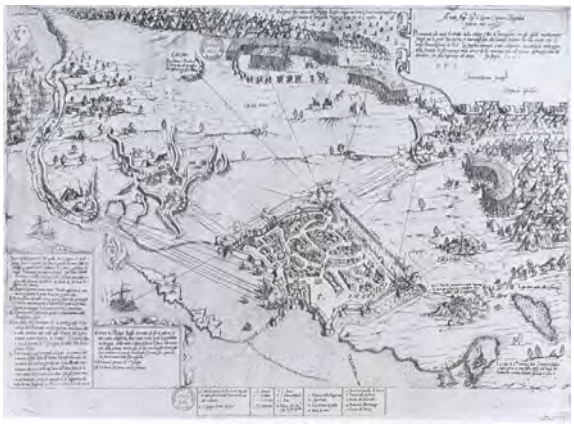

Figure 1. S. Gibellino engraving, ritratto della celebre di Famagosta, 1571 [15]

Although there were no castles or inner walls for Crusader nations as in the Holy Land cities, Westerners, all supported by commercial privileges, were doubtlessly the favoured ones in the diversion of the city. They had their churches, monasteries and hospitals in this zone, besides their residences. The

churches of the Westerners, besides being scattered throughout the city, are mostly located around ‘Decumanus’ and main piazza which is the politic/military and commercial center (Figure: 2). On the east and north sides of the piazza, there exists St.Nicholas Church, St. George the Latins Church, St. Francis Church, St. Antoine Church, and St. Dominic Church, the most important churches of Latins. The location of palace and loggias, established along the port, then on an axis from the piazza to north-west, shows the approximate location of Western communities (Figure: 3). Through the definition of the Latins’ zone, it can be considered that they were settled around the most important economic, politic focal points namely Palace, Land Gate, Sea Gate, piazzas next to gates, Main Piazza, Port, Customs and commercial axis from Main Piazza to Sea Gate. The commercial, civic and religious buildings like stationes (shop), fondicis/fondouks (bazaar), voltas (depot), hospitals and monasteries, described in notary records/historical documents were also mostly located in this zone

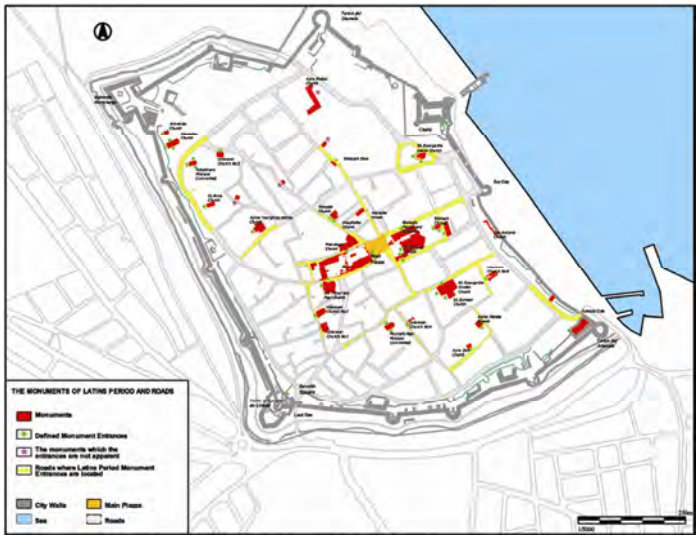

Figure 2. The Monuments of Latins Period and Roads

Eastern Christians, second efficacious group in the city, had their zone within the city close to Latins and commercial centre in the west of the city. As they had an important role in international trade, they were very close to port and commercial activities. They also had their churches, established by various Oriental ethnic and religious groups in their zone. The Churches of Eastern Christians were located between Land Gate and Martinengo Bastion (Tophane Tabya). SS. Peter and Paul Church (Figure: 3), the biggest and most important church of this group is near the Palace and Piazza, on the border of Latins’ zone. The other important churches of this group were Ayios Yeorghios Xorinos (Nestorian) Church and Armenian (St. Mary) Church. Tabakhane Mosque, Unidentified Church No: 3 are the churches that the original names are unknown and have oriental influences and located in this area.

Figure 3. Zones of Famagusta in Latins Period

Third group, consisting of native Greeks, was settled on south-east of the city close to arsenal and farther than the commercial centre, port and the gates, which forms the spine of the city (Figure: 3). This area is seen to be the least dense area in Gibellino engraving of 1571 (Figure: 1), other historical maps and illustrations. St. George of the Greeks Church, the major church of the Greeks is on the south border of Latins' zone. Greeks used to worship in smaller churches before the construction of St. George the Greeks in the middle of 14th century in their district (Figure: 3) in spite of their crowdedness [3]. Ayios Nicolas Church, Ayia Zoni Church, St. Symeon Church and Mustafa Paşa Mosque carries the influences of Byzantine and traditional Cypriot Greek Church.

Jews, who were to increase in number afterwards in Venetian Period, occupied south-west of the city on an important location, next to the Land Gate. Although, there does not exist any physical evident of the Jewish district, the historical documents show the existence of Jews on the southwest of the city. Jewish Elias of Pesaro, who visited city in 1563, mentioned about 25 Jewish families and a synagogue [4]. However, registration of only 6 married and 1 single Jews in the census of 1572, scattered in the city [16], shows a dramatically decrease in 10 years. B. Arbel [17] stated that Jews have been banished by Venetians from the city for the excuse of their possible help to Ottomans during the siege. B. Arbel, leaning on 'next to the Land Gate' description for the Jewish District in Venetian correspondences and the '*zuecha*' word probably meaning '*giudecca*' in Gibellino engraving, proposed that the Jewish community have settled between Land Gate and Cavalier de Santa Nappa [17] (Figure: 3). This thesis is supported by various evidences: the name of the hill '*Colle degli Hebrei*' across this region in 1571 Gibellino engraving (Figure: 1), the names used for Cavalier de Santa Nappa in Genoese registers [18] as *T.Judaice* and in the military map of 1560's, published by F. Frigerio, as *Torio della Zudecha* [19].

Some areas could be identified through Gibellino engraving. The indication '*toro di trer al palio'* on the north-east area of the town (Figure: 1) leaded the definition of this area as 'Palio Area', apparently used for military exercises (Figure: 3). The empty area between city walls and built area on the north-west, crowded by soldier groups on the gravure (Fig.1) and empty on the Sanmicheli Model (Figure: 4), was probably allocated for military exercises at peace and for military circulation at war times. This finding is also supported by the general characteristics of north area and '*Torio dei Cavaler'* (Chevalier Bastion) name of the tower [19], next to this area. The area around Arsenal, giving its name to the bastion and the gate next to it, is named as 'Asenal Area' after G. Mariti's definition of 'Arsenal District' for the area in his siege notes [20].

Figure 4. G. Sanmicheli Model (1x1.5 m), 1548-58 Venetian Maritime Museum

Different cultural, ethnic and religious groups had come together in Famagusta in 14th century and get involved in the present intercultural relations of the city. They had to face and contact, had to learn each others language and culture, and had to adopt the conditions of the city. The intercultural relations between these identical groups, their efficacy and their relations with the urban functions can be easily perceived in their architectural heritage and location in urban pattern.

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AN ANALYTICAL APPROACH FOR THE ASSESSMENT OF NEW EXTERIOR ADDITIONS TO HISTORIC BUILDINGS

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ABSTRACT

Intervention within the architectural heritage is one of the inevitable approaches in architectural conservation in order to adapt the historic buildings to the changing contemporary conditions. Considered as major interventions, introduction of new exterior additions to historic buildings may appear to be acceptable, especially when the demands of new conditions require extra space. In practice, the standards guiding interventions and new additions are determined by legislations of each country most of which have been developed on the basis of international charters regarding architectural conservation.

However, it is observed that such regulations may result in unappreciated examples, as the interpretation of the architect is still one of the basic criteria directing the state of the building after restoration. This study is structured as an alternating approach to the dilemma of either putting forward strict rules or simple guides in order to direct the design of any new addition. Therefore, the aim is not to direct the architect through providing a set of rules, but to help invoke the criteria that may form a basis for design decisions through the analysis and evaluation of actual examples. The study is expected to be helpful for the architects in the establishment of a relation between the historic building and the contemporary addition by proposing an assessment method applied on example buildings with additions.

1. INTRODUCTION

Designing a new addition is discussed much due to its nature to cause dilemmas. One of the dilemmas relates to the limits of the intervention: Considering the characteristics of the structure, which renders it worth to be protected, it is

requested to keep interventions at minimum in order not to cause loss in values. On the other hand, it is expected that the structure should meet at least the resources allocated for its restoration and even bring more than the spent resource. Whereas, meeting these expectations requires greater interventions. Especially, the public buildings in city centres are exposed to large-scale interventions. If such a historic building keeps its functional continuity, it will inevitably be exposed to greater interventions in order to meet the increasing demands or to meet the requirements of any new function, which will provide more income. Another dilemma that can be shown as a reason for debates about the interventions is that the intervention is new in any scale. This causes the dilemma of establishing the appropriate relation of traditional-contemporary language.This study began as a survey of different attitudes and especially contemporary architectural approaches towards the historic buildings facing the above-mentioned dilemmas.

As historic buildings are progressively coming under the threat of inappropriate interventions in Turkey, the related regulations determining the type and range of interventions have been changed frequently to find out the recipe for the acceptable approach for interventions. Infact, the acceptable approach by means of conservation is that the new addition can be both separated from the historical structure and should be in harmony. Nevertheless, it is not quite possible to formulate the architectural characteristics of the additions and to form an architectural guide. In this study, the hypothesis is that the design of a new addition can be stimulated through the analysis and assessment of completed projects. Case study examples are provided to point out acceptable and unacceptable preservation approaches where new use requirements were met through construction of an exterior addition. These examples are included to suggest ways that change to historic buildings can be sensitively accomplished, not to provide in-depth project analyses or endorse particular architectural design.

The suggested method is exemplified on six public buildings from İzmir: Alsancak Public Hospital, Usakizade Mansion, Konak Public Hospital, Alsancak Train Station, School for Deaf and Blind and Pasaport Quay. Among them School for Deaf and Blind is presented in this paper. The studied buildings have been intervened on the basis of a restoration project, which fulfilled the requirements of the commissions having the right to decide or comment on the application of the restoration criteria. According to the type of addition, new exterior additions that exceed the building site, either adjacent or connected to the mass of the historic building were chosen. The analysis of example buildings are presented on tables and followed by written assessment.

2. INQUIRY OF NEW EXTERIOR ADDITIONS TO HISTORIC BUILDINGS

When the subject of new exterior additions is introduced, the possibility of destroying both the building’s significant characteristics and the historic character

of the environment arises. To avoid destruction or inappropriate results the main restoration approach should be based on an exhaustive study of the architectural heritage which enables a differentiation between the fundamental elements and linking these elements at the physical, spatial and functional levels. Thus, in the comprehensive process a detailed documentation and examination of the actual state and the study of the historical evolution of the building is necessary. The creative approach and design constitutes the third phase of the restoration process that follows documentation and restitution. The assessment of existing building and its context bears importance since the creative process differs in each case and in each context which forms the way of joining old to new [1].

On the other hand, the practical assessment inevitably allows for a certain degree of subjectivity and relativity. In order to make it as objective as possible, some criteria must be respected. Therefore, together with the architectural characteristics, the values that make the building an historic heritage and that are inevitably necessary to preserve should also be clearly defined. In the following two headings the aspects considered in the analysis of a historic building and the features forming the architectural character will be discussed. The data gathered will be used to develop the criteria for the assessment of the relationship between the historic building and new addition.

2.1. Analysis of Historical Buildings

As the starting point of conservation studies is based on the definition of the significance of the heritage, while designing a new addition, the significance of the building should clearly be defined. Such a statement will prevent the false attitude which may interfere with the aspects to be protected in a building. An architectural product gains importance through the values society perceives to be expressed by that edifice, which may change in time, and due to the significance it gains, its protection and conservation as an architectural heritage becomes a must. In the past, the importance was given to an architectural product if it was a major monument embracing reflections of religious or political power. Today, the approach is to perceive the architectural edifice as a medium reflecting the cultural, social and spiritual features of a changing society.

Regarding these tangible and intangible values of an architectural edifice, the analysis considers a building's merit in five sets of criteria. The following criteria have been developed for the building’s values attributed due to its degree of: architectural importance, historical importance, contextual importance, authentic importance, contemporary importance.

2.2. Analysis of New Exterior Additions to Historic Buildings

In any analysis of an architectural edifice, various factors as forces directing the evidence of architecture should be regarded in relation to two sets of conditions; on the one hand buildings must respond to fundamental issues such as the need for shelter and for ideas to be symbolized, on the other hand, they must relate to a region, to a specific location, to topography, to climate and to the movement of

people. This intrinsic link is evident in the origin of architecture which belongs to the satisfaction of the basic needs of man [2]. All these concrete and abstract terms that a building includes, form its architectural character which are explained under following topics:

Environmental relations: The basic physical characteristics of the surrounding buildings such as height and function are considered. The location of the building in the city, its perception from the main roads, its accessibility is the criteria for analysis of an historic building before and after a new addition.

Building-lot relations: As most of the exterior additions are constructed horizontally to the historic building either attached or detached, they particularly interfere with the relation of the building with its own lot. Building-lot relations may reside in the number of buildings in the lot, building order, location of buildings in the boundaries of the lot, orientation or specific location of buildings among each other, and use of open-space.

Mass relations: Massing is one of the more significant factors that contribute to establishing the character of a specific building, because the eye tends to complete any eroded or distorted articulated form to its simple geometrical form: a cube, a rectilinear box, a horizontal cylinder etc. Thus, if the mass is considered as a geometrical object, its architectural form will become the fundamental expression in its original state. Then the form is organized and articulated to satisfy the functional demands of the programme [3]. The analysis of mass includes form of the building, its height, its proportions, type of superstructure and its structural system.

Façades: Façade analysis of the example buildings included in this study is based on the analysis of façade composition and separate analysis of each component. The components, such as window, door, roof etc. are different in their forms, materials and colours according to the functional and structural requirements and materials used in their production. The components of the façade are analysed regarding their number, placement, form, proportions, divisions, units, type, material, surface material and ornaments. On the other hand, the composition is the language binding the components to the whole, while providing each component individually recognisable [3]. The arrangement of windows and doors in a regular and repetitive manner across the front of a building establishes the façade order which includes proportions, main axis, and ratio of solid and glazed surfaces. Superstructure is another feature of façade and it is analysed according to the type of slope and material. For the exterior analysis of a building, the choice of surface materials on new additions is important because of its high visibility. Exterior surface finishes provide colour to buildings depending on the materials used. Stucco, stone or wood, as well as paint or stain that covers a material's natural colour can add visual interest to a new addition.

The criteria for the analysis of new exterior additions to historic buildings are presented in the following on one of the example buildings (Figure: 1).

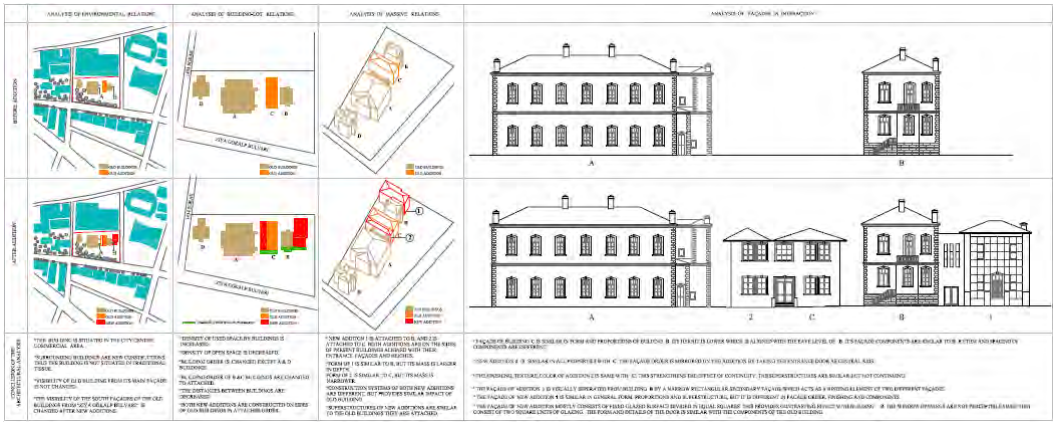

Figure 1. Analysis of School for the Deaf and Blind [4].

3. ASSESSMENT OF INTERVENTIONS

The interpretation of data gathered from the analysis of sample buildings forms the base for the assessment process which is exemplified below on School for the Deaf and Blind [4]. Constructed in 1880's the building functioned as the English Hospital until the Republic Period, when the School for the Deaf and Blind had moved into this building. Today, the building complex serves as the High School for Tourism.

Assessment of environmental relations: Considering the neighbour buildings, the old school is lower in height and has low area usage density. The main entrance to the building plot is from the west side facing the street, but the orientation of the main building is towards the north. It is possibly because the entrance to the site was from the north, when it was built. The orientation of new addition is towards west with reference to current entrance to the plot. The large open space provides a green area among the dense built-up neighbourhood in the city centre. With the introduction of new addition;

-the perception of the historic building from the street is not disturbed.

-the distinguishing effect of the building as a green and low dense area among the high dense environment is not destroyed.

Assessment of building-lot relations: There are two buildings on the lot; the main school building A, and the secondary building B, which was used as an administration office. The main building was constructed on the north side of the lot with an old addition on its south. It is situated in a large garden, which acts as a separation element from the high-rise new constructions around. With the introduction of new addition:

-the regular pattern of the old building complex in height is continued.

-the building order is destroyed; the new addition is attached to old building.

-although the use and placement of open spaces is respected, the distance between the buildings is reduced.

-the area covered by buildings is increased, thus the amount of green area is decreased.
-the use of the main building and the functional distribution among the blocks is continued.

Assessment of mass relations: The generic form of the mass of main building is a hallowed cube; it is a two-storey building consisted of cells arranged around a courtyard. The square planned courtyard was later closed by an iron and glass shelter. The secondary building B has a rectangular prismatic form and it is smaller than the main building. The new addition was constructed adjacent to B due to the need for additional space. With the introduction of new addition:
-similar formed masses are used and the new addition is designed lower than the old building.
-masses are articulated by similar super structures and the construction system of new addition is designed as concrete skeleton system in order to provide similar appearance with masonry.
-the masses are differentiated by the articulation of façades.

Assessment of façades: The entrance façade of the main building and the new addition are not facing each other and front façades comprise a silhouette. The problem of establishing harmony in between the old building and the new addition can be understood by the examination of proposals for the addition to B. The proposals of the architect show that it is difficult to balance the harmony and differentiation at the same time.

Figure 2. The first proposal for the new addition.
(Source: İzmir 1st Numbered Regional Council for Immovable Cultural and Natural Properties)

Concerning the relation of two façades, in the first proposal, the façade order and façade components of the new addition are similar to the old building's (Figure: 2). The articulations of historic components are eliminated for abstraction. As respect to historic building, the dimension of the new mass is reduced and a small connection part is designed in between the old building and the new one, which also serves as an interior corridor between the two buildings.

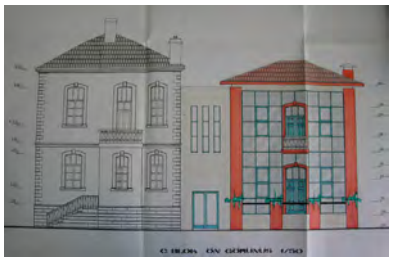

Figure 3. The second proposal for the new addition.
(Source: İzmir 1st Numbered Regional Council for Immovable Cultural and Natural Properties)

In the second proposal the connection part is enlarged and the façade of the new addition is rearranged to look more "contemporary" (Figure: 3). However, the historic details, which are designed in order to establish a harmony with the old building, are exaggerated and false selections. Thus, the end product resulted in a maladjusted new addition: neither a good imitation, nor a contemporary design (Figure: 4).

Figure 4. Existing situation of the building. The new addition is on the right end.

4. CONCLUSIONS

From the assessments of examples it is concluded that the approach of architects for new additions tends to create "harmony" through "similarity" in general, and architects tend to use "difference" to make the new addition "distinguishable" from the original. This kind of approach was observed in the additions of all examples except Passport Quay, which is totally contrasting with the historic building. In all other examples the similarity and abstraction is used in different aspects of new design.

When the examples are evaluated in relation with the appropriateness of the new addition and the legal regulations directing their design, it is concluded that the existing evaluation methods for the value assessment of historic buildings should be developed and detailed regarding the relation in between the architectural character and historic values of the building. Thus, the potential to damage and destroy significant historic material and features and the possibility of

changing the historic character may be reduced. Besides, the methodology of historic building registration and determination of interventions with in the building should be revised, since the historic character of each building may differ.

An equally important consideration is to provide proper explanations for the terminology used in regulations, such as “harmony” which may be understood as “to preserve the building’s historic character”, as observed from the examples. However, in an acceptable approach, a new addition should make a distinction from the old in order not to cause falsification while it should establish its own language and should bear a contemporary identity. The features of the historical structure, which can be reference to the new design, are its own architectural characteristics and the values that make it worth protection. Thus, it is defended that they should not go beyond being the references.

As offering a receipt regarding how the new design will be is trying to destroy the creativity of the architect, this study is thought to be helpful as a clear and consistent guidance for professionals who are responsible for the resolving of ethical priorities and values concerned with conservation. With reference to the assessment method developed in this study, it is possible to derive the issues to be taken into consideration both in determination of the limits of an intervention and in succeeding design decisions for additions. Thus, this study may be helpful for the architects in two manners: by proposing a method for criticizing and evaluating the existing new additions to historic buildings and by forming a basis supporting the decision of approach for the new additions during the design process.

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TRANSFORMATIONS THROUGH HISTORY: THE MARKOU WATERMILL IN VERIA (GREECE) AND ITS CONVERSION TO BYZANTINE MUSEUM

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ABSTRACT

This paper is focused on the methodology adopted at the conservation project for the conversion of a watermill to a museum. The different stages of the project are presented with emphasis to the historic documentation. This documentation was critical during the whole process of the planning in the effort to succeed a balance between the old fabric and the new use. The different parameters of the building and its environment and their connection to planning decisions are presented, in an endeavor to show that by highlighting the values of a historic building and its surroundings, as defined through the historic documentation, interesting solutions can be achieved from the preservation and the architectural point of view.

1. INTRODUCTION

Adaptation of historic buildings to new uses is a necessary procedure for their preservation in time. Different approaches are observed at an international level, relevant to the alterations made for their reuse. The complete respect to the fabric with minimum alterations on one hand and facadism on the other, define the borders between which these approaches are fluctuated.

Detailed documentation of the building and its history is the necessary procedure in order to define the values of the building and determine the possibilities of alterations. Especially history, when dealing with buildings without obvious significance, is proved a precious methodological tool during the whole process of the conservation project. This procedure is described through a case study which regards the conversion of a watermill to Byzantine museum.

2. CREATION OF BYZANTINE MUSEUM IN VERIA

Veria is the capital city of the Prefecture of Imathia, which is located in the northern borders of Greece. Possessing a strategic position on the axis of Egnatia road, very close to ancient Aege (Vergina), the first capital of the Macedonian Kingdom, it appeared in historical texts first in the 5th century BC, it grew rapidly and kept its importance through time. The material evidence of its past is rich, and especially of the Byzantine period. A large collection of mosaics, dated mainly from the 5th century AD, a well known collection of approximately 500 Byzantine icons, sculpture from different periods, ceramics, religious books and metal-works, as well as 45 churches with frescos, the oldest dated from the 11th century, reveal the level of civilization developed.

Ministry of Culture, in order to highlight the rich heritage of the period, decided to create a Byzantine museum in the city. The conversion and reuse of the abandoned watermill of Markou appeared to be a privileged choice. Its position, at the borders of the old city and very close to the centre of the town, its size and space, convenient for a museum use on one hand, the opportunity for the preservation of an industrial building, through a new use, on the other, were these privileges and the reasons for this choice.

It is worth mentioning that Veria, by the end of 19th century, developed a strong industry exploiting the power of the waters of the river Tripotamos and of a torrent that determined the west and southeast borders of the old town. Previously, water-driven pre-industrial installations were operating across them. A number of pre-industrial and industrial buildings are now abandoned, others in fairly good condition and others in ruins. In the last decades, there is a concern of the State and the Local Authorities on their protection and reuse.

Figure 1. The watermill before the restoration works

Figure 2. The internal space before the restoration works

3. METHODOLOGY OF CONSERVATION PLAN

The image of the building in 1991, when the conservation plan started, was disappointing (Figure: 1). It was burnt in 1981 and what were left from it were the external walls and a metal construction of columns and beams, badly distorted.

Therefore, the range of choices for its conversion and reuse was large, as the authentic structure was deeply injured.

In order to understand and define the values of the building, necessary procedure for the conservation plan, a research was carried out where varied factors were examined with emphasis to historic analysis. Within this frame, it was examined the ownership and the owners themselves, the architectural plans the possible engineers involved, and the resemblance to other buildings of the period, the construction and possible information about the constructor, the origins of the building materials and the equipment and the importance of the building in the area concerning its function, its construction and possible renovations. Furthermore, research was carried out about its current state of preservation, the foundation soil and the characteristics of the environmental space. The results of this research determined the decisions and the scheme of the conservation plan.

4. HISTORICAL AND ARCHITECTURAL ANALYSIS

The initial owner of the mill was Stergios Markou, a doctor, with strong connections abroad. A land owner, also, he built the mill in order to grind the wheat he collected from the tithe. He, himself, was not much involved with its function, as he became very soon the mayor of the town. After his death, the mill passed to his descendants who operated it until the 1960s, when it was abandoned. In 1980s, Ministry of Culture expropriated the building in order to convert it to the Byzantine museum.

The construction of the building started in 1908 and was completed in 1911. All its equipment was imported from abroad and was working with water-power. In that period, it was the first time that cylinders, instead of millstones, were used in the area for grinding, an innovation that gave possibilities for the production of different types of flour. The region of range of the mill was large.

It was a four-storey building, at a rectangular ground plan. The architectural drawings were owed to two German engineers who visited the area for this purpose. The whole construction was of a high quality, by stonewalls and timber floors and roof, plain, with minimal decorative elements, where the traditional patterns were followed with some additions, typical to the industrial buildings of the period. These additions were the use of bricks at the arches, the carefully carved corner-stones and the metal windows and doors. Moreover, it was the first time in the broader area that iron was used as a building material. An iron construction of columns and beams was positioned in the middle, across the long side of the rectangular ground plan, in order to support, together with the stone walls, the timber beams of the floors. Rings of iron plates, embedded in the stone walls, were used for tightening the walls, while iron plates connected the timber beams to the iron rings. Finally, iron plates were used to form the lintels of the openings. The iron and the timber elements of the structure were imported from

Europe. A comparative study to flour mills in Greece and abroad showed many similarities and influences.

The constructor was a moving "compania" of technicians with various skills, who built many buildings in the area, coming from Lehovo, a mountainous village in west Macedonia.

Concerning the environmental space, behind the mill, parts of the walls of the fortification of the town, including a tower, are preserved and on top old houses and a mosque, all dating from the 19th century. At the east corner of its ground another building is preserved, where taxes was paid to enter the town. Behind the walls parts of the old town are preserved in good condition. At the mill's south side, the waters of the torrent that provided movement to the industrial installations developed across it are nowadays conveyed underground at the borders of the town and a road was constructed at its position. This road has an inclination that gives a hypsometrical difference of approximately 4m at the two edges of the ground of the mill.

5. STATE OF PRESERVATION

Due to the fire of 1981, all timber work was demolished and the iron construction was badly distorted, causing serious cracks to the two narrow walls to which it was connected with. In 1993, when the conservation project started, the condition of the mill was still stable, though exposed to adverse weather conditions. This fact proved a very good quality of structure. However, research works on site and in the laboratory were carried out to get further information about the condition of the fabric and the foundation soil. Borings at a depth of approximately 15m proved that the soil was of porous rock and that there were not underground waters. Test trial sections on the ground, next to the foundations showed that they were built with iron stones, a solid construction, their depth varied, to reach the rock, and a solid mortar was used at the bottom where they were seated. Core drilling and mechanical tests in the laboratory, together with hammer tests and mortar analysis gave information about the mechanical properties of masonries. All the information gathered and examined was very encouraging for the whole condition of the existing fabric.

Though the internal space was demolished by the fire, traces on the walls and the distorted iron element, together with old photographs, gave evidence about its initial form and construction (Figure: 2). This evidence made possible reliable reconstruction drawings, valuable to the conservation plan for its restoration and reuse.

6. VALUES AND CONSERVATION PROJECT

Historic documentation proved that the building was unique in the area. The introduction of iron as a building material was an innovation, as well as some of the construction details. Innovating was also its equipment that gave many possibilities at the production of flour. The whole quality of the structure was

exceptional. The collaboration with foreign engineers, as well as the import of building materials and equipment was not a usual practice in the area. The mill played an important role in a wide geographical area. Furthermore, its owner was a public person and the “compania” known at the time for the number of buildings they built in a large region. Finally, the building is located in an area where different aspects of the history of the city are revealed.

The values of the building, together with the reliable reconstruction drawings, lead to the decision to rebuild the carrying system of the construction, in simpler form and details, so that at short distance the contemporary of the construction is distinguished (Figure: 3). In that way the material evidence of the innovating technology of the period is preserved and highlighted. Small parts of the original iron construction are displayed at the courtyard of the museum.

Figure 3 Reconstruction of metal carrying system, timber floors and roof

Figure 4 The construction of a basement in the mill

The equipment of the mill was all destroyed by the fire. The only evidence by its operation by using hydro-power was a detail on the wall that shows the entrance of the pivot that gave movement to the machines. This detail was preserved and is displayed.

The internal space was left plain, as used to be, taking the use of exhibition areas. Moreover, this choice permits the audiences to get to know the museum contents and the building itself. Timber beams were reconstructed in the same size and position, while double timber floors were used, placing shock-absorbing materials and installations in between. New windows were also made in the same form and materials, but double panes were used for heat insulation reasons.

The information about the structure of the roof was not adequate. Therefore, a timber roof was built in modern form and technology. Similarly, the position and geometry of the staircase was not clarified. A modern staircase was designed in relation to an elevator that was introduced. Generally, all new additions were designed in modern forms to be distinguished from the original form and structure of the building.

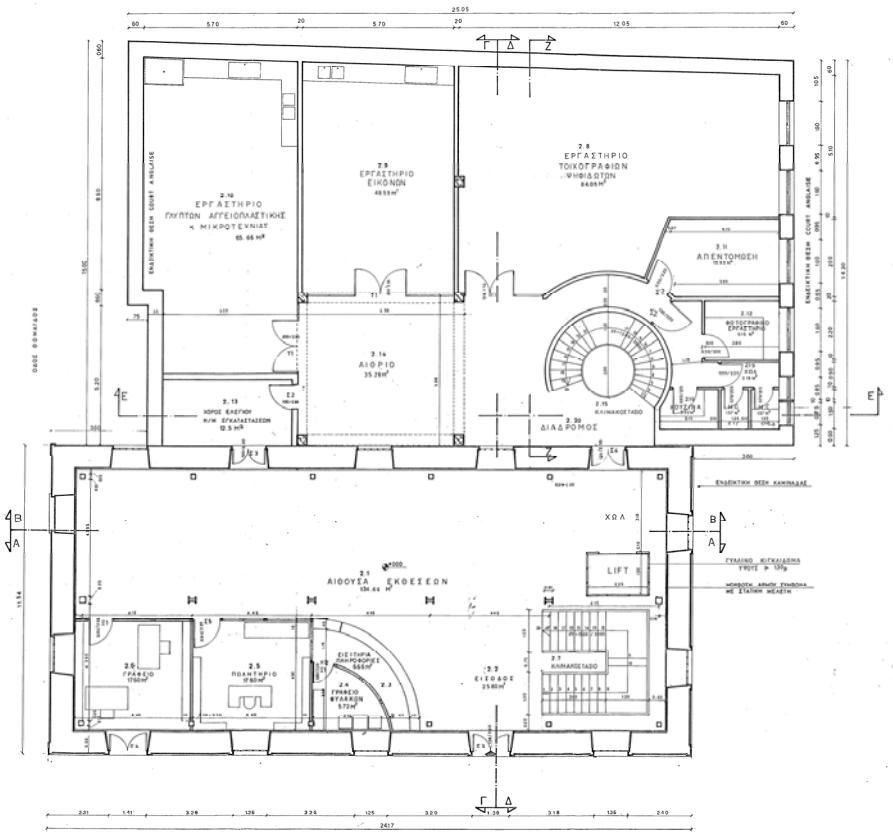

Figure 5 Ground plan

The size of the mill was not enough to house the additional functions of a museum, such as laboratories, training rooms, storerooms, offices, boilers, etc. To face this necessity, the building was extended to new constructions. Taking advantage of the inclination of the ground, a new building was inserted on a level with the ground, invisible from the road side due to this inclination, with a two-storey basement (Figure: 5). This building was built in touch with the mill at the position of two later storehouses of minor importance. The visible part of the façade at this level was kept visible by positioning a covered atrium. The laboratories were located at the ground level of the extension. The visitors, through windows of the mill, have the image of the laboratories. A basement was also added under the mill for multiple uses, such as, temporal exhibitions and training programs. The construction of these extensions was based on advanced technology (Figure: 4), to ensure the safeguard of the old building and to be clearly differentiated from the old construction. Finally an external staircase was added to the mill for security reasons. This staircase, as well as the roof of the atrium, the only actually visible parts of the extensions, was constructed by iron and glass to match the building materials of the mill (Figure: 7). Furthermore, the use of glass permitted the view of the city walls at this position, behind it. The

whole idea at the design of the extensions was to be as unobtrusive as possible, so that not only the industrial building but the whole site are not disturbed.

Figure 6 The transformed mill to a museum

Figure 7 The external staircases and the roof of the atrium

Figure 8 Ground floor, after the restoration works

7. EXHIBITION AREAS

The internal space of the mill, after the restoration works, was imposing (Figure: 8). Therefore, the exhibition design had additional difficulties. It should respond to the demands of a museum exhibition where the focus is on the exhibits, to the display of the building itself as a reminder of the later history of the city and to the museology study, which entailed the division of the space. The aim of the plan was to get on a balance with different levels of view. The exhibits should gather the concentration of the visitor, so planning should focus on them, highlighting their importance and the scenario of the museology study. At a second level, the visitor should have the image of the internal space of the old factory, after its restoration. Therefore, all the constructions for the division of the space should have the minimal dimensions to correspond to their role. At a third level, the constructions themselves and all exhibition equipment should be elegant, equivalent to the qualities of the building and the excellent art of the exhibits.

Within this frame, all the partitions were plain, following clear geometrical forms, creating slots between them to leave fragmentary views, at a limited

number, the necessary one to define units, with maximum height 2,20m. Double face icons were supported by simple metal stands, while show cases have minimal dimensions and simple forms. In addition, a glass corridor was positioned over a part of a mosaic to permit its view. Glass, iron, mortar or smooth plasters were used to fit to the building materials of the museum (Figures: 9, 10). The final result, according to public and experts opinion was quite successful, accomplishing the aims of the architectural plans [1].

Figure 9 Exhibition area

Figure 10 Exhibition area

8. CONCLUSIONS

The values of the mill of Markou, as it was preserved after the fire, were not obvious. Therefore, a conservation project for its reuse, without the detailed and systematic historic documentation, could lead to quite different decisions and part of its meanings could be lost forever. The creation of a new building within it, irrelevant to its initial form and construction and the preservation only of the facades, a common practice when dealing with historic buildings of the late periods, could lead to attractive solutions, solutions however that wouldn't make the internal space differ from that in a contemporary construction. It was proved that history was a strong tool for transforming the historic building to accommodate its new use and a means of inspiration for the creation of a different space, where past and present live together in harmony.

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INTERVENING IN THE PAST

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ABSTRACT

Most of us would agree with William Morris that the great buildings of the past *'do not belong to us only; they have belonged to our forefathers and will belong to our descendants unless we play them false. They are not in any sense our property, to do as we like with.' We are only trustees for those who come after us'*.

This paper seeks to examine various intervention, restoration and preservation techniques and methodology practiced in England today, while exploring the range of conservation philosophies and architectural responses that have characterised conservation in England. Through the case study of a luxury hotel development within group(s) of listed buildings, in the heart of the city centre this paper aims to focus attention upon some of the principal issues confronting historic buildings & their setting, namely, economic pressures, difficulties in providing appropriate uses, decay and its prevention, tourism, and traffic, new interventions and design difficulties in adaptation.

Powey in 1929 said, '*that it is not wise to lay down dogmatic rules, for when they are made one is apt to be confronted by a case where they do not work.* Although Powey's advice related to techniques of repair, but it is sound advice in relation to most aspects of work with historic buildings.

1. HISTORICAL DEVELOPMENT OF THE SITE

The Grade I listed 'In & Out Club' (Naval & Military Club), in London started its life as a Palladian villa designed by Mathew Brettingham for the second Earl of Egremont, and initiated rebuilding at the western end of Piccadilly. Following a trend beginning in the 1660s when mansions such as Burlington House and Clarendon House were constructed at the east side of the street, During its

lifetime, the original villa has witnessed various building and decorating works for subsequent private owners in 1822 and again in 1829, but the most extensive campaign of alteration and refurbishment took place between 1866 and 1876, after the Naval and Military Club took over the property. The architect responsible for these works, John McVicar Anderson, added the portico and first floor balcony to the Piccadilly frontage, built a new dining room over the old stables, installed new offices and cellars, enlarged the Smoking Room and added the long corridor that linked the two ends of the property.

The Green Park Mansions was built in 1882-1883 to the design of the architectural firm of John G Finch Noyes. The building is four storeys high, in the Queen Anne's style: red brick, with stucco additions. It contained shops on the ground floor, the westernmost limit of commercial premises in Piccadilly, and residential apartments above. A number of such 'Gentlemen's lodgings' were built next to Clubs in the late 19 century.

The former American Club was built in 1884 to the design of Frederick William Roper and Alfred Lovejoy, as a three storey private house, in what was known as the time as the Flemish Renaissance style. This building features a number of very fine 18th c marble chimney pieces and mahogany doors. They were salvaged from the previous house on the site that belonged to Mr. John Jones, a successful military tailor. It became the American Club in 1919.

No 42 Half Moon Street was the last addition to the In & Out Club site, designed by Henry Lennox Anderson, son of John MacVicar Anderson. This property was designed and later altered to provide dormitories for junior officers of the defence services.

Finally, during the 30s Cubitt Nichols Architects carried out further alterations to the club, which included insertion of a passenger lift between the Club and No 42 HMS, this finally making a direct link between the two properties; two squash courts were added above the existing kitchens in place of what may have been an ancillary ball or function room (there are only barest traces left of the this interior).

No less significant than the works of reconstruction was the listing of the Club at Grade I in February 1958, a signal event in the life of any building. The current list description dates to 1994. The forecourt wall was only listed later, in 1970, and the Green Park Mansions and the American Club, both were listed Grade II in 1972. The site is located entirely within Mayfair Conservation Area.

2. EXISTING STATE OF PRESERVATION

This group of buildings was bought by the current owner in 1999, after the club moved to its new premises at St. James Street, since then all these buildings have been lying vacant, and have suffered extensive dry rot and wet rot infestation, due to water ingress and retained damp conditions within the buildings, consequently the club was added to English Heritage's Register of Building at Risk in 2001.

The fine rooms of the Club are in a good state of preservation; other areas have suffered extensively due to neglect and lack of maintenance. Despite the listing of the buildings, there have been unsympathetic interventions to the historic fabric of the buildings. Insensitive lift installations, toilet provisions, partitions, concrete stairs, cement repairs and the installation of false ceilings, have all harmed the architectural fabric of the buildings. This group of buildings, though architecturally and structurally sound, in places would still require extensive alterations, interventions and repairs to bring the buildings back into use and provide a use that would be sustainable and economically viable. These buildings have been lying vacant for over 7 years deeming large sections beyond repair. Fortunately, the areas and elements that are considered of high historic significance are still in a good state of preservation.

A number of different methods of construction have been noted along with the spacing and depths of the existing floor joists and the floor boards. Fibrous lime plaster pugging laid on lath and lime plaster ceiling has been recorded in a majority of the locations. Steel sections have been recorded in the rebuilt areas after the bomb damage during the Second World War; a number of original hearths were also discovered under the floor joists after the floor boards were removed. Secondary floor boards laid diagonally to the floor joists have been recorded in evidence in most of Green Park Mansions and certain areas of the American Club. This secondary flooring in Green Park Mansions has been compromised extensively in the past for additional services within the apartments. The existing pugging has also been compromised in certain areas for the provision of services during previous building works. The flooring on the third floor of the Club has been covered with screed laid on wood chip with chicken wire mesh, which is a modern intervention and would require complete removal. The existing Minton tiles in the ground floor corridor and entrance lobby, though slightly weathered, is considered to be of medium historical significance.

3. THE APPROACH

The starting point for development of this project to save and revitalise this group of buildings was the recognition that its future viability could not be assured without a radical rethink of the way all the buildings operated and a fundamental shift in the way it was perceived. It is important to note that although, the project includes significant conservation elements, a ‘conserve as found’ approach would have kept the buildings in a state where the original architecture had been diminished by insensitive alterations; the ‘cleanliness’ of the original buildings had been lost due to lack of maintenance; and it would continue to be unable to function as a viable historic resource. In short, although conserving and repairing the surviving fabric is central to the project, merely carrying out these works would not ensure the long term future of the buildings without it being done in parallel with some alterations.

Whilst the club, and its surrounding buildings is seen as an important landmark building , it is not a ruin and its continuing use as club/ hotel involved considerations beyond its requirements for its conservation. The objective for this group of buildings future use is the provision of adequate leisure facilities, guest suites and efficiently operational back of house services. In order to do this a strategic approach was necessary that would balance issues of the way the buildings functioned, linked with each other; costs of repair and of use; revenue generation; respect for their architecture; and the technical issues of repair of the fabric.

Aukett Fitzroy Robinson's experience, gained working on projects with complex briefs, entailing sensitive conversion of listed buildings into high end hotels, such the Lanesborough in London and the Grove, had taught them that these often conflicting demands required different strategies with different objectives for parts of the building that would need to proceed in parallel. These strategies encompassed conservation, restoration, alteration and extension. Factors considered in the development of the plan for these four elements of the strategy included extent of authenticity of original fabric still present; its condition; the current and future use of the parts of the building; reversibility; and above all, the original design intentions.

4. EVOLUTION OF THE PROJECT

Full planning permission, listed building consent and conservation area consent were granted for the original hotel scheme on 23 August 2002. At the time that approval was obtained for the works to the buildings, the hotel market was collapsing in the wake of 9/11, due to which the project was put on hold for a number of years. Upon recovery of the market, it became clear that expectations and demands for spa provision in high-class hotels had increased substantially. Therefore, additional floor space for the spa needed to be incorporated into the revised hotel scheme; also detailed design showed that insufficient plant space was incorporated into the consented scheme. Any re-allocation of floor space to plant space would have lead to an unacceptable reduction in guest suites, in viability terms.

In the light of the above, a new extensive team of consultants with Aukett Fitzroy Robinson appointed as the lead Architect, was instructed to review the proposals and to necessarily incorporate No. 100 Piccadilly to provide the additional floor space to accommodate the combination of the required plant, bedrooms, spa, restaurants and operational space. No. 100 Piccadilly is currently an office block with a retained façade that is Grade II listed, but the interiors were all altered and modernised during the 80s when the building was extensively refurbished.

As may be expected in a project of this nature and duration, a number of design options regarding locating of facilities have been considered. So far 12 different planning and listed building consent applications, pertaining to different

areas of the buildings have been submitted for proposals to co-join Nos. 96-100 Piccadilly with the consented hotel scheme. Incorporation of 100 Piccadilly has ensured that the changes to the historic buildings are minimised and are least intrusive.

Compared to the original scheme of housing 101 guest suites within the main group of buildings, now there are only 72 proposed with the remaining 54 located in the new build parts of the scheme, increasing the total to 126. A spa and leisure facility including a pool is proposed in the front basements spanning the entire length of the buildings. The shops and the Grade I listed Ballroom are proposed to be converted into restaurants, with a nightclub proposed under the internal courtyard of the Villa. The principle rooms of the Villa; the original layouts of the American Club, Green Park Mansions and 42 Half Moon Street are retained unaltered as the new guest suites. The rear of the Club, which has been a subject of extensive modern interventions has consent to be demolished and rebuild to house mainly the back of house areas, offices for the hotel operator and some guest suites at upper storeys.

No 100 Piccadilly is proposed to be linked to the rest of the buildings via a bridge link (to be used by guests) and an underground link to join all the spa facilities and to facilitate efficient functioning of the back of house routes.

The independent development of the buildings that formed the In and Out Club resulted in a range of different floor plates and levels that impacts on the circulation and the use of the buildings. These have affected both the internal layouts whilst meeting current DDA requirements and the configuration of individual suites. Different levels manifest themselves across the development even into the vaulted basement areas that severely restrict the spa and back of house layouts in these areas.

The current proposal is consistent with the existing Planning Consent which is for hotel use. This is a natural extension from the last known use (for most part of the existing buildings) which was for club use. Originally, these buildings were large private dwellings so the reinstatement of grand entertaining, dining and sleeping facilities are consistent with the buildings' original uses. The grandeur and original quality of the craftsmanship within the surviving features are of a significant historical importance.

Generally, a restrained approach has been adopted. This is intended so that the buildings could be appreciated not only by architectural connoisseurs but by the users and the visitors as well. Their restoration within a luxury hotel will provide access to the public domain, which has been supported both by English Heritage and Westminster City Council's Conservation Officer, during pre-application discussions. English Heritage and Westminster City Council have recognized the need for the four parallel strands of the strategy outlined above and have been supporting this approach to the project from the outset. It is of considerable value that all those involved – client, local authority, English Heritage and architect share a common understanding of the building and what is needed to secure its future. The process is further underpinned by the length of time the team has been

working together and collaborate with key organizations like the Victorian Society and the Georgian Group. The close working relationship between the Architect and Westminster City council's current conservation officer, John Wilman means that there are few areas of disagreement as to the appropriate approach and that when these arise, they are quickly resolved.

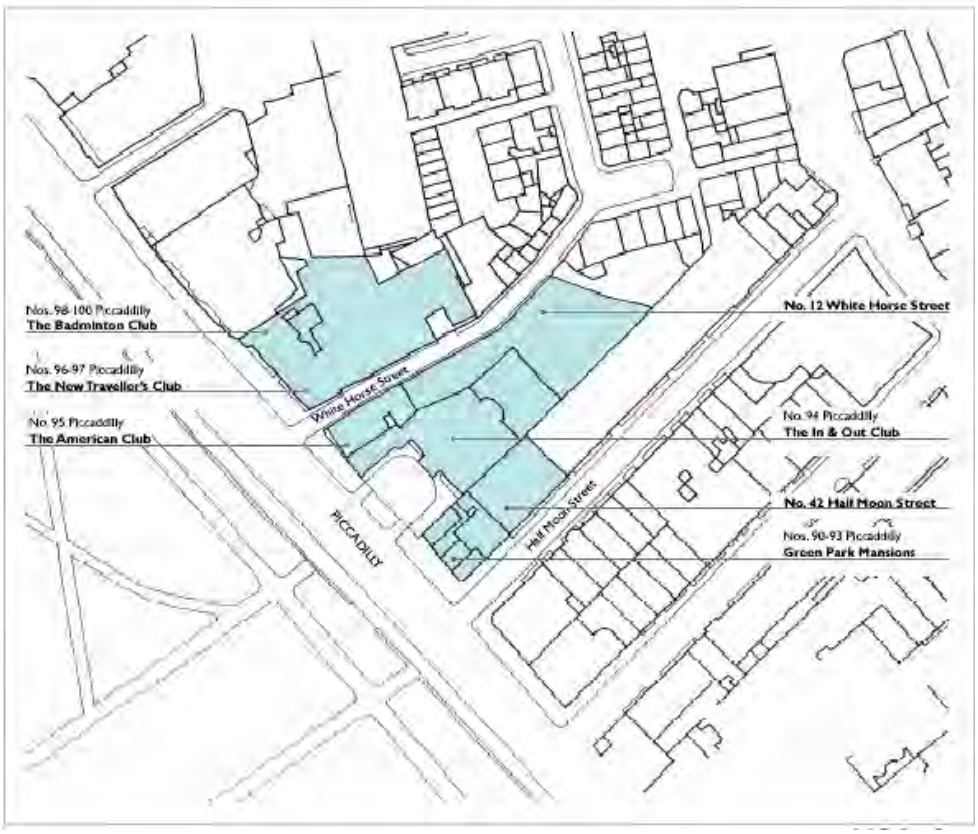

Figure 1

5. CONCLUSIONS

In developing the scheme, overall conservation philosophy has been: To avoid disrupting historic fabric unnecessarily, and in general to work with the 'grain' of the building; To provide discreet disabled access off the main forecourt; To enable flexible us of the most significant Villa/Club rooms; To bring all elements of the site into good state of repair, carrying out work to a high conservation standard, reinstating damaged or missing features; To design new work that is simple, dignified and understated, using materials in response to particular contexts; To devise engineering solutions and a servicing strategy that minimises disruption to historic structure; and To respect the character and appearance of the conservation area.

Indeed, it has been possible to retain some elements of the original fabric which were to be removed as part of the consented scheme, and locate more of the operational plant areas at 100 Piccadilly to avoid impact on the Club and its adjoining buildings, the more sensitive historic building. It is considered that the proposed changes do not materially affect the character and appearance of the listed buildings and the areas affected are mainly graded as low significance. These works crucially do not materially affect the special interest of the building (i.e. the Grade I listed Palladian villa at the centre of the existing buildings).

The changes to the historic fabric as proposed in the consented scheme have been reduced significantly. The rationale behind these changes has been to improve the circulation around the proposed hotel, whilst at the same time seeking to mitigate any impacts through the retention of other areas. This balance has been successfully struck with amendments to the scheme such as those on the first floor enhancing the appearance of a number of rooms through the retention of significant walls and thus preserving the plan form and layout of the original villa. The architectural and historical interest of all of the buildings has been preserved by these amendments. In reality, the plan form of a number of rooms has been improved through the removal of unsympathetic modern partitions and the impact on the interest of the building has been enhanced.

It is considered that the historic, and architectural, integrity of the building is preserved and thus, these works comply with UDP Policy as well as PPG15. Intervention, where necessary, has been carefully considered to have the least impact, as practically possible, whilst providing a hotel fully compliant with current legislation and operational needs.

The proposals contained within the current revised listed building consent application will not only provide a luxury 6 star hotel in Piccadilly but also carefully restore and rejuvenate a group of listed buildings that are currently on English Heritage's Buildings at Risk Register.

Further structural analysis of the basement vaults and the basement lightwell has revealed the fragility of the structural fabric and established the extent of building works that would be required to make these areas structurally sound. If the basement vaults were to be retained, they would require extensive underpinning and waterproofing, and they would probably require complete reconstruction in order to facilitate the building of the swimming pool, making the proposals financially unviable.

According to PPG15 (3.12), *"… where new uses are proposed, it is important to balance the effect of any changes on the special interest of the listed building against the viability of any proposed use and of alternative, and possibly less damaging, uses. In judging the effect of any alteration or extension it is essential to have assessed the elements that make up the special interest of the building in question…"*

The assessment of the elements that make up the 'special interest' of the club has identified those physical features that are significant to its character and appearance, as well as those elements of negative contribution.

PPG 15 (3.15) advises that *"Achieving a proper balance between special interest of a listed building and proposals for alterations or extensions is demanding and should always be based on specialist expertise;….. If an applicant is willing to exploit unorthodox spaces rather than set a standardised requirement; or if an architect can respect the structural limitations of a building…. For example….any unusually heavy loads can often be accommodated in stronger areas such as basements."*

It has been demonstrated that the large sections of the buildings are in an advanced state of disrepair and that they have suffered from a long-standing absence of use, thus resulting in a site of dereliction which seriously detracts from the character and appearance of the listed building. The proposed development would be sensitive to its context and respond to the needs of the user.

ACKNOWLEDGEMENTS

The Author would like to thank the Hotel team at Aukett Fitzroy Robinson.

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DOCUMENTATION OF A VERNACULAR HOUSE IN ALAÇATI

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ABSTRACT

The importance of preserving historical houses possessing local or regional characteristics has been accepted at international level. The aim of this study is to document, analyze and evaluate a vernacular house as a part of the built cultural heritage. This vernacular house is the Sezgin House in Alaçatı - a historical and touristic town of Çeşme which is a district of İzmir, on the Aegean coast of Turkey. The house dated to the late 19th century is a corner building that is still used for residential function. In fact, it is surrounded by a number of traditional dwelling units. It stands out with the continuity of the majority of its original architectural characteristics. A balance between the cultural values of the Sezgin House regarding the needs of the traditional community living in and around the building, and its socio- economic value regarding the tourism potential of contemporary Alaçatı should be searched in the development of a conservation approach.

1. INTRODUCTION

The study aims to document a vernacular house in Alaçatı as an expression of the culture of its community, of the relationship with its territory and of the world's cultural diversity. Within this frame, measured survey combining manual, topographical and photogrammetric methods and visual analysis at building scale; and photographic survey at both building and settlement scales were carried out. The data gathered at the site, and the results of historical and archive researches were analyzed and evaluated to support a possible treatment approach.

2. ALAÇATI SETTLEMENT

Alaçatı, which is a province of Çeşme today, played a significant role in the commercial life of Anatolia together with the contribution of the Genoese living in Chios Island across the main land until the 16th century. After the Ottomans

conquered the Chios in 1566, İzmir became the commercial center of the region [3].

In the 19th century, Hacı Memiş Ağa invited the Greeks living in Chios to Alaçatı so that they could work in his fields. The Greek workers were settled at the north of the Alaçatı Harbor and they played role in the development of viniculture in Alaçatı. In 1895, the total population of Alaçatı and its surroundings was 14.977: 13.845 of them Greeks and the rest Turks. Wine was exported from Alaçatı to foreign countries. Starting with 1914, Turkish immigrants – first from Jugoslavia and then from Macedonia, and Crete and Kos islands- came to live in Alaçatı. From then on, the Greeks of Alaçatı migrated to Greece. The majority of the new comers were foreign to viniculture but they were experienced in tobacco culture. So, tobacco culture and animal husbandry became the major economic activities. Today, different types of agriculture, fishery and especially tourism play role in the economy of the settlement [1, 2, 3].

There are two sub-regions as observed with their different geometric orders in the settlement plan: the one at the south with a relatively organic pattern inhabited since the 16th century, and the one at the north with a gridal pattern dating to the 19th century. The Southern part is organized around the Hacı Memiş Mosque and the northern part is organized around the Çarşı Church. These modest squares still enrich the public life of the settlement. The vernacular Alaçatı Houses, which possess rear courtyards, contribute to the narrow streets of Alaçatı with their exterior architectural elements such as original shutters, casings, bay windows ("cumba"), cornices, etc. Workshops, storage spaces and shops are observed on the ground floors, and on the first floors, living spaces are organized around a hall ("sofa") [1].

The urban site of Alaçatı including both of the above mentioned regions was declared as a conservation zone with the decision taken in 13.11.1976. The conservation decisions for listed buildings and the new regulations for constructions in the urban site were approved in 01.07.1998 with a decision numbered 422 [2]. The building subjected to this study has been listed in 2006 as a second degree architectural heritage.

3. THE CASE STUDY

The Sezgin House which is close to the Hacı Memiş Mosque, neighbours the modest-scale public square at the very south of Alaçatı. Hacı Memiş Street running along the east – west axis and Mithatpaşa Street running along the southeast – northwest axis intersect at this square. The type of usage around the square is mostly residential excluding the coffee house and the grocery. The majority of the buildings are two storeyed. Although the coffee house and some of the neighbor houses are built in the 20th century, they are at the same scale with the historical buildings. The Sezgin House, dated 1891 as learned from the inscription panel at one of its entrance doors, extends to the above mentioned lively public square with its bay window (Figure 1).

Figure 1 Location of the House and Public Square in front of it

The dwelling unit is composed of the double storeyed house mass (14.00^{x}18.00m) and a rear courtyard (18.00x16.00 m) located at the southwest of the building mass. Two additional masses juxtapose the building at its southwest (4.50x2.00 m) and south (8.00x2.30 m). The courtyard, entered from its south- west corner, is used as storage space at present. Although the presence of well in the courtyard is common in vernacular Alaçatı Houses, the well of the Sezgin House is located just in front of the shop space of the house, which is used as a storage at present, on Hacı Memiş Street (Figure 2). The two houses, neighboring the Sezgin House at its northwest and belonging to the relatives of the Sezgin family, contribute to the courtyard space with their modest scale and façade organization.

The first owner of the house was a Greek family who made its living with growing grapes and olives. The present user - the Sezgin Family - migrated from Kavala in 1924 - made some alterations in the house, mainly with the anxiety of improving the comfort conditions. The house was vertically divided into two dwelling units in 1980s because of a conflict between two family members. In this study, the dwelling unit at the north is named as unit one and the other is named as unit two.

Two of the exterior façades facing Mithatpaşa and Hacı Memiş Streets have preserved the design characteristics of the 19th century such as doors and windows with casings, wooden shutters, bay window and cornices (Figure 2). Because of the interventions made by the inhabitants of the house, the courtyard façade has lost its original characteristics (Figure 3).


Figure 2 Northeast Elevation
(Documented with photographic methods)


Figure 3 Courtyard Façade

The building has seven entrances: four from the street to the living units and the shop, three from the courtyard to the service areas.

In the ground floor (Figure 4), the unit one has an entrance hall (3.01x7.21x2.90x8.45 m) with an additional staircase and a latrine (2.50x1.05 m), and a storage space (4.87x5.12x4.77x7.03 m) at the northwest of the entrance hall. From the rear door of the entrance hall, a small additional storage (3.20x1.60 m) located at the northwest of the courtyard can be reached. The unit two has an entrance hall (2.07x3.68x4.28x5.21 m), an original staircase in the entrance hall with a latrine addition underneath it, a small room (3.00x4.60 m) at the west, and a large L shaped service area, which is used as a kitchen (Figure 5) at present (4.50x7.50 m), linked to the rear courtyard. Here, the original ceramic jars half buried into the ground can be observed.

Although it is difficult to follow a definite order in the layout of the ground floor at present, the idea of organizing rooms around a linear hall is still legible on the first floor. At the first floor plan in unit one (Figure 5), the staircase leads to a small hall (1.90x3.07x1.77x3.30 m) surrounded by a small room at its east, the main room at its north and a service unit at its west. The chair rails are eye-catching in the hall and main room.

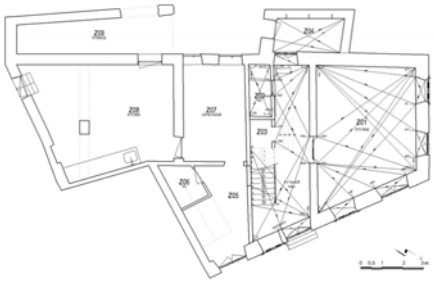

Figure 4 Ground Floor Plan

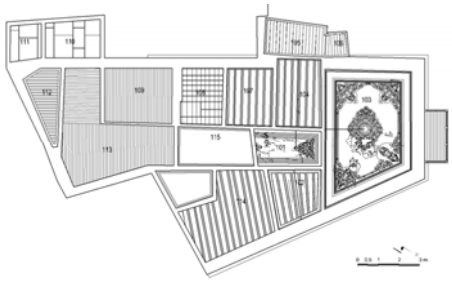

Figure 5 First Floor Ceiling Plan
(Documented with manual methods)

This small room (2.61x2.96x2.24x2.01 m) is used as a bedroom at present. The main room (4.68x6.88x4.87x4.21 m) with the bay window (1.00x3.19 m) is located at north. The service unit is composed of a storage (2.90x2.20 m) accessed from the hall, and an additional kitchen with a shower unit (3.20x1.60 m) at its west.

In Unit two, the original staircase leads to a linear hall (4.52x1.86 m) enriched with a corner pilaster. The L shaped room (3.88x3.04 m) at the east, and the two rectangular rooms at the west (2.80x2.25 m and 2.80x3.02 m) circumscribe the hall. The L shaped room is used as a living room and the others are used as bedrooms at present. In the larger bedroom, the trace of a fireplace and original shelves can be observed. Through a door on the southeast side of the hall, an additional L shaped corridor (9.27x9.10 m) is reached. There is a niche that can be used as a clue for the restitution phase of the case study on the northeast wall near

the door. At the southwest, an additional bedroom (2.70x2.70 m) is observed. The L shaped corridor is linked to the above mentioned additional mass juxtaposing the building, through a door at its southwest side. Here, a bathroom (1.50x1.65 m), kitchen (2.66x1.88 m) and a terrace (3.17x2.00 m) are organized in additive fashion. A small storage space (0.96x1.02x3.67x3.87 m) with traces of an original latrine is observed at the southeast of the corridor.

The construction system and materials used in the Sezgin House repeat the common characteristics of the vernacular Alaçatı Houses. Tuffs are put together with mortar using timber bonds at various levels. There is plastering on both exterior and interior surfaces of the solid masonry stone walls. Gray color on the exterior walls and blue or white wash on the interior surfaces can be observed. The construction technique of the bay window is timber skeleton system.

Leave and flower motives are painted on the ceiling of the main room and the hall in Unit one. According to visual analysis, paint was applied on the plaster layer covering the wooden ceiling. Although the ceiling is damaged extensively because of dampness, the paint is still visible.

There is no important structural damage in the stone masonry walls, but the wooden structure of the bay-window is in a dilapidated condition. The main problem that deteriorates the materials is dampness in form of rising damp and rain penetration. Lack of a drainage system at the roof and around the building, the usage maintenance of the roof covering and exterior plastering and the absence of an adequate damp- proof course or ventilation holes in the foundation walls are possible reason of the dampness in the building. The cement floor covering applied on the ground floor surfaces excluding the storage can be pointed out as a damaging agent as well. Finally, the additional masses have restricted natural ventilation since they have blocked ends of the building axes on both floors.

4. RESTITUTION DECISIONS FOR THE CASE STUDY

One of the major problems in the building at present is the division of the house vertically into two dwelling units and the usage of the two parts by different members of the same family as mentioned in the above. This division has given way to the spatial transformations, mass additions such as extra wet spaces and a staircase addition. As a result, the original layout, which reflects the living tradition of the Alaçatı community in the 19th century, was lost.

The original layout of the dwelling can be deciphered with respect to the restitution sources such as the traces coming from the building itself, historical research, comparative study and oral sources. The rear courtyards were provided in the dwellings of Alaçatı as a result of the agricultural production dependent social structure. The rear courtyard of Sezgin House is connected to the streets through two narrow passages: one between the studied building mass and the neighboring building at its southwest, and the other between the studied building mass and the house neighboring it at its southeast (Figure 6). At the courtyard

façade, there is a lack of order in mass design, lack of completeness in cornice elements and also there are contemporary material usages such as aluminum window frames and ceramic tiles. These interventions are evaluated as unqualified alterations.

It was concluded that the building was designed to house the combined functions of accommodation, production and marketing. The ground floor together with the courtyard included a shop unit, a workshop for wine production, and opens and closed storage spaces. The present kitchen in Unit two was used as a workshop in the original layout. The workshop was used together with the courtyard. The household was producing grapes and related products considering the traces coming from the building itself such as original ceramic jars and the historical research about the wine production in Alaçatı during the 19th century. [4]. The grapes, which were used to produce wine and vinegar, were probably carried to the courtyard by animals through the passage. Some of them were laid on the first floor terrace or on the courtyard ground in order to be dehydrated and some were washed, liquidized, and extracted into the jars in the workshop. The space connecting the entrance hall and the workshop, which is used as a room in Unit two at present, was probably used as storage. The processed grapes were stored in this part. The orientation of the corner space towards the two streets and the presence of the entrances from both of the streets indicate that it may be a shop. It can be claimed that the characteristics of the 19th century Alaçatı and its economy played role in the form of the house; as in many other traditional dwellings in Anatolia [2].

The first floor was the resident of the inhabitants. Although there is an axial arrangement on both floors, the directions of the axes are perpendicular to one another. In the original plan scheme, there was a linear hall terminated by the main room at one end, and the entrance from the terrace at the other. The rooms had their entrances from this hall. This was the residence of the inhabitants. The L shaped room at the eastern part is thought to be a bedroom because of the plan form, and size. The room at the southeast of it is thought to be used as storage (“sandık odası”) considering its closeness to the main bedroom and its size. The main room was the place where the guests were welcomed. The neighboring room at southeast may be another bedroom. At the southeast of it, there is another room which is thought to be used as a bedroom. The original kitchen should be the room at the southwest end of the hall with respect to the traces of the fireplace and cupboards. At the end of the hall in Unit two, there is a window with iron railing which provides clue about the original closed space - open space relations. Considering the contemporary material usage, the plan typologies of the same period houses in Alaçatı and the interviews with the inhabitants; the presence of a terrace (6.50x6.85 m) juxtaposing the narrow side of the rectangular hall can be claimed. There was not an original latrine at the interior, but it is thought to be on the terrace. Considering the relation between courtyards and terraces in the other house in Alaçatı dated late 19th century, the existence of a staircase [2]. connecting the courtyard to the terrace of the studied example can be claimed.

It is known that wealthy families living in İzmir in the 19th century furnished their houses with furniture brought from Europe. It can be claimed that the first users of the studied house were wealthy people; considering the ceiling painting, ornamental elements enriching the façades, relatively large scale of the house and its outstanding location in the urban layout. Therefore, the possibility of a European style furnishing is questioned for the studied house.

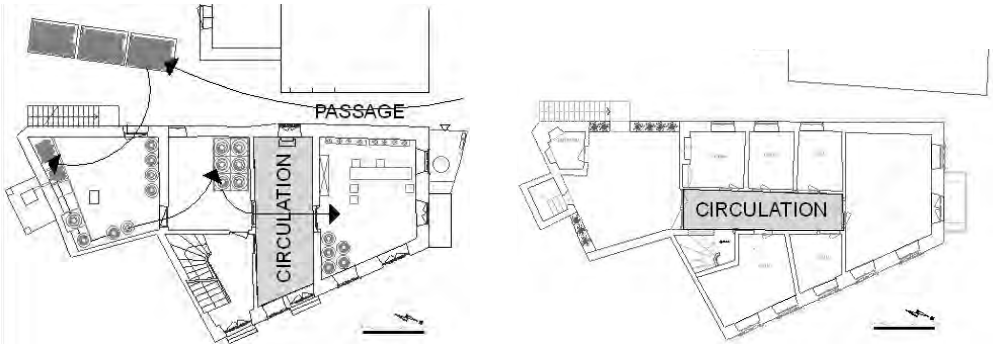

Figure 6 Ground and First Floor Plans (Restitution Drawings)

5. CONCLUSION

The Sezgin house, which is a qualified example of modest-scale dwellings that still exists in Anatolia, documents the shared-lifestyle of the Ottoman community living in Alaçatı in the 19th century. The concept of privacy serves as the basis of evaluation in analyzing the interrelation of different functions within the building, and the interrelation of the dwelling unit and the neighborhood. It is an important tool for understanding agriculture and trade based society of the settlement.

Despite some architectural alterations, the building is structurally sound, and the original layout is still perceivable. It was evaluated that Sezgin House has a specific importance among the Alaçatı Houses with its artistic value stemming from the ceiling paintings and ornamental corner elements at the exterior facades. It has also documentary value since the process of the wine production, and the placement of wet spaces (kitchen and latrine) at the first floor and the original plan scheme of the building can be traced out despite the mentioned alterations, and the original function of the building is continued. The perpendicular circulation axes to each other on different layers are an important characteristic of the house which is not common in the other Alaçatı Houses. However, the vertical division of the house makes this characteristic of the house unclear. The exterior architectural elements are conserved. Apart from these heritage values, the dwelling unit has a potential for the contemporary socio-economic life of Alaçatı.

The continuity of the residential function in the Sezgin House and its surrounding should be considered as a value, and a balance between tourism and traditional lifestyles should be established in Alaçatı. This study forms a basis for

the definition of an appropriate treatment approach for the presented potential of the studied vernacular heritage.

ACKNOWLEDGEMENT

We would like to thank specialists Ayşe Gül Afacan, Elif Uğurlu and Kerem Şerifaki, research assistants Burcu Irgat and İpek Akbaylar, architect Gamze Saygı and Ceren Üste, and technician Cihat Küçükboyacı for their valuable contribution.

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LASER SCANNING OF KÜÇÜK AYA SOFYA, ISTANBUL, TURKEY

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ABSTRACT

In 2002 a laser scan of Kücük Aya Sofya, Istanbul, Turkey was carried out. The laser scanner is described. For the complete scan of the interior of the mosque about 26 stations have been installed and the coordinates of more than 21 million points have been collected. These 26 point clouds are transformed in a unique local coordinate system by minimising the distances of so called tie surfaces in the different point clouds. The standard deviation of the point coordinates is about ±0.04m. As final result the complete geometric structure of the interior of the mosque is represented by particular point coordinates in 3 dimensions. Using CAD software, arbitrary floor plans, profiles and surface projections of the mosque can be constructed from the point system.

1. INTRODUCTION

The church of Sergios and Bakchos in Istanbul, Turkey, also known as „Küçük Aya Sofya" is one of the most important Byzantine buildings in Istanbul. Since the 16th century the building is used as mosque. Due to its desolate actual conditions in 2004, a complete restoration work was started.

Since 1979 we have documented four times in different time intervals the condition of the mosque by taking photogrammetric pictures ([2], [3]). Before the restoration, we had the possibility in 2002 to record the geometric structure of the mosque's interior using a laser scanning system. We report about these measurements and their evaluation in the following chapters.

2. LASER SCANNER

The laser scanner used for this study is a prototype developed by Hovenbitzer [5] at the Geodetic Institute of Darmstadt University of Technology. The scanner consists of the raw laser scanner 3dLMS mounted on a rotation stage. The vertical raw range is about 180°. A step motor rotates the scanner in steps of 0.25° about its vertical axis. The horizontal range amounts to 360°.

A complete scan at a particular station collects a 3d-point cloud of 807 840 points within 90 minutes. Figure 1 shows the principle of the laser scanner, figure 2 is a photo of the laser scanner mounted on a tripod. Table 1 represents the most important parameters of the laser scanner.

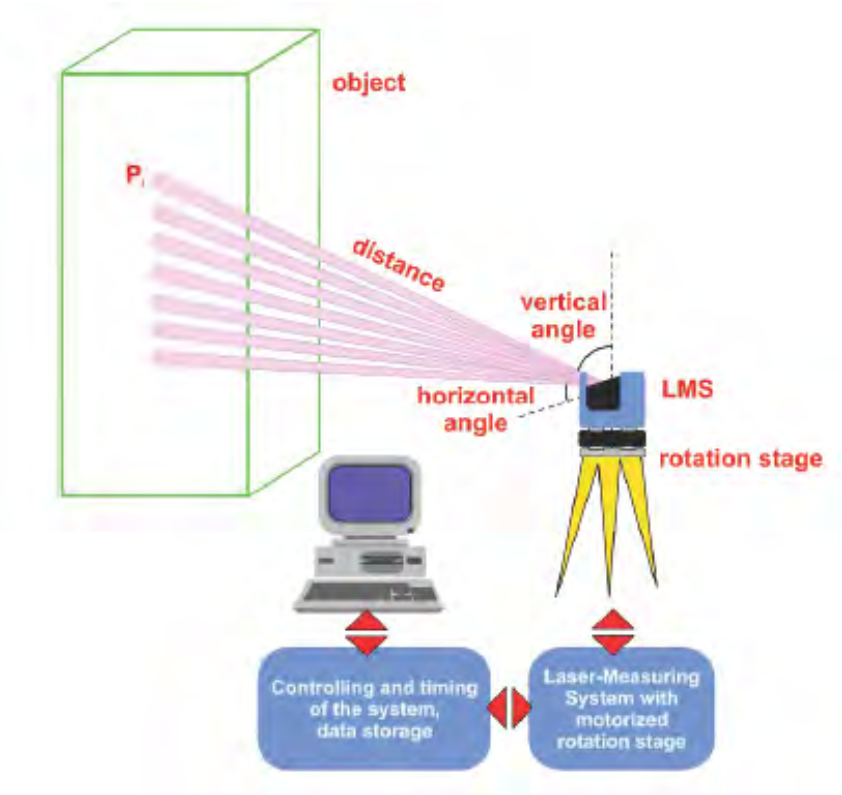

Figure 1: Principle of 3dLMS laser scanner

Figure 2: Photo of the 3dLMS laser scanner [6]

Table 1: Parameter of the laser scanner 3dLMS

Parameter	**Value**
Vertical Observation Range	180°
Horizontal Observation Range	360°
Vertical Resolution	
0° - 40°, 140° - 180°	0.5°
40° – 140°	0.25°
Horizontal Resolution	0.25°
Range Precision	0.01 m
Spot diameter/10 m	0.25°≡ 0.044 m
Number of points/complete scan	807 840
Time necessary for a complete scan	90 minutes

3. LASER SCAN OF KÜÇÜK AYA SOFYA

The laser scan was carried out in June 2002. For the complete scan of the mosque's interior, 26 stations were necessary (Figure 3). Coordinates of the stations and orientation of the laser scanner system have been determined in a local reference system by geodetic means. All together it took about 3 days to collect the data. The 3d-coordinates of more than 21 millions points have been sampled. More details are given in [3].

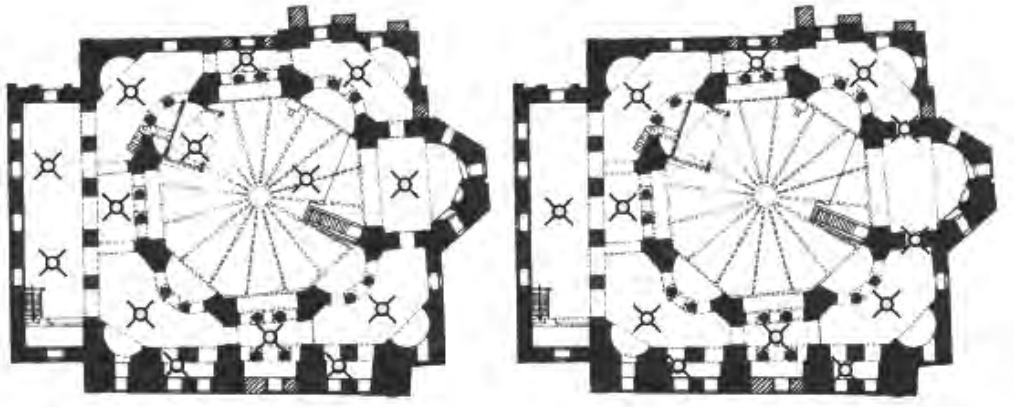

Figure 3: Stations of the laser scanner in Küçük Aya Sofya mosque; left: ground floor, right: gallery.

4. DATA PROCESSING

Data processing can be divided in three steps. At first a cleaning of the point clouds from gross errors was necessary. Due to multiple reflections of the laser beam by windows, lamps and other structures of the mosque more than 20 % of the point coordinates show gross errors. For that purpose we have plotted the point clouds station by station. For the first automatic identification of gross errors we have applied a simple median filter size 9x9. More than 99% of the gross errors could be eliminated in this way. The remaining gross errors have been removed manually.

In figure 4 the cleaned 3d point cloud of a particular station projected on a vertical cylinder is shown.

In the second step we have to register the point clouds. For the registration no control points have been available. Generally, in photogrammetry registration is carried out in such a way that identical tie points in different images are matched to each other (least square matching LSM, ([1], [5])). Since the different point clouds have not identical tie points – laser scanners never scan identical points - we have chosen for registration the method as described by Düppe and Klein [4]. The point clouds of all stations are transformed to an unique coordinate system by determining identical tie surfaces in the different point clouds. The parameters of one particular tie surface are determined separately in each point cloud. These parameters are then used to match the point clouds to each other by minimizing the distance between the tie surfaces automaticly. The principle is shown in figure 5. The transformation parameters (registration parameters) are determined by least square adjustment, whereby 3 translations and 3 rotations for each point cloud are estimated. The scale of the point clouds is kept fixed. Surfaces of order 1 (planes) and 2 are used.

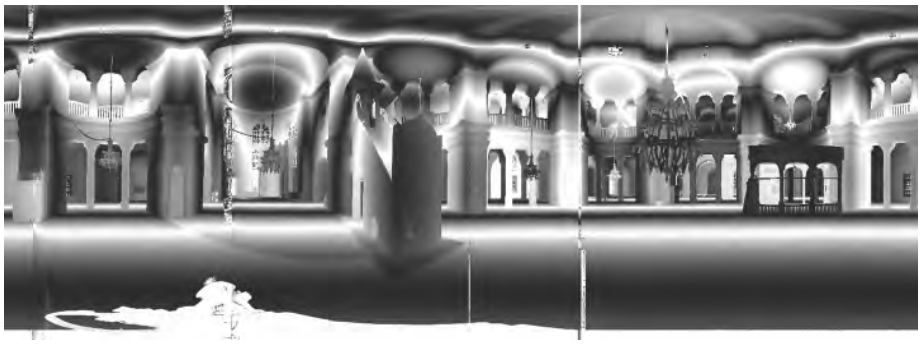

Figure 4: Laser scan of the interior of Küçük Aya Sofya Camii (cylindrical projection).

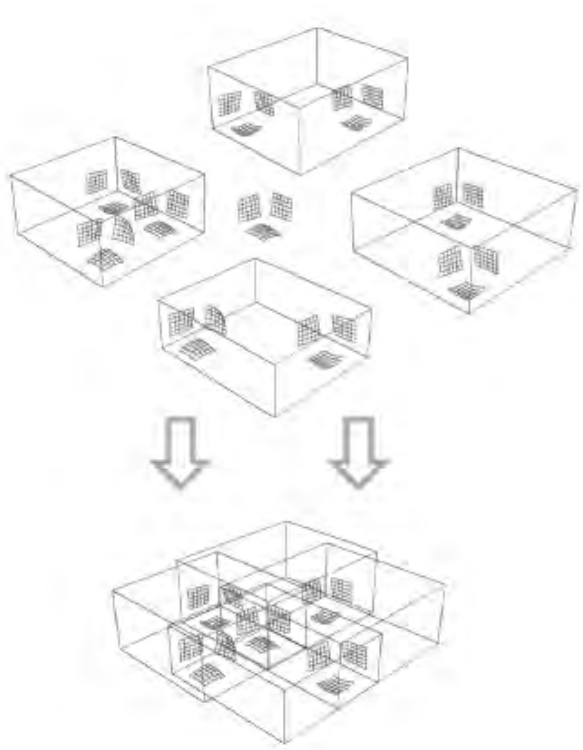

Figure 5: Principle of tie planes and block adjustment. Tie surfaces are identified in different point clouds. The different point clouds are fitted together by fitting the tie surfaces to each other.

We have determined in the 26 point clouds about 2 294 tie surfaces (996 planes, 1298 surfaces of order 2) with 9 391 257 points. Each tie surface contains in minimum 15 points. In maximum a tie surface consists of 38 624 points. In the mean one tie surface is identified in seven point clouds (minimum 3 point clouds,

maximum 22 point clouds). The registration is done by minimizing the distances between the tie surfaces. Figure 6 shows the tie surfaces of two point clouds observed at two different stations.

As final result of this adjustment procedure, we obtain a 3d point cloud representing the complete indoor surface of Küçük Aya Sofya mosque. The large number of 3d surface points allows to determine the accuracy of the surface model. Generally, the standard deviation of a particular point is about ± 0.04 m..

The third and last step involves the visualization of the result. As example in figure 7 and 8 orthogonal horizontal and vertical cuts through the mosque are shown. The different colors indicate the distance of the laser points to the reference plane.

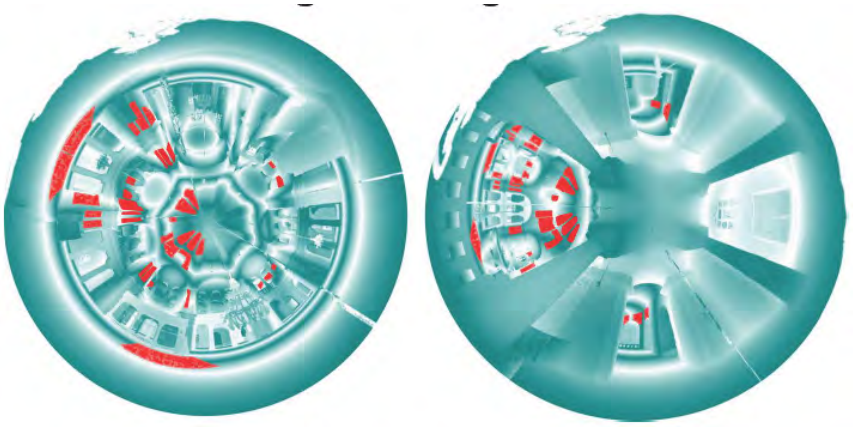

Figure 6: Tie surfaces (red color) of two different point clouds.

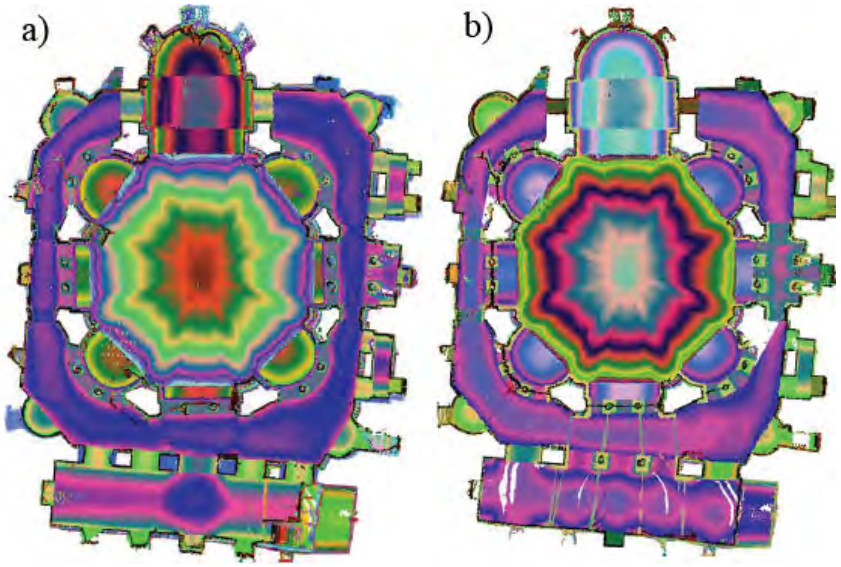

Figure 7: Horizontal cuts through Küçük Aya Sofya mosque from laser scanner data. 7a: ground floor; 7b: gallery.

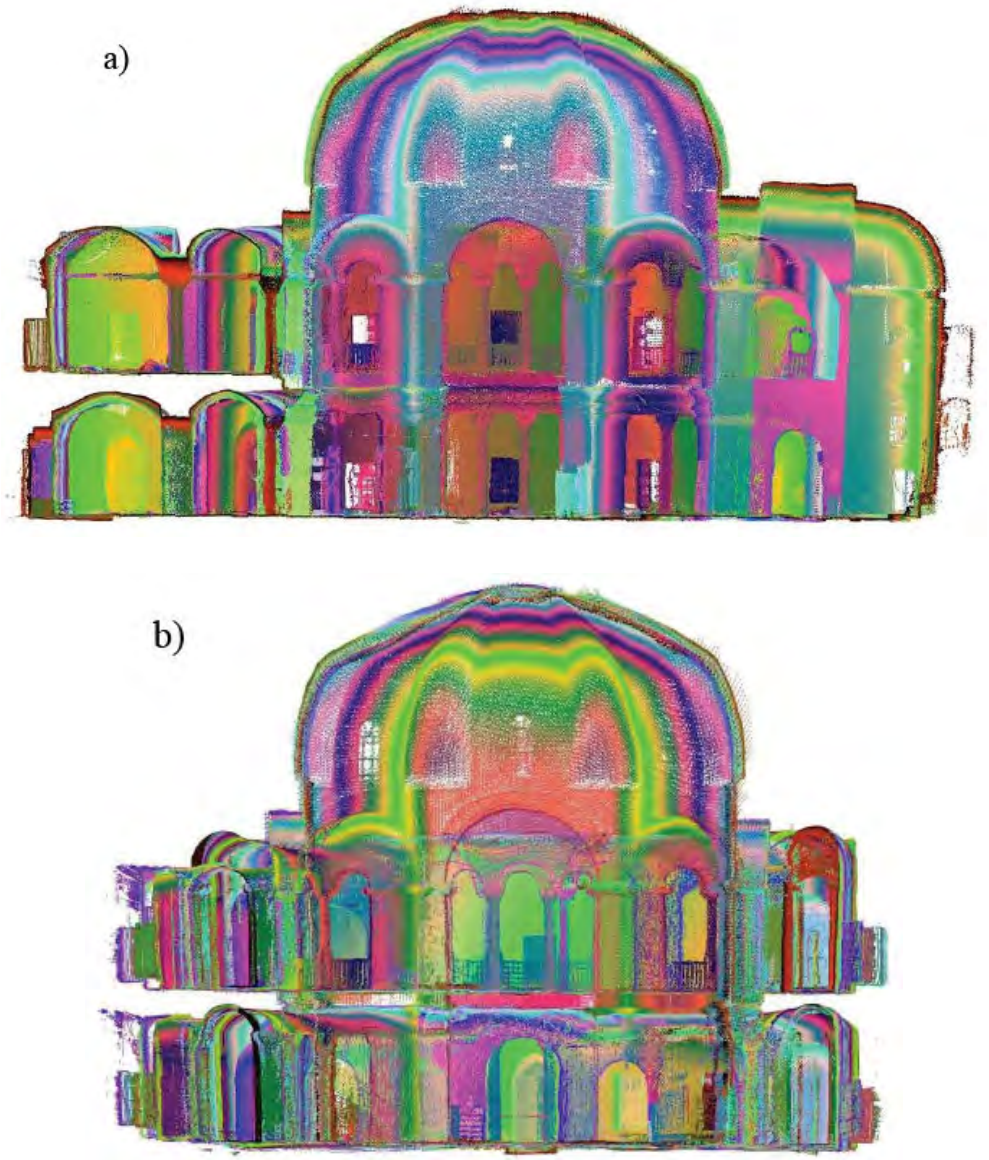

Figure 8: Vertical cuts through Küçük Aya Sofya mosque from laser scanner data: 8a: cut in West – East direction; 8b: cut in North- South direction;

5. CONCLUSIONS

The laser scan of Küçük Aya Sofya carried out in 2002 has delivered a digital indoor surface model of the mosque with an accuracy of about 0.04m. This data set can be used now as a reference for future scientific investigations concerning the stability of the structure and the quality of the repair work which has started in 2003.

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CHAPTER II

Archaeological Studies

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STUDY ON CHANGES IN ANCIENT CITY AGORAS USING FRACTAL ANALYSIS —Using Image Analysis to Describe the Formation of Agora in 300 B.C., 150 B.C., and 100 A.D. —

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ABSTRACT

This paper examines the “implicit structure” of space in agoras by analyzing their architecture using image-processing technology. Agoras were central to the lives of Western European people and can be called the starting point of Western European civilization. Image processing technology was used to perform the initial restoration of the architecture and city shape. Each building in the 3D model of the plaza was then constructed, centering on the formation of the agora. The box-counting method was used to determine the relationship between the shadow image and the fractal analysis of the 3D plaza composition. This was applied in the fractal analysis of the changes in the arrangement of the facilities from generation to collapse.

1. INTRODUCTION

The ancient Greek city of Athens gave birth to Western architecture and civilization. The city’s 2500-year history has been extensively studied by international researchers. Initial brother of the quills hardly did the editorial of the planning of the city’s layout.

Plato and Aristotle developed theories of the ideal city that considered the interrelation of different social classes as well as the physical layout and organization of the city. The concept of city planning was developed in the

Hellenistic period by Pliny, Frontinus, Witolwius, and others. Still, a substantial portion of the technological book still transmitted today concerns only the ruins that remain as they relate to cadastral surveys, water supply, etc.
Constantinos A.Doxiadis (1913-1975), a Greek architect and city planner, wrote a paper, "Archıtectural Space In Ancıent Greece," that described the system of site planning for temples in ancient Greece. His paper continues to have enormous influence.
Agoras, not temples, were central to the lives of Western European people. Using current knowledge and modern technology, the authors analyzed the architectural arrangement of the agora to determine its "implicit structure" of space.

2. RESEARCH AREA

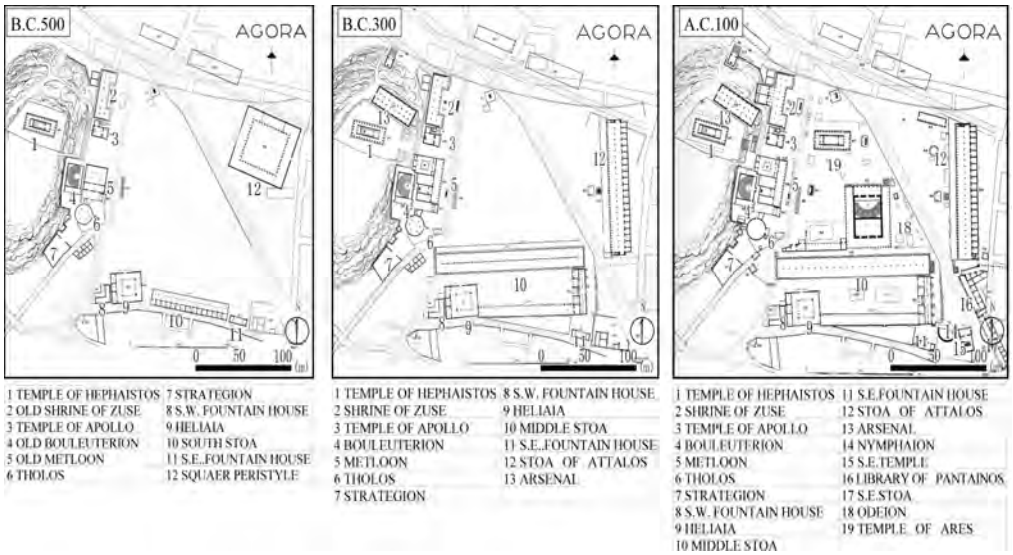


Fig.1 Transition of agora formation (B.C.500-A.C.100)

Ancient agora on the Acropolis in the center of Athens, Greece
Agora about 120km northwest of Athens at the ancient Oracle at Delphi on Mount Parnassus
Period of investigation
Athens: July, 2001; Delphi: July, 2001
Subjects of investigation
Foundation and cornerstone, size of foundation substructures, building arrangement, and style, and method of processing the stone.
Fractal analysis
A fractal dimension each aeta was analyzed using the 3D-restoration mode.

3. RESEARCH FACTURE

Process of analysis

1. Image processing technology was used for the restoration work and to determine the shape of the city.
2. Each building was constructed using a 3D plaza model centering on the formation of the agora.
3. The box-counting method was used to determine the relationship between the shadow image and the fractal analysis of the 3D plaza model.

4. PROCESS OF PLAZA FORMATION

4.1. Analytical method

Using the site plan from references 2-13, the formation processes were classified by age into three categories.

1. Architecture that had existed in each age: existing architecture
2. Architecture that was constructed during the age: constructed architecture
3. Architecture that was extinct in the each age: extinct architecture

Architecture in the plaza was classified by building use into five types separated by age using the site plan from the reference.

1. Governmental 2. Public 3. Commercial
4. God precincts 5. Housing 6. Cultural

4.2. Analysis of facility arrangement (Fig.2, Table1)

The transition of the agora, from construction to the disappearance of facilities, and its usage, are described below.

Many small naos, as well as mesoscale commercial, and cultural facilities, were constructed on the west side in 500 B.C.

In 400 B.C., a new road was constructed, enclosing the central portion. New facilities were constructed alongside the road. Most of the facilities were naos. Commercial facilities were also constructed alongside the road.

In 300 B.C., small-scale naos gave way to new public facilities. In particular, commercial facilities and naos on the east side were replaced by large-scale public facilities. The road on the south side, which did not pass by the facilities, also disappeared.

In 150 B.C., the construction of large-scale commercial facilities was notable. Roads on the south and east that had disappeared by 300 B.C. were restored and large-scale commercial facilities were constructed along them. Small- and medium-scale naos were located in the west, while medium-scale naos and large-scale commercial facilities were located in the south and east.

In 100 A.D., many new facilities, particularly cultural facilities, joined the existing facilities. Large-scale cultural facilities, medium-scale naos, and small-scale government facilities went into unoccupied land. Moreover, construction extended outside the unoccupied land. Naos were built to the west, and

government, commercial, and cultural facilities were scattered about, raising the overall density.

The naos in the southwest remained unchanged in position, scale and usage from 400 B.C. to 150 B.C. Thus, at each age, many naos were present along the Kolonos Agoraios located in the west. Between 150 B.C. and 500 B.C. unoccupied land in the agora that was open to the public underwent development. Although the scale and usage had changed, naos with many features were constructed in the west and along the road in a manner that enclosed the unoccupied land. By 100 A.C., however, the density of buildings had risen. A great number of cultural facilities moved into the unoccupied land. The authors analyzed this movement into the unoccupied land.

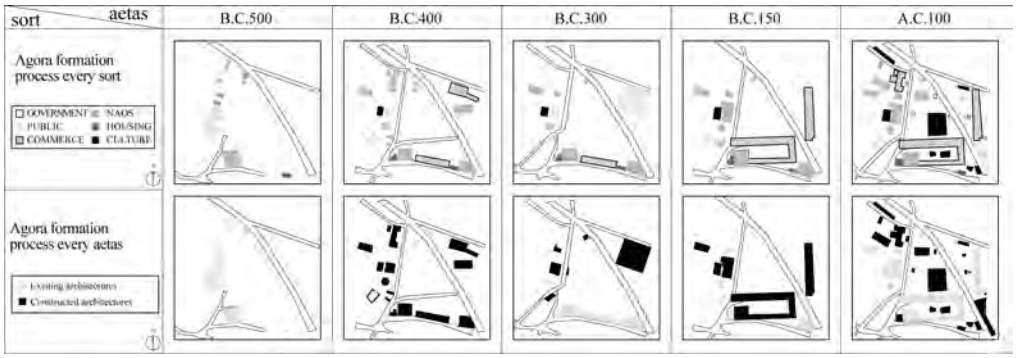


Fig.2 The analysis by the facility use (B.C.500-A.C.100)

Table1 The analysis by the facility use (B.C.500-A.D.100)

	B.C.500	B.C.400	B.C.300	B.C.150	A.C.100
extinct architectures		ROYAL STOA I SHRINE OF ZEUS TEMPLE OF APOLLO TEMPLE OF METER BOULEUTERION I PRYTANIKON	NEW BOULEUTERION (II)	ESCHARA HOUSE BOULEUTERION (III) OLD BOULEUTERION (II) SQUARE PERISTYLE SOUTH STOA I	SHOPES BOULEUTERION (IV) MINT PRISON HELIAIA
constructed architectures	ROYAL STOA I SHRINE OF ZEUS TEMPLE OF APOLLO TEMPLE OF METER BOULEUTERION I PRYTANIKON HELIAIA 12GODS ESCHARA S.E.FOUNTAIN HOUSE	TEMPLE OF HEPHAISTOS ROYAL STOA II TEMPLE OF ZEUS NEW BOULEUTERION (II) OLD BOULEUTERION (II) THOLOS STRATEGION HOUSE SHOPES COURTROOM PRIVATE HOUSE & SHOPS SOUTH STOA I MINT PRISON POIKILE STOA	APOLLO PATROOS BOULEUTERION (III) S.W.FOUNTAIN HOUSE SQUAER PERISTYLE	SANCTUARY OF DEMOS & GAECE ARSENAL METLOON BOULEUTERION (IV) BEMA STOA OF ATTALOS MIDDLE STOA SOUTH STOA II HELIAIA	APROACH FROM DIPYOLON BOULEUTERION (V) TEMPLE OF AREA ODEION BASILICA HOUSE A SHOP LIBRARY OF PANTAINOS S.E.STOA NYMPHAION S.E.TEMPLE BATHS
exiting architectures	ROYAL STOA I SHRINE OF ZEUS TEMPLE OF APOLLO TEMPLE OF METER BOULEUTERION I PRYTANIKON HELIAIA 12GODS ESCHARA S.E.FOUNTAIN HOUSE	HELIAIA 12GODS ESCHARA S.E.FOUNTAIN HOUSE TEMPLE OF HEPHAISTOS ROYAL STOA II TEMPLE OF ZEUS NEW BOULEUTERION (II) OLD BOULEUTERION (II) THOLOS STRATEGION HOUSE SHOPES COURTROOM PRIVATE HOUSE & SHOPS SOUTH STOA I MINT PRISON POIKILE STOA	HELIAIA 12GODS ESCHARA S.E.FOUNTAIN HOUSE TEMPLE OF HEPHAISTOS ROYAL STOA II TEMPLE OF ZEUS OLD BOULEUTERION (II) THOLOS STRATEGION HOUSE SHOPES COURTROOM PRIVATE HOUSE & SHOPS SOUTH STOA I MINT PRISON POIKILE STOA APOLLO PATROOS BOULEUTERION (III) S.W.FOUNTAIN HOUSE SQUAER PERISTYLE	HELIAIA 12GODS S.E.FOUNTAIN HOUSE TEMPLE OF HEPHAISTOS ROYAL STOA II TEMPLE OF ZEUS THOLOS STRATEGION SHOPES COURTROOM PRIVATE HOUSE & SHOPS MINT PRISON POIKILE STOA APOLLO PATROOS S.W.FOUNTAIN HOUSE SANCTUARY OF DEMOS & GAECE ARSENAL METLOON BOULEUTERION (IV) BEMA STOA OF ATTALOS MIDDLE STOA SOUTH STOA II	12GODS S.E.FOUNTAIN HOUSE TEMPLE OF HEPHAISTOS ROYAL STOA II TEMPLE OF ZEUS THOLOS STRATEGION COURTROOM PRIVATE HOUSE & SHOPS POIKILE STOA APOLLO PATROOS S.W.FOUNTAIN HOUSE SANCTUARY OF DEMOS & GAECE ARSENAL METLOON BEMA STOA OF ATTALOS MIDDLE STOA SOUTH STOA II APROACH FROM DIPYOLON BOULEUTERION (V) TEMPLE OF AREA ODEION BASILICA HOUSE A SHOP LIBRARY OF PANTAINOS S.E.STOA NYMPHAION S.E.TEMPLE BATHS

5. FRACTAL DIMENSIONAL ANALYSIS

5.1. Analytical method

Formulation of 3D data (Fig.3)

1. The floor plan and elevation plan were imported as graphics data into CAD and converted into vector data.
2. The height of the architectural structures, etc., were measured according to references 1-14 and the fact-finding data. The vector data was opened with CAD.
3. Three-dimensional computer model was used to read and place the data on a site map drawn by three-dimensional computer model.

Fig.3 3D Model (B.C.500-A.C.100)

Construction of 3D Plaza model (Fig.4)

A 3-dimensional plaza model, 300 m x 300 m in size, was created and designated Range 1. A second 3-dimensional plaza model, 135 m x 135 m in size, was created and designated Range 2(references 14, 15).

Light source (Fig.5)

1. For Range 1, the light sources were set at eye level (1.6 m) at each of the three path intersections.
2. For Range 2, the light source was set at eye level (1.6 m) at the center (Point 4) of the 3D Plaza model.

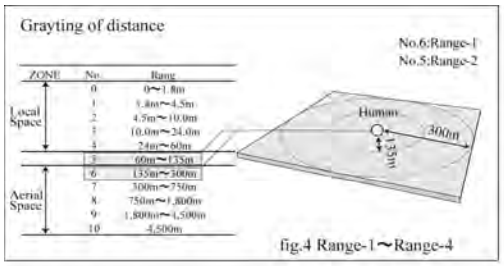


Fig.4 Model setting

Light decay

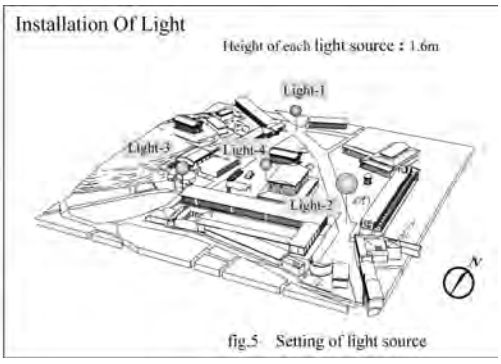


Fig.5 Setting of light source

The light intensity distribution for the point light source is shown in Figure 4. A site with a radius of 135 m was used as the attenuation start point. The light intensity was perfectly attenuated at Points 1 to 4 on a circular boundary circumscribed on a 3D model.

Fractal dimension analysis (Fig.6, Fig.7)

The box-counting method (references 16-18) was used to binarize the shading image at the applicable threshold level. In this study, the threshold level was 2.3% (256×0.23≒6; more than 6 shades of gray are considered white). Number of pixels is 1024.

The binarized image was covered with filled-in squares. Each square was r x r pixels in size. The number of white squares was N(r) from pixel spacing r. Following equation to be true.

$$N(r) \cdot r = C \quad \cdots\cdots\cdots\cdots\cdots (1)$$

C is constant and D is a fractal dimension. (1) is transformed as follows:

$$\log N(r) = \log C - D \log Nr \quad \cdots\cdots\cdots (2)$$

Fractal dimension D is given by the slope of line logr and logN (r), and calculated by the least-squares method.

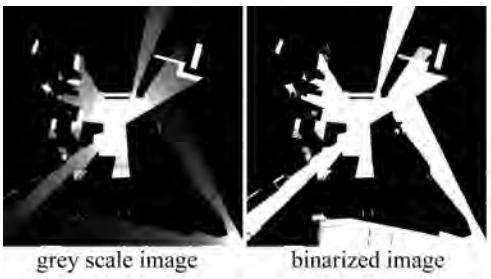


Fig.6 Binary image processing

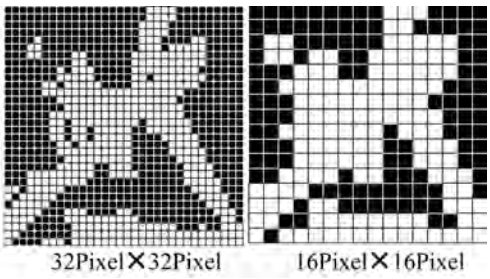


Fig.7 Box counting

5.2. Form analysis using fractal dimensions (Fig.8, Fig.9)

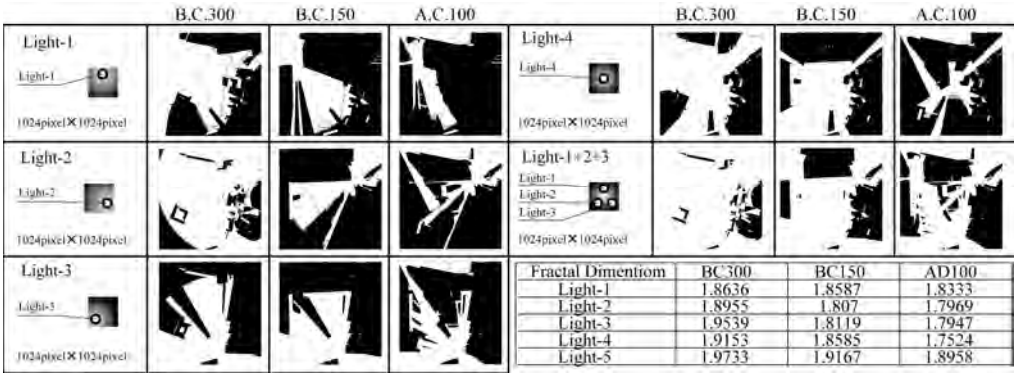
The changes in the agora in every age and every point were examined using fractal analysis.

Analysis of every age

As a general tendency, fractal analysis run down as the age progressed. Fractal analysis ran down rapidly at Light 3 in 150 B.C. and at Light 4 in 100 AC. As the fractal analysis proceeded, Light 5 and Light 4 showed approximate contrasts.

Analysis of every point

Fractal analysis showed little contrast at Light 1 in every age. Fractal analysis at Light 2 and Light 3 ran down rapidly in 150 B.C. At 100 A.D., the contrast was small. Fractal analysis of the contrast at Light 4 and Light 5 ran down in a phased manner. Fractal analysis at Light 4 ran down the most.



Fractal Dimentiom	BC300	BC150	AD100
Light-1	1.8636	1.8587	1.8333
Light-2	1.8955	1.807	1.7969
Light-3	1.9539	1.8119	1.7947
Light-4	1.9153	1.8585	1.7524
Light-5	1.9733	1.9167	1.8958

Fig.8 Fractal dimension

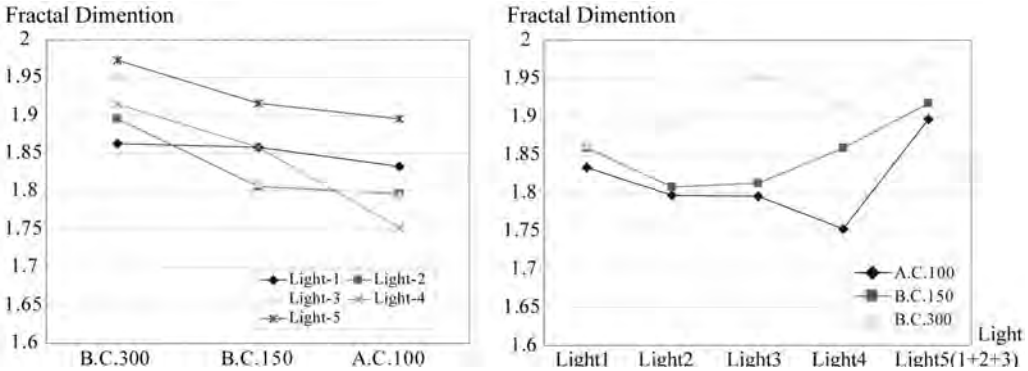


Fig.9 The change Fractal dimension (Every age. Every point)

6. CONCLUSION

In this study, we used fractal analysis to examine the transitions in the arrangement of facilities from construction to collapse. Agora with small-scale naos in 300 B.C. had high fractal analysis. In 150 B.C., Fractal analyses showed drastic decreases at both Light 3, where very large-scale commercial facilities were constructed along the south side of the road, and at Light 2, which was located between the commercial facilities on the south and the east sides. Fractal analysis at Light 1 hold down height comparatively set along the road there were no commercial facilities. In 100 A.C., however, construction of very large-scale public facilities at the center of the agora ran down the fractal analysis of the whole agora. It is believed that the above process caused the changes in the agora.
In this paper, the authors 1) restored the agora using image processing technology, 2) constructed a three-dimensional analytical method for system of site planning of Dokishiades using fractal dimensional analyses, and 3) examined the "implicit structure" of space on changes in ancient city agora from the viewpoint of complex systems theory. The authors believe that these techniques and analyses provide a new and effective viewpoint for examining and planning plazas.

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THE MORRO DA QUEIMADA ARCHAEOLOGICAL PARK PROJECT, OURO PRETO, MG-BRAZIL

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ABSTRACT

On April 18, 1881, during one of his many visits to Ouro Preto, Dom Pedro II found an important archaeological site on *Morro da Queimada* (Burnt Hill). The Emperor, erudite and widely-traveled, wrote in his journal that these ruins reminded him of Pompeii, the Roman city buried by the eruption of Mount Vesuvius in 79 AD, discovered in 1748 and today a famous archeological site, visited by specialists and tourists the world over.

The archaeological site *of Morro da Queimada* similarly has its origin in tragedy. Also known as "*Morro do Paschoal*" or the Village of *Ouro Podre*, it was one of the earliest settlements in Ouro Preto. It was destroyed in 1720, following the revolt led by Felipe dos Santos against the increased taxes imposed by the Portuguese Crown (Fig. 1). After its destruction by fire on the orders of the Count Assumar, the area was renamed *Morro da Queimada* and the population transferred to the nearby *Arraiais*. Felipe dos Santos was hanged, his corpse then tied by the legs to a horse´s tail and torn to pieces. As a result of the *Sedição de Vila Rica* in 1720, the establishment of the proposed Royal minting houses was postponed, and Minas Gerais became an administrative region independent of the *Capitania* of São Paulo.

Figure 1: The Execution of Felipe dos Santos, July 1720
Reconstruction by Antônio Parreiras
(Museu Antônio Parrieras, Niteroi, RJ, Brazil)

Morro da Queimada today constitutes a priceless archaeological site, a concrete record of the first urban architectonical typologies of Minas Gerais, evidence of the gold rush at the beginning of the 18th century, and a remnant of one of the most dramatic moments in the history of Colonial Brazil. Besides the ruins of old buildings, in the area may be found the remains of the many gold mines that dot the hillside: hollowed shelters carved out of rock, long galleries, ventilation shafts and entrance tunnels. Still found on this archaeological site are *mundéus*, reservoirs constructed for the washing of ore, small dams, water diversion channels, and hydraulic systems used for transporting slurries of water and mud mixed with gold.

1. DEVELOPMENT

In recent decades, *Morro da Queimada* as an archaeological site has become corrupted due to the chaotic growth of the City of Ouro Preto. In the absence of urban planning, the site was occupied, the ruins being used by the population for building material, and the surviving structures employed as foundations for new constructions (Fig. 2). The lack of protection for the archaeological remains on *Morro da Queimada* in Ouro Preto constitutes one of the more serious cases of neglect of cultural heritage by the various levels of government.

In April, 2003 UNESCO identified the preservation of the archaeological site at *Morro da Queimada* as one of the measures necessary to halt the alarming deterioration of the cultural and environmental heritage of Ouro Preto.

Figure 2: Irregular occupation of *Morro da Queimada*
(IPHAN archives, Ouro Preto, MG, Brazil)

2. RESULTS

Following this warning, the *Instituto do Patrimônio Histórico Artístico Nacional-IPHAN* (National Institute for Historical and Artistic Heritage) established work groups necessary for the preparation of a pilot project for an archeological park in the area. This project sought to create a substantial and positive impact on the City of Ouro Preto by means of the following:

- expansion of historical research and the creation of programs for archaeological excavations, facilitating a wider knowledge of mining history and the material culture of the period;
- protection and classification of the ruins dating from the earliest settlements in Ouro Preto (Fig. 3);
- preservation of the memory of Felipe dos Santos and of the *Sedição de Vila Rica* in 1720;
- creation of an ecological and archeological museum for the towns which emerged during the "Gold Cycle";
- creation of a unusual option distinct from the traditional tourist circuit, to encourage visitors to extend their stay in the area;
- protection of a meaningful part of the landscape, including the urban and architectural complex of Ouro Preto;
- improvement in the quality of life and social inclusion of the nearby

communities, creating new employment and business opportunities, as well as ensuring the economic sustainability of the project.

Figure 3: View of part of the ruins at *Morro da Queimada*
(IPHAN archives, Ouro Preto, MG, Brazil)

During 2006, various plans for public works were developed, including the following:

- demolition of the recent constructions inside the park (Fig. 4); the families concerned were relocated to new homes designed for improved quality of life;
- delineation of the area of the park and creation of the park program (Fig.5);
- creation of an ecological museum, in line with the requirements of the local population in the nearby areas, so as to encourage social and cultural relationships that would facilitate social development based on the elements of living space, society and heritage.

Figure 4: Demolition of irregular constructions
(IPHAN archives, Ouro Preto, MG, Brazil)

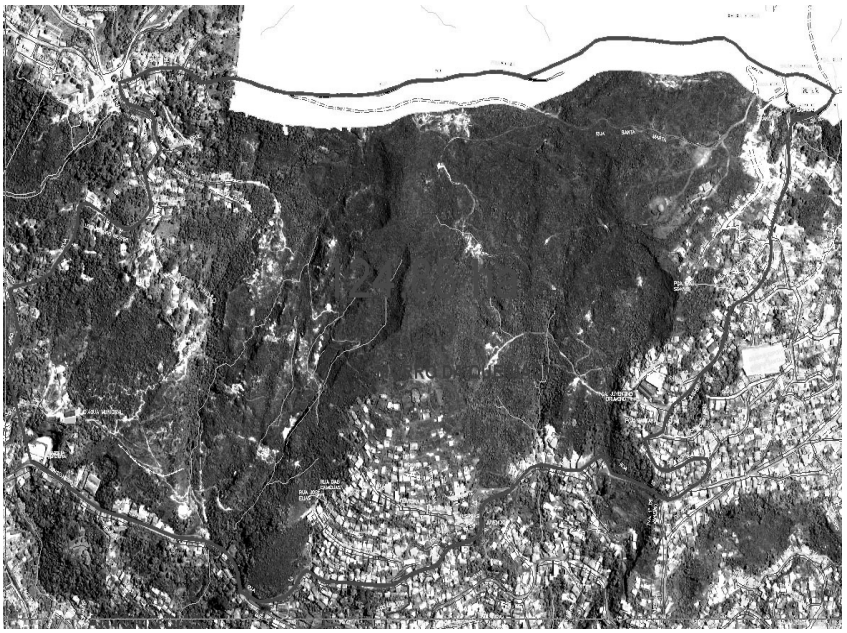

Figure 5: Aerial view of the park: area of 124.88 hectares
(IPHAN archives, Ouro Preto, MG, Brazil)

3. CONCLUSION

The challenge – to implant in the community a modern approach to sustainable development that takes into consideration the preservation of the natural and cultural heritage of the city –requires concerted action from all parties concerned.

This project is supported by several public and religious institutions, including the following: The United Nations Educational, Scientific and Cultural Organization - UNESCO, *Instituto do Patrimônio Histórico Artístico Nacional - IPHAN*, The Federal University of Ouro Preto – UFOP, State Institute for Historical and Artistic Heritage – IEPHA, the State Forestry Foundation – IEF, the State Public Funding Agency and *Museu de Arte Sacra do Carmo* of the parish of *Nossa Senhora do Pilar*. In addition, there is support from various NGO´s, such as the *Associação de Proteção Ambiental Ouro Preto –APAOP* (Ouro Preto Environmental Protection Association), the *Amigos do Patimônio Cultural e Natural de Ouro Preto - AMO Ouro Preto* (Friends of the Cultural and Natural Heritage of Ouro Preto) and the *Federação das Associações de Moradores de Ouro Preto- FAMOP* (Federation of Residents Associations of Ouro Preto).

This project was formally proposed by the *Museu de Arte Sacra do Carmo*, based at the *Paróquia de Nossa Senhora do Pilar*, and was approved during the last meeting of the *Conselho Nacional de Incentivo à Cultura – CNIC (*National Committee for the Promotion of Culture), under the auspices of MinC – the Federal Ministry for Culture, and sponsored by the *Programa Petrobras Cultural* and the *Caixa Econômica Federal (*Federal Development Bank).

Figure 6: View overlooking Ouro Preto from Morro da Queimada
(IPHAN archives, Ouro Preto, MG, Brazil)

Morro da Queimada is a site endowed with rare natural beauty, from where it is possible to obtain a unique view overlooking the historical centre of Ouro Preto, and the Peak of Itacolomi, which guided the first European settlers, the bandeirantes, to the area, , and, still to this day, a symbol of the city (Fig. 6). The

creation of the archaeological park of Morro da Queimada is one of the most important recent undertakings in Ouro Preto, and the realization of this project will be as important to the city as the Acropolis is for Athens or the Palatine Hill and the Ancient Forum are for Rome.

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THE MARMARAY PROJECT AND HISTORICAL HERITAGE

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ABSTRACT

This paper presents the Marmaray Project and explains its impact on Istanbul. The Marmaray Project provides a 76 km long new railway system and 40 new stations for Istanbul, of which 13.4 km railway and 3 stations lie underground. During the excavations in Istanbul, a history reaching back 8000 years was uncovered. In this paper, the efforts for preserving the historical heritage and information about the archaeological findings are presented.

1. THE MARMARAY PROJECT

The Project provides an upgrading of the commuter rail system in Istanbul, connecting Halkalı on the European side with Gebze on the Asian side with an uninterrupted, modern, high-capacity commuter rail system.

Railway tracks on both sides of the Istanbul Strait will be connected to each other through a railway tunnel under the Istanbul Strait. The line goes underground at Yedikule, continues through Yenikapı and Sirkeci new underground stations, passes under the Istanbul Strait, connects up with Üsküdar new underground station and emerges at Sögütlüçesme (Figure 1).

This Project is presently one of the major transportation infrastructure projects in the world. The entire length of the upgraded and new railway system is approx. 76 km. .The main structures and systems include an immersed tube tunnel, bored and cut-and-cover tunnels, at-grade structures, three new underground stations, 37 new surface stations, Operation Control Centres, workshop and maintenance facilities, the upgrading of existing tracks including the construction of a new

third track on ground level, completely new electrical and mechanical systems and the procurement of modern railway vehicles.

Figure 1

1.1. Special Challenges

The Marmaray Project offers many special challenges of which the most important ones are as follows:

- The Immersed Tunnel under the Istanbul Strait is the deepest built so far, with its deepest point being some 58m below water surface.
- Istanbul and its surrounding will most likely experience a seismic event of up to 7.5 magnitude during the lifetime of the Project
- The ultimate capacity of the Commuter Rail system is not less than 75,000 passengers per hour per direction . This necessitates special safety provisions for the tunnels and deep stations.
- The marine work has to be performed in very deep waters in a waterway that carries more than 50,000 ships each year, with a cross traffic of a vast number of ferries and passenger boats from one shore to the other.
- The deep stations and tunnels will have to be constructed in an area where history can be traced back more than 8,000 years in time. Preservation and rescuing of Historical Heritage is therefore a special focus point.

2. HISTORICAL HERITAGE

The cultural artifacts unearthed during archaeological excavations in Istanbul, a town whose history stretches far back, are providing valuable information on Istanbul's archaeology and history. The archaeological excavations and the findings are explained in terms of their locations.

2.1. Yenikapı

The Langa area at Yenikapı was in Byzantine times the port of Istanbul to the Marmara Sea and was referred to as the Theodosius Harbour. Commerce by ship

and therefore ports played an important role in the development and growth of the new capital Constantinopolis founded by the Roman Emperor Constantine. An area of 26.250 m^2 in total (Figure 2) is being excavated at Yenikapı.

The cultural assets uncovered during the excavations show great diversity in period and materials. This diversity is normal considering the area was a port in antique times. The fact that in Ottoman times the harbour was filled with soil brought in from other parts increases the diversity of the findings. Amongst the findings, are terracotta containers, metal coins, leather sandals, oil lamps, metal objects, wooden combs, pieces of containers ornamented with human and animal figures, and pieces of Ottoman tiles and ceramics. The pieces are restored in the workshops on the excavation site, undergo a conservation process and are then transported to the Archaeological Museums.

Figure 2

2.1.1. Ottoman Findings

The first excavated layer revealed ceramic remains from the Late Ottoman period. The architectural findings were structures constructed with a dry wall technique. The findings indicate that towards the end of the 19th century this area was involved in pharmaceutical and medical production. Amongst the findings there are a full bottle of mercury and a bottle top labelled enema.

2.1.2. Ship wrecks

In the East area at a depth of -1.10 m, a large number of processed wooden artefacts and pieces of rope were discovered. The excavation area was extended. It became clear that a ship full of amphoras from the 11th century had sank at Theodosius harbour and had remained buried under the mudd when the area filled

up. The sunken ship was documented and moved to a conservation pool by Assoc. Prof. Dr. Cemal Pulak.

The present length of the ship remain measures 6.5 m, but based on collected data the ship was 10-12 m long, without a deck and with a single mast (originally there were decks at the front and back of the ship). It was probably build in the Marmara region and had been modified before it sunk. Iron anchors were found on board which would have been very valuable at that time. Hundreds of wrought iron rails had been used during maintenance, and its rail had been raised to enable the ship to carry more freight. Oak had been used extensively.

20 ships were uncovered so far during the excavations. Amongst these are commercial ships of varying sizes, small fishing boats and boats with long oars. After measurement surveys and documentation work the ships are transferred by experts to special pools where for a period of 5 years they undergo conservation work. Following this treatment they are ready to be exhibited.

Naval power was very important to Byzantine. The ships uncovered provide valuable information on the design and construction methods of Byzantine ships, their load-baring capacity and the conditions under which they operated. The research undertaken by the experts will reveal information unequalled in importance on Byzantine fleet ships and the constructions methods used in the Middle Ages.

2.1.3. West Area

In the west part of the excavation site, architectural remains of different periods ranging from 4th century BC to 13th century AC were discovered. The most important finding was a wall, built of connecting cut stones and plastered with Khorasan plaster, approximately 51 m long and 4.20 m wide. Some scientists believe that this is the 'Constantinus city wall' built by the Roman Emperor Constantinus I. Maximus (324-337). No remains of the Constantinus city wall were uncovered until today, therefore views about its alignment vary, but further excavation on site will reveal new information.

One of the most important findings in the area is what is thought to be a Potern from the 4th century BC (Figure 3). A large number of oil lamps were found in this arched brick structure of which 11 meters are visible. Although some researchers believe that it could be a waste water canal, the presence of oil lamps makes it more likely to be a Potern. The structure dates from the same period as the city walls presumed to be from the Constantine period, and a connection needs to be established between these two structures.

Harbour rocks and remains of a breakwater were also found in this area. Right in front of the harbour, two parallel rows of wooden poles run for a length of 43 m, suggestive of a jetty as an extension of the quay. The area seems to form the land side of the former harbour, in other words it was on shore. This believe is supported by the fact that remains of a hypogeum were found, which by its construction technique can be dated back to the 11th century, and remains of the

city wall from the II Theodosius period. on which bricks with Byzantine imprinted stamps were found.

Figure 3

From the interwoven remains of different periods we can easily follow Istanbul's historical development, and that of harbours and their surroundings. Therefore the Preservation Committee decided that this area should be 'preserved and turned into an archaeological park area'. Following this decision the TCDD station planned at this location was cancelled and the design work which allows preservation of this part was commenced. Passengers who come to use the Metro and Marmaray stations will be able to view the findings in a museum on this site and gain information on the cultural assets recovered during the historical harbour excavations.

2.1.4. Calcolytic and Old Bronze Age Findings

During the archaeological excavations on the East side, at - 6.60 m elevation below the Theodosius harbour remains, a fill layer dating back 8,000 years and ceramic pieces from the Calcolytic and Old Bronze Age were discovered. It is hoped that these findings will complete missing parts of Istanbul's prehistory. It is possible that the ceramic pieces originated from this location, or they may have been carried down by the Lykos stream from other settlements. Looking at the large size of the pieces and the fact that they have not been subjected to friction and have preserved their hard outlines, the idea that there was a settlement at this location becomes more likely. The presence of architectural elements with foundations consisting of large sea rocks laid in a particular arrangement and plan, and with wooden upright structures, are signs which support our theory that these are houses from the Calcolytic period. The findings have been documented.

The layered marine fill between the sunken ships from the 11th century AC and the architectural remains from the Calcolytic period form a valuable source of information that helps to understand the changes which the Marmara Sea underwent in the past 10,000 years. A geo-archaeological investigation performed in such an area will provide important information on both the neolytic settlements of which there are no traces on the North and East shores of the Marmara Sea, and on the changes in sea levels in the Late Holsen period.

In order to research the changes in the stream mouth, bed and shoreline of the stream Lykos which flowed into the antique harbour, and in order to establish the factors which caused the flooding of the settlement in the Neolytic and Calcolytic periods, Istanbul University together with with the relevant departments of some other universities and Istanbul Archaeological Museum commenced a project named "A geo-archaeological investigation of Yenikapı Antique Harbour / examination of 10,000 years of cultural and geological inheritance in Istanbul" .

2.2. Üsküdar

In the archaeological excavations on the site of the Marmaray Üsküdar station in Üsküdar square, the remains of foundations of an Arasta (market) were uncovered. Their presence is mentioned in various sources. Drawings were made of the plan of the remains, there measurement surveys were prepared and they were documented. In the same area, architectural remains of a tannery which is shown on the Pervititch maps, were discovered. It is thought that this is one of the two tanneries mentioned in the same source. The wooden barrels of the tannery were documented and removed by experts of the Istanbul University Restoration and Conservation department so that their former function can be established and they can be displayed in a future Leather Work Museum.

Only the architectural remains of the upper layers were uncovered during our work. The lower layers were reached through boreholes dug in certain places. The boreholes reached a depth of -7 meters. At this layer archaeological materials were found in the filled soil. During the excavations no architectural pieces from the Byzantine or earlier periods were found, but after a depth of - 4 m Roman, late Roman and Byzantine oil lamps and Byzantine stamp prints and coins were discovered.

These findings show that, as mentioned in the antique sources, this area was previously a bay, but was filled between 16-18 century, was opened up to residential use and the settlements whose architectural remains we found, were built.

2.2.1. The Religious Building

The findings uncovered during the archaeological excavations near the Ahmet III Fountain and Mihrimah Sultan Mosque are very significant, particularly with regard to the Byzantine history of Üsküdar.

The foundation remains of the apsidal structure uncovered during these excavations are a sign that this location is no longer part of the original bay but

that we are now on land, as the excavation results show that the structure is not built on a filled ground. The plan and materials of the structure which we think is the foundation of a religious building, can be dated back to 12-13 century BC.

Figure 4

The discovery of a Temenos wall outside the square-planned structure makes it all the more interesting. This religious building must have been a church or a chapel or a Martyrion. It must be noted that the axis of the building does not lie exactly in a east-west direction. More than 25 skeletons were found inside the building and between the building and the Temenos wall, and these were documented and sent to Ankara University, DTC Faculty Antropology department for investigation.(Figure 4). During the construction of the building the walls were built on top of the knees of some of the skeletons but the skeletons remained whole, which shows that the apsidal structure was built at a later date than the burial. Detailed work is continuing on this structure which we believe will throw light on Üsküdar's Byzantine period.

2.2.2. The Harbour

The rows of stones uncovered near Ahmet III Fountain indicate that there was a harbour on the shore of the bay. We cannot follow the monoblock stones further as they continue under the Ahmet III Fountain.

However, when we look at the close distance between the rows of monoblock stones and at the location of these and the apsidal structure as a whole, we gain information which will enable us to determine where the shoreline between land and bay used to run.

The excavations in this area revealed surprising findings. Fired and tarred wooden logs, parallel to each other, found at -0.50 m, form the structure of a pier. The logs are situated at the point where Bülbül creek and Çavuş creek join up. Small and large nails and wooden joints were used at the connection points of the

logs. Around this formation which resembles the ship building methods of the antique era, pieces of pottery and crockery from the Byzantine era were found. The data obtained strongly points at the likelihood that these in-situ remains were constructed in Byzantine times.

During the borehole investigations, remains of ancient pottery and crockery were discovered at a deeper level. Although architectural remains were not encountered, the small findings may well be an indication that there was an ancient settlement in this area. It is also possible that these findings were carried into the area by the creeks Çavuş and Bülbül.

2.3. Sirkeci

The archaeological excavations conducted under the Marmaray project at Sirkeci station North and South entrance areas and West and East shafts provide a great opportunity to establish the stratygraphy of a densely populated city like Istanbul. During geological boreholes excavations in 2004 we reached archeological findings at a depth of -11.50 m in the West shaft area, and -12.70 m in the East shaft area. The findings themselves and the depths of the layers in which they were encountered point at a historical development starting in the 6th century BC and continuing up to today.

The initial stages of the excavation work in the West Shaft and East Shaft areas are now completed. The first layer uncovered showed traces of the cultural phase of the Ottoman period. The non-movable cultural assets in the form of architectural remains found here are thought to belong to the end of the Ottoman period. This is confirmed by 19th and 20th century maps of Istanbul. It will only be possible to establish the stratigraphy of this area once the upper layer has been documented and removed and the lower layers are reached. .

3. CONCLUSIONS

The excavations carried out within the scope of the Marmaray Project offer a good opportunity for archaeologists to throw light on Istanbul's history. Without this project we would not have known about the non-movable cultural assets discovered at Yenikapı and Üsküdar, in particular the Byzantine Theodosius harbour and the sunken ships which the mud had swallowed up and preserved undamaged until this day. Preservation of cultural assets and modern progress are not incompatible opposites. One cannot be sacrificed for the other.

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SITE CONSERVATION AT LIMAN TEPE

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ABSTRACT

This is an overview of the conservation work performed on the site of Liman Tepe. Located on a small peninsula in the Izmir region of western Turkey, Liman Tepe was inhabited from the Neolithic to the Late Bronze Age, and into the Classical Period, when it was known as Clazomenai. The excavations at Liman Tepe are conducted by the Izmir Region Excavations and Research Project (IRERP), under the direction of Prof. Dr. Hayat Erkanal.

The site, in excellent condition when excavated, soon faced the usual problems deriving from exposure to the environment. The conservators' approach to these issues at Liman Tepe was similar to what would have been done in ancient times when repairing or maintaining buildings and homes. Whenever possible, traditional techniques and materials were used.

The immediate goal was to support the walls and structures, thus protecting them from damage or even collapse until a more comprehensive and large-scaled preservation plan, such as a shelter, can be put into place.

The primary conservation/restoration process included the following stages:

- Documenting the site with photos, drawings, and maps;
- Cleaning the ancient mortar from between the stones;
- Preparing and applying new mortar.

The walls, the layout, the structure, and the materials used in building any settlement contain a wealth of invaluable information; the chronology, the building techniques, the organization of society and even the means of destruction are all issues that can be inferred and understood by studying the stones and walls of a site.

1. INTRODUCTION

Several periods are represented at Liman Tepe, however, the conservation work started on the Early Bronze Age (EBA) fortified settlement, with its massive walls and horse-shoe shaped bastions -- comparable to those at Lerna, Naxos-Panormos, Aegina and Palamari Skyros. The EBA site also includes several administrative buildings, an upper and lower town, and a harbor complex. These features, along with its ideal location, suggest that EBA Liman Tepe was a well-organized urban center, which seems to have played an important role in trade within the Aegean [1].

It was decided that the site conservation work should begin on two sectors of the settlement selected by the archaeologists for their historical importance as well as for the frailty of their condition. One section consisted of the EBAI fortification walls. The other section consisted of the storage compartments of an administrative complex (Figures: 1 and 2) and a staircase from the Late EBAII.

Figure 1: Storage compartments before conservation.

Figure 2: After conservation.

At this point it would be useful to stress the difference between the renovation and the conservation of a site. Renovation is a rather complicated and difficult procedure, which requires years of planning, and strong evidence for the way the buildings were before the destruction.

Conservation, as was applied at Liman Tepe, is meant mainly to support excavated walls and other constructions in the positions in which they were found (Figure: 3), starting with the ones that were the most endangered. The goal should be to maintain the character of the site aesthetically and architecturally.

Figure 3: After conservation, left in position as found.

2. TECHNICAL DEVELOPMENT

2.1. Methodology

Materials in conservation need to be extensively tested before application. Strength and weathering tests should be performed in laboratory conditions; such tests are commonly done for most important sites, and hopefully will become routine for all sites, even smaller ones.

Of course, any added or new material, even if tested, requires much caution. Widespread use of armed concrete in the last century has caused one of the biggest problems faced by conservators today, and has damaged numerous monuments and sites beyond repair.

Nevertheless, as our use and understanding of materials evolve, we can only attempt to improve what we have at hand, and avoid repeating the mistakes of the past.

At Liman Tepe, preliminary mortar trials were carried out two years before work began. The urgent nature of the project, however, mostly required the use of tried-and-true techniques and materials. Indeed, although somewhat modified and hopefully improved, our methods should be considered a continuation of ancient techniques, tested over the years on similar cases.

In the present case, a mortar strong enough to hold the walls, but still soft enough to be removed, was considered ideal. The color and the texture of the new mortar were taken under equal consideration. Although there was no attempt to reconstruct the walls back to their original form, the areas to be worked on were carefully documented with photos and drawings. The stones were numbered and recorded to facilitate their removal and replacement.

2.2. Application

The cleaning of the old mortar – or soil, in the case of Liman Tepe -- is important and time-consuming work. Small picks, but also specially made hooks, were used in order to scrape away the soil between the stones (Figure: 4). Next, the walls were thoroughly hosed with water, removing any last remaining soil, and preparing the surface for the new mortar.

Figure 4: Cleaning of the old mortar

The next step was the preparation and the application of the new mortar (or the “mud”, as the old Greek construction-workers call it). The mixing and the application of the mortar were done with traditional methods and tools. The mortar that was used at Liman Tepe consisted of the following ingredients and portions:

Table 1

#	Material	Parts
I	Sand	4
II	Pozzolanic Earth	1
III	Lime	1
IV	Pottery Dust	1
V	White Cement	1

Pozzolanic earth is a porous volcanic ash commonly used in hydraulic mortars. When mixed with cement, it hardens either in air or under water. White

cement is preferred to grey cement because it produces less salts, although very small amounts of grey cement is commonly used for extra strengthening purposes, even nowadays. Pottery dust is an additional aggregate, also included for color and texture.

The above formula was previously used and tested over the years at the prehistoric sites of Kommos and Kato Zakros, with slight variations in order to achieve the most structurally and aesthetically suitable result for each site. All the sites mentioned have similar environmental conditions and the same two major destructive factors: humidity, and sea-salt carried by strong winds. Temperature fluctuations and rain frequency are comparable from site to site.

Once applied, the mortar needs to be pressed firmly between the stones, filling all the gaps, and also reducing as much porosity as possible, thus sealing the structure against humidity. This is important, as water can infiltrate through cracks in the mortar, carrying salts, which, once the water has evaporated, crystallize and expand, eventually causing major damage to the structure and to the site.

Next, the excess mortar is cleaned away, and the surfaces of the stones are brushed. Once the stones are properly revealed and clean, soil collected from the surrounding area is thrown onto the damp mortar. This added soil does not affect the physical or chemical characteristics of the mortar, and is applied only for esthetic purposes. Although the new mortar will now blend in with the general environment of the site, it will still be visible and distinguishable from the original, as according to conservation ethics.

For the next few days, it is important to regularly wet the fresh mortar, thus ensuring its proper hardening.

3. FUTURE PRESERVATION

The work at Liman Tepe is only the first step in what will be years of work to come. It should be noted that the conservation described here has only a limited life and needs to be reapplied periodically. A long-lasting treatment requires the collaboration of architects and engineers, who can help with the building of a shelter, and with the construction of a water-draining system.

When backfilling is not an option, the safest way to preserve a site is to protect it with a shelter, which, together with a carefully chosen and well-applied conservation treatment, offers the most efficient solution. It is important as well to regularly clean the site of any naturally occurring flora, as plant roots can cause structural damage. In addition, it is helpful during excavations to have the presence of an experienced conservator for any first-aid conservation that might be needed.

4. CONCLUSION

Today, the site of Liman Tepe is crossed by a highway and half buried under modern buildings (Figure: 5). Although Liman Tepe, as any site, is vulnerable to elements beyond our control, such as urbanization, weather fluctuations and rising sea levels, it is vital to save and preserve what we can for generations to come.

Due to the large number of sites presently threatened, it is urgent to promote the exchange of information, to determine common problems and solutions, and to coordinate efforts in order to improve the preservation of these important monuments.

Typical site conservation requires only a minimal investment: common building equipment, ordinary materials, manpower and, of course, the will. By investing a little today, we can preserve a wealth of information about past civilizations.

Figure 5: Liman Tepe, crossed by a highway.

ACKNOWLEDGEMENTS

We would like to thank Prof. Dr. Hayat Erkanal for giving us the opportunity to work on the site; Dr. Vasif Sahoglu, Dr. Eleni Nodaru, and Etienne Baxter for their ongoing support and proof-reading skills; INSTAP for co-funding the project.

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INTERDISCIPLINARY ASSESSMENT OF A ROMAN TEMPLE: ANTIOCHEIA AD KRAGOS (GAZIPAŞA, TURKEY)

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ABSTRACT

A collapsed Roman temple, probably dedicated to an as yet unknown emperor, exists in a ruined state on a mound above the ancient city of Antiocheia ad Kragos near Gazipaşa on the south central coast of Turkey. An international team of scholars from the fields of art history, classics, archaeology and architectural engineering are assessing the structure, excavating its remains, and probing the interior with non-invasive technology.

1. INTRODUCTION: ROUGH CILICIA ARCHAEOLGICAL SURVEY PROJECT

Since 1996 The Rough Cilicia Archaeological Project (RCAP) has surveyed much of the landscape along a 60 km coastal strip in southern Turkey. In antiquity the survey area formed the boundary between eastern Pamphylia and western Rough Cilicia. In modern terms the RCAP area rests within the confines of two provinces (Antalya and Icel), encompassing three districts (Alanya, Gazipaşa, and Kaledran). The survey zone extended from the coast inland approximately 25 km into the foothills of the Taurus mountains. Within this narrowly enclosed basin, a number of urban communities thrived at the height of the Roman Era. Along the coast, between Alanya and Anamur, stood five cities whose names are well established even if the sites themselves have received little scholarly attention: Iotape, Selinus, Kestros, Nephelis, and Antiocheia ad Kragos. The main thrust of the architectural component of RCAP had been to document and record the

physical remains of these cities and other numerous villages and minor sites within the survey zone. Numerous articles on project research by team members have already appeared and final reports of the survey phase are currently being prepared for publication.

In the summer of 2004, project personnel, the Alanya museum director, representatives of the Archaeological Directorate in Ankara, and municipal and district government officials, discussed an opportunity to begin limited excavation at Antiocheia. These officials indicated their willingness to permit an investigation of a collapsed imperial temple at the site, followed by restoration, at least partial, of the temple. All parties have agreed that the project would be a collaborative venture between RCAP and the Alanya Museum, with an understanding that the excavation of the temple and its blocks would be a prelude to wider-scale excavation in future seasons. This new project, the Antiocheia ad Kragos Archaeological Research Project (AKARP) will focus exclusively on the archaeology of the Roman city.

2. ANTIOCHEIA AD KRAGOS: TOPOGRAPHY AND HISTORY

The site of Antiocheia is located approximately 20 km southeast of Gazipaşa. The remains of the city can still be seen throughout the small village of Güney Köy that occupies much of the site today. Antiocheia in reality comprises two sites: a large, cliff-ringed promontory that juts out into the sea that has remains of Byzantine era fortification walls and Christian chapels, and the center of the city, higher up the slope towards the northeast. To the west of the promontory is a sheltered inlet that served as the harbor for the ancient city. The upper site was constructed on primarily sloping ground that descends from the Taurus range down to the sea. In spite of the fact that the city lies directly on the coast, the city center is placed over 400 meters above sea level and is protected on several sides by cliffs and steep slopes that offered protection from sea borne attack. The portion of the site where ancient architecture is still preserved within the modern confines of the village of Güney occupies a large territory, over 24 ha in area.

Historically the site with its harbor likely served as one of the havens for the Cilician pirates who operated from these shores and preyed upon shipping and coastal communities of the eastern Mediterranean during the first half of the first century B.C. Pompey ended the pirate scourge in 67 with a naval victory at nearby Korakesion (Alanya). No traces of Antiocheia's pirate past survive among the remains visible today. Antiochos, client-king under the emperor Gaius (ruled A.D. 38 – 72), founded the city and named it after himself. At Antiochos' death the city fell under direct Roman control.

3. NORTHEAST TEMPLE: INITIAL RESEARCH

Prior to this project's activities, the site had never been thoroughly examined, much less excavated. In the mid-1960s Antiocheia was among the cities of Rough

Cilicia described by Alföldi-Rosenbaum who included a schematic plan of the site and drawings of some, but by no means all, visible structures [1]. Among the surviving identifiable structures in the upper city center there include a colonnaded street with strong gates, serving as the principal entry into the city, a colonnaded peristyle, perhaps serving as the city agora, bath buildings, several churches, and tombs. Not recorded by Alföldi-Rosenbaum are the collapsed remains of a temple, located on the upper reaches of the ridge above and northeast of the gate, in a prominent position overlooking the city center below. The remains have received scant attention by scholars. Bean and Mitford, in an epigraphical study of the region, recorded inscribed dice oracles on a pair of wall blocks from the structure [2].

In the 2005 research season the AKARP team, comprised of researchers in archaeology, art history, classics, and architectural engineering, began to investigate the temple methodically [9].

Figure 1. Architectural Remains of collapsed Temple at Antiocheia ad Kragos

Once the debris mound was fully cleared, each block was catalogued, sketched, photographed and surveyed with a Total Station in order to create an actual state plan of the structure (Figures: 1 and 2). In that initial field season over 270 blocks were catalogued and brought into the state plan. Additional blocks lie below the top layer and are therefore not yet catalogued. Atop the mound several blocks that constitute a remnant of the wall foundations can be observed still in situ, but for the most part the outline of the walls is still obscured by earth and debris.

In spite of the ruinous mound of blocks several preliminary observations may be made. Raised on a podium, the temple itself was constructed with blocks of white marble, the provenience of which is currently unknown but appears similar to that used in the newly-identified temple to Trajan at Selinus.

Figure 2. Antiocheia ad Kragos. Temple state plan

In plan, the temple measures approximately 8 meters by 13 meters, which makes the structure the largest temple in the region. There is apparently a single chamber in the interior. Broad stairs facing southwest led to a tetrastyle in antis porch. Columns with Corinthian capitals graced only the porch, typical of podium-style temples. The structure was nonetheless ornately decorated, with relief mouldings of floral, geometric and mythological designs carved on the porch's architrave soffits. The pediment over the southern end contains a bust (clipeus), presumably a representation of an emperor in the manner of Apollo carrying a bow and quiver, enclosed within an oak wreath that is borne by two flanking winged Victories (Figure: 3). It was an imposing and handsome temple that, based on preliminary stylistic evidence, appears to date to the early third century A.D.

4. 2007/2008 RESEARCH PROGRAMS

The labor in moving over 270 blocks, plus documentation, will require two seasons of approximately four to five weeks each. The primary research envisioned for each season involves the removal of blocks from the mound to an adjacent field for study and the excavation of the podium. In order to study the blocks completely, it is necessary to lift them from their fallen position. In many cases the blocks are upside down or their decorated faces are obscured. Other blocks are partially buried in the ground thus requiring some excavation to dislodge them. There is also a conservation issue that needs addressing. As they are currently situated one on top of the other, the blocks are breaking along stress points due to their own weight. In addition, shrubs and bushes with deep root

systems are pushing against the blocks, in some cases causing damage to the stone.

Figure 3. Antiocheia ad Kragos. Temple pediment

This is particularly a problem with the podium blocks as roots are pushing the blocks out of place or damaging them. Moving the blocks to the adjacent field will provide them protection as they will be arranged upon wood skids keeping them off the ground and affording minimal contact with each other. One other problem has emerged in recent years, namely looting. Looters have broken blocks while digging into the ground in an effort to find antiquities. The project hopes to avoid looting incidents in the future by educating the local villagers about the project's activities and to press upon them that protecting their heritage is in their best interests.

In order to move the blocks to an adjacent field for complete study, AKARP will lease a heavy truck crane with rotating and telescoping boom that is rated to carry a load of up to two tons at full extension. Based on the number of blocks that need to be moved and studied, it is estimated that approximately 156 hours of crane operation in the first field season will be required. This estimate should allow the removal about half the blocks to the block field. Heavy hemp rope, looped under the blocks, will be used to protect the stone during the lifting operation. This technique has been used with success at the reconstruction of the Temple of Zeus at Nemea (Greece). Individual blocks will be placed on wood skids for study access. Trained students will be charged with the task of drawing blocks and completing the measurements begun in 2005. Blocks newly exposed from the lifting of the upper layer will be surveyed to add to the state plan.

Many blocks are embedded in the soil to various depths. This will require excavation around the blocks that will be done in a controlled archaeological environment. In addition, accumulated fill will be removed from the structure's interior to reveal the form of the podium. Finally, as the hundreds of blocks are

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