

THE TRADITIONAL ARTS AND CRAFTS OF TURNERY OR MASHRABIYA

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CAPSTONE ABSTRACT

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For centuries, the *mashrabiya* as a traditional architectural element has been recognized and used by a broad spectrum of Muslim and non-Muslim nations. In addition to its aesthetic appeal and social component, the element was used to control natural ventilation and light. This paper will analyze the phenomenon of its use socially, historically, artistically and environmentally. The paper will investigate in depth the typology of the screen; how the different techniques, forms and designs affect the function of channeling direct sunlight, generating air flow, increasing humidity, and therefore, regulating or conditioning the internal climate of a space. Also, in relation to cultural values and social norms, one can ask how the craft functioned, and how certain characteristics of the *mashrabiya* were developed to meet various needs. Finally, the study of its construction will be considered in relation to artistic representation, abstract geometry, as well as other elements of its production.

Table of Contents

| | |
|--|----|
| Abstract..... | ii |
| List of Illustrations..... | iv |
| Introduction..... | 1 |
| Chapter One: Background | |
| 1.1. Etymology..... | 3 |
| 1.2. Description..... | 6 |
| 1.3. Origin and History..... | 8 |
| Chapter Two: The construction of Mashrabiya | |
| 2.1. Structures and Mechanism..... | 12 |
| 2.2. Pattern and Design..... | 18 |
| Chapter Three: Craftsmanship and Woodwork | |
| 3.1. Craftsmanship..... | 20 |
| 3.2. Different Types of Wood..... | 21 |
| 3.3. Tools and Machinery..... | 22 |
| Chapter Four: The Common Places for Mashrabiya | |
| 4.1. Private and Public use..... | 24 |
| Chapter Five: Modern Interpretation of Mashrabiya | |
| 5.1. The modern Interpretation of Mashrabiya..... | 26 |
| Conclusion..... | 29 |
| Bibliography..... | 31 |

List of Illustrations

| | | |
|----------------|--|--------------------|
| Figure (1): | The water skin..... | Supplementary (1) |
| Figure (2): | An old neighborhood of Jedda Government | Supplementary (2) |
| Figure (3): | Mashrabiya of Beit as-Sinnari..... | Supplementary (3) |
| Figure (4): | House of 'Ali Effendi Labib..... | Supplementary (4) |
| Figure (5-A): | Al-Salih Tala'I's mosque..... | Supplementary (5) |
| Figure (5-B): | Mosque of Al-Salih Tala'I (1160 AH)..... | Supplementary (6) |
| Figure (6): | Bayt al-Suhaymi,..... | Supplementary (7) |
| Figure (7): | John Frederick Lewis, "The Reception"..... | Supplementary (8) |
| Figure (8): | John Frederick Lewis, "The Midday Meal" | Supplementary (9) |
| Figure (9): | John Frederick Lewis, "The Courtyard of the Coptic Patriarch's House in Cairo"..... | Supplementary (10) |
| Figure (10): | Walter Charles Horsley, "Women and an Old Man in the Harem". | Supplementary (11) |
| Figure (11): | Arthur Von Ferraris1, "The Coffee House" | Supplementary (12) |
| Figure (12): | Hexagon design mashrabiya wood at Al Ain Palace Museum, Abu Dhabi - United Arab Emirates..... | Supplementary (13) |
| Figure (13): | The Kanaysi or church mshrabiya design..... | Supplementary (14) |
| Figure (14): | The Maymoni mashrabiya design..... | Supplementary (15) |
| Figure (15): | The framing or "تأطير" of the mashrabiya. The Cross mashrabiya design..... | Supplementary (16) |
| Figure (16-A): | Bow lathe turner in Marrakesh..... | Supplementary (17) |
| Figure (16-B): | Powered lath, chisel, and a divider tool to assist in shaping the | |

| | | |
|----------------|--|--------------------|
| | wooden piece..... | Supplementary (18) |
| Figure (17-A): | The exterior, southeast façade, of Al Keritliya house (1540/947 AH, 1631/1041 AH)..... | Supplementary (19) |
| Figure (17-B): | Al Kiritliya roof terrace mashrabiya with designs of calligraphy and ewers..... | Supplementary (20) |
| Figure (18): | Wekalet El Ghouri, (1504 CE)..... | Supplementary (21) |
| Figure (19): | The Institut du Monde Arabe 1987..... | Supplementary (22) |
| Figure (20-A): | The Mashrabiya house..... | Supplementary (23) |
| Figure (20-B): | Elevation of the mashrabiya house..... | Supplementary (24) |
| Figure (21): | The perforated screens called Jaali, in the “DPS Kindergarten School”, 2013..... | Supplementary (25) |

Introduction

Mashrabiya is a hybrid architectural element revealing the shifting cultural, historical and political dimensions in light of cultural globalization, foregrounding thereby the notion of identity as a process of constant flux and cultural exchange. *Mashrabiya* is a spiritual, decorative, and functional architectural element that merges the form and function of the Islamic window screen with a conventional jalousie, taking on the materiality of local culture.

Azra Akšamija¹

The focus of this research study is to try to unravel the history as well as to shed some light on the craftsmanship of the artistic and architectural element called *mashrabiya* or Turnery. This form of craft has been recognized as a significant element of Islamic architecture from the middle Ages, until the eighteenth or nineteenth century. The *mashrabiya* appears in many forms and serves a variety of functions: as window cases, Egyptian and Moroccan wood stands for brass tray tables, Arabesque and Islamic furniture, as well as home decoration elements. The technical aspect of the craftsmanship can be described in terms of the coordination of the hands and feet of the turner (worker), and the machine (lathe). The element is recognized for its beauty, functionality, and its cultural role in specific societies. This study is an attempt to answer the following questions:

1. What is the *mashrabiya* and what is the history behind its creation; when and why did it originate in its places of origin?
2. Was the widespread use of this artistic and architectural element a result of cultural influence, regional, geographical, and economic circumstances, or was the flourishing as well as the dying out of this craft dependent on rather different reasons?

¹<https://architecture.mit.edu/art-culture-and-technology/project/mashrabiya>

3. For such craftsmanship, what are the requirements of production, in terms of machinery and tools, as well as talent, skills and creativity?
4. Did the production of the craft completely die out: If yes why did it, and if it did not, where is it used now, and in what form?
5. In order to revive the production and use of this element, what conditions would be required?

In addressing these questions, we will examine the history, development, aesthetics, function, and other factors that made the *mashrabiya* an important element of Islamic architecture over many centuries.

Chapter One: Background

1.1. Etymology:

In reference to the origin and the meaning of the word “mashrabiya,” it is understood that the Egyptian name *mashrabiya* or “مشربية”², comes from the Arabic root *sharab* or “شرب”, with the meaning of “the place to store the drinking water pots”. As the study of comparing and contrasting the literal translation of the most common traditional names reveals, “*Al-rawshan, Al-shanshool, and Al-mashrabiya*” أو المشربية أو الشنشول or “الروشان”, it appears that these names, which vary according to what location of the Middle East they come from, have multiple translations. The theory behind the Egyptian name is either “المشربية”, a place to store the drinking water pots as previously mentioned or “الشرفة” *mashrafiya*, which derives from the verb *Ashrafa* with the meaning of “the place to overlook or observe,” most likely from a higher stand or position. With time, the *mashrafiya*³ name was thought to evolve especially as a result of the accents and influences of the non-Arab speakers to take its common name *Mashrabiya*.

In a similar manner, the name “الشنشول” *al-shanshoul* or *al-shan* “الشن”, used mostly in Iraq, translates to “the small water skin with the cold water”. The verb version of the name, *shan* “شن”, translates to the liquid, or pouring the liquid. Historically, the water skin, as shown in figure (1), is a container that was usually made from a sheep or cow

² Lexicon brief, the General Organization for the princely presses, Egypt. Arabh.sna 1411h - (1991m) .

³ Social media and blogs such as: <http://www.abiya-mashrabiya.com/mashrabiya-blog/2014/9/14/confusion-mashrabiya-the-different-spellings-of-mashrabiya>.

bladder. As a material, it was known to be the best of its time for naturally retaining the water or liquid, and therefore being a useful tool in desert crossings⁴.

The *rowshan* “الروشان” is another name that comes from the Saudi Arabian culture, translates to *al- shubak* “الشباك” or window. The first theory behind the name expresses that it is an Arabic pronunciation of the Farsi or Persian name *rawzan* “روزن” or *rawzana* “روزنه”⁵ with the meaning aperture. Figure (2) provides a picture of an old neighborhood’s *rawasheen* “رواشين” in Jedda Government, Saudi Arabia. The picture is accompanied by an electronic article titled: “صناعة الأجداد التي تولى عنها الأحفاد الرواشين”⁶, which discusses the craft as an architectural element that was perfected by the older generation, yet was abandoned by the younger ones. The second theory, as per E. Aljofi’s article *The potentiality of reflected sunlight through Rawshan screens*, asserts that: “The word *Rawshan* originated in India where it is known as “*rushandan*” which means to give light.”⁷ (Ashraf, 1983 in Aljofi, 819)

The *mashrabiya* as an Islamic architecture element is encountered in many regions or by many cultures where Islam is practiced. Jaali or “जाली” is a name that the element, within Indian culture, translates as the word “net”. Yatin Pandya in his article, *Jaali' as a Traditional Element*⁸ states that: “Jaali as small perforations in a wall has been versatile enough to prove effective in hot dry as well as hot humid climate zones.”

⁴http://gertrudebell.ncl.ac.uk/photo_details.php?photo_id=6907

⁵<https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=farshi%20to%20english>

⁶http://almadenh.com/show_news.php?id=3985

⁷http://www.inive.org/members_area/medias/pdf/Inive%5Cpalenc%5C2005%5CALjofi.pdf

⁸<http://www.dnaindia.com/analysis/column-yatin-pandya-on-jaali-as-a-traditional-element-1599623>

The description of the element seems to suggest its use as a flat net installed in the wall for the purpose of ventilation. Therefore and to conclude, the literal translation of the several versions of the name *mashrabiya*, appear to be directly associated with the functions or purposes for which the *mashrabiya* was recognized; as a place to cool the water jars, overlook the surroundings, provide privacy, and to govern climate conditions in the dwelling.

1.2. Description:

As for the types and styles of the *mashrabiya*, Aljofi explains:

There are various kinds of *Rawshans*, which vary in appearance that arose from the taste of the client and the skills of the craftsmen. Their sizes also depend on the size of the opening, which is mainly influenced by the type of climate.

Rawshans can be classified in to three kinds: cantilevered, screen panels, louvered timber walls and louvered windows. (Aljofi, 1995 in Aljofi 2005)

Indeed, the variety of appearance has been designed to serve multiple purposes among which, is to satisfy the aesthetic taste of a client. Traditionally, the *mashrabiya* was seen as a wooden box that encases the higher floor windows on the outside leaving the space on the inside to be used as either a bench seating area or a shelf for the porous water containers made from clay, to be cooled by evaporation as a result of such a design. Other functions are providing privacy and protecting people from the glaring hot sun, taking into consideration the desert climate of the places where it originated. The cantilevered style was recognized to add more square footage to the upper floors, as well as to provide shade or protection to the street and first floor windows, indirectly creating a bearable atmosphere sheltering the passers by from the rain and direct sun.

The element is a structure that wraps around windows or balconies on the second or higher floors either overlooking the outside or the inside of the house, in which there is a *sahn* or an interior courtyard, yet it could be encountered on the first floor. The structure of the screen is literally an assemblage of small pieces of turneries dovetailed one into the other, without the use of glue or nails, in order to stop the weather with its potential for causing shrinking and expanding, from disrupting the overall frame.

Yehya Wazeri, the author of the book *Mwsoat Anaser Al-Imara*,⁹ explains that the

common shapes of the *mashrabiya* are either rectangular, seen in figure (3),¹⁰ recognized more in Cairo, Egypt; or semi-cylindrical called “خراجة” or *Kharaga* and formed by semi-circle cuts of the used wooden materials encountered more in the city of Tripoli, Libya¹¹. Figure (4) is a similar example of such style¹². In addition to the functional use of the *mashrabiya*, Wazeri emphasizes those religious and social purposes of constructing it as a place for women to peek through while remaining hidden, a place where they can watch the hustle and bustle of the street or the life of the courtyard without being seen. On the other hand, John Feeney the writer of the article *The Magic of the Mashrabiya*,¹³ stresses the issue of its functionality stating:

The shade and open lattice of a mashrabiya provided a constant current of air which, as the sweating surfaces of porous clay pots evaporated, cooled the water inside. This was such an important function that sometimes a small screened platform large enough to accommodate two or three pots of water was built out from the main screen to catch additional air and cool more water...[mashrabiya] not only subdued the strong desert sunlight but also cooled houses, water and people in lands from India to Spain.

He also recognizes that the *mashrabiya*, which thought to exist in Egypt since the 14th century, is not only a traditional method of cooling water, but also an architectural element that provided both shade and privacy.

⁹ https://archive.org/stream/mwsoat_anaser_al-imara#page/n95/mode/2up

¹⁰ <http://www.panoramio.com/photo/34801977>

¹¹ Wazeri, page 97.

¹² ¹² <http://www.panoramio.com/photo/34812846>

¹³ <https://www.saudiaramcoworld.com/issue/197404/the.magic.of.the.mashrabiya.htm>

1.3. Origin and History

It is unclear when exactly the development of the *mashrabiya* started. In the case of Egypt, there are a few examples of *mashrabiya* that dated back as early as the 12th century. The oldest examples were the two done for the portico as well as the *minbar*, “pulpit” of the Al-Salih Tala’i’s mosque, figure (5A & B),¹⁴ a late Fatimid-era mosque commissioned by the vizier Tala’i ibn Ruzzik in 1160 AH. The mosque is located south of Bab Zuweila, right outside the southern entrance of the old city of Cairo. Richard Yeomans, the author of the book *The Art and Architecture of Islamic Cairo* indicates that the wooden minbar shown in figures (5A) was presented to the mosque around 1299 (Yeomans, 68).

Meanwhile, William Samuels in his master thesis *Performance and Permeability: An investigation of the mashrabiya for use within the Gibson Desert*¹⁵ asserts that: “the earliest authenticated examples occur in the Ayyūbid cenotaphs (thirteenth century) in the mosque of Imām ash-Shāfi’i, in the railings surrounding the tomb of Sultan Qalāwūn” (in Samuels, p 20). He continues to explain that from that point on, especially during the Ottoman period (1517-1805), the *mashrabiya* use became widespread. Whether it was developed during the Abbasid (750-1258), the Ayybid (1171-1250), or the Ottoman period, the spread of this Islamic architectural element was related to the environmental, social, cultural as well as the aesthetic requirements of the times and places where it developed. Yet, there are some differences between the

¹⁴The Art and Architecture of Islamic Cairo: Richard Yeomans

¹⁵<http://researcharchive.vuw.ac.nz/handle/10063/1840>

mashrabiya of individual countries or even towns. As Samuels notes:

“While in Rosetta and Alexandria [Mashrabiya] are made of turned woodwork, resembling that of Cairo though less elaborate, the window-openings of houses in Damietta, Mansurah, Matariyyah, etc. are filled with a trellis formed of delicately fretted strips of wood, equally appealing in a different way.” (p 20)

He further explains that the regional differences only affected the style and design of the *mashrabiya*, but not its function. So, whether it is called “*takhrima*” as in Yemen, “*barmaqli*” as in Tunis, *Shanashil* or *Rowshin* as in Iraq and Jeddah, the element was recognized as a tool of climate control regardless of the differences in name, design, or region of construction.

*Mashrabiya*s offered their homes that aesthetic appeal or status that many of the rich families strived to achieve. It was a cultural symbol within vernacular architectural representation, yet it was later replaced by modern or technological climate conditioning solutions such as air-conditioners. In addition to its physical manifestations, the *mashrabiya* could also play a symbolic role in certain books, poems, and paintings. An example would be a poem called “شناشيل ابنة الجلي” or “The *Shanashil* of Algalabi’s Daughter” by the Iraqi poet Badr Shaker Alsyyab (1926-1964).¹⁶ The poet describes his lover, Algalabi’s Daughter, coming into sight from behind the *Shanashil* or *mashrabiya* daily at dawn. Along with the expressed emotions in the poem, there is a reference to the status of the lover’s family exemplified in owning the town’s biggest house with its sophisticated *mashrabiya*s.

Due to many factors, the *mashrabiya* experienced a noticeable decline starting

¹⁶<http://www.aklaam.net/forum/archive/index.php/t-3428.html>

around the nineteenth century, with the developments of the industrial revolution and other elements of mass production, the high cost and time consumptions of constructing mashrabiya, the evolution of architecture, as well as the issue of the dry climate; fire hazard and neighborhood safety. As Feeny explains:

The mashrabiya lining the streets had become a dreaded fire hazard. Tinder dry, and in some very narrow streets nearly touching, like balconies in medieval Europe, they caught fire easily. There are terrible accounts of fires leaping from window to window at frightening speed. As a result many were removed, the art swiftly began to decline¹⁷.

Also, the influence of globalization and modernity as an alternative route to the vernacular architecture style had an impact on the development of architecture within the Middle Eastern region as well as other places where the *mashrabiya* was used. In that regard William Samuels asserts that:

The [mashrabiya] were the most sophisticated objects in the traditional houses of Jeddah... As such, they were the most expensive elements in the building...but now that the building industry is mechanized and production is based on reducing the time and cost involved, detailed craftwork such as mashrabiya struggles to remain relevant. (in Samuels, p25)

Therefore, the decline of the *mashrabiya* production is a result of various cultural and practical factors. Yet, the element is still produced in some of the regions where it used to be a dominant element in the architecture. It is in some parts because of cultural sentiment towards heritage and traditional architecture, but also as an attempt to revive the production, maybe with a modern twist, especially since recent studies and researches have managed to raise awareness of its practical function.

¹⁷<https://www.saudiaramcoworld.com/issue/197404/the.magic.of.the.mashrabiya.htm>

Ashraf M. Salama in his research study *Mediterranean Visual Messages: The Conundrum of Identity, ISMS, and Meaning in Contemporary Egyptian Architecture*¹⁸

refers to the issue of architecture and identity stating:

Movements toward a more culturally and environmentally responsive architecture are now taking place. Public participation, adaptive reuse and urban intervention in historic Cairo are relatively new approaches to architectural practice. The *Al Darb Al Asfar* alley project exemplifies a real experiment in limited restoration coupled with wider conservation. Like other areas of heritage and cultural value, the area around the Al Suhaymi house in Old Cairo was neglected. Documentation and preservation processes started in 1994, funded by a grant from the Arab Association for Social Development. (Salama, 96)

Thus, there is that movement of looking back and including cultural and traditional elements of architecture, such as *mashrabiya*, as a tool of reinforcing the issue of identity on the modern representation of architecture. The referred to, Al Suhaymi house provides an exquisite example of such screens, the configuration of that *mashrabiya* screen will be discussed in detail later on in the paper.

¹⁸<http://archnet.org/system/publications/contents/4938/original/DPC1651.pdf?1384787239>

Chapter Two: the construction of Mashrabiya

2.1 Structures and Mechanism:

The contemporary architect Hassan Fathy¹⁹ in his book, *Natural Energy and Vernacular Architecture: Principles and Examples with Reference to Hot Arid Climates*²⁰, explains how the different patterns of *mashrabiya* were developed to satisfy a variety of conditions or functions. These functions as he puts them in order are: (1) controlling the passage of light, (2) controlling the air flow, (3) reducing the temperature of the air current, (4) increasing the humidity of the air current, and (5) ensuring privacy. He further explains that each *mashrabiya* pattern is designed to fulfill several or all of the mentioned functions. Furthermore, it is the size of the interstices or spaces between adjacent balusters, as well as the diameter of the balusters that are specifically adjusted to serve these functions.

Considering the climate conditions of the places where *mashrabiya* was encountered; Northern Africa and the Middle East, Some parts of Europe like Turkey and Spain, and Western as well as Southern Asia especially India, it is believed that the mechanism behind the structure was evolved as a climate control element. Many of the mentioned regions; homes, public buildings, or religious institutions were built from adobe, brick or natural stones or a combination of all these elements, which are mostly local materials. The thick walls of the buildings were understood to assist in cooling them down; insulating the inside, and sheltering from the hot and dry weather of the outside. The wooden material of *mashrabiya*, which in addition to being expensive didn't have a common use in construction within such atmosphere, thought to be the perfect natural

¹⁹<http://archnet.org/collections/11/authorities/1>

²⁰<http://archive.unu.edu/unupress/unupbooks/80a01e/80A01E07.htm#Openings>

material for providing ventilation. Fathy in an attempt to explain the issue, using Egyptian climate as his base or model of explanation, points out that a room with an opening facing south has two components of significance for the inhabitants; the direct high-intensity sunlight, and the lower-intensity reflected glare. He explains the role of *mashrabiya* regulating these elements stating:

The sizes of the interstices and the balusters of a *mashrabiya* placed in such an opening are adjusted to intercept direct solar radiation. This requires a lattice with small interstices. The balusters, round in section, graduate the light reaching their surfaces, thus softening the contrast between the darkness of the opaque balusters and the brightness of the glare entering through the interstices...Therefore, with the *mashrabiya* the eye is not dazzled by the contrast as in the case of the *brise-soleil*...The characteristic shape of the lattice with its lines interrupted by the protruding sections of the balusters produces a silhouette which carries the eye from one baluster to the next across the interstices, vertically and horizontally. This design corrects the slashing effect caused by the flat slats of the *brise-soleil*.²¹

Therefore, and in comparison to the *brise-soleil*, as a sun-shading structure of simple patterned concrete walls first introduced by Le Corbusier²², Hassan Fathy recognizes the effect of the *mashrabiya* as an element of conditioning the room providing shade, light and comfortable visual effect. He stresses the importance of the shape of the balusters, as well as the size of the interstices as elements in controlling the desired effect of airflow, humidity, shade, and privacy. For example, to compensate for the accompanying dimming effects of *mashrabiya*, he explains that the interstices should be much larger in the upper part of the screen than they are in the lower one. Indeed, such manner would

²¹<http://archive.unu.edu/unupress/unupbooks/80a01e/80A01E07.htm#Openings>

²² http://www.academia.edu/10112316/Le_Corbusier_The_Brise-Soleil_and_the_Socio-Climatic_Project_of_Modern_Architecture_1929-1963

allow the reflected light to brighten the upper part of the room, while preventing the direct sunlight from entering and heating the rest of the place.

On the other hand, he explains that if the window happens to face the North direction, where the direct sunlight as a heating element isn't an issue anymore, then the interstices of the *mashrabiya* screen on its lower part could be relatively large, of course with taking in consideration the issue of privacy, in order to provide adequate room lighting. In reference to that matter, he states:

A typical mashrabiya is composed of two parts: a lower section with fine balusters in close mesh, and an upper section filled with a wide mesh grill of turned wood... If this solution still does not provide sufficient air movement due to the small interstices required to reduce the glare, the dimensions of the mashrabiya can be increased to cover any size opening, even to the point of filling up the entire facade of a room.

An example of such condition would be the famous *mashrabiya* screen of Bayt Al Suhaymi or el Suhaymi house in Cairo Egypt, shown in figure (6)²³. The house belongs to the Ottoman period, built 1648/1057-1058 AH and was expanded in 1796/1210-1211 AH. The *mashrabiya* screen is known to cover the entire wall of the room called "*mandara*"²⁴ located on the second floor. As per Feeney's description:

At the far end of the mandara is one of the most visually exciting mashrabiya's in Cairo. Reaching from wall to wall and nearly from floor to ceiling, it is an immense carved screen that looks out on an inner garden. From inside it resembles a giant lantern with shafts of sunlight and shadow tracing filigree patterns on the floors and walls and evoking silent echoes of slipped feet brushing the mosaics with its pattern of shadows and light²⁵.

The following link, <http://www.3dmekanlar.com/en/bayt-al-suhaymi.html>, offers a 3D tour of the room as well as a closer look of the screen and its divisions. It seems that the

²³http://archnet.org/sites/2195/media_contents/6138

²⁴<http://www.3dmekanlar.com/en/bayt-al-suhaymi.html>

²⁵<https://www.saudiaramcoworld.com/issue/197404/the.magic.of.the.mashrabiya.htm>

screen is divided into three panels; a lower panel of two windows vertically aligned and filled with designs of strictly small balusters and interstices; a middle panel with design that offer much bigger interstices and balusters; and a third panel that tops the other two touching the ceiling of the room, and could be described as a strip of small stained glass units or windows. Thus, such style of covering the entire wall of a room with mashrabiya work closely relate to the practical purpose of controlling elements such as light, heat and glare.

As for the function of increasing humidity, Fathy refers to the characteristic of organic materials such as wood absorbing, retaining and releasing water as a mechanism of regulating their skin temperature as well as the atmosphere surrounding them. The “evapotranspiration” process as he explains when applied to the technique and style of creating mashrabiya works as follows:

Wind passing through the interstices of the porous-wooden mashrabiya will give up some of its humidity to the wooden balusters if they are cool, as at night. When the mashrabiya is directly heated by sunlight, this humidity is released to any air that may be flowing through the interstices...The balusters and interstices of the mashrabiya have optimal absolute and relative sizes that are based on the area of the surfaces exposed to the air and the rate at which the air passes through. Thus if the surface area is increased by increasing baluster size, the cooling and humidification are increased. Furthermore, a larger baluster has not only more surface area to absorb water vapor and serve as a surface for evaporation but also more volume, which means that it has more capacity and will therefore release the water for evaporation over a longer period of time.

Consequently, the design of the turnery pieces relies on a technique that firmly focuses on the function of conditioning the hot arid air of the desert climate. Notice that the *mashrabiya* screen has been constructed by assembling different formations of small wood pieces, instead of carving a one solid wood screen to achieve the same goal.

Factors behind this practice are the cost of the wood used for such purpose, of course in

relation to quality; the need for adjusting the measurements of the design to serve various purposes, and the need to ensure the strength and sustainability of the overall structure as well. Working in such a manner, the technique allows the weight of the structure to be divided horizontally, vertically, and diagonally, which guarantees the stability of the piece.

To fulfill one of the key functions of the *mashrabiya*, a screen with small interstices except at the top end, above eye level, would surely act as a perfect element of ensuring privacy. Considering the social and religious aspect of the Islamic culture, the architectural element was seen suitable for the “*haramlek*” area, which is a place that was designated only for women, in keeping with Mameluk and Ottoman regulations. The *mashrabiya*, with its connotation of screening women, played a role in representations based on the Western fantasy of the oriental culture during the centuries that followed the Napoleon expeditions of (1798-1801), which took place within the Middle East regions of Egypt and Syria. Many of the artistic representations, paintings and photography reflected this fantasy utilizing the *mashrabiya* as a unique symbol of cultural boundaries.

Artists such as John Frederick Lewis, Walter Charles Horsley, and Arthur von Ferraris²⁶ among others have managed to depict the hareem and their hidden behind the *mashrabiya* life as examples of such fantasy, see figures (7-11). In an article titled “*Emirates art lovers welcome Orientalism*” with the BBC News online,²⁷ Sylvia Smith offers the opinion of Manal Ataya, the director general of Sharjah Museums Department of the United Arab Emirates, in reference to oriental paintings stating: “It is fascinating to

²⁶ See figures number 7-11

²⁷ http://news.bbc.co.uk/2/hi/middle_east/8020421.stm

see places in the Muslim world that now no longer exist. We are lucky to have such accurate records of the architecture of the time. In many cases they are the only records we have". Ataya's statement was generally explaining that Oriental representation of either paintings or photographs are being looked at and accepted, by the East, since they are sometimes the only record of the past. As such, the depiction of the *mashrabiya* indeed offers an insight on the cultural views that were associated with its existence or creation.

2.2 Patterns and Designs:

Pointing out that Islam had a strong prohibition against the representation of any living being, Feeney points out that the *mashrabiya* was strictly composed of simple geometric patterns or shapes, and often ewer or calligraphy designs from the Quran. Feeney's explanation is one reason why *mashrabiya* adopted such a style of representation. Another reason would be the technical aspect of creating the *mashrabiya* as a climate regulator tool; as Hassan Fathy explained.²⁸ The volume of the balusters and the size of interstices directly affect the temperature as well as the level of humidity and glare within the room. Therefore, geometry has to be involved in constructing specific shapes with specific measurements to control such elements. In addition, Oleg Graber in his book *Islamic Art and Beyond*, refers to the association between geometry and calligraphy on one hand, and the Islamic art in general on the other asserting that:

“The works of Islamic art...can be identified, described, and judged according to a relatively small number of principles which form their essence. One of these principles is geometry, which therefore became a whole book. The second premise is a reluctance to deal with history, to accept even incompatible varieties or irreversible changes as expressive of cultural wealth rather than a regrettable weakness.” (p 50)

Thus, Graber believes that Muslims, in expressing the artistic wealth of their culture are reluctant to use art forms from the past, unless they're meant to express regrets and weakness. Furthermore, he believes that the unity of Islamic arts, in this case exemplified in the spread of the *mashrabiya* craft with unified characteristics across the Islamic nations, relates to the profoundly Islamic theological notion of *tawhid*, or the absolute

²⁸<http://archive.unu.edu/unupress/unupbooks/80a01e/80A01E07.htm#Openings>

oneness of God. And that such notion not only was transferred to the community, but also to the objects and buildings sponsored and used by the community or *ummah*. (p 51)

Common *mashrabiya* designs are known to be: the Hexagon as shown in figure (12), the long narrow vertically assembled balusters design called Kanaysi or Church as in figure (13), the thicker round in areas and squared in areas design called Maymoni as in figure (14), and the short round diagonally, vertical and horizontally assembled called Cross as in figure (15). A visual representation of these designs is provided through the video Luxury crafts - Mashrabiya by *Sofitel Cairo El Gezira*.²⁹ These designs were versatile in shape or appearance and practical in serving the purpose for which they were used.

²⁹<https://www.youtube.com/watch?v=JFiaVEWG3gs>

Chapter Three: Craftsmanship and Woodwork

3.1 Craftsmanship:

In reference to the quality of the craftsmanship, indicating that the wood used was mostly imported from Lebanon and Minor Asia, Feeney asserts that:

Carved screens could be divided and subdivided into smaller and still smaller pieces of wood, each piece fitting into the next, the whole screen, sometimes of huge proportions, being held together without the use of a single nail. Later, as techniques were perfected, as many as two thousand individual pieces of wood including tiny, perfect wooden balls and links—would go into the making of a single square yard of finely made mashrabiya.

Considering how intricate the element is, it is clear that the machinery or tools, the skillful hands, and the mechanism behind the creation certainly have come together to successfully manage the production. William Samuels in his research³⁰, refers to the issue explaining:

The craftsman would use a lathe to turn each stick to the required thickness and length, beginning with a series of long primary balusters. These could be anywhere between 100mm to a meter in length, depending upon the scale and detail of the final mashrabiya, and would provide the basic framework of the screen. The balusters were turned to create a series of cylindrical lengths that were periodically broken by larger spherical or cubic pieces that would become the connection points for the lateral balusters. At each of these connection points the craftsman would drill a hole into which the shorter secondary baluster fitted. (p 22-23)

Furthermore he indicates that:

Regardless of the various climatic and social requirements, each building had an “optimal absolute and relative size” for the length and diameter of its mashrabiya balusters, ensuring that a precise solution could be tailored to suit every unique building. It was up to the craftsman to determine these sizes during production and thus control the internal climate of the building with precision. (p 23)

³⁰<http://researcharchive.vuw.ac.nz/handle/10063/1840>

3.2 Different types of wood:

As for the required types of wood, the state website of the Egyptian government³¹ provides information on the craft of turnery as an authentic, deeply-rooted practice of the craftsmen of ancient as well as modern Egypt. The site refers to the different types of wood, local and imported. It explains that local woods, such as Guava, Lemon, Sycamore, Olive, Date, and Willow are used in turnery as they have different ornamental colors. Other material such as Mulberry Wood also can be used in turnery since it is tough, has a condensed fiber, and can be polished. As far as the imported wood, the site explains that workable wood such as red and yellow pine, known as “Mosky” or Swedish, was used in the make of turnery and furniture. Also, tough rigid woods like Ebony with its different types and colors; red, brown, green and black has been used in turnery.

As mentioned, there are two different types of turnery; the large elements used for furniture of seats and table, fences, and windows overlooking internal corridors; and the fine one known to be used for “mashrabiya”. In addition, and as provided by the state website:

There are also turned units used for ornamentation and joining other units. It should be noted that both large and fine turnery may exist side by side in one unit. Thus, we can find a large frame containing fine turnery representing Arabic orthography, a pending lamp, an animal or a bird³². Two different colors of two different types of timber can be used to give an exquisite woodwork³³.

Therefore, the creation of mashrabiya pieces can be understood as a process of mixing and matching different types of turneries, as far as wood types, colors, styles, sizes, and designs. It is a remarkable craft that demands for mastery and innovation.

³¹<http://www.sis.gov.eg/En/Templates/Articles/tmpArticles.aspx?CatID=533#.VLBcmNLF-Zg>

³² It seems that the use of a living being came as a late development of a more secular or relaxed practice of the culture of developing art.

³³<http://www.sis.gov.eg/En/Templates/Articles/tmpArticles.aspx?CatID=533#.VLBjR9LF-Zh>

3.3 Tools and machinery:

Directing the attention to the tools and machinery that are used for creating the *mashrabiya*, one finds that during the ancient times the production was done manually.

Using what's called a bow lathe³⁴, seen in figure (16), as well as different types of chisels, the process is described as follows:

In turnery a cutting tool is used to shape a piece of wood while turning on a lathe. This is accomplished through removing excess wood from the external diameter of the work piece. The traditional lathe is the bow lathe. To use it, the turner sits on the floor in front of the lathe, and twists the cord of the bow around the right hand side of the piece of wood to be turned. Putting the work piece between the two jaws of the lathe, he moves the bow back and forth, and consequently the work piece rotates around its axis. As the bow moves backwards, the turner uses the chisel held in his left hand and pushed by his big toe against the work piece thus cutting chips of wood from its external diameter.³⁵

The following link, https://www.youtube.com/watch?v=wnv0DAR_gWA,³⁶ provides a visual explanation of how the process is done. The worker turns a piece of wood on a bow lathe using just his skew chisel. The production comes as a result of the hands and foot coordination in addition to the manual tool discussed. It is understood that such tool was replaced later on by electrical ones in order to keep up with the notion of mass production and design sophistication. The next video, <https://www.youtube.com/watch?v=8YZeG5-ofWQ37>, offers an example of what an electrical yet semi-manual tool looks like. This time, using only the hands along with different types of chisels, the master is creating unique but unified pieces that are

³⁴https://www.google.com/search?q=bow+lathe+turner&espv=2&biw=1280&bih=637&source=lnms&tbnm=isch&sa=X&ei=MHPrVOaeAcamggTQ8oLIAG&ved=0CAgQ_AUoA

³⁵<http://www.ebay.com/gds/Traditional-Arts-and-Crafts-from-Egypt-TURNERY-/10000000018552894/g.html>

³⁶ Filmed by Stuart King on March 2007, and uploaded on Mar 30, 2010.

³⁷ Uploaded on May 29, 2011, and accessed on Feb 2015. A video demonstrating the skill of an Egyptian craftsman manufactures a mashrabiya piece on a lathe machine.

supposed to fit together into one frame creating the pattern of the *mashrabiya*, as mentioned before without the use of neither nails nor glue. Moreover, the video *Luxury crafts - Mashrabiya*, filmed by Sofitel Cairo El Gezira Hotel; <https://www.youtube.com/watch?v=JFiaVEWG3gs38>, refers to the nine steps of preparing, cutting, shaping, sanding, staining or varnishing as well as framing or “تأطير” the turned pieces as seen in figure (15), securing them with a rubber band or a thin rope, before assembling them.

Technology nowadays offers more sophisticated turning machines that could be fed the chosen design, through their computerized memory, in order to initiate the production of thousands of pieces which used to consume a great amount of time and manpower. Lath machines such as CKX-600/1300/1600 CNC WOOD TURNING LATHE,³⁹ among many others such as the one offered by the video/link: <https://www.youtube.com/watch?v=T139HqDDrTs>,⁴⁰ provide an example of such technology which supports the modern production of the craft. It is understood that the cost of production is mainly on the expensive side, traditionally and currently, which made the element a material for the wealthy and well off people who can afford such luxury.

³⁸ *Luxury crafts - Mashrabiya*, Sofitel Cairo El Gezira.

³⁹ <http://en.intorex.com/1674/cnc-wood-turning-lathes-ckx-600-1300-1600#ad-image-2832>

⁴⁰ Published on Aug 1, 2012, and accessed on March 13, 2015.

Chapter Four: The common places for the mashrabiya

4.1. Private and public use of the mashrabiya

The *mashrabiya* was encountered in many of the traditional homes of the medieval Islamic Egypt. Some of the late Fatimids, Mamluk, and Ottoman homes provide great examples of *mashrabiya* screens that were constructed during these eras.

John Feeney describes Cairo streets lined with homes with *mashrabiya*s asserting that:

As recently as the late 1900's, entire Cairo street fronts were still embellished with row upon row, level upon level of mashrabiya's. Splendid examples were also to be found in houses surrounding Ezbekiya Lake, one of a chain of lakes left by the receding Nile. Others graced great houses lining the old Khalig Canal, part of an ancient waterway linking the Nile to the Red Sea.⁴¹

Al-Suhimye house, as mentioned earlier, is an example of such a home. "The different spaces of the *haramlik*, which is a room designated only for women, overlook the courtyard through openings concealed by *mashrabiyyas*."⁴² The qa'a or reception room, as in any traditional house of the period, is another indoor space that can be embellished with the *mashrabiya*. Al-Suhaymi *qa'a* or *mandara*, has that exquisite wall-to-wall screen which was constructed as an element of providing air flow and reducing glare inside the room. In order to serve such purpose, the lower section of the screen was configured of short interstices and small size balusters while the higher section maintained a looser design.

El-Kretiliya house, also known as Gayer-Anderson museum or the house of Amna bint Salim al-Jazzar, is another example of a traditional *mashrabiya* home. The house belongs to the Ottoman period (1540 CE/947AH, 1631CE/1041AH).

⁴¹ <https://www.saudiaramcoworld.com/issue/197404/the.magic.of.the.mashrabiya.s.htm>

⁴² http://archnet.org/sites/2195/media_contents/6138

It is an alteration of two homes that were joined together with a veranda during the early twentieth century, and was converted to a museum on 1937.⁴³ Three levels of *mashrabiya*s dominate the courtyard. There is also a roof terrace *mashrabiya*, which is a great size open screen, unlike the enclosed casing that wraps around the window. The screen offers a beautiful example of calligraphy and ewer shape designs shown in figure (17).

As Feeney notes, that the use of the *mashrabiya* was not limited to the private homes. Rather it was introduced into mosques and other semi-public buildings and caravansaries such as Ibn Tulun's mosque and Wakalah El-Ghori. In that sense, *Mashrabiya* was used on a much larger scale, but still served the same purpose of conditioning the atmosphere for occupants or worshipers. The previously mentioned *mashrabiya*s of the portico as well as the minbar, or “pulpit” of the *Al-Salih Tala’i’s mosque*,⁴⁴ are examples of such practice. So is, *Wekalet El Ghouri (1504 CE)*⁴⁵ in Cairo. As one element of the *El Ghouri Mamluk Complex*; the *mosque*, *madrassa* or school, *Khanqah*⁴⁶ or the spiritual room, mausoleum and *Sabil-Kuttab*, the *wekalet* used to serve as a merchants gathering spot as well as a residence. It is a three-story building; the first floor acted as storage for goods and animals of the merchants; the second as offices; and the third as kitchen and woman-designated area. As shown in figure (18), the upper floor windows are covered with *mashrabiya* cases lined across the three sides of the inner court of the building.

⁴³<http://dome.mit.edu/handle/1721.3/72945>

⁴⁴The Art and Architecture of Islamic Cairo: Richard Yeomans

⁴⁵<http://www.cairo.gov.eg/CairoPortal/Culture%20and%20Arts/Lists/Creativity%20Center/AllItems.aspx>

⁴⁶<https://cardinalsolar.bsu.edu/handle/handle/184548>

Chapter Five: Modern Interpretation of the Mashrabiya

5.1. The Modern Interpretation of The Mashrabiya

As for the modern interpretation and expressions of the craft *mashrabiya*, there were many attempts to adapt the technical aspects, as well as the appeal of the element. Either as a method of reviving the use of vernacular architecture, a fascination with the style, or a thorough understanding of its function, the *mashrabiya* has been a symbol of the Islamic architectural heritage or design. The French architect Jean Nouvel in designing the Institut du Monde Arabe 1987, focused on the *mashrabiya* as a facade cover as well as a light regulator, figure (19). His adaptation relied on presenting the element in a modern style with a mechanical technique of installing lens-like diaphragms. Tim Winstanley in the *Archdaily magazine*⁴⁷ wrote on the issue explaining:

A main feature and innovative element of the IMA is the advanced responsive metallic brise soleil on the South façade. Nouvel's proposal for this system was well received for its originality and its reinforcement of an archetypal element of Arabic architecture – the mashrabiya....The system incorporates several hundred light sensitive diaphragms that regulate the amount of light that is allowed to enter the building. During the various phases of the lens, a shifting geometric pattern is formed and showcased as both light and void. Squares, circles, and octagonal shapes are produced in a fluid motion as light is modulated in parallel...While these ocular devices create an incredible aesthetic, they are functional from an environmental controls standpoint as well. Solar gain is easily mitigated by closing or reducing the aperture sizes.

The following link https://www.youtube.com/watch?v=eWgeXczf_0M, is a YouTube video that offers a visual insight on the process of fabricating these metal aperture plates.

In addition, Nouvel in his interview with the Louisiana channel, [https://](https://www.youtube.com/watch?v=eWgeXczf_0M)

www.youtube.com/watch?v=eWgeXczf_0M, explains that his intention was to reflect upon the Islamic architecture's characteristics of using abstract elements and geometry.

⁴⁷<http://www.archdaily.com/162101/ad-classics-institut-du-monde-arabe-jean-nouvel/>

Therefore, Nouvel in his design, was not only influenced by the aesthetic appeal of the *mashrabiya*, he also applied its function.

Another modern adaptation of the *mashrabiya* is found in an apartment complex called “The Mashrabiya House” by Senan Abdelqader, in Jerusalem; figures (20A &B).

The design is a contemporary re-interpretation of the element. The technique is explained:

The wooden screen is re-imagined in the form of a large-scale stone envelope that surrounds the building, combining the “Mashrabiya” motif with stone. Its typical semi-transparent effect is achieved by positioning the stones slightly apart, with irregular spacing, creating an effect of lightness and porousness... The playful arrangement of small and large openings provide views from the interiors out into the landscape while carefully retaining their privacy.⁴⁸

Furthermore, the issue of regulating the climate and controlling the temperature of the building is explained as follows:

The stone mass of the outer envelope acts as a climatic buffer: It helps to absorb heat during the day and release heat during the cool Jerusalem nights... The gaps between the stones ensure a constant flow of fresh air. A further element of passive cooling is the 1m gap between outer and inner envelop. Not only does it ensure constant circulation of fresh air around the building the fact that it remains open towards the top of the building generates a suction effect like that of a chimney: Hot air travels upwards and fresh air is sucked into the gap from below.

Again, the modern use and adaptation of the *mashrabiya* was not only based on its aesthetic appeal and beauty for many of its advocates, nor was it solely motivated by the desire to revive a key element of the vernacular traditions of Muslim architecture. Rather, the form could be adapted to continue to meet functional requirements for which it was originally designed.

⁴⁸<http://www.archdaily.com/175582/the-mashrabiya-house-senan-abdelqader/>

Another and final example of the modern interpretation of *mashrabiya* is a project of the Indian architect Sandeep Khosla called the “DPS Kindergarten School,”⁴⁹ in Bangalore, India. The design was awarded at the 2013 Inside Festival in Singapore. In the following video, <https://vimeo.com/78347069>, Khosla explains the use of the Jali screen, *mashrabiya*, as a tool of creating a natural ventilation effect; how incorporating the perforated screens, figure (21), was used to keep the classrooms cool, without the need for any air-conditioning equipment, therefore offering a “climate-sensitive and sustainable school”. In addition, Khosla refers to the decorative aspect of using the Jali, indicating: “We used two modules of different patterns and we've created very nice floral patterns by combining them”.

The adaptation of *mashrabiya*, in the modern cases discussed involved new materials and methods of construction. New materials included metal, stucco or cement. Contemporary designers of *mashrabiya* all modernized the element, while retaining its core principals. Some interior design companies, mostly located in the Middle East, offer the craft as an indoor decorative element; room dividers, wall finishes for hotel lobbies and else, as well as furniture. And as such, the adaptation heavily draws upon both the function, and appeal, maybe not in the traditional sense, but definitely in the sense of recognizing its function in social, cultural, and economic terms.

⁴⁹<http://www.dezeen.com/2013/11/04/movie-dps-kindergarten-school-by-khosla-associates/>

Conclusion

It is imperative to look into our own backyard and review what tools and strategies did [the] architecture of the place applied for centuries. A look at the vernacular/traditional architecture reveals that these built forms have proven their performance over centuries in terms of combating environmental conditions with least or no electrical energy spent... A number of architectural elements have contributed in respective regions to arrive at comfort conditions with optimization of material resources and energy consumption. Jaali is one such element of architecture that has been an effective tool in addressing environmental comfort.

Yatin Pandya

As Pandya notes, making use of traditional architecture forms and materials is a successful method of conserving energy and optimizing material resources, which is in fact what the *mashrabiya* screen has offered its homes, as well as public places, for centuries. The use of the element was successful in terms of function and climate regulation, but also played a role in terms of the social, cultural, and aesthetic presentation. For centuries, the *mashrabiya* served both cultural and environmental purposes.

At a first glance, especially to those who weren't familiar with that type of construction, the screen seemed as a mysterious social and gender boundary, or as a symbol of the oriental life; with women being kept hidden behind the *mashrabiya* while men dominating the world that exists on the other side of that screen. A naive explanation of the economical function of the projected screen was to cool the water jars, where in fact the element was an essential architectural tool of governing the home climate of the Saharan or desert communities and countries. As we have seen, the theory behind using the element relied on the natural characteristics of the wood material used for such creation. Furthermore, the technique, the use of abstract and geometry, and the versatility

of shapes and designs of the *mashrabiya* rigorously served the environmental purposes behind constructing it.

On the other hand, taking in consideration the level of sophistication and intricacy of the element, it is clear that the process of creation was affected by high cost and time limitations. As such, and as a result of competing against the industrial revolution and mass production, and against the modern development of architecture, the decline of the *mashrabiya* was thought to be inevitable. However, the notion of reviving vernacular and traditional architecture started to influence societies, architects and others, therefore it called attention to elements such as the *mashrabiya*. Also, other modern climate governing tools were proven not as environmentally safe or cost effective.⁵⁰ All these factors have spurred the adaption and renewal of the *mashrabiya*.

It should be understood that the *mashrabiya* element is not in any way produced to replace such modern tools. On the contrary, the reference here is to its current development as a rediscovery of the successful technique and mechanism behind it on one hand, and to the use of the traditional architecture as a reinforcement of culture identity on the other. The current production of the *mashrabiya* seems to favor the modern application of the science behind the traditional creation, without neglecting to reflect on that cultural and aesthetic appeal associated with it.

⁵⁰ Only in relation to the hot arid desert climate!

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