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WOOD IN ARCHITECTURE AND APPLIED ARTIFACTS IN COASTAL CITIES IN EGYPT AND ITS ARTISTIC METHODS

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Abstract

The availability of both local and imported wood in Egypt's coastal cities, including Rosetta, Alexandria, and Damietta, led to the flourishing of the carpentry craft and the development of woodwork to its greatest degree. Being a simple material, wood was a fundamental material of great importance in architecture and the arts, whether in buildings or furniture. It was used in architectural elements such as doors, windows, ceilings, floors, columns, stairs, cupboards, and arcades, in addition to movable elements such as pulpits, seats, Quran stands, reciters' chairs, and others.

Various wooden elements were used in civil buildings, including windows, which are openings in walls or ceilings. These included windows, skylights, doors, and roof openings on upper floors. Wooden artifacts in religious buildings include doors, windows, ceilings, pulpits, niches, preachers' benches, and reciters' benches. The availability of wood, both local and imported, led to the flourishing of the carpentry craft and the development of wooden products to the highest degree, wood, being a simple material that is easy to shape and use, was one of the basic materials of utmost importance in construction work, whether in buildings or furniture. Carpenters, along with other artists and craftsmen, contributed significantly to the enrichment of buildings, furnishing them with elegant, appropriate furniture that reflected the spirit of the times and the extent of prosperity and progress. Wood was also an easy material for implementing a variety of decorative techniques, given its versatility and the ability to be shaped and decorated using various techniques, including carving, turning, inlay, and other woodworking techniques. The scientific content of this research addresses the manufacture of wooden artifacts in Egyptian ports, including the wood used in the manufacture of wooden artifacts and the artistic techniques employed in this industry, which include: assembly and interlocking, carving, turning, inlaying, cutting and hollowing, and coloring.

Keywords: Wooden artifacts, coastal cities in Egypt, Rosetta, Alexandria, Damietta, carpentry, civil buildings, religious buildings, woodworking techniques.

First: Introduction

Trade in the Ottoman era had two aspects: external trade, including import and export operations between Egyptian and European ports, Ottoman ports, Italian ports, the Levant, the Maghreb, and European countries; and internal trade, including trade within Rosetta with various Egyptian cities.

Egyptian coastal cities such as Rosetta, Alexandria, and Damietta were teeming with commercial establishments, considered major institutions where buying and selling took place both domestically and internationally. Goods came to these cities from France, Germany, Venice, the Turkish provinces, Syria, and North Africa.

Therefore, they served as a huge warehouse for imported and exported European, Levantine, Turkish, and Moroccan goods. They were also a center for the timber trade since the sixteenth century, with ships arriving there laden with timber from Lebanon, Syria, and Europe, where it was unloaded or transported to the timber warehouses in Bulaq.

Timber was imported from abroad by Italians and other Europeans, and then distributed to Egyptian merchants, who sold it to Egyptian merchants in other Egyptian cities. They were obligated to supply a portion of this timber to the Alexandria Arsenal. Some Moroccans were active in the timber trade. Many industries continued to flourish in the nineteenth century. All the industries necessary for shipbuilding were present, such as sawmills, which sawed large and heavy wooden blocks. In addition, the sailing industry, established during the reign of Muhammad Ali, was also present, along with all the subsidiary industries, such as blacksmithing and carpentry. This was before navigation shifted from Rosetta to Alexandria. This industry, as a whole, began to fade from Rosetta when its owners migrated to Alexandria, and it was replaced by the fishing boat industry, one of the most prominent industries. The availability of wood in the cities of Rosetta, Alexandria and Damietta, both local and imported, led to the flourishing of the carpentry craft and the development of wooden products to the highest degree of sophistication. Wood - because it is a material that is easy to shape and use - was one of the basic materials of great importance in architectural and artistic works, whether in buildings or furniture.

It was used in architectural elements of buildings, such as doors, windows, ceilings, floors, columns, stairs, cabinets, and arcades, in addition to movable elements such as pulpits, seats, Quran stands, reciters' chairs, and others. Carpenters, along with other artists and craftsmen, also contributed significantly to the enrichment of buildings, providing them with

appropriate and elegant pieces of furniture that reflected the spirit of the era and the extent of prosperity and progress. Furthermore, wood was an easy material for implementing many decorative techniques, given its versatility and the ability to be shaped and decorated using various techniques, including carving, turning, inlay, and other industrial methods[1]. The excessive use of wood in various buildings was one of the factors that affected the city's buildings from a geographical and social perspective. The use of wooden architectural elements, such as mashrabiyyas, also helped reduce humidity.

Modern studies have proven that the air passing through the wooden mashrabiyya loses some of its moisture due to the absorption of the wooden bars. When the mashrabiyya heats up from direct sunlight, it releases moisture to the air flowing through it.

These mashrabiyyas, made of turned wood and with narrow openings, protect the privacy of the household from the prying eyes of outsiders. Women can peer through them freely without being seen.

An important element in the facades of the houses is the rows of wooden blocks (tie beams) extending lengthwise (cans) and widthwise (partitions) that intersect the walls to strengthen them. The walls protrude outwards gradually, resting on wooden beams that are an extension of the ceiling joists or are attached to them. Prominent wooden inserts with geometric decorations in plaster or wood were also taken into consideration.

The wood elements used in civil buildings were numerous, including windows, which are openings in walls or ceilings. These included windows, skylights, doors, and roof openings on upper floors. Door openings are divided into two categories: the first is rectangular openings, such as the doors of warehouses and agencies in houses, and doors with niches, in addition to the doors of commercial and industrial buildings, and the interior doors that close onto rooms. The second category includes the arched openings in the doors of public fountains and stables, and the doors that close onto the floors of houses starting from the second floor.

The doors of houses and commercial and industrial buildings varied, including interior and exterior doors. Exterior doors include doors with niches, doors without niches, doors of

[1] Darwish, Mahmoud Ahmed (1989). The buildings of Rosetta and their wooden artifacts in the Ottoman era, manuscript of a master's thesis, Faculty of Archeology - Cairo University. Darwish, Mahmoud Ahmed (2019). Encyclopedia of Rosetta, 3, Cairo: The Arab Nation Foundation for Publishing and Distribution, pp. 6ss.

warehouses, agencies, and mills, in addition to the doors of public fountains, stables, and bathrooms. The interior doors lead to the floors or rooms of the house, and each of them has one leaf, and in rare cases two leaves. The openings in which the windows and skylights are installed are characterized by being narrow and high on the ground floor, but on the upper floors they are characterized by being wide and consisting of two rows on each floor, and include windows topped with skylights.

The architect was careful to use slatted shutters behind the wide-planked windows to screen those inside, as well as on the upper floors and skylights that were screened with narrow-planked shutters or were elevated above eye level, hence, the need to screen all rooms, both on the first floor and on the upper floors. Thus, the slatted or slatted shutters, even though they are traced back to subsequent house modifications, were implemented according to sound principles, reflecting the houses' pre-existing conditions. Wood played an important architectural and structural role in the roofs of houses in Rosetta, Alexandria, and Damietta during the Ottoman era. The roof was placed on brackets (couples) fixed to the wall above the wall. The benefits of the brackets included increasing the floor area, overlooking the streets from multiple directions, and ventilating the rooms. The brackets that hold the slats, which are positioned opposite the walls intersecting with the original walls, are composed of a wooden beam embedded in the structure, acting as a bracket at times and as a tie at other times. They also provide the necessary tension at the top of the bracket.

The piston is often placed at a ten-degree angle to enable its outer edge to be raised. A wooden block is then placed the width of the pistons to support the two faces of the mawarada. Beside it are ribs supporting the the floor supply (mawarada). Its walls are built of bricks thinner than the walls below. Wooden ceilings were not usually placed directly on the walls; rather, wooden slats were placed between them and the walls, securing them. Most ceiling slats were wide, with three-quarters of them at the top of the walls, supported by wooden slats called ('Aflat), known to craftsmen as "Jamal", these were placed vertically between the courses at equal intervals. At the corners, the vertical posts were close together, with a large wooden block rising horizontally alongside the courses, for added stability.

The roof consists of a truss, sometimes with chamfered edges in the middle area called swimmer (sabbah), and a stalactite is made attached to the ends of the truss, which is called sole (na'l), and the visible parts of the walls between the trusses are covered with rectangular

pieces of wood called (harna'i)[1], and a skirting board is made that runs below the trusses to cover the fodder, and the gaps between the skirting board, the trusses, and the harna'i are closed with a skirting board perpendicular to the wall that is fixed below the trusses, which is called (qatrouniya)[2].

The architect ensured that each room's ceiling was independent from the adjacent room. We never saw a ceiling extending to cover two rooms except when the two rooms were converted into one on the upper floor. Conversely, the ceiling of each room runs in the opposite direction to the rafters, opposite the adjacent ceiling (perpendicular to it), and to the ceiling of the upper or lower room. This means that no two rooms are adjacent to each other, nor do they have rafters running in the same direction. The goal is to regulate the weight distribution on the walls. The architect ensured that expansion joints were installed between each room; protecting the house from any damage should a part of it collapse. An important architectural technique for constructing house ceilings is the sloping ceiling technique, which consists of two ceilings separated by a distance of 0.50 to 1.0 m. The ceilings were designed so that the upper ceiling represented the floor of the room, while the lower ceiling represented the ceiling of the room below. The trusses on the two ceilings ran in opposite directions, which facilitated the decorative features of the lower ceiling. This technique demonstrates the skillful execution of the two ceilings of this room. The architect created two piers: the first on the western wall, facing north, and the second on the northern wall, facing west. The two piers met at the corner, where the western piers rose above the northern piers.

While the western piston runs above the lower ceiling's pilasters, it also forms a ten-degree angle with the line of the pilasters at its southern end. These two pistons form an architectural element that helps shift the weight of the angle to the sides, in the same way that an arch

[1] Al-Harna'iyyat: These are square wooden pieces (duqam) placed between the ends of each of two adjacent jars and fixed in the jar by means of a nail or a screw using small wooden pieces (socks). One of the most important aesthetic functions of the al-Harna'i is that it hides the shape of the wall behind it without sticking to it so that it is not affected by moisture.

[2] Qatrouniya: It is a wooden plank that extends horizontally below the ends of the battens and directly below the ribs sandwiched between the ends of the battens. The qatrouniya is used to fill the space between the ribs and the wall and to create a connection between the ribs and the ends of the battens, the first and last battens, which have a square or rectangular section, form, with the qatrouniya, a frame surrounding the ceiling. Qatrouniya is a professional term used by craftsmen.

distributes the weight of its top to the sides. When constructing the large rooms or halls, care was taken to divide the ceiling into two sections by means of a beam supported by two pilasters, as in the houses of al-Tuqatli and al-Amasyali in Rosetta. Some pilasters were also built into the structure, such as the two pilasters that support the ceiling of the entrance porch of the Ramadan house in Rosetta. Another method used in large rooms is to create an octagon inside the square of the room by means of beams that intersect with the pistons to form an octagonal shape, with the aim of increasing the ceiling's load-bearing capacity and reducing the width. The beams that form the octagon are often placed above the level of the panels, and the architect does not neglect to place a beam that divides the ceiling into two sections as well. Sometimes two rows of beams are placed, each one above the other in the opposite direction, and then the panels are placed over the lower beams.

Staircases were widely used in all buildings, including houses, to reach the different floors. Staircases rested on two or three wooden beams (thighs) for each step. The top of the staircase was often lined with wooden planks, with steps built on top. The bottom of the beams was rarely covered with wooden planks.

The treasuries called "al-Aghaniyyat" which are found in the houses of the rich was a common feature in all houses, each house contained at least one treasury, and the main rooms of the floors, starting with the first floor, were designated treasury halls. They were distinguished by occupying an entire wall facade, with each room having an entrance in the middle. Sometimes the entrance was located at the end of the treasury, depending on the location of the entrance on the wall occupied by the treasury. The treasury consisted of a safe surmounted by a lath structure that reached the ceiling or simply served as a barrier. Lath was used in these structures, while interlocking and assembled fillings were used in the safes. The architect ensured that the songs were parallel to the ceiling beams, with the facade of the songs resting on one of these beams. If necessary, the architect would place a beam supporting the face of the songs. The architect exploited the presence of the songs to create a broken entrance to the rooms. Entry was via the door into a small hallway the width of the songs, then turning left or right into the room. The turning would be from the dourqa'a, then to the hallway, then right in houses where the main rooms were located to the left of the dourqa'a. Alternatively, the turning would be from the dourqa'a to the right, then to the hallway, and then left in houses where the main rooms were located to the right of the dourqa'a. Sometimes, the entrance was located in the middle of the songs, depending on its

location in the room.

Wall cabinets were found in walls devoid of doors, windows, or niches. This is because a windowed wall is thin, designed to lighten the facade. Furthermore, it is occupied by windows and skylights, preventing the creation of entrances for wall cabinets. Furthermore, symmetry was taken into account in the distribution of the cabinets. Some were built on two walls if the room had niches and overlooked a single facade. The room doors did not prevent the creation of cabinets in the walls containing these doors. Iwans are an architectural element, and their location was at the forefront of the durqa'a. They usually occupied an area approximately the width of the durqa'a itself, and the dominant feature was that they were confined between three walls. Some iwans occupied niches in the halls, as is the case in the houses of Ramadan, al-Tuqatli, and al-Mayzouni. The iwan overlooks the durqa'a with three arches supported by wooden columns.

We see that the iwan in houses is similar to the takhtabush in Cairo's houses. The iwan's architectural composition was not limited to a wooden bench. Rather, its construction encompassed several interconnections. First, it presided over the durqa'a. Second, behind it was a double window, supported by a marble column, overlooking the street or courtyard on the first floor. On the second floor, a window with mashrabiyya screens was located behind it. Dikkak were used for sitting, and varied according to the space allocated for their construction. Their shapes also varied, including one-sided, two-sided, or three-sided benches. Sometimes, a three-sided bench was constructed instead of an iwan, due to the space of the durqa'a not allowing for an iwan. The houses included many wooden barriers, including the song barriers in the upper part, the porticos and benches barriers. The most important of these barriers are those that define the openings of the ceilings in the upper floors of the houses and are divided into two types: the first is the plain barrier, which defines the square and rectangular openings. There are also barriers for the benches of the preachers and the songs and the benches in the houses and the benches of the reciters as well. The barrier is divided into squares and crocodiles that enclose the spokes of church maps. As for the second type, it is the municipal barrier, which is divided into three sections or three stations.

The lower deck is Arabic in shape, with beveled filler, while the middle deck is made of squares and crocodiles. The squares are filled with cistern turnings, while the crocodiles are filled with church turnings. The third deck is made of hollow horns and church turning

crocodiles.

Rosetta preserves a unique model of mills, represented by the Abu Shahin Mill, which comprises two mills, each with two grinding machines made of wood. Each consists of a girder (Jayza) that holds the mill parts. This girder is a crossbeam connected to the Hermes (column), a vertical, square column that ends at the top with a finger rotating in a hole inside the girder. The large wheel (the large gear) is fixed horizontally to the Hermes at its center and rotates on its axis. The upper stone is fixed at the bottom to a small vertical wheel, which in turn is connected to the Hermes. It is connected to the column horizontally by a hood (a long arm made of acacia wood) placed on the neck of the bull that turns the mill to move the column.

When the hopper (the houd) is moved, the Hermes moves, moving the large wheel horizontally, and the small wheel connected to its teeth moves vertically, causing the upper stone attached to it to rotate. When the wheat is placed in the hopper (Qadoos), it falls between the two stones through an opening in the center of the upper stone, and is ground. It then falls onto the wooden top (Sieve) to be sifted and packed, ready for use.

The wooden artifacts in religious buildings include doors, windows, ceilings, pulpits, niches, and pulpit and reciter benches.

Exterior doors consisted of two leaves, except for the doors of the fountain rooms, which had a single leaf. Iron nails were used on the doors, and "Sabras" (spear) fillings, as well as square and rectangular fillings, were common. Interior doors consisted of two leaves, and this type of door was limited to the doors of shrines.

.Mosque windows varied, including large windows on the lower facades, topped with small skylights. There were also lathed windows above the doors. Interior windows also varied, as did the windows above the entrances leading to the shrines and the windows overlooking the interior of the mosque from the shrines. As for the use of wood in religious architectural elements, the ceilings of mosques and shrines varied between wooden ceilings and domes. The ceilings were constructed with trusses resting on the walls, with wooden "caps" placed beneath them on the wall surface. The trusses were covered with wooden panels. There are unique examples of ceilings applied with panels, onto which interlocking or colored decorations were attached. During the Ottoman era, the pulpits retained their ancient designs. They were architectural elements whose size was not related to the mosque's area, and they were all constructed of wood.

Examples of niches in the mosques of Rosetta include the niche in the middle of the shrine chamber, and the niche consisting of one side, as the shrine chamber is surrounded by three walls.

The mosques were distinguished by the presence of the preachers' benches, which are an architectural element. The components of the bench include a base topped by a barrier. The roof consists of pilasters and panels, with corbels formed at the ends of the pilasters. Ascending to the benches is accomplished by wooden ladders, with the barrier constructed from squares and rectangles in turned form.

The reciters' benches are small and divided into two parts. The lower part represents a box closed on all four sides alongside the roof. The upper part represents the barrier, which surrounds the bench on all four sides, except for the part designated for ascending to its roof. The benches are decorated with interlocking domes, while the two sides each contain square and rectangular inlays. The barriers are divided into horizontal and vertical rectangles in turned form. The domes rest on columns that carry arches running parallel to the qibla wall and perpendicular to it, forming squares that support the domes. The dome rests on an octagonal neck with a window made of lath on each side. The dome was covered from the inside with horizontal wooden panels and the decorations, which include plant and geometric elements, were executed in color.

Second: Wood Used in the Craft of Wooden Artifacts in Egypt's Coastal Cities

Wood is considered one of the most important raw materials due to the ubiquity of its natural resources in various parts of the world, its artistic properties, and its ease of processing[1]. Although Egypt relied on local woods such as sycamore[2], acacia, sycamore[3], olive, tamarisk,

[1] Hirt, Warner (1977). The Carpenter's Public Works, translated by Abdel Moneim Akef, Cairo-Leipzig, p. 9.

[2] Al-Baghdadi, Marfaq Ahmad Abu Muhammad ibn al-Latif (1869). Al-Ifada wa al-I'tibar fi al-Amr al-Musharidah wa al-Adhdath al-Musawwarah fi al-Ard Misr, Cairo, p. 52.

[3] Al-Hamawi, Shihab al-Din Abu Abdullah Yaqut ibn Abdullah al-Hamawi al-Rumi al-Baghdadi (d. 626 AH / 1246 AD) (1906). Mu'jam al-Buldan, 4, Cairo, 1, p. 353. Maher, Suad (1967). The Navy in Islamic Egypt and its Remaining Monuments, Cairo, p. 169.

palm[1], jujube, and others[2], it resorted to importing from abroad[3]. Southern Europe, Syria, and India were important sources of wood[4], along with Sudan[5].

Rosetta, Alexandria, and Damietta have been centers of the timber trade since the 16th century AD. Ships laden with timber from Lebanon, Syria, and Europe would arrive there, unloading it at Rosetta or transporting it to timber warehouses in Bulaq[6]. The availability of both local and imported timber led to the flourishing of the carpentry craft, and woodwork developed to its highest level. Being a simple, easy-to-shape and work material, wood was a fundamental material of paramount importance in construction, both in buildings and furniture[7]. It was used in architectural elements such as doors, windows, ceilings, floors, columns, stairs, cupboards, and arcades, in addition to portable elements such as pulpits, benches, Quran stands, Quran reading chairs, and others[8].

Carpenters, along with other artists and craftsmen, contributed greatly to enriching buildings and providing them with suitable, elegant pieces of furniture that reveal the spirit of the age

[1] Al-Basha, Hassan and others (1970). Cairo: Its History, Arts, and Monuments, Cairo, p. 354. Abu Bakr, Ni'mat (1985). Pulpits in Egypt during the Mamluk and Turkish Eras, PhD dissertation manuscript, Faculty of Archaeology, Cairo University, p. 12.

[2] Marzouq, Muhammad Abd al-Aziz. Artistic Life in Islamic Egypt from the Arab Conquest to the Turkish Conquest, Egyptian Civilization, p. 593.

[3] Shafi'i, Farid (1970). Arab Architecture in Islamic Egypt, 1, The Era of the Governors, Cairo, p. 219. Al-Basha, Hassan et al., Cairo: Its History, Arts, and Antiquities, p. 354. Haridi, Salah Ahmad (1980). Crafts and Industries during the Reign of Muhammad Ali, Cairo, p. 67.

[4] Butler, A. (1884). The Ancient Coptic churches, I, Oxford, p. I8. Adeny, V. F. The Greek and eastern churches, Now York, p. I8. Abu Bakr, Ne'mat (1968). Wooden Pulpits in Egypt until the Mamluk Era, MA dissertation manuscript, Faculty of Arts, Cairo University, p. 85. Haridi, Salah Ahmad (1980). Crafts and Industries during the Reign of Muhammad Ali, p. 67.

[5] Al-Basha, Hassan et al. Cairo: Its History, Arts, and Monuments, p. 354.

[6] Denon, V. (1807). Voyage dans la basse et la haute Egypte pendant les campagnes du general Bonaparte, Paris, p. I3. Reymond A. (1973). Artisans et commercants au Caire au XVllle siècle, Institute Français du Damas, I, p. 356.

[7] Abed, Abdul Qader and Fathi Al-Sabai (1963). Al-Hafr, Cairo, p. 28.

[8] Al-Basha, Hassan (1979). Introduction to Islamic Antiquities, Cairo, p. 441.

Adeny, V. F. The Greek and Eastern churches, p. 80. Migion, G. (1907). Manuel d'art musulman, II, Paris, p. 89.

and the extent of prosperity and progress that life had achieved[1]. Wood was also an easy material for implementing many decorative methods due to its ability to be shaped and decorated in various ways, including engraving, turning, inlaying, and other industrial methods in wood[2].

Types of Wood

1. Poplar

It is used for carving, inlaying, fine turning, roofing, and siding. It comes to Egypt from Europe and Africa[3] and is of two types:

A. Red Poplar: It grows in Europe and North and West Africa. Its core wood ranges from light red to yellow-brown and dark red. Its surface bark is white with a reddish tinge. It is soft, light, highly shrinkable, and slightly flexible. It is very easy to plan and nail. It is easy to polish and stain. It is not resistant to pressure, wear, weather, or humidity. It is susceptible to rot[4].

B. Gray Poplar: It grows in Europe and Northern Asia. Its bark is white, bright red, or orange-green. It is soft, light, slightly flexible, highly shrinkable, and easily ferments. It is good at coloring. It is not resistant to weather, humidity, or rot.

2. Oak

This is an important hardwood species and grows in Europe, Western Asia, Turkey, China, the Himalayas, the mountains of Kurdistan, and the coasts of North Africa, from Marrakesh to Algeria[5]. Its heartwood is grayish-yellow or yellowish-brown, and its bark is white-yellow or whitish-gray. It is a durable, polishable wood with little flexibility, moderate shrinkage, and easy to split. It is tannable and polishable. It can be stained and impregnated, and is resistant to weathering, water, and rot[6]. It is expensive[7]. A type called shell oak has a

[1] Al-Basha, Hassan et al., Cairo: Its History, Arts, and Monuments, p. 369.

[2] Butler, A. The Ancient Coptic churches, I, p. I8.

[3] Darwish, Mahmoud Ahmed (2019). Encyclopedia of Rosetta, 3, pp. 18:43.

[4] Hurt, Warner. General Carpentry, p. 112. Abu Bakr, Ne'mat. Minbars in Egypt during the Mamluk and Turkish Periods, p. 20.

[5] Al-Meligy, Abd al-Mun'im (1896). A Dictionary of the Marvelous Arts and Crafts, 2, Cairo, p. 20.

[6] Hert, Warner. General Carpentry, p. 116.

[7] Mainoud. B. (1957). Domestic Carpentry, translated by Abd al-Ghani al-Shal, Cairo, p. 31.

beautiful effect when painted, giving it a shiny appearance that shimmers in the light[1]. It has yellow veins and markings[2]. It is also dark olive-colored[3]. It is hard and soft, and can withstand humid conditions without compromising its durability or strength[4]. It is used in the manufacture of doors, pulpits, ceilings, and preachers' benches[5].

3. Beech

Beech wood is the preferred wood species for woodworkers. It has a long lifespan and is easy to manufacture and shape to suit all household needs and categories. It is also easy to manufacture furniture, making it a popular choice for curved furniture. It grows in India, some African countries, and temperate regions of Asia and Europe[6]. Its color ranges from slightly reddish, grayish-white, or yellowish-white. It is extremely hard, has little flexibility, shrinks strongly, lends itself well to polishing and staining, is easy to impregnate, and resists pressure and warping. It is resistant to weather conditions, but not to moisture and water.

Beech wood is among the best woods, as it is purest compared to other woods. It also maintains the lifespan of furniture for the longest possible period. It is dense, able to withstand all environmental factors, and is odorless, which also makes it suitable for the manufacture of furniture and interior wooden artifacts.

Beech wood can withstand some heavy loads, as it is not affected by heat, so you always find your home at a comfortable temperature. It is also easy to clean. Beech wood also boasts the advantage of not being susceptible to decay like other types of wood. It can also be

[1] Mainoud. Domestic Carpentry, p. 31. Abu Bakr, Ne'mat. Minbars in Egypt during the Mamluk and Turkish eras, p. 179.

[2] Wood ridges are the result of gum, resin, or rosin. Gum is an organic secretion containing hydrocarbons from plants, particularly conifers, which are highly valued in the market for their chemical components and uses, such as varnish and gum, and as an important source of raw materials and organic synthesis. Al-Baalbaki, Munir (2013). Al-Mawrid Al-Hadith Dictionary, Dar Al-Ilm Lil-Malayin - Lebanon, p. 986.

[3] Hurt, Warner. General Carpentry, p. 112. Abdel Halim, Muhammad (1928). Wood, Carpentry, and the Carpenter, Cairo, p. 15.

[4] Abu Bakr, Ne'mat. Pulpits in Egypt during the Mamluk and Turkish Periods, pp. 14-15. Kishk, Shadia al-Dasouqi (1984). Woodwork in Religious Buildings in Cairo, MA Thesis Manuscript, Faculty of Archaeology, Cairo University, p. 80.

[5] Khalifa, Rabie Hamed (1948). Arts of Cairo during the Ottoman Period, Cairo, p. 179.

[6] Al-Meligy, Abdel Moneim. Dictionary of Marvelous Arts and Crafts, p. 29. Abu Bakr, Ne'mat. Pulpits in Egypt during the Mamluk and Turkish Periods, p. 4.

stained from time to time, and gives a shiny, beautiful color when painted. There are some drawbacks to beech wood, however, including its heavy weight, making it difficult to transport easily. It is also not resistant to moisture. It is used in various woodwork, such as barriers, pulpits, recitation benches, various types of turning, windows, and mashrabiyyas[1].

4. Pine

It grows in Syria, Asia Minor, and the Mediterranean region[2]. Yellow pine, also known as musky pine, is characterized by its light yellow color and strong fibers. It contains a large amount of resin[3]. Its weaknesses include its inability to be polished, its numerous knots and defects, and the inability to obtain a solid surface[4]. Resinous pine, known locally as azizi (beach pine), is considered one of the best conifers in terms of quality and beauty, due to its beautiful dark color and reddish-yellow color. It is also highly polishable and unaffected by weather conditions, especially moisture-saturated wood, making it one of the best woods used in coastal areas[5].

Musky pine is used for ceilings, floors, and cladding on cornices and doors. Azizi pine is used for pulpits, doors, reciters' benches, windows, and preachers' benches, as well as products that do not require dyes that would alter the wood's color. It is also used in architectural carpentry.

5. Teak (or rosewood)

Is a wood imported to Egypt from India and tropical Africa. It is considered the most expensive and valuable type of wood. It is distinguished by its variety of colors, its beautiful texture, and its blend of dark brown, making it resemble a homogeneous piece of precious metal. Its colors vary, including jet black striped with brown or white veins, brown with

[1]Al-Bustani (1884-1887). Al-Bustani Encyclopedia, Beirut, 9, pp. 158-159. Abd al-Halim, Muhammad. Wood, Carpentry, and the Carpenter, p. 14. Abu Bakr, Ni'mat. Pulpits in Egypt during the Mamluk and Turkish Eras, p. 14. Kishk, Shadia al-Dasouqi. Woodwork in Religious Buildings in Cairo, p. 79.

[2] Abd al-Jawad. Tawfiq Ahmad (1976). Architecture and Building Construction, Cairo, p. 42. Naguib, Mustafa (1975). The Qirqumas Amir Kabir School, manuscript of a doctoral dissertation, Faculty of Arts, Cairo University, 2, p. 119. Abu Bakr, Ni'mat. Pulpits in Egypt during the Mamluk and Turkish Eras, p. 17.

[3] Kishk, Shadia El-Dessouki. Woodwork in Religious Buildings in Cairo, p. 80.

[4] Abu Bakr, Nemat. Minbars in Egypt during the Mamluk and Turkish Periods, p. 13.

[5] Hert, Warner. General Carpentry Works, p. 119. Abu Bakr, Nemat. Minbars in Egypt during the Mamluk and Turkish Periods, p. 13.

white veins, and yellow and green. It is also characterized by its extreme hardness, with its high resistance to weather conditions, especially cold and humid climates. It is characterized by the presence of an oily or fatty substance within its fibers, allowing it to survive for a long time without being affected by the weather or insects that lead to its decay. It is not easily polished and worked, requiring technical skill. Teak is used in the manufacture of pulpits[1], coffins, doors, and turning[2].

6. Boxwood (Buxus)

Grows in Europe, Western Asia, and North Africa, it is striped, sometimes smooth, and hard. It is used in the manufacture of pulpits[3], turnings, and doors[4].

7. Ebony

Imported from Sudan[5], it is one of the most valuable types of wood[6]. It has a variety of colors, beautiful grains, and a deep tan. It can be jet black, black with brown or white veins[7], or brown with white veins. It is characterized by its hardness and ease of breaking[8]. It is the most durable and weather-resistant of all woods. It is also one of the most difficult woods to shape, producing a reasonably smooth, shiny surface[9]. It is used in turning, pulpits, and doors. It is also used in inlays with ivory[10], where its use creates a color contrast[11].

8. Turkish Walnut

[1] Marzouq, Muhammad Abd El-Aziz. Artistic Life in Islamic Egypt, p. 593. Abu Bakr, Nemat. Minbars in Egypt during the Mamluk and Turkish Periods.

[2] Hert, Warner. General Carpentry Works, p. 119.

[3] Hurt, Warner. General Carpentry, p. 123. Abu Bakr, Nemat. Minbars in Mamluk and Turkish Egypt, p. 15.

[4] Khalifa, Rabi' Hamid. The Arts of Cairo in the Ottoman Era, p. 179.

[5] Marzouq, Muhammad Abd al-Aziz. Artistic Life in Islamic Egypt, p. 593. Al-Basha, Hassan et al. Cairo: Its History, Arts, and Monuments, p. 354.

[6] Nazir, William (1970). The Plant Wealth of the Ancient Egyptians, Cairo, p. 218.

[7] Abdul Halim, Muhammad. Wood, Carpentry and the Carpenter, p. 15. Abu Bakr, Ni'mat. Pulpits in Egypt during the Mamluk and Turkish Eras, p. 16.

[8] Al-Meligy, Abdel Moneim. Dictionary of Innovations in Arts and Crafts, p. 22. Abdel Gawad, Tawfiq Ahmed. Architecture and Building Construction, p. 142.

[9] Abu Bakr, Ni'mat. The Pulpits in Egypt in the Mamluk and Turkish Eras, p. 16.

[10] Al-Maliji, Abdel Moneim. Dictionary of Innovations in Arts and Crafts, p. 19.

[11] Ezzat, Ragab (1987). The History of Furniture from the Earliest Times, Cairo, p. 147.

Imported from Asia Minor, India, Syria, Lebanon, Kurdistan, Anatolia, and Europe[1], it is a hard, durable wood that can be polished[2] and shaped easily. It is characterized by its graining, due to its fibers tending toward a burnt brown or black color. These fibers are cohesive, and when oiled, it produces[3] a perfectly polished surface. It is unaffected by humidity and heat[4]. There are two types: Turkish and Indian. It is used for doors, carving, and inlay work, as well as pulpits[5].

9. Cypress (Cupressus)

Cypress is a genus of tree-like plants in the cypress family that grows in Turkey, southern Europe, and the eastern Mediterranean. The most important species is the Mediterranean cypress. It contains volatile oil and is an ornamental tree with approximately fifteen species. Cypress trees can reach a height of 30 meters. They are slow-growing, and their wood is fragrant.

Cypress wood is reddish-yellow [6] or reddish-veined, with regular, fine fibers. It is characterized by its durability[7], strength, and extreme hardness. Cypress trees are clearly visible in various Ottoman decorations[8].

Accordingly, wood is divided into five types:

A. Hardwoods

They are characterized by dense fibers, high resistance, and flexibility over time. The most important types of hardwoods are beech, walnut, and teak.

B. Softwoods

This is a term applied to the wood of trees belonging to the bare-root plant group. This type of wood is commercially important. It belongs to the conifer family. Scientifically, it is considered non-porous wood, obtained from pine, spruce, and other trees, and is known as whitewood.

[1]Al-Maliji, Abdel Moneim. Dictionary of Innovations in Arts and Crafts, p. 25.

[2] Abdul Jawad. Tawfiq Ahmad. Architecture and Building Construction, p. 142.

[3] Abdul Halim, Muhammad. Wood, Carpentry and the Carpenter, p. 24.

[4]Al-Maliji, Abdel Moneim. Dictionary of Innovations in Arts and Crafts, p. 25.

[5] Khalifa, Rabi' Hamid. The Arts of Cairo in the Ottoman Era, p. 179.

[6] Al-Bustani. Al-Bustani Encyclopedia, Beirut, 9, p. 598.

[7] Abdul Jawad. Tawfiq Ahmad. Architecture and Building Construction, p. 143.

[8]Abu Bakr, Ni'mat. The Pulpits in Egypt in the Mamluk and Turkish Eras, p. 16.

C. Gum-like woods

Their sap contains abundant gum, and the most important types of wood are pine and cypress.

D. Precious woods

These are extremely hard woods that resist friction due to their even grains. The most important types of wood are boxwood, rosewood, Hollywood, and teak.

E. Tropical woods

This is a term applied to highly porous woods characterized by abundant pigments and colored, wavy wood[1]. These include oak, poplar, gum, chestnut, ebony, and others.

Third: Artistic Methods in the Craft of Wooden Artifacts

1. Assembling and Interlocking

This method is one of the earliest methods for fixing various inlays. The mandrel and mandrel methods, as well as the tongue method, were the most prevalent[2]. This method is used to assemble the stiles (vertical frames) and the heads (horizontal frames) of doors, windows, and other structures, and to create a pottery channel along one side of the wooden inlay. When fixing the inlays, they must not be nailed or tightly clamped to the bone. Rather, care must be taken to ensure they are free to move so they do not crack during shrinkage.

A. Fillings

The artist was careful to increase the number of fillers in the corners to help them easily attach to each other. The fillings are called: the baggage (square filling), the date (horizontal rectangular filling), and the crocodile (vertical rectangular filling). In addition to fillings in

[1] Adeeb, Atef. The Art of Carpentry, Damascus, pp. 16-17.

[2] See: Clot Bey (1930). A General View of Egypt, Two Parts, Translated by Muhammad Saud, Cairo, 2, pp. 3-479. Abd al-Halim, Muhammad. Wood, Carpentry the Carpenter, pp. 82-83. Zaki, Rashid (1932). The Art of Arket, 1st ed., Cairo, p. 30. Marzouq, Muhammad Abd al-Aziz (1965). Islamic Art: Its History and Characteristics, Baghdad, pp. 146-147. Shafi'i, Farid (May 1974). Ornamental Wood in the Abbasid and Fatimid Styles in Egypt, Journal of the Faculty of Arts - Cairo University, 1/16. Abd al-Jawad, Tawfiq Ahmad. Architecture and Building Construction, pp. 109-172. al-Basha, Hassan. Introduction to Islamic Antiquities, p. 440. Ibrahim, Abd al-Latif (1979). Documents in the Service of Antiquities, Studies in Islamic Antiquities, Cairo, p. 348. Kishk, Shadia al-Dessouki. Woodwork in Religious Buildings in Cairo, p. 408. Haridi, Salah. Crafts and Industries, p. 67.

various geometric shapes, carpenters were careful to leave a suitable clearance (space) in the throats to aid the expansion of the wood without causing any strain on its fibers. This is because wood is affected by regular changes in humidity, and its fibers are susceptible to shrinkage and expansion.

The method used to design fillings was a compass and a string. The center was determined, and a circle was formed that would encompass the desired shape. Then, a nail was fixed to the center, with a string tied to it, to create the various lines that comprise this shape. This method is called "carpentry drawing" and "strike string." Geometric fillings in various forms also became widespread, and this method was known in Egypt during the Fatimid era[1].

B. Interlocking Strands

Interlocking strands are widely used, consisting of interlocking strands (qinanat) called "qishr." The difference between them and interlocking fillings is that in the case of fillings, the canals are level with these fillings, and the grooves are executed with canals. Sometimes, the fillings are higher than the canals and their edges are chamfered. Strands, on the other hand, are fixed to the surface of the wood, and the ends of the canals are angled to form angles.

Sometimes, the strands are executed together without a floor and are called "Abu Janzeer" or "Bee's Nest." Abu Janzeer is a geometric shape that radiates from the center of the strands, intersecting with other shapes. It was mistakenly called Abu Janzeer wood turning "Khart Abu Janzeer." The bee's nest, on the other hand, consists of interlocking hexagonal shapes, and was mistakenly called Wavy "Ma'qali Ma'raj."Artists have been able to create [2] numerous geometric elements by assembling and interlocking the fillings or strands, such as[3]:

- Al-Ma'qali

This is a method of arranging fillings in square or rectangular shapes at an angle of (90) degrees, (60) degrees, or (30) degrees. It includes:

Right Ma'qali: consists of longitudinal and transverse fillings separated by other square

[1] Fikry, Ahmed (1965). Mosques and Schools of Cairo, 1, The Fatimid Era, Cairo, p. 106. Marzouq, Muhammad Abd al-Aziz (1965). Islamic Art, Its History and Characteristics, Baghdad, p. 149.

[2]Abu Bakr, Ni'mat (1968). Wooden pulpits in Egypt until the Mamluk era, p. 113.

[3] Khalifa, Rabi' Hamid. The Arts of Cairo in the Ottoman Era, pp. 175-176.

fillings at a right angle of (90) degrees.

Diagonal Ma'qali: consists of longitudinal and transverse rectangular fillings separated by square fillings at an angle of (45) degrees.

Curved Ma'qali: consists of rectangular fillings wrapping around a square filling. The rectangular fillings end at an angle, giving the shape a cross-like appearance.

Half-on-Half Ma'qali: resembles brick molds.

- Mafarik

The mafaruk is a decorative unit consisting of a right square or a (30)-degree angle. Its designated base begins at one-third of the side of the square containing the entire filling. The slanted bases begin at half or one-third of the side of the square of the original filling. The square's sides are T-shaped and include the slanted mafaruk and the curved right mafaruk.

- Star-shaped plates

They are considered one of the foundations of Islamic geometric decoration, due to their spirit, interweaving, and interconnectedness, evident in the beautiful intertwining of their geometric structure. They are an artistic unit composed of three distinct parts, regardless of the complexity of the method of combining them.

For various reasons, perhaps foremost among which is the Muslims' interest in astronomy, star shapes of various types occupied a prominent position among the common geometric decorations in Islamic art. This was until the sixth century AH, when a new form, unprecedented in any other art form, was added to the list of star-shaped shapes: the star-shaped plate.

The star-shaped plate is a complex decorative design composed of pointed, polygonal star shapes revolving around a central star. In its early form, it appeared as a decorative unit consisting of a six-pointed star surrounded by six pentagonal inlays.

The Fatimid artist came up with this innovative decorative form in his quest to imbue the wooden inlays of pulpits and furniture with an aesthetically pleasing character. He technically adopted the method of grouped inlays to overcome the expansion and contraction of wood during the different seasons, which would have led to the curvature and distortion of furniture pieces, especially if the wood was of ordinary types.

This means that the first appearance of the star-shaped plate was purely a response to the aesthetically pleasing decorative tendency inherent in Islamic art. However, this appearance soon evolved, with the star-shaped plate becoming a decorative feature intended for its own

sake, not merely a beautiful form for a utilitarian or functional purpose. The star-shaped dish begins with a square, with a circle inside that touches its sides. Then the division begins. The circle is divided to form a star shape after bisecting it and drawing the strings and arcs. In the center of the star-shaped dish decoration, we find a central star with serrated edges. The number of these edges may reach (24) pointed edges. This single central element is known as the shield, as the star-shaped dish only has one shield. The second element is the kanda, singular kanda, which is a six-sided inlay that begins with a square base from which two rectangular edges extend, ending in the shape of an acute-angled triangular head. These kandas form the outer border of the star-shaped dish, and the number of kandas in each dish is equal to the number of edges of the shield.

The final decorative element is the almonds, singular almond, which are small fillings that fill the space between the shield and the kandas. The almond consists of a quadrilateral shape that corresponds to the edges of the shield in a radial form, and their number in the star plate is equal to the number of kandas. Star plates come in many sizes, ranging from octagonal to (32) sides. The essence of the star plate design, after its full geometric maturity, is a radial image that moves in a specific direction but in a fixed manner at the center of the decoration. It revolves in a circular orbit whose axis or pole is the star plate, and its larger fragments are the kandas, while the smaller ones are the almonds. The star plates connect with each other via the kandas, which simultaneously serve as separating and connecting elements. This is another artistic engineering genius that gives the star plate decoration the infinite character that characterizes the spirit of Islamic plant decoration in particular.

The Muslim artist enhanced the decorative character of the star-shaped plate by relying on contrasting colors of the inlays. He first used woods of various shades, ranging from shades of brown to ebony black. He then followed this with ivory inlays, especially in the shields and small almonds. The star-shaped plates acquired a rich decorative richness when the artist inlaid the various inlays with ivory and mother-of-pearl, enhancing the color character of the star-shaped plates.

However, these decorative elements, which originally originated within the embrace of a functional and utilitarian purpose, quickly transformed into a decorative element skillfully used to decorate artistic products other than wood, appearing in almost all applied arts products.

The eight- and twelve-pointed star-shaped plates were widespread in the buildings of the

city of Rosetta, particularly on pulpits and the roofs of houses such as the Amasyali House.

- Stars and various geometric shapes

They consist of fillings and shapes: three-, four-, five-, six-, seven-, and eight-pointed stars; three-, four-, six-, eight-, twelve-, and six-pointed stars; and twenty-four-sided shapes. Hexagonal shapes include those made up of six fillings (rhomboids); hexagonal shapes divided into six sections by hexagons (Serwa hexagon); hexagonal shapes with two hexagons on either side of a six-pointed star (Khatam hexagon); octagonal shapes with four surrounding a six-pointed star (Tasuma hexagon); or surrounded by four five-pointed stars and four pentagons; or with rays; in addition to various shapes that enclose rays extending to meet other shapes (Abu Janzeer); and the frog, alley, dagger, and krandaz shapes with frames and zigzag shapes; in addition to square and rectangular shapes and fillings with fillings and hexagons.

2. Wood Carving

Wood carving and carving are beautiful visual arts that combine multiple skills, including a vivid imagination, dexterity of hand, and a keen sense of sight, along with a balance between the mind, eye, and hand. Sculptors use a variety of materials to showcase the beauty of this wonderful art.

Wood carving requires knowledge of the following:

- Familiarity with the various characteristics of the types of wood used: grain direction, hardness and softness, susceptibility to bending and cracking, etc., to determine their suitability for carving based on the type of wood suitable for the design.
- Understanding the types of carving and shaping to enable the formation of its units in accordance with the type of wood and the desired purpose.
- Studying the various styles used to identify the style of pieces required for the carved designs.

Wood carving[1] in the Ottoman buildings of Rosetta City featured inscriptions, stalactite, and bastim. These lines were executed using a slanted chamfer, like a channel, with a cross-section shaped like the letter U or V. Sometimes, bastim was executed using the sabresah

[1] Demand, M.S. (1985). Islamic Arts, translated by Ahmed Mohamed Issa, Cairo, pp. 115-122. Marzouk, Mohamed Abdel Aziz. Artistic Life in Islamic Egypt, pp. 593-594. Abdel Wahab, Hassan (1979). Engineering Drawings of Islamic Architecture, Studies in Islamic Antiquities, Cairo.

method, which involves stacking panels vertically, horizontally, or diagonally, with the spaces between them highlighted by chamfering the edges like the letter V. The techniques also included ornamentation. Wood carving techniques included incising, sunken and raised carving, slanted chamfering, and the use of carving to create grooves in the fillings, in preparation for assembly and interlocking. Incising was also used to create lines on the edges of various fillings and the structures of wooden artifacts in general. Sunken and raised carving was used to create geometric and inscriptional elements, while slanted chamfering was used on the edges of fillings and to create stalactite[1]. Engraved decorations were drawn on the wood, then the surfaces were flattened, making the element prominent. This method is called "daq al-uwayma."

Types of Three-Dimensional Engraving

- Flat Relief Engraving

In this type, the engraved motifs reach a height of approximately 0.5 cm and are commonly found in medallion designs and Islamic engraving.

- Shaped Relief Engraving

In this type, the height of the engraved motifs and shapes on the ground increases by more than half (0.5 cm) and reaches approximately 7 cm. The ground surfaces must all be of equal depth and of equal height.

- Raised Engraving

This type is similar to shaped relief engraving, but is more prominent and deeper in the ground surfaces, which must also be of equal depth. The height of the engraved motifs may reach a frame of 25 cm, creating a stronger effect. This type of engraving is suitable for use in areas that are hidden from view. - Stalactites

A type of decoration developed by the Arabs, it has become a distinctive feature of their art. It has various forms, some resembling the limestone deposits hanging from certain caves, and others resembling ant nests or beehives. The origin of stalactites is the niche used to transition from the square to the level where the dome is erected, in buildings distinguished by their domes.

[1] Abed, Abdul Qadir and Fathi Al-Sabai. Engraving, p. 48. Marzouq, Muhammad Abd Al-Aziz. Islamic Decorative Arts in the Islamic Era, Cairo, p. 169, Ministry of Public Works (1941-1942). Valuation Book, Item 293, p. 56.

Currently, this art is limited to decorations that can be suspended from ceilings, such as lighting centers, places for hanging chandeliers, or the sides of large, comfortable seats. The Syrian Arabs inherited this art from other nations that preceded them, and they developed it greatly, until it became its current state of innovation and creativity.

- Sunken carving

This is the opposite of raised carving, which is a type of previous art. In this type, the decorations are engraved inward, leaving the floors as they are, without engraving or engraving. The ancient Egyptians used it extensively in temples and tombs with limited light, to help the shadows stand out and last longer.

- Three-dimensional engraving

This is the most precise type of engraving and involves engraving blocks with the intent of shaping and reconstructing them. It is most commonly used in sculpture and statues.

3. Turning

Al-Khart: turning a tree, turning it, removing its bark and smoothing it with a lathe. Al-Khart is an active participle, and turning is the craft of the turner, and the turner is the one who carves wood on the lathe, so that it comes out conical and round[1]. Al-Khart is the wood executed in conical shapes on the lathe[2], and it is in the form of conical spokes, and the spoke represents the basic element of turning, in addition to the mandrels that connect those spokes, and the spoke consists of a conical column whose length and dimensions cannot be determined as its size varies according to the purpose for which it is made, and there are many types of spokes, including square, hexagonal, octagonal, spherical, or oval, and these shapes are called (akr), as for the two ends of the spoke, each of them is called (bucket), and it is connected to the spokes in a vertical position, but if it is tilted, spokes are used at an angle of (45) degrees[3].

It has been mistakenly stated that turning is done by a small, conical piece representing the

[1] Al-Bustan Dictionary. 1, pp. 662-663. Al-Bustani, Butrus (1870). Muheet Al-Muheet, Beirut, 1, pp. 252-256.

[2] Ibrahim, Abdel Latif. Documents in the Service of Antiquities, p. 409. Al-Meligy, Abdel Moneim. Dictionary of Innovations in Arts and Crafts, p. 66.

[3] Ministry of Public Works (1942-1943). Valuation Book, p. 32. Marzouq, Muhammad Abd al-Aziz. Artistic Life in Islamic Egypt, p. 594. Abed, Abd al-Qadir and Fathi al-Sabai. Engraving, p. 60. Ezzat, Rajab (1987). History of Furniture from the Earliest Times, Cairo. pp. 146-147.

connecting elements between the turned units. However, this method is used to secure masts, heads, and cylinders to doors, windows, or other artifact structures. It replaces nails, where the parts are drilled together and a beechwood (conical) nut is attached. Instead, the mortise and tenon method is used, where the mortise is executed with the spokes and the tenon with the mortises. Mortise for the mortises is not possible due to their small size. The ends of the spokes at the hoppers are mortised with a tenon that is placed in the groove in the bracket into which the spokes are engaged. This means that each spoke, no matter how large, should have only two tenons, and each horn has a number of grooves proportional to the number of mortises attached to it.

Mortise and tenon mortise was used to connect the various turned parts to each other or to the external frames.

The turning industry flourished in the city of Rosetta during the Ottoman era, and two main types of turning were widespread: the first was Maimonid turning, and the second was cistern turning:

- The precise (fine) Maimoni turning[1]

This is the precise turning in which the space between the acre is equal to the space of the acre, meaning it is "as empty as a full" or less, and sometimes wider than that if intersecting groves are added within the (empty) shapes between the spokes or without any space. The precise Maimoni turning includes several types:

• The oblique square Maimoni turning

In which the spokes take the shape of a square (the acre) and are oblique (45) degrees, and the square spaces between the spokes are equal to or less than the size of the spokes.

• The empty Mimouni cross

Its beams are horizontal and their intersections produce square spaces. The shape of the acre is spherical. It was wrongly called the “empty cross,” but it is more correct to call it “empty.” Its name “full” comes from the fact that it is supported by two intersecting branches like a cross. When it is devoid of these two branches, it is not called a “cross,” but rather an empty

[1] Maimuni or Ma'mouni turning: A type of turning known in Egypt since ancient times, and widespread in both its forms during the Mamluk era. Ibrahim, Abd al-Latif. Documents in the Service of Antiquities, 2, p. 409.

Mimouni cross (empty)[1].

These two shapes appeared together, resulting from the addition of one or two intersecting groves to the empty cruciform grove. This occurs in each square enclosed between every four acres (pillars). If there is one grove, it is called a "half-cruciform," while if there are two intersecting groves, it is called a "cruciform."

- **The hexagonal Maimoni**

Its spokes can be vertical or horizontal. Each spoke consists of two hoppers and a number of acorns, or of just an acorn with one more in place of the two hoppers. When the spokes are placed, the acorns alternate with each other, so that the space enclosed between every six spokes is a hexagonal shape. Each acorn is also considered the center of a hexagonal shape. The acorns can be spherical or hexagonal. There is a type of hexagonal Maimoni turnery called (Abu Shroual), which has curved projections that form arches around the spherical acorns, with each acorn being surrounded by six arches.

- **The hexagonal Maimoni**

Its spokes can be vertical or horizontal. Each spoke consists of two hoppers and a number of rakes, or of just one raker instead of two hoppers. When the spokes are placed, the rakes alternate with each other, so that the space enclosed between every six spokes forms a hexagonal shape. Each raker is also considered the center of a hexagonal shape. The rakes can be spherical or hexagonal. There is a type of hexagonal Maimoni loom called "Abu Shroual[2]," which has curved projections that form arches around the spherical rakes, with each raker surrounded by six arches.

This is a type of turning with spokes that takes shapes other than square or spherical. The hollowing method is used to create spoked spokes, producing several types of these turnings: The superimposed turning with hexagonal spokes enclosing triangles. This is formed by a wide diaphragm in which hexagonal shapes are cut, each surrounded by triangles. When joined together, the spokes produce hexagonal shapes with triangles surrounding each one. Sometimes the spokes are connected in trapezoidal or parallelogram shapes.

[1] Kishk, Shadia Al-Dessouki. Woodwork in Religious Buildings in Cairo, p. 441. Khalifa, Rabie Hamed. Arts of Cairo in the Ottoman Era, p. 174.

[2] Abu Sarwal or Abu Shirwal is a type of pigeon that has feathers on its legs that look like trousers. Al-Bustan Dictionary, 1, pp. 189–1088–1220.

The split turning with hexagonal spokes (wavy): Long hexagonal shapes are created. When the spokes are joined with spokes, they also take on a long hexagonal shape. Four hexagonal elements are formed, enclosing an octagonal space between them. This type is called the ring octagon.

• The Maimoni, also called the Arnas or Arnoos[1], is a woven basket of small, unattached spokes, in the shape of a bucket or column, with a base, body, and crown.

• The church-style mimouni, It consists of ungirted lintels, erect and octagonal with upper and lower frames. It differs from the arnoos in that it consists of two or more shapes.

• The cistern-style lintel, It consists of lintels with larger cross-sections than the mimouni lintel, with some reaching a thickness of 5 cm and lengths of up to two meters or more. It is distinguished by the fact that the spaces between the lintels forming its cross-sections are much wider than the mimouni lintel, with some exceeding ten centimeters. Therefore, it is wider than the mimouni lintel. This is the difference between it and the mimouni, which is called the cistern-style lintel. The cistern-style lintel is used for wide windows in mosques or on the first floors of houses, which are reserved for men and lack mashrabiyas. It is also used for skylights above windows on the upper floors of houses to compensate for the reduced light output caused by the mimouni lintel. The cistern map includes several types:

• The inclined cistern map, It includes several types, the first of which is the oblique and upright cistern map, with spherical or oval shaped wheels.

• The square cistern map, It is in the form of a right angle (90) degrees or an angle (45) degrees, with a square, chamfered wheel whose face turns into an octagon.

4. Inlay

Inlay, or inlaying, relies on highlighting symmetry in drawn shapes by inlaying wood with various materials, such as mother-of-pearl, bone, tin, copper, and even silver. This is accomplished by engraving fine lines representing the desired designs, which are then filled with the desired material. The wood inlaying method was inspired by Byzantine mosaic work and differs from the art of engraving, as it uses different types of wood, such as ivory, mother-of-pearl, and bone, in colors different from the wood being engraved. Alternatively, it uses different types of precious wood, such as rosewood, pearwood, and walnut, which are

[1] Al-Arnas or Al-Arnoos: a type of bird similar to the pigeon. See Al-Bustani, Boutros. Muheet Al-Muheet, Beirut, 2, p. 1387.

different in color and type. This color enhances the beauty of the decorative elements.

Bone, tooth[1], and mother-of-pearl[2] were used in the wood decoration of the buildings of Rosetta during the Ottoman era. Engravings were used in the designated areas for adding precious materials[3], and the resulting spaces were then filled with these materials. The artist then smoothed the surface of the work after inlaying, ensuring that both surfaces were even[4]. The areas engraved for inlaying are called "maestrick" or "flatto[5]."

Many applied artifacts, such as doors and chandeliers, have been made with the Kari mother-of-pearl technique. Kari mother-of-pearl is a hard material with an attractive luster, representing the hard armor of some marine mollusks. The inner layer, characterized by its softness and luster, is used. Kari mother-of-pearl woodwork is decorated with two types of inlay: partial inlay and full inlay.

Partial inlay is represented by a single technique known to the Turks as "kkama," in which the design is drawn, then the mother-of-pearl units are cut out with the other inlay units. The design is then transferred to the inlay, and the decorations are engraved, ensuring that the depth of these cavities is equal to the thickness of the mother-of-pearl units. The surface of the wooden inlay is level with the surface of the areas decorated with mother-of-pearl. Full inlay is performed in two methods:

The first method is "Yapsterma," in which the required design is also prepared in advance, and the mother-of-pearl is prepared according to the desired decorative elements. The wooden surface is fully engraved, and the mother-of-pearl units are affixed to the engraved background. Sometimes the spaces between the mother-of-pearl units are filled with other

[1] Tooth or ivory: is the bone of the elephant. Nothing but the elephant tusk is called ivory. If you cut an elephant tusk crosswise, you will see rounded lines intersecting it, forming vertical diamond shapes with curved borders. This is what distinguishes true ivory, or elephant tusk, from other types of bone, whether dental ivory or otherwise. Ivory is softer in texture and more flexible than other types of bone. Al-Bustani. Al-Bustani Encyclopedia, 11, p. 433.

[2] Shells are marine animals whose shells are used after being cut into small pieces. Al-Bustani, Boutros (1870). Muheet Al-Muheet, Beirut, 1, p. 1170.

[3] Mahrez, Gamal. Wood Decoration in Egyptian Islamic Art, Risalat al-Islam Magazine, 1, 2nd year, p. 93.

[4] Arseven, G. A. (1939). L'art turc, Istanbul, p. 197.

[5] One of the less used methods in Cairo's buildings. Kishk, Shadia El-Dessouki. Woodwork in Religious Buildings in Cairo, p. 130. Khalifa, Rabie Hamed. The Arts of Cairo in the Ottoman Era, p. 196.

materials, such as ebony and bone, taking appropriate shapes. Alternatively, they are filled with paste, and the elements are affixed directly to the surface without engraving. This is called "tarsi" or inlay.

The second method is "Kapelma," or "veneering," which involves completely covering the wooden surface of the artifact. The decorative mother-of-pearl units are affixed, one piece next to the other, so that the background disappears. Sometimes, some of the decorations are engraved on the surface of the mother-of-pearl.

5. Cutting and hollowing

This is called hollowing, and involves carving hollow shapes with an arc saw while simultaneously engraving them so that the units are held together. This is one of the methods prevalent in architectural decoration in the city of Rosetta during the Ottoman era. When executed on paper or wooden panels, the artist outlines the decorative shapes, then hollows them out by removing the floors separating the decorative elements. The hollowing should be in the direction of the wood grain to prevent breakage.

Cutting and hollowing were used to create niches, arches, columns, balconies that crown pulpits, lobed domes, spiral shapes, corbels, and plant and geometric shapes.

6. Staining

Staining was a widely used method for decorating wooden artifacts in the city of Rosetta during the Ottoman era. A variety of colors were used, including brown, white, red, green, purple, and gold. This method involved treating the wood before staining in two ways: the first was to cover the surface to be decorated with a diluted solution of mastic and petroleum. The second method involved covering the surface with a thick layer of wax and petroleum. The colors used to color the wood were then dissolved in egg yolk mixed with wine or glue. Staining was used to create plant motifs on ceilings and on canopies[1]. Staining decorations took various forms, including plant and geometric motifs, inscriptions, and other motifs such as ships and mosques.

References

Abd al-Jawad. Tawfiq Ahmad (1976). Architecture and Building Construction, Cairo.

Abdel Halim, Muhammad (1928). Wood, Carpentry, and the Carpenter, Cairo.

[1] Khalifa, Rabi' Hamid. The Arts of Cairo in the Ottoman Era, p. 170.

Abdel Wahab, Hassan (1979). Engineering Drawings of Islamic Architecture, Studies in Islamic Antiquities, Cairo.

Abdul Halim, Muhammad. Wood, Carpentry, and the Carpenter.

Abdul Jawad. Tawfiq Ahmad. Architecture and Building Construction.

Abed, Abdul Qader and Fathi Al-Sabai (1963). Engraving, Cairo.

Abu Bakr, Ne'mat (1968). Wooden Pulpits in Egypt until the Mamluk Era, MA dissertation manuscript, Faculty of Arts, Cairo University.

Abu Bakr, Ne'mat. Minbars in Egypt during the Mamluk and Turkish Periods.

Abu Bakr, Ni'mat (1985). Pulpits in Egypt during the Mamluk and Turkish Eras, PhD dissertation manuscript, Faculty of Archaeology, Cairo University.

Adeeb, Atef. The Art of Carpentry, Damascus.

Adeny, V. F. The Greek and eastern churches, Now York.

Al-Baalbaki, Munir (2013). Al-Mawrid Al-Hadith Dictionary, Dar Al-Ilm Lil-Malayin – Lebanon.

Al-Baghdadi, Marfaq Ahmad Abu Muhammad ibn al-Latif (1869). Al-Ifada wa al-I'tibar fi al-Amr al-Musharidah wa al-Adhdath al-Musawwarah fi al-Ard Misr, Cairo.

Al-Basha, Hassan (1979). Introduction to Islamic Antiquities, Cairo.

Al-Basha, Hassan and others (1970). Cairo: Its History, Arts, and Monuments, Cairo.

Al-Bustani (1884-1887). Al-Bustani Encyclopedia, Beirut, 9.

Al-Bustani, Butrus (1870). Muheet Al-Muheet, Beirut, 1.

Al-Hamawi, Shihab al-Din Abu Abdullah Yaqut ibn Abdullah al-Hamawi al-Rumi al-Baghdadi (d. 626 AH / 1246 AD) (1906). Mu'jam al-Buldan, 4, Cairo, 1.

Al-Meligy, Abd al-Mun'im (1896). A Dictionary of the Marvelous Arts and Crafts, 2, Cairo, p. 20.

Arseven, G. A. (1939). L'art turc, Istanbul.

Butler, A. (1884). The Ancient Coptic churches, I, Oxford.

Clot Bey (1930). A General View of Egypt, Two Parts, Translated by Muhammad Saud, Cairo, 2.

Darwish, Mahmoud Ahmed (1989). The buildings of Rosetta and their wooden artifacts in the Ottoman era, manuscript of a master's thesis, Faculty of Archeology - Cairo University.

Darwish, Mahmoud Ahmed (2019). Encyclopedia of Rosetta, 3, Cairo: The Arab Nation Foundation for Publishing and Distribution.

Demand, M.S. (1985). Islamic Arts, translated by Ahmed Mohamed Issa, Cairo.

Denon, V. (1807). Voyage dans la basse et la haute Egypte pendant les campagnes du general Bonaparte, Paris, p. I3.

Ezzat, Ragab (1987). The History of Furniture from the Earliest Times, Cairo.

Fikry, Ahmed (1965). Mosques and Schools of Cairo, 1, The Fatimid Era, Cairo.

Haridi, Salah Ahmad (1980). Crafts and Industries during the Reign of Muhammad Ali, Cairo.

Hirt, Warner (1977). The Carpenter's Public Works, translated by Abdel Moneim Akef, Cairo-Leipzig.

Ibrahim, Abd al-Latif (1979). Documents in the Service of Antiquities, Studies in Islamic Antiquities, Cairo.

Khalifa, Rabie Hamed (1948). Arts of Cairo during the Ottoman Period, Cairo.

Kishk, Shadia al-Dasouqi (1984). Woodwork in Religious Buildings in Cairo, MA Thesis Manuscript, Faculty of Archaeology, Cairo University.

Maher, Suad (1967). The Navy in Islamic Egypt and its Remaining Monuments, Cairo.

Mahrez, Gamal. Wood Decoration in Egyptian Islamic Art, Risalat al-Islam Magazine, 1, 2nd year.

Mainoud. B. (1957). Domestic Carpentry, translated by Abd al-Ghani al-Shal, Cairo.

Marzouq, Muhammad Abd al-Aziz (1965). Islamic Art, Its History and Characteristics, Baghdad.

Marzouq, Muhammad Abd al-Aziz. Artistic Life in Islamic Egypt from the Arab Conquest to the Turkish Conquest, Egyptian Civilization.

Marzouq, Muhammad Abd Al-Aziz. Islamic Decorative Arts in the Islamic Era, Cairo.

Migion, G. (1907). Manuel d'art musulman, II, Paris.

Naguib, Mustafa (1975). The Qirqumas Amir Kabir School, manuscript of a doctoral dissertation, Faculty of Arts, Cairo University, 2.

Nazir, William (1970). The Plant Wealth of the Ancient Egyptians, Cairo.

Reymond A. (1973). Artisans et commercants au Caire au XVllle siècle, Institute Français du Damas, I.

Shafi'i, Farid (May 1974). Ornamental Wood in the Abbasid and Fatimid Styles in Egypt,

Journal of the Faculty of Arts - Cairo University, 1/16.

Shafi'i, Farid (1970). Arab Architecture in Islamic Egypt, 1, The Era of the Governors, Cairo.

Zaki, Rashid (1932). The Art of Arket, 1st ed., Cairo.