

# The Amcazade Yalısı in Istanbul. A New Light on Ottoman Carpentry

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**ABSTRACT:** On account of their spatial innovations and their ground plan typologies Ottoman wooden houses are a very important and common scientific topic. Nevertheless, the construction peculiarities of these buildings have been much neglected. One reason is probably the inaccessibility of their supporting structure, if the houses are in maintained condition. But the main reason is the repeatedly mentioned simplicity of the construction of the framework, as far as it was examined until now. However, these examinations have been very infrequent, and their results have seemed to confirm the prejudice against Ottoman wooden houses. But new investigations at the Amcazade Yalısı in Istanbul have provided the opportunity to check previous theories in the case of a very prominent example. To some extent the prejudices are confirmed, as the woodworking joints are quite simple, mostly secured with huge iron nails. But the quality of carpentry in the way the members of framework were prepared is surprising. And a closer look at the construction peculiarities reveals a distinguished and individual system probably influenced by naval architecture.

## INTRODUCTION

### Setting

The Amcazade Yalısı in Anadolu Hisarı is without question an incunabulum of Ottoman architecture. Among Ottoman wooden houses it is the most widely known example and furthermore one of the oldest. The waterfront of the Divanhane, probably originating in the 17th century, has become synonymous with Bosphorus architecture. At the same time it has become a symbol for the endangered heritage of Istanbul, because already for many years, the Divanhane has been threatened by decay. The present remains of the Amcazade Yalısı are only fragments of what was formerly a group of buildings. These originally formed a row of wooden houses on the Asian shore of the Bosphorus. In the 17th century the influential Köprülü family had erected this impressive summer palace here, in a wide area of shore extending to the west towards the Rumeli Hisarı fortress (Eldem; Ünver 1970). The arrangement of buildings had the classical components of a Selamlık and a Haremlik – here unusually far apart (Eldem 1974, p. 191) - see Fig. 1. Allocated to both the Selamlık and Haremlik were several additional wooden and solid houses of various functions. Of these just a few parts survive today. Of the Haremlik only some remains of the foundation walls still exist. The building itself had already been demolished before the 1st world war (Eldem 1970, p. 10). Only in the Selamlık do parts of the wooden structure survive in very different states of preservation. The elongated building was orientated in east-west direction and was closed to the east by a bathhouse and a kitchen of stone. The main body of the building - the so called Meşruta Binası (Bachmann 2008, p. 209)- originated in the middle of the 19th century and replaced the structure of the older Selamlık. Of the Meşruta Binası itself, only some wooden walls of the ground floor still remain. The damage to the building is relatively new, the speedily accelerating dilapidation having started about thirty years before.

A little staggered to the south, the Divanhane bordered onto the narrow western end of the Meşruta Binası – see Fig. 2 (left). Thanks to this building – actually an exposed component of the Selamlık – the construction has great fame. The Divanhane is seen as the embodiment of a Turkish wooden house. The fascinatingly clear-cut layout was achieved by arranging the triple Eivan in a T-section, whose central square was domed. On the eastside of the Divanhane –away from the waterfront – is the main entrance, which leads directly from outside into the centre of the building. Whereas the entrance of the building was extremely modest in appearance,

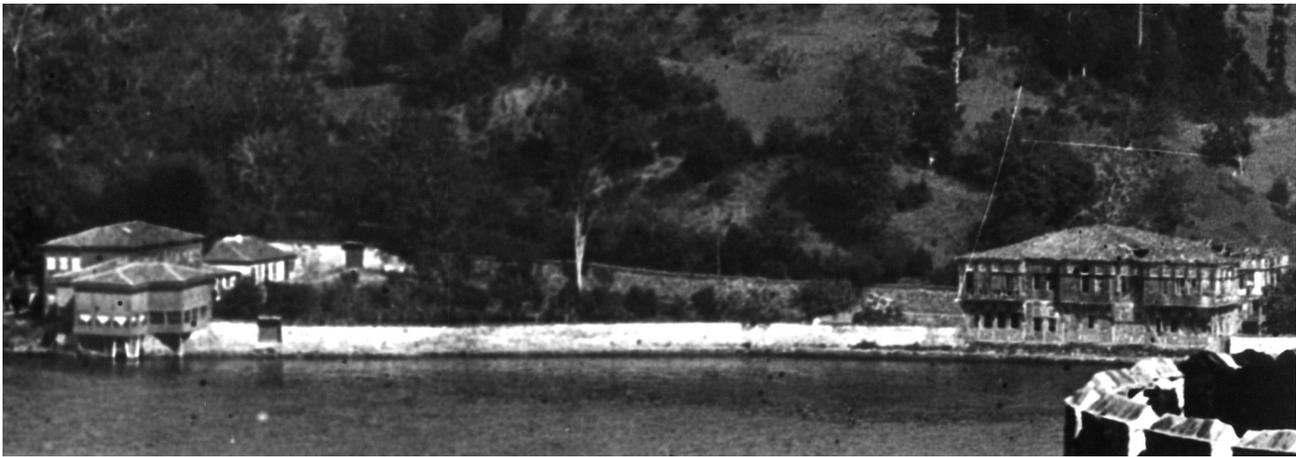


Figure 1: Extract of a view of the Asian shore with the area of the Amcazade Yalısı, the Haremlik right and the Selamık with Divanhane on the left side, approx. 1890; (DAI Istanbul)

a programme of exceptionally rich decoration was revealed within, still impressive even in its present ruined state. A reconstructive drawing of the interior was made by S. H. Eldem (Eldem 1942) – see Fig. 2 (right). Besides the dome above the central room, there were wooden vaults arching the alcoves of the Divanhane. These are aynalı vaults formed by a monastery vault intersected in the upper part by a horizontal rich decorated plane. This apex was clearly situated lower than the central dome and was in this way subordinate to the hipped roofing system. The domed areas were originally stretched over with canvass, painted and decorated with gold leaf. They were framed by carved friezes with “Mukarnas” decoration. The defining element of the room is a line of large panels with repetitive flower decorations, which almost covered the upper two thirds of the wall mount. This is finished off underneath in a wide overhanging depository board with Mukarnas decoration – the so called Serge (Egli 1941, 207). And only underneath that runs a continuous, horizontally emphatic line of windows. This opens up views over the water to the opposite shore in all directions. For the parapet under the windows there was now only a band of 45 cm left. This gave support to the bolsters and cushions of the Divan.



Figure 2: Waterfront of the Divanhane approx. 1980 (left) and a reconstruction drawing of the interior (right); (Photograph after Sözen 1989, p. 115, drawing after Eldem 1942, fig. 15)

### State of knowledge and aims

Reflecting the building's fame, the list of publications and references for the Amcazade Yalısı is long. Scientific research began far back in the 19th century. Gaspard Fossati made a building documentation from memory, whose validity is naturally very limited (Eldem 1970, p. 13-14). The first systematic building investigation was already carried out at the beginning of the 20th century. It was prompted by the *Société des amis de Stamboul* in Paris. Drawings were done by three architects of the Mimar-Sinan-University and published in 1915 by H. Saladin and R. Mesguich in a presentation folio issue (Saladin – Mesguich 1915). The main object of the documentation was clearly the richly decorated patterns of the central space of the Divanhane. So it was not a genuine architectural documentation as the severe damage and deformation by building decay, which had already taken place, was not reported and the wooden framework and the construction of the building were completely neglected.

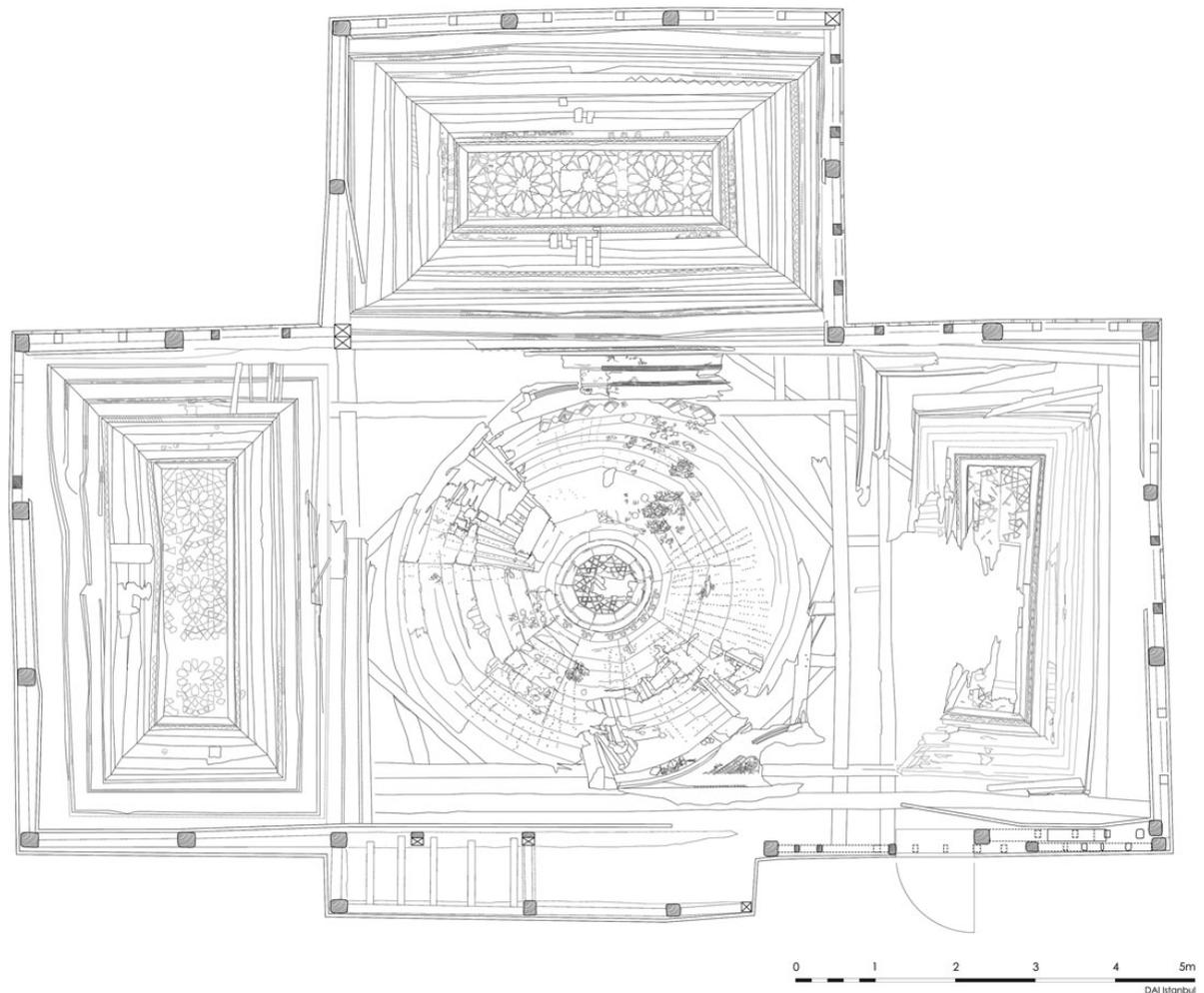


Figure 3: Reflected ceiling plan of the Divanhane, building documentation 2008 (Drawing Secil Tezer, DAI)

The greatest expert of wooden houses on the Bosphorus and a frantic chronicler of their disappearance in the decades after the 2nd world war, was the architect Sedad Hakkı Eldem. In his numerous publications the Amcazade Yalısı appears repeatedly. Besides the investigation of the Divanhane, his main concern was for the original shape of the whole building's configuration (Eldem 1994, pp. 82-86). Our knowledge in this regard is mainly the result of his research work. Eldem emphasized the layout- as well as typological and diachronic aspects of the structure, but unfortunately did not investigate or document the construction of the wooden framework.

In 1947, only through dramatic intervention into the supporting structure of the Divanhane, Cahide Tamer, head of a restoration team, was able to keep the westerly Eiwan from collapsing into the Bosphorus (Tamer 1947). An extensive presentation of these works was done recently (Tamer 2001, pp. 1-41) and give important knowledge on construction of the Divanhane, which was gathered alongside the restoration. Truly lasting protection of the building could not be guaranteed by these measures, especially as further conservation works did not materialise. So through decades of neglect the constructive skeleton of the wooden building, as well as its decorative ornamentation is in a lamentable state. The original roof truss is completely lost, as also are parts of the wall framework. With the decorative features of the wall and ceiling, a serious loss of the original surface is noted; moreover, the panelling is partly missing, although most of the panels are still in place. The dilapidated condition has however allowed access to the interior of the construction, which had not been possible before, and enabled the workmanship to be understood in more detail. It was a unique opportunity to carry forward to new levels the limited investigations of the Amcazade Yalısı, which previously featured mostly art-historical analyses of the decoration programme and lay-out typologies. The new investigations represent an effort to deliver a study comparable to studies of the historic wooden architecture of central Europe, which focus much more on aspects of construction.

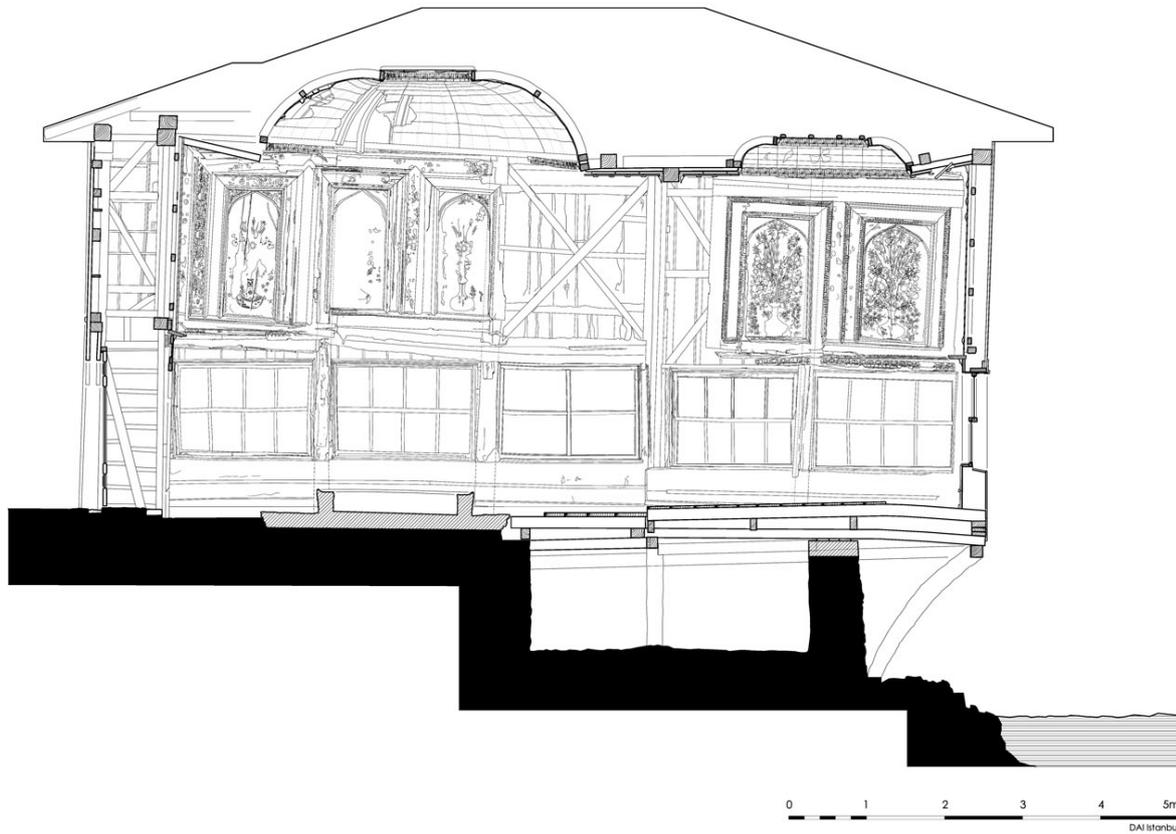


Figure 4: Cross-section through the Divanhane with view to the south, building documentation 2008; (Drawing Secil Tezer, DAI)

## THE 2007/2008 BUILDING DOCUMENTATION AND ITS RESULTS

### The documentation

First the building documentation should be introduced before the resulting conclusions about the construction are presented in more detail with the support of a scale model. The reflected ceiling plan – see Fig. 3 - clarifies the clear main framework of the building, the vertical posts being placed at an average distance of approx. 1.85 m apart. Their substantial dimensions of approx. 22 cm square profile created a relatively strong wall section, which allowed a separate installation of the inner and outer wall facings. The ceiling plan shows the lamentable state of the originally extremely richly decorated vaults and dome.

The situation on the Bosphorus side is best illustrated with a cross-section facing south – see Fig. 4. This section shows, left to right, the entrance area with a double wall, used also as a cupboard, then the front of the southern Eivan with the upper dome section of the central room and to the right, the south wall of the westerly Eivan, hanging over the Bosphorus. To the right the chambered substruction behind the shore wall towards the Bosphorus is visible. The projecting part of the building rests on this. Here the constructive connection between the foundation of the Divanhane and its framework is revealed. The erection of the building in the immediate vicinity of the shore, with part of it actually projecting above the water, must have presented some technical difficulties. It seems that the shore was partly banked up to create a ground support. The present conditions might be due to the restoration of 1947, when the top of the walls was consolidated with a coping of concrete. The floor construction also exhibits significant changes, so that only few remains can be assigned to older phases. To these belongs a longitudinal oak beam supported on three posts with secondary beams at right angles notched onto the same posts. They rested above the water on a bottom girder, which was supported by the curved consoles of the sea façade. A cut-off fragment of this survives. The complete western floor construction, which had tilted markedly towards the Bosphorus, was clearly removed in 1947 and, apart from the remains just mentioned, replaced by a new structure at a higher level. The parapet of the western Eivan is lower than in the other areas, as the equally sunken walls and ceilings of the Eivan could not be raised. This settling of over 40cm compared with the eastern elements of the building is clearly visible in the section. Unfortunately, this could not be changed, even when in 1947 an 8 m long steel girder was placed diagonally beneath the Eivan to shore up the south-west corner, which projects furthest over the water (Tamer 2001, p. 16). For the fabric of the flexible wooden construction, this measure was possibly disadvantageous.

In the central area of the section drawing the precious panels have been removed, so that the cross frames and external cladding can be clearly seen. The diagonals are traversed or intercepted by small cross beams, which are fixed close together.



Figure 5: Model of the Divanhane, made of limewood in scale 1:20; (Anita Knipper and Steffen Sauter, Karlsruhe University, photograph Bernd Seeland, Karlsruhe University)

They serve a dual purpose: together with the diagonals they add rigidity to the main framework, and they support the external cladding. Like the elements just described, all the pieces of the external panelling consist of industrially manufactured profiles. The vertical boards of the façade are a characteristic feature of the Amcazade Yalısı, but rather untypical of an Ottoman house, which normally has horizontal panelling. But the arrangement of the original posts may indicate that it was originally purposed. The cullis is covered by a gutter board which derives probably from a fundamental change of the façade system, whereas originally a projecting simple roof overhang might have closed the façade.

### Construction and scale model

The Ottoman type of 19<sup>th</sup> century wooden house is generally very simply designed, consisting, as a rule, of a primary system of lightweight vertical posts. These were normally set 3-4 m apart and, prior to that, fitted with corbel pieces, which were fastened to the upper ends of the posts with lap joints and large forged iron nails. Such nails play an altogether decisive role in the joining techniques used in these houses. The surrounding horizontal beam of the next storey was then fastened onto the corbels, so that a relatively stable framework was made. Elements of the next storey were created in the same way and the roof normally involves a simple hipped roof truss. The structure derived further stability from the interior works. This was achieved firstly through a close arrangement of vertical beams at the level of the wall. Inside this, small horizontal slats were nailed side by side onto these and the primary posts, which served as support for the plaster. On the other hand, the exterior of the building was covered with horizontal boards. Even though it was extensively reinforced in these ways, the structure was still, in comparison with the framework of central European wooden houses, extraordinarily flexible and unstable. This is often mentioned as an advantage in connection with the real danger of earthquakes in Istanbul.

The Divanhane of the Amcazade Yalısı underlines however that in older times the primary elements of the construction consisted of carefully axed oak beams of comparatively strong dimensions – quadratic profiles of 22 cm lateral length. The framework of the building proves to be extraordinarily simple in the way it is constructed – but in choice of materials and execution very ambitious. It is mirrored in a scale model, which was built from Anita Knipper and Steffen Sauter from Karlsruhe University in accordance with the results of the new investigation – see Fig. 5. It has to be said that what it shows is a reconstructed state. It does not display the original condition, which it is difficult to grasp, but the situation, established through our findings, in the second half of the 19<sup>th</sup> century. To show the internal construction and development, half of the building is shown with its constructive framework, while in the other half the design of the inner and outer facings is revealed.

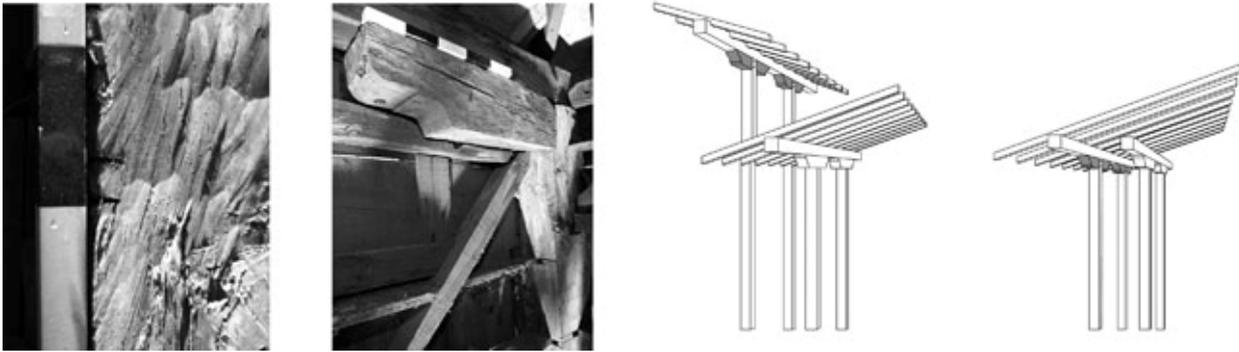


Figure 6: Detail of the surface of a vertical post (left), corbel piece (centre) and hypothetical sketch of the changing process of the northern wall; (photographs and drawing DAI Istanbul)

The whole roofing system with the hip rafters is reconstructed, as the original roof trusses were almost completely removed for re-roofing in the 1990's. Central elements of the construction of the Divanhane are the described strong oak posts – see Fig. 6 (left). They cover the whole height of the wall and are connected above with the extending corbel piece to form a constructive unity. These corbels of oak are fastened with lap joints and large forged iron nails. The woodworking joints are very precise and carefully executed. The corbels show some variation. Normally their design is very austere, but at the doubled entry wall they are made in a curved shape – see Fig. 6 (centre). The remnants of an oxblood red paint give a possible indication of a building phase. According to that, the corbel pieces and the substantially higher posts were originally part of an additional wing of the Selamlık, on which the Divanhane was abutting. The corbel pieces were displayed in the outer building and were finished accordingly. After the demolition of this wing, these corbels may then have been placed on shortened posts, which created the eastern façade of the Divanhane. This process is made clear in a provisional sketch – see Fig 6 (right).

The corbels carry a strong joist of approx. 18-20 cm, which forms the upper girt of the framework. There seems to have been a corresponding bottom girt, but no proof can be provided. At the height of the upper girt, oak beams of the same dimensions span the openings to the Eiwans and complete the primary system of construction. They are lap-joined to the girt. Above them a level of oak joists, spanning the space, form the horizontal framework of the wooden vaultings and determine their basic geometric shape.

The strong wall section with an inner and outer supporting system for the panelling distinguishes the construction of the Divanhane significantly from the Ottoman wooden houses of the 19<sup>th</sup> century, and from the widespread habit of building thin walls. The inner level of the wall construction was probably not affected by later changes and is very simply structured. It mainly consists of strong, but irregularly shaped and probably axed oak benches, which were attached at intervals of about 60 cm. The joints with the posts are only prepared through notches. The profiles are pressed in between and fixed to the beams with strong forged iron nails. Only at a very few places on this level is an additional diagonal plank inserted. This is the construction of the upper wall area in the zone of the floral panels. The window line extends in a boxlike frame underneath; lastly comes the very low parapet, which is covered with horizontal planks; and hidden behind this is the only series of regular diagonals of the inner wall construction.

The construction of the inner wall facings is wholly determined by the requirements of their richly decorative design. The beams and planks of the panels are again fixed to the horizontal profiles with forged iron nails, but are arranged in a very different fashion. The floral motifs were painted onto hardwood planks of absolutely huge dimensions. Their width was up to 88 cm, their thickness 3-4 cm, and their length more than 220 cm. The production of these planks by itself could be called a masterpiece of pre-industrial woodcraft. The fields of the panels show only in very few instances any visible cracks. The framing was made of more simple softwood boards of smaller dimensions. These too were attached with nails. On top of this a thin layer, only 5 mm thick, of light wood was stapled, serving as a base for decorations of paint and gold leaf decorations and producing the plastic composition of the wall construction. It surrounds the ogival arches of the floral panels and is additionally divided into sections by carved slats. Also made of light wood were the strong, decorated Mukarnas friezes, which form the upper and lower finish of the wall panels and originally had a rich application of gold leaf.

Similar to the wall development is the constructive shaping of the wooden vaults in the ceiling area. A system of curved oak ribs, not unlike in shipbuilding, forms the aynalı vaults of the three Eiwans – see Fig. 7 (left). The lower ends of the ribs rest not on the strong beams of the primary supports, but on slats that were attached to the side of these. The ribwork was also underpinned by a series of oak planks, which were nailed to the bottom of the supporting wood. They form at the same time the substructure of the closed ceiling panelling. As facings, thin boards were used also for the vault areas. These boards were horizontally nailed to the ribs and adapted to the curve of the vault – see Fig. 7 (centre). The main points of the upper and lower finish of the vaulted area formed again the carved Mukarnas friezes with gold leaf decoration, already familiar from the wall construction. The mirror of the aynalı vaults of the Eiwans carries a decoration of geometric design.



Figure 7: Details of the ceiling construction: Aynalı vault with curved oak ribs (left); detail of a rib with forged nails and parts of the facing (centre) and the wooden dome construction (right); (Photographs DAI Istanbul)

The motives were formed out of paper-thin small trims and boards, which were nailed onto softwood boards. Above these boards run supporting slats, so that the ceiling plan looks from above like a normal door, with which the vault was "covered".

Similar in principle, but more complex, is the construction of the central dome of the room – see Fig. 7 (right). This too consists of a close arrangement of ribs, whose concentric construction made it necessary in the lower section of the dome to insert a further series of shorter "in-between ribs", which run up against short cross-beams between the main ribs. This "cage" apparently rests on a supporting frame of oak beams formed as an octagon. The octagon in turn is connected to the main structure by means of a grid system, so that, for the load distribution of the dome, the roof construction was not used. However, there are some hints of a suspension for the main horizontal beams in the roof. Unfortunately the original roof construction was removed totally for re-roofing in the 1990s. Only the hip rafters of the northern valley gutters survived.

As in the aynalı vaults, the main dome is framed horizontally by a Mukarnas frieze and closed off on top with a flat plate. The horizontal triangular areas of the ceiling, which are not included in the dome, were also covered with richly decorative ornamentation in gold leaf and paint. The construction of the Divanhane turns out to yield a great wealth of information both about the technical solutions adopted and about the materials used. The choice of various types of wood was determined by their places in the complex structure. All elements of the primary structure, including the supporting ribs of the dome, were made of oak, later partly replaced by soft wood. The main elements of the wall facings, the flower panels, consist of hardwood as well – probably maple, beech, or fruit-tree wood. This material seemed to be the most suitable for the valuable pieces of artwork. The remaining areas of the wall – and roof-facings were closed with softwood boards, but then covered with a second layer of poplar or maple, which supported the paintings and gold leaf decorations and facilitated the subtle plastic decoration of the walls. In the area of the domes, paper-thin boards were applied so that they could maintain the exact shape of the vaults. The decorative work was carved out of light wood (maple or linden). A great variety of materials and shapes characterize also the marquetry of the entrance wall.

## CONCLUSIONS

The main means of effecting joints and adhesion in all areas of the Divanhane of the Amcazade Yalısı are forged iron nails of all varieties and sizes. Hundreds, nay thousands, of nails hold together the building and its decorative panels. But this comparatively simple technique should not be ascribed to a lack of skill in carpentry, since the precise manufacture of the construction wood and its careful selection are far above the ordinary; and in spite of a total lack of any mortise and tenon joints, some simple but carefully executed wood-working joints were used. The construction of the Divanhane displays, especially in regard to the vaulting, many parallels with shipbuilding. In the first instance, the absence of a load transfer from the vaults to the roofing system might seem a fatal flaw, but it allowed the total separation of the very delicately made dome from all other carpentry works. If the roof structure had broken down, it would possibly have left even less of the remarkable ceiling decoration than is the case today. With the detailed knowledge of the construction of this building, Ottoman wooden architecture appears in a new light, changing the picture dominated by younger wooden buildings.

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