



FIGURE 1 The desk at the Virginia Museum of Fine Arts (82.114) seen from the front.

# THE IDENTIFICATION AND TREATMENT OF SURFACES ON A 17<sup>TH</sup>-CENTURY INDIAN WRITING DESK

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## ABSTRACT

An example of overlaid furniture in the form of an Indian writing desk, or *galamdan*, is at the Virginia Museum of Fine Arts. This desk, with its bracket feet and a single row of three drawers, would have stored writing implements. It would have been used while a person was seated on the floor in front of it. It was manufactured in the Gujarat region of India in the late 16<sup>th</sup> to early 17<sup>th</sup> century and was probably made for export to Ottoman Turkey.

This paper will give a brief historical account of this type of object and will discuss theories regarding its manufacture as noted through examination and preliminary analytical results conducted at the Metropolitan Museum of Art in New York. The treatment of the surface will follow.



## INTRODUCTION

Not much information exists about overlaid furniture. Simon Digby, Islamic scholar and author, published an article in 1982, *The mother-of-pearl overlaid furniture of Gujarat: the holdings of the Victoria and Albert Museum*, and this remains the most collaborative source of art historical information on this type of furniture. The Virginia Museum of Art owns an example of overlaid furniture and in preparation for a catalog of the Indian Arts collection (to be released in 2001) requested the treatment and analysis of this object. The treatment of this desk was primarily for stabilization for handling during photography and future exhibition. Analysis was done not only to provide compositional information to the curator, but also to investigate the materials of this type of furniture for which no previous compositional data exists. The following paper is an introduction to the history, technology and conservation of this example of overlaid furniture.

## HISTORICAL CONTEXT

Mother-of-pearl items have long been valued in India, the countries surrounding India and in the Middle East. The Mughals of India and the Ottoman Turks shared a passion for mother-of-pearl ornamentation. They ornamented many of their possessions, especially desks and writing tools.

In the early 16<sup>th</sup> century, Europeans, beginning with the Dutch and Portuguese, traveled east for trade and returned to Europe with many of these decorated objects. With the increase of trade between Europe and Asia in the 16<sup>th</sup> century, ornamented shell and mother-of-pearl items became as popular and fashionable in Europe as they had long been in Asia. Small furniture pieces began being manufactured following the European structural designs of examples

first brought to Asia by the Portuguese. The centers of this export production were in Ahmedabad, Cambay and later in Surat.<sup>1</sup> These centers are all located in the region of Gujarat, India which became famous for its inlaid and overlaid examples of mother-of-pearl works.<sup>2</sup> The mother-of-pearl overlaid tables, chests and other objects were sold all over India and in the west. From the early 16<sup>th</sup> to late 17<sup>th</sup> century, the Ottoman Turks controlled the trade across the Arabian Sea from Gujarat, India. Many overlaid items made directly for export were probably diverted to Turkey along those trade routes.

The overlay technique can be seen on wooden tomb covers in Gujarat from the early 17<sup>th</sup> century although mother-of-pearl inlay was used in Islamic tombs as early as the mid-15<sup>th</sup> century (1460s).<sup>3</sup> It should be noted that although surviving overlaid items appear to belong to aristocracy and royalty, Simon Digby<sup>4</sup> has found at least one example of overlaid work which may have been sold to the general public.

The term overlaid appears to be a direct result of Mr. Digby's article. Many overlaid items have been recorded by museums and collections as being inlaid. It was probably the easiest term to use in order to convey the general appearance of the object. Overlaid work, unlike inlaid surfaces, does not have recesses cut into the wooden substrate to be decorated. The entire decoration of mother-of-pearl and resin is laid on top of the wood surface without the substrate physically holding the resin and/or mother-of-pearl pieces in place. Based on European documents, the overlay craft existed until the end of the 17<sup>th</sup> century when its popularity slowly declined and Europe turned its interest to items being imported from further east. Unlike inlaid items from Gujarat, whose styles varied according to the changing tastes of Europe, the overlaid furniture remained largely uniform throughout its production, creating difficulty in distinguishing between early and late styles.<sup>5</sup>

The most common example of overlaid furniture appears to be caskets with beveled lids and pedes-

tal feet. Simon Digby has found seven examples of such caskets. Examples of overlaid pieces can be seen in the Royal Collections of museums in Dresden, Athens, Istanbul and London. Objects vary from a shield at the Topkapi Palace<sup>6</sup> to shoes held at the Royal Danish Kunstkammer.<sup>7</sup> An example of overlaid work at the Los Angeles County Museum of Art, a 16<sup>th</sup>-century pen box, has a drawer decorated on the exterior panels with a painted floral motif<sup>8</sup> which is similar to colors used on the desk at the Virginia Museum of Fine Arts (VMFA). A desk at the Benaki Museum in Athens is also similar in style and shape, although the mother-of-pearl is much smaller and finer than that of the VMFA. The desks of the Benaki Museum and VMFA have also been called storage chests and were often used to store reed pens, fine knives, inks and other scribal implements.<sup>9</sup> The Benaki desk was made in the Gujarat region in 1587. The date is "written" in mother-of-pearl on the desk along with Persian and Arabic verses and the maker's name in the Persian *nasta'liq* script.<sup>10</sup> The inscription connects this Athens piece to a shrine of Jal al al-Din Rumi in Konya, Turkey while the script on the desk from the Virginia Museum suggests an Ottoman connection. The translation of this script will be presented in the upcoming catalog.

Due to the materials and the climates of India and Europe, many of these overlaid furniture pieces have not survived well over time. According to Simon Digby, "the Victoria and Albert Museum possesses four pieces of Gujarat mother-of-pearl overlaid furniture out of about 30 [in existence] of which [he has] record."<sup>11</sup> The four pieces at the Victoria and Albert make up the single largest collection of overlaid furniture held in any museum.

#### THE VIRGINIA MUSEUM OF FINE ART DESK

This writing desk (VMFA accession number 82.114) is the largest example of overlaid furniture in existence today (fig. 1). It was purchased by the VMFA in 1982, after being on exhibit at the Victoria and Albert Museum in their exhibition of *Indian Heritage—Court Life under Mughal Rule*. The desk had formerly belonged to Howard

Hodgkin, a well-established contemporary artist in London who was also known as an avid collector of Indian art.<sup>12</sup> Prior to this acquisition, there is no record of the desk, and it was probably in private homes in London and Turkey.

The top of the desk is decorated with a collection (or *ghazal*) of Sher verses (two-line poems) written in Ottoman Turkish in the Persian *nastaliq* script. The verses are “written” in carved mother-of-pearl and appear in 10 separate panels along the edges. The sides of the desk display a series of circular spiral scrolls with a split-leaf<sup>13</sup> motif and lack “filler” designs between the scrolls usually seen on other overlaid pieces, like the one in the Benaki Museum. The VMFA desk has three drawers, two with ivory and one with mother-of-pearl pulls and each with mother-of-pearl embellished escutcheons.

The drawer interiors are ornamented with painted wooden corner brackets and a gold and black chevron design along the rim.<sup>14</sup> Turkish-style flowers have been painted inside the drawer<sup>15</sup> and may have been painted in Turkey, presumably in the late 17<sup>th</sup> or early 18<sup>th</sup> century (fig. 2).

#### TECHNOLOGY

Very little information has survived about the techniques and materials actually used in the manufacture of mother-of-pearl export furniture in India. The surviving written documentation about overlaid furniture is largely in the form of inventories and notations from tradesmen and officials. These representatives were obliged to send regular written correspondence to their supervisors about the local trade, social culture and politics of the country in which they were stationed.<sup>16</sup> With the small amount of information and examination of



FIGURE 2 The interior of the center drawer contained the most vibrant example of the painted flower motifs. The smaller drawers contain the long tulip forms and have darkened significantly more overall.

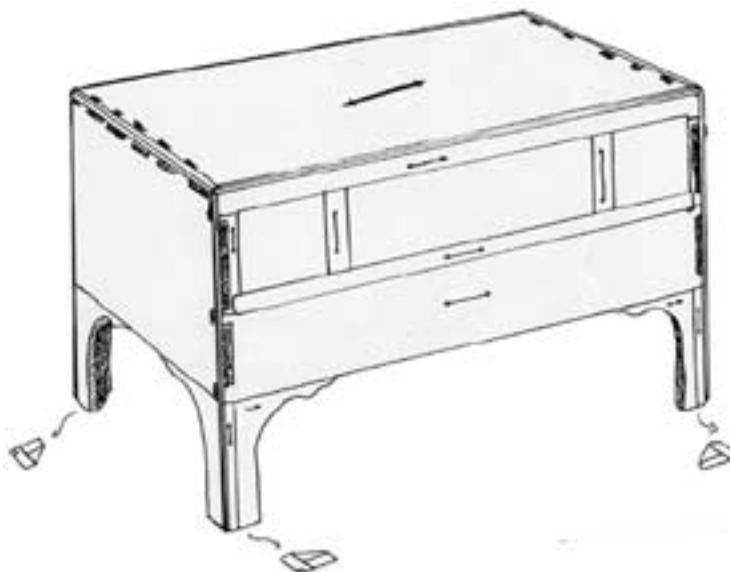


FIGURE 3 The construction of the desk as illustrated from examination. Arrows signify grain direction.

the desk surfaces, a few insights into the technology could be determined. In order to investigate the materials used, a few analytical samples were removed from various locations on the desk with the permission of Joseph Dye, Curator of South Asian and Islamic Art. The following is a record of the findings.

#### WOODEN STRUCTURE

Although the construction of any object covered in a variety of materials is hard to determine, close

examination of the joins from the interior and exterior suggest the following:

The Indian writing desk was constructed of wood. *Shisham* wood (or Indian rosewood) was often used for the overlaid furniture produced in this region and is assumed to have been used here as well. Since the wooden structure of the desk is in good, sound condition, sampling was avoided.

Visual examination of the construction of the writing desk (fig. 3) and its drawers indicated that each side of the writing desk was connected using an interlocking join similar to that of a square or slot dovetail. The bottom panel of the desk was set into a rebate, cut into the lower portion of each of the four sides. The legs are additions and each is made from three pieces of wood; two decorative pieces, which can be seen from two sides and a third, triangular piece, a corner block, which adds structural support from the interior.

The drawers are of dovetail construction. The drawer bottom was beveled on the outer face and was cut into a rectangular shape with extensions in order to interlock with the sides. There are square, beveled drawer stops on the inside of the back of the desk.

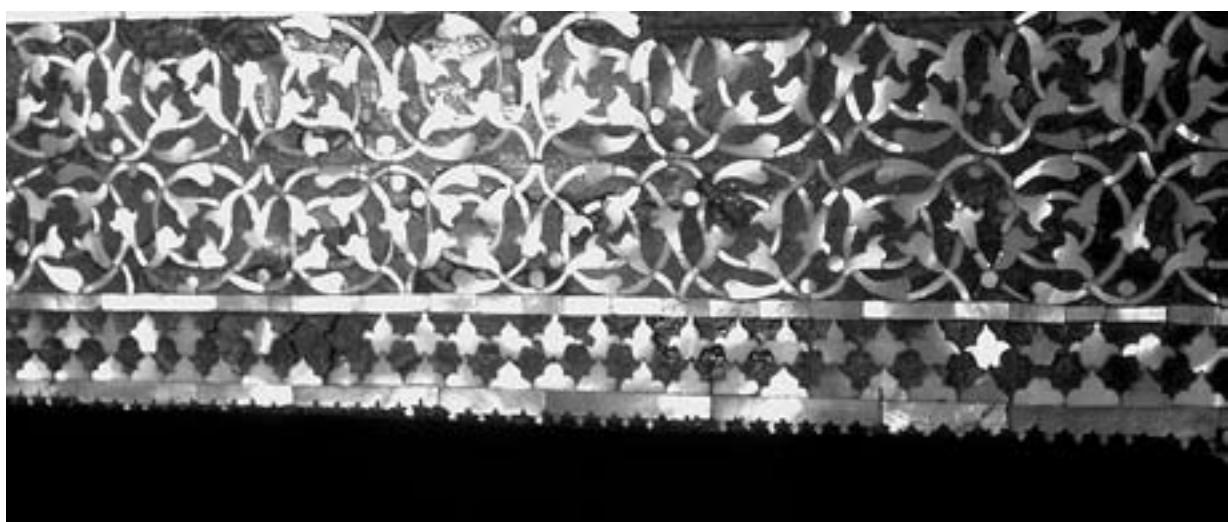


FIGURE 4 Detail of the desk front displays mother-of-pearl decoration whose negative image is that of star shapes.

#### APPLIED ELEMENTS: MOTHER-OF-PEARL AND CEMENT

The mother-of-pearl pieces that decorate the surfaces of the writing desk may have been formed by cutting the shapes with a knife, saw, or by using shaped punches. A series of mother-of-pearl pieces visible on the front face along the bottom edge of the center drawer, show mother-of-pearl remnants from cutting star shapes (fig. 4). It may have been placed in this location intentionally since the Benaki museum example has similar pieces in this location, or it may have been placed here to substitute for missing pieces that may have fallen off. Either way, it provides an insight into the technique used for creating these shapes.

The mysterious black cementing agent surrounding the mother-of-pearl has always been assumed to be a lac or some sort of resin. Shellac is plentiful in India,<sup>17</sup> so the assumption of lac is well founded. References regarding overlaid techniques have added other alternatives in technique and composition. George Birdwood, in his book from the late 1800s titled, *The Industrial Arts of India*, states that, “the more elaborate designs (with)...mother-of-pearl, (were) worked into a cement, and laid on the surface to be ornamented.”<sup>18</sup> Another author, R. Mehta, mentions a cement mixture containing shellac, white lead and indigo,<sup>19</sup> and a pure resin dissolved in bitumen or oil. Curator Joseph Dye, as well as the conservation staff, believed that an investigation into the composition of the resin would be a worthy venture.

Cementing agents on this writing desk, although generally uniform from a distance, were found to have different textural compositions. Under ultra-

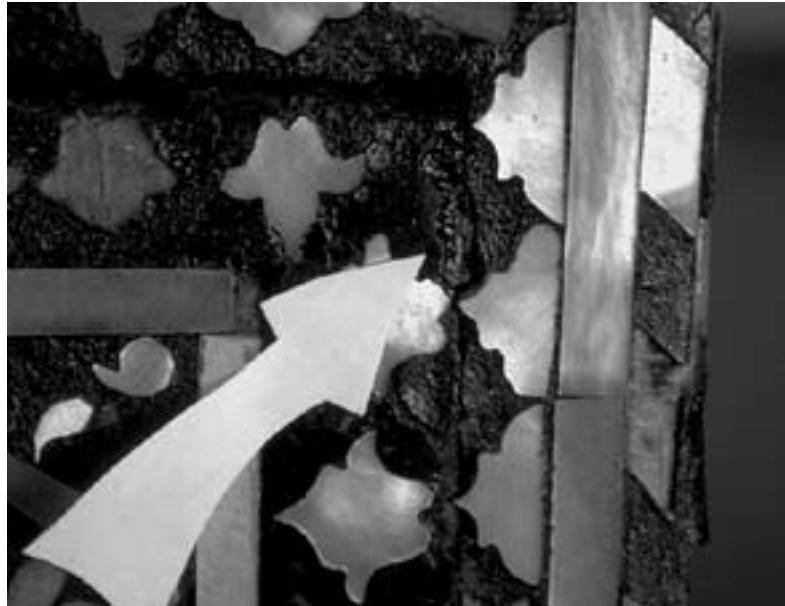


FIGURE 5 Detail image of an example of the smooth black cement.

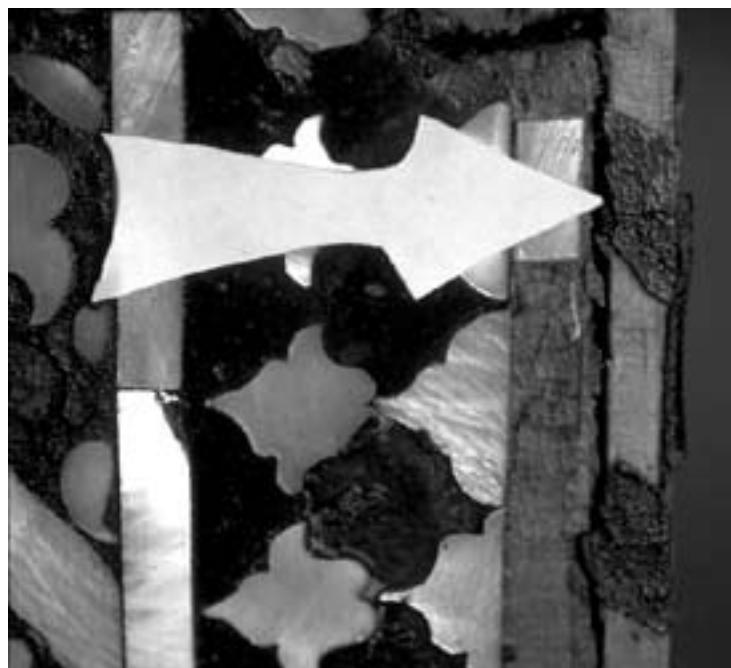


FIGURE 6 Detail image of the textured black cement.

violet fluorescence, differences were also noted between areas of the black cement. Smoother areas appeared to fluoresce orange as opposed to the rougher, textured cement areas. Small samples of visually-determined varieties of this cement were removed, and were examined under polarized light microscopy.



FIGURE 7 The arrow points to the brown cement seen throughout the surface in areas of mother-of-pearl loss.

Samples were analyzed at the Metropolitan Museum of Art in New York using Fourier Transform Infrared Spectroscopy (FTIR) and Scanning Electron Microscopy/Electron Dispersion Spectroscopy (SEM/EDS). The conservation scientists on staff at the research laboratory carried out the analysis, and the results showed the following:

FTIR analysis of the resinous smooth-appearing black cement (*fig. 5*) suggested a mixture of gypsum, lac and black pigment. The black pigment might be charcoal although SEM/EDS analysis did not show any significant presence of phosphorus. SEM/EDS did confirm the presence of calcium and sulfur indicative of the gypsum (calcium sulfate) detected by FTIR.

FTIR analysis of the rougher black cement (*fig. 6*) showed it to contain black (possibly charcoal) pigments mixed with white gypsum bulking agent and animal protein glue.

This then raises the question whether the different black cementing materials were used side by side intentionally or if the black animal glue was used to repair areas of overlay that had fallen off. Animal glue was also found to be the possible binder for brown-colored cement seen in loss of areas

of mother-of-pearl (*fig. 7*). The question whether the animal glue is present due to extensive repair or present as an original cementing agent remains unanswered.

Technologically, if the animal glue was original, this would suggest that the wood surface of the desk was prepared with a thin coat of animal glue, gypsum and possibly charcoal. This thin coat could also have been further bulked with the other two ingredients in order to compensate for the varying thickness of the shell

as well as any alterations in the wood substrate. Onto this prepared surface, mother-of-pearl pieces would have been laid.

Interestingly enough, there is one area of the desk that sheds some light on some of its previous restoration campaigns. On the proper right side of the writing desk, an area of loss reveals a glue saturated paper surface adhered to the wooden substrate (*fig. 8*). The paper has an ink drawn scroll design on it which corresponds with the designs seen on the object. The other surfaces of the desk were examined for evidence of paper between the mother-of-pearl and cement, but no other areas were found. The paper is probably a previous restoration campaign in which a large reconstruction of the area took place. Ironically, the mother-of-pearl and cement that was laid onto this surface is now missing.

#### PAINTED SURFACES

The desk has been painted in two locations: the underside of the desk overall and on the inside of the drawer bottoms. The underside of the desk was painted in an orange red paint and then was later over painted with a thin coat of darker red paint. The drawer bottoms have been decorated with flower designs (Turkish-style tulips) using various colors and gold. In George Birdwood's book, he

describes how surfaces of ornamented furniture not inlaid were often primed with a thick gum. A design was then painted onto this surface using pigments and liquid silver or gold and coated with a clear varnish.<sup>20</sup> A similar concept has been applied here—and judging from the style may have been applied to the drawers at a much later time than the desk's original construction (perhaps after the desk left India for Turkey).

SEM/EDS analysis of the paint on the underside of the desk suggested that the dark red paint is chrome red based on the presence of lead, calcium and a significant amount of chromium. This pigment was not used before the early 19<sup>th</sup> century, which indicates that the desk was repainted after that time. Underneath the chrome red paint is a red-orange layer, which was determined through SEM/EDS analysis to be largely red lead,<sup>21</sup> with

some calcium and possible traces of iron, and most likely the original paint applied to the desk.

The red flower painted on the interior of the center drawer was sampled close to an area of previous damage. FTIR analyses indicated that the interior of the drawers may have been prepared with a layer of pine resin and then painted with pigments in a pine resin binder. The pigments used were analyzed with SEM/EDS and results showed the presence of lead, mercury, and sulfur. This suggested that vermillion or cinnabar (mercuric sulfide) along with either red and/or white lead were used to paint these Turkish flower motifs. In this instance, the identification of the paint cannot determine whether the floral motifs were applied before or after the chrome red was applied to the underside of the desk.



FIGURE 8 On the proper right side of the desk, a piece of paper with the continuation of the scroll design drawn in ink is adhered in an area of mother-of-pearl and resin loss.

## PREVIOUS CONSERVATION TREATMENT

As mentioned at the beginning, many of these desks have not survived very well over the years. The expansion and contraction of the wood due to the variations in the relative humidity of Europe and Asia, coupled with the rigidity of the lac and/or hide glue attempting to remain adhered to the moving surface, has caused all surviving pieces of overlaid furniture to have some loss and deterioration. This example is no exception.

This desk has a history of travel and use, and many restoration campaigns have been carried out on it. A previous conservation report from 1983 noted that, "old restorations in several materials were [observed] scattered randomly over the surface."<sup>22</sup> The desk had also apparently been somewhat unstable prior to its journey across the Atlantic. In preparation for its transport to the United States from London, the desk was covered with "numerous deposits of unknown, thick thermoplastic resin."<sup>23</sup> The resin was applied to consolidate the blistered and buckled surfaces of the mother-of-pearl, which were in danger of falling off. Over the applied resin, a synthetic varnish was added to secure a thin, transparent film to all the surfaces of the desk as a facing during travel. It is unknown whether this treatment was carried out by a gallery, a shipping company or by the owner. It is known, and must be stated, that the Victoria and Albert Museum was not involved in this travel preparation.

Upon arrival to the Virginia Museum of Fine Arts, the writing desk was treated by contract conservator, Carol Aiken. Dr. Aiken removed the transparent film, some of the resins, the residual masking tape adhesive and the synthetic varnish, and she reattached the loose pieces of mother-of-pearl as best as she could in the time allowed—one week.<sup>24</sup>

## CONSERVATION TREATMENT

The Indian desk came down to the conservation laboratory in the fall of 1998 for stabilization and treatment. Two mother-of-pearl fragments

had fallen off the object and were saved in an envelope for reapplication. Their original location needed to be determined by studying old photographic records. Areas of cement and mother-of-pearl appeared to have air pockets beneath the surface and needed to be checked for instability. The curator and the conservation staff agreed that the Indian writing desk should be stabilized so that more overlay fragments were not lost during handling for photography and future exhibition. A full restoration of the desk was considered unnecessary. The desk is a surviving example of a craft of which few representatives remain. Although damage and losses are evident, the integrity of the desk is still intact with consolidation alone.

Previously-removed small samples of cement were tested for solvent solubility. The test results indicated that toluene was the appropriate solvent for reapplying the mother-of-pearl pieces as it did not affect any of the samples.

Each mother-of-pearl piece was checked for movement and possible air pockets beneath the surface. The mother-of-pearl was re-adhered using an injection of 15% Acryloid B-72<sup>25</sup> in a 100 ml toluene solution. Occasionally a small amount of ethanol was applied by cotton swab to soften the resin and assist in re-adhering it onto the wooden substrate. Excess adhesive was removed—and residual resin from that trans-Atlantic packing preparation was removed mechanically with a scalpel wherever possible.

## CONCLUSION

Through the analysis and treatment of this desk, a better perspective and understanding of the materials and techniques of overlaid furniture has been achieved. As with any small amount of information, no generalizations in regard to overlaid furniture can be based upon the information gleaned without further study and comparison with other examples. It is the hope of this author that more analysis and study into the materials comprising overlaid furniture occurs and that the studies are published so that we may all learn more about this type of furniture.

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