

CASE REPORT

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The Identification of Stolen Paintings Using Comparison of Various Marks*

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ABSTRACT: Several oil paintings, suspected of being stolen, were found in the possession of an art dealer in Tel-Aviv, Israel. The authors were asked to determine if these paintings were the stolen ones, based on photographs, stretchers, and frames submitted by the alleged owners in France. A physical match was found between two of the questioned paintings and two stretchers. Another painting was identified as being previously affixed to the original frame by several nails. The fourth painting was identified as being the one photographed by the alleged owner. This identification was done by comparing micro-topography marks revealed by the illumination conditions of that photograph and of the questioned painting.

KEYWORDS: forensic science, physical match, photographs comparison, depression marks, stolen paintings, artwork examination

During an international investigation of a theft of 18th–19th century paintings from Europe, 34 paintings, suspected as stolen, were found in the possession of an art dealer in Tel-Aviv, Israel.

Four of these paintings were recognized by the owners in France, based on photographs sent by the Israeli investigators. The sole proof of ownership, presented by the alleged owners, was a few amateur photographs of the paintings. There was no other meaningful or conclusive way of identifying these paintings at that time.

The authors were asked by the investigators to determine if the paintings found in the art dealer's possession were those seen in the owners' photographs. This was important, since the suspect claimed

that he had possessed the paintings for some time. He contended that the photographs sent by the alleged French owners were, in fact, photographs of simple reproductions of the original paintings.

Experimental and Discussion

The four questioned paintings were compared with the photographs, submitted by the alleged owners. Visual examination revealed that for each painting, both the photograph and the painting exhibited similar brush strokes and micro-cracks in the paint layer. Since these phenomena may be regarded as unique, it was concluded that the owners' photographs were indeed of the questioned paintings. However, the suspect's claim, that the "paintings" shown in these photographs were actually reproductions of the original paintings, could not be ruled out.

According to the authors' instructions, the investigators obtained two stretchers⁴ and two frames from the alleged owners, and submitted them for examination.

Three different examination methods were applied: physical match examination, comparison of depression marks, and comparison of micro-topography.

Physical Match Examination—The First Two Paintings

During the burglary, two paintings were crudely cut from their stretchers, leaving traces of painted canvas on the edges of the stretchers.

The two similar paintings seized on the art dealer's premises were framed. The canvas was attached to a new lining and stretched onto a stretcher. In addition, each of these paintings was treated with brown tint, to make it look like an original.

The new stretcher was removed from the frame and examined under UV illumination. It was clearly observed that some over-painting had been made. The edges of the paintings were revealed using acetone and glue remover. It was observed that the edges had been retouched and over-painted.

The remains of the canvas from the original stretcher were then placed near the corners of the canvas of the paintings suspected as being the stolen paintings (Figs. 1, 2).

⁴ A stretcher is a wooden frame that holds the canvas flat. Once the paint is placed on the canvas, the stretcher stays with the canvas. The "exhibition frame," or "frame," usually holds the stretcher in place. Both the frame and the stretcher are replaceable.

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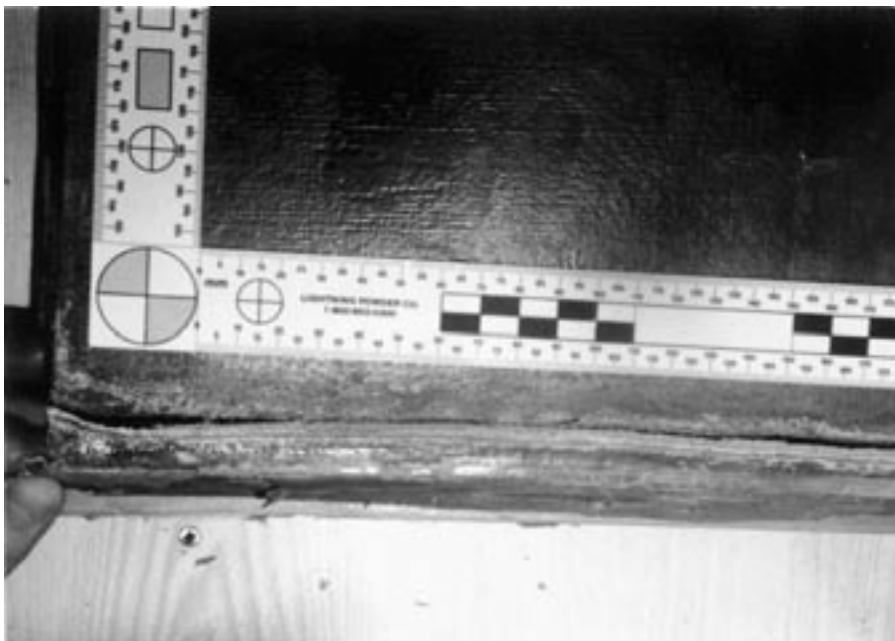


FIG. 1—Physical match of canvas remains on the original stretcher and the corner of the original painting.

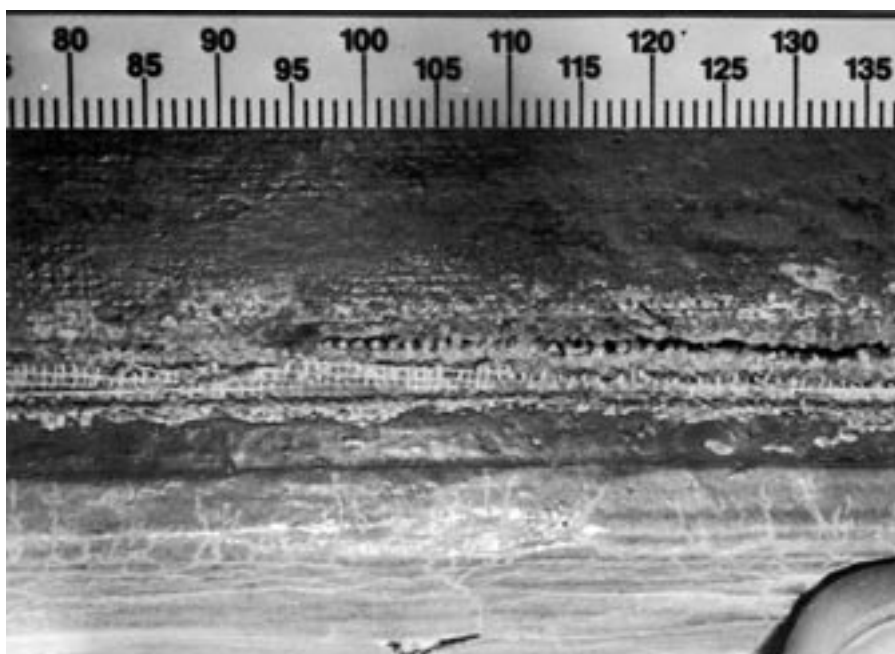


FIG. 2—Enlargement of a section of the matching tear shown in Fig. 1.

A “physical match” between two objects may lead to the conclusion that these two objects were once one unit (1–3). The complexity of the random contours of the separated surfaces of the canvas, on the stretcher and the suspected painting in one of the examined paintings, led us to conclude that this match is unique (3), and therefore definitely link the remains of the canvas left on the original stretcher with the painting. In the second painting a “high probability” link level was set. This lower level was reached because the authors did not want to destroy the edge of the “re-

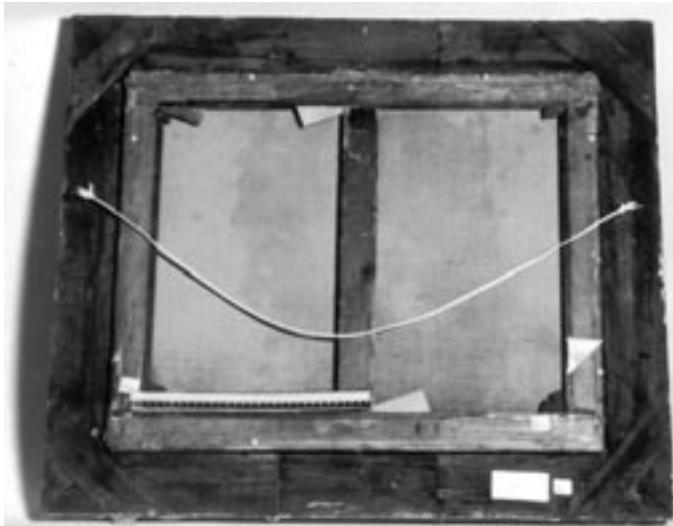


FIG. 3—Stretcher inside frame, including the seven bent nails.

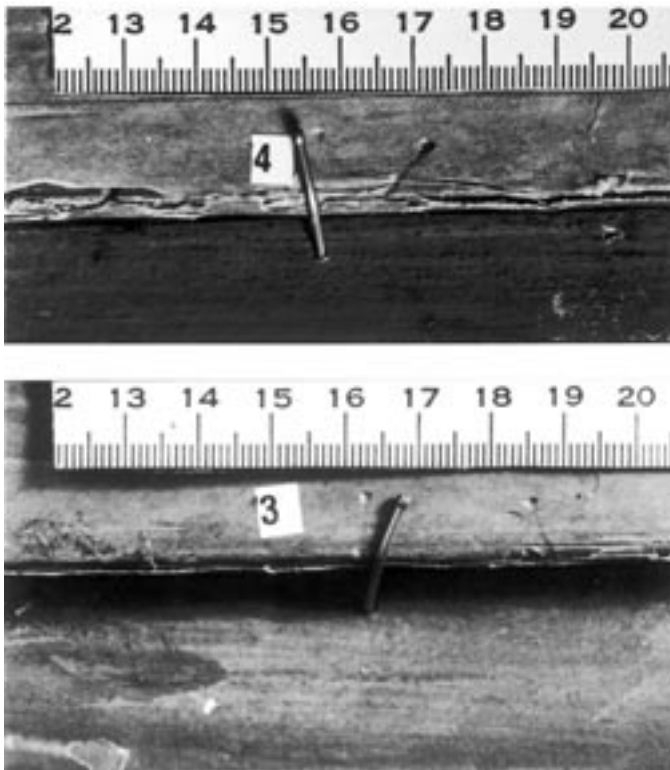


FIG. 4—*a.* (above) and *b.* (below) Details of two nails (Numbers 3 and 4) and their matching depression marks. The nails are slightly offset, for clarity. Note the big nail mark in Fig. 4a that does not belong to nail Number 4.

stored” painting; therefore they uncovered only some of the recent over-painting, which left some areas still covered.

Comparison of Depression Marks—The Third Painting

Seven bent nails were found on one of the frames received from the alleged owners (Fig. 3). The location of these seven nails matched seven depressed marks on the stretcher of one of the examined paintings. These were not, of course, the only depression marks on that stretcher. During the “life” of a painting, several frames could have been used, each leaving its marks on the stretcher of that painting. However, for each bent nail on the examined frame, there was a depression mark, in the exact location and of the same shape, on the painting’s stretcher (Fig. 4). The marks were consistent with the nails in size and angle as well.

The resolution of *each* mark and the degree of individuality that could be attributed to it did not lead to a conclusive result. Nevertheless, since seven such marks occurred on the frame, we concluded that it is highly likely that this particular painting was, in the past, affixed to this frame.

Direct Electronic Flash—The Fourth Painting

The last exhibit received was a photograph of an oil painting (Fig. 5). The photograph was taken with a direct electronic flash in the lower third of the picture. As a result there was a bright spot in the middle of the picture, and the illumination was unbalanced.

In a properly illuminated photograph of this painting, made in the authors’ laboratory, the authors could not detect any marks to assist in revealing a definitive conclusion about the connection between the photograph received and the seized painting.

The original frame did not provide a quick solution either. The original painting was painted directly on wood that was held in its external frame with six iron arches. Only two arch marks could be seen clearly on the back of the wooden painting. The external frame was slightly bigger than the panel of the painting, so the marks were not exactly in the same place. These arch marks were insufficient to draw any positive conclusion.

The authors realized that the unprofessional photograph made by the owner could be used to shed light on the character of the painting’s surface. While a painting can be reproduced photographically, giving an almost identical reproduction, this will be only a two-dimensional recording, since it is not possible to copy the three-dimensional surface of the brush strokes.

Several experiments were conducted for reconstructing the flash photography made by the alleged owner of the painting. It was observed that even a slight change in the flash condition revealed different micro-topography marks. In one of these experiments we received a similar flash spot in our photograph of the seized painting (Fig. 6a). In this photograph, we obtained specular reflection patterns similar to those appearing in the alleged owner’s photograph. Using these photographs, it was possible to examine some areas and find numerous micro marks that led to the conclusion that the photograph received as an exhibit is the three dimensional oil paint (“impasto”) that was seized in the possession of the art dealer.

An interesting reflection feature is the small white cross mark at the horse’s bridle, near its ear (Figs. 6b–6d). Many other unique marks were found in our photograph and were found to be matching those marks in the alleged owner’s photograph.

We are not aware of previous use of this phenomenon for proof of authenticity or ownership.



FIG. 5—*Photograph of the oil painting sent by the alleged owner.*

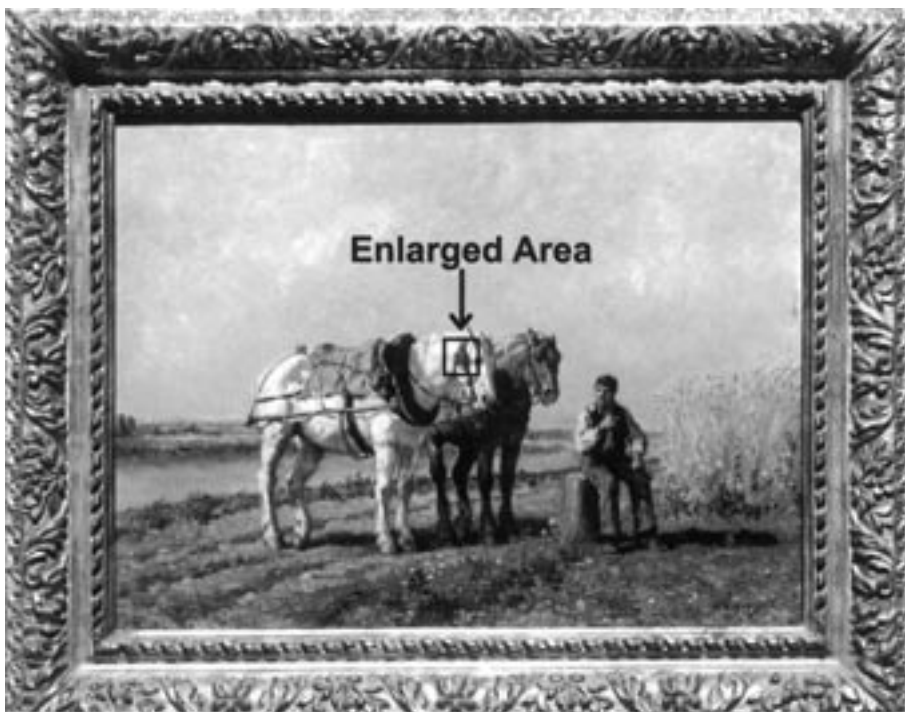


FIG. 6—*Comparison of photographs taken using different light conditions: a. A photograph of the questioned painting. b. Lower left: bridle detail (taken in the authors' laboratory with diffused light). c. Center: bridle detail (taken with a flash in the authors' laboratory). d. Lower right: bridle detail (out of Fig. 5, the owners' photograph).*

Conclusion

Various methods were used in this case to determine whether or not the frames and the photographs received from the French owners establish the positive identity of the suspected paintings. A combination of evidence was used and the results demonstrate how forensic thinking can solve questions that can be time consuming to solve in other, routine, methods.

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