

CASE REPORT

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The Restoration and Identification of Water-Soaked Documents: A Case Study

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ABSTRACT: The wallet of a 33-year-old male who had been reported missing a year ago was recovered from a pond and submitted to the Arkansas Crime Laboratory for identification. While the wallet retained its original shape and size, the billfold contents looked to be severely damaged. This paper discusses the procedure used to restore and identify successfully these documents.

KEYWORDS: questioned documents, water-soaked material, freeze-dehydration

Of the many problems confronting the document examiner, one of the most perplexing is the restoration and identification of water-soaked documents. While there is no magic formula that will restore these documents to complete legibility, success is dependent upon three variables: the writing medium, type of paper, and period of immersion. For example, carbon typewriting, graphite pencil, and oil-based inks are affected very little by water. These writings can be deciphered provided that the paper base has not been seriously damaged. Washable dye inks on the other hand are totally affected by water. These writings may become smeared, faded, or completely obliterated [1]. As previously mentioned, the paper base of documents may be severely damaged depending on the length of time a document is submerged in water. In the case that follows, despite a lengthy period of immersion, twelve months, nearly complete decipherment and restoration of a variety of documents are illustrated.

Case Study

In August 1985, the Arkansas State Police submitted to the State Crime Lab an unidentified man's wallet in a jar of pond water (Fig. 1). The victim had been purportedly shot in July of 1984. His body had been abandoned in a wooded area and had not been recovered. However, a wallet and handgun were found in a nearby pond. The law enforcement officials requested assistance in drying out the wallet and identifying the contents.

Historical references revealed that in 1970 a freeze-dried method had been used success-

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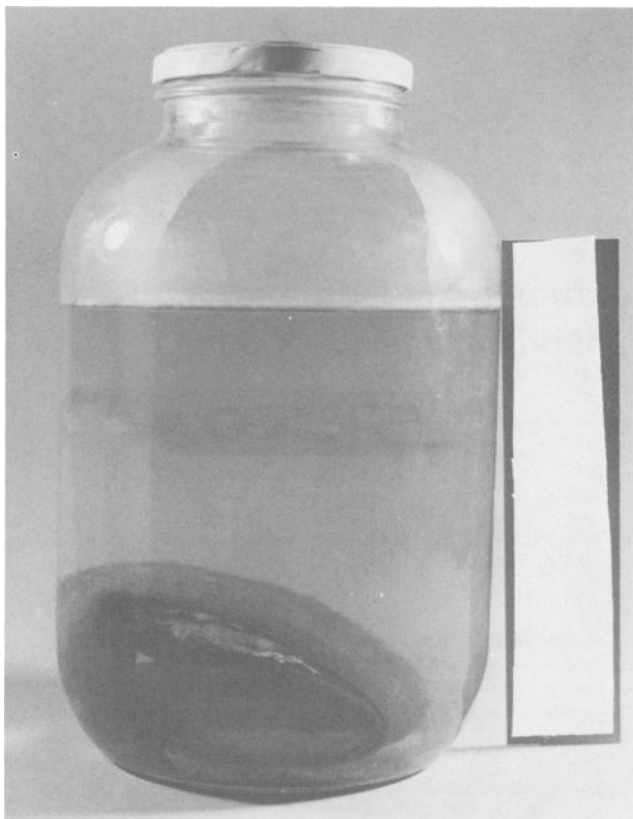


FIG. 1—*The water-soaked material in natural pond water.*

fully to preserve valuable documents when a major fire hit the Regional Library in Godthåb, Greenland. Many irreplaceable manuscripts, books, and letters had become water-soaked and had frozen solid in the frigid air. The conventional method of air-drying would have caused the inks in some of the papers to run, so the decision was made to freeze-dry the frozen material [2].

Freeze-dehydration is basically a preservation technique which is carried out in a vacuum chamber where frozen material is placed in the chamber and then heated gently. Under the combination of heat and vacuum, the water changes directly from a frozen state into a vapor and is drawn off [3].

Since the wallet in question had been immersed in pond water for approximately twelve months, and because the edges of the protruding documents appeared to be damaged, the freeze-drying process was selected as a method for drying the materials. The jar of water and contents were transported to a lyophilizer where the wallet and contents were first frozen in the pond water, then placed in the vacuum chamber for a period of ten days [Fig. 2]. With a 0°C temperature applied to the frozen material, the moisture was drawn off at a barometric pressure of 80 μm .

Discussion

The freeze-dried method gave excellent results for all materials contained in the wallet (Fig. 3). The cover and each page in an address book separated easily and in no case did the



FIG. 2—*The lyophilizer.*



FIG. 3—*The recovered material as a result of freeze-dehydration.*

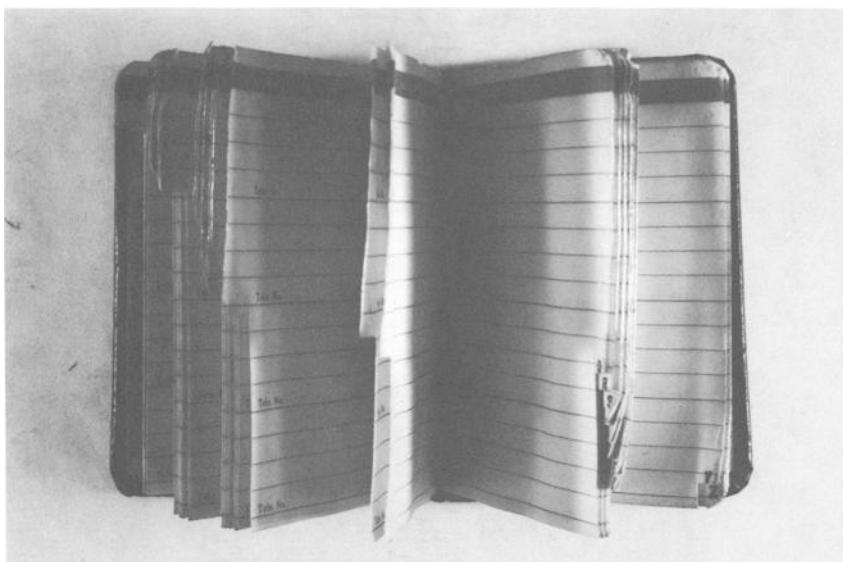


FIG. 4—The restoration of leather, glue, paper, paint, and various inks.

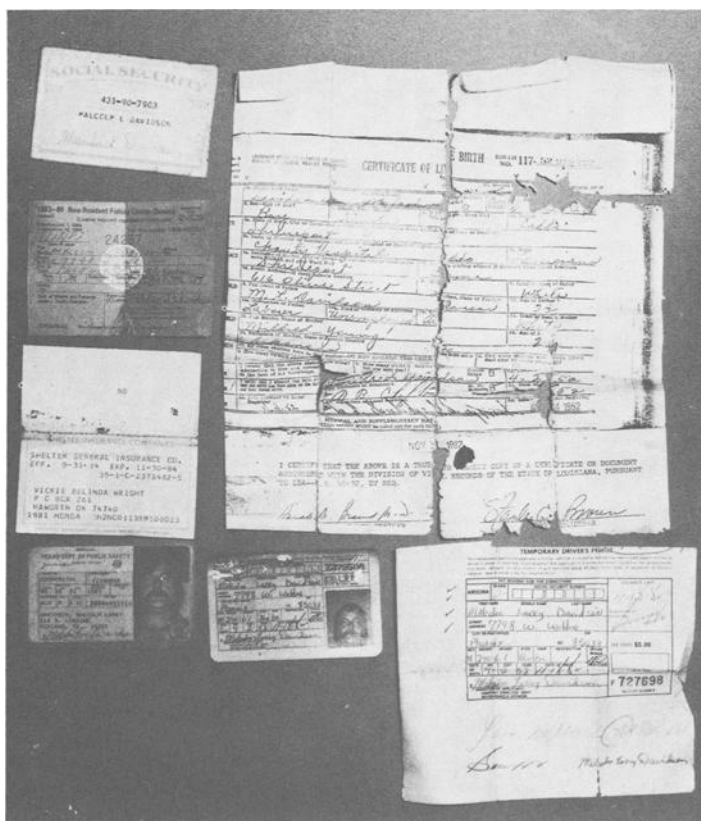


FIG. 5—The recovery of a variety of paper folded and pressed together by normal wear.



FIG. 6—*The restoration of emulsion on water-soaked photographs.*

ink fade or smear (Fig. 4). Even the gold edging on the pages were preserved. Other items included in the wallet were: (2) two driver's licenses, (1) one fishing license, (1) one temporary driver's license, (1) one insurance card, (1) one social security card, (5) five assorted business cards, (1) one photocopy of the victim's birth certificate, (14) fourteen notes on various scraps of paper, and (1) one cash register receipt, all of which were legible. Although some of the documents were severed, it was felt that this was caused primarily by excessive folding and pressure applied from normal wear (Fig. 5). Also included in the wallet were seven photographs. Three of the photos (2 color and 1 black-and-white) were in excellent condition. Two color photos were partially damaged and one color photo had ink transferred from the insurance card onto the face of the photo (Fig. 6). The remaining color photo showed appreciable damage.

Conclusion

In summary, freeze-dehydration resolves many problems of recovering water-soaked documents. The evidence presented in this case study demonstrates the near complete restoration of water-soaked materials (leather, glue, paint, emulsion, inks, papers) that were pressed together and submerged over a year in natural pond water.

Acknowledgments

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References

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