

ink aging process on paper, parchment (made from goat or sheep skin), and vellum (made from calf skin).

The salamander letter was shown to have been prepared around 1950 with an error of ± 40 years. Despite the poor accuracy, this clearly indicates fraud. This poor accuracy was explained after Hofmann confessed how he manufactured the documents. He artificially aged them by using ammonium hydroxide or oxidizing agents such as hydrogen peroxides or ozone. These apparently damaged the inks sufficiently to affect the accuracy of the analysis.

Conclusion

One underlying theme of each analytical method presented is the importance of standard reference collections. These collections should contain samples that are stable with time, are sufficiently numerous, and can be reliably discriminated using a series of analytical examinations. A unique match with the collection must be carefully analyzed before it is considered to be a positive identification. Information on the uniqueness of the standards from the manufacturer is a critical factor. Occasionally, repeated measurements are statistically analyzed to test the specificity of the procedure and the validity of the match.

Although inks (writing and printing) and paper are emphasized in

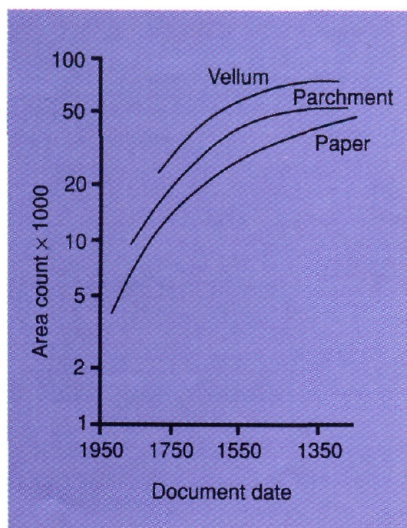
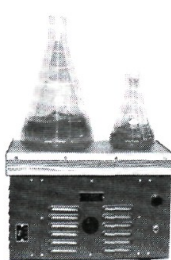


Figure 5. Aging curves of iron-based ink on paper, parchment, and vellum.

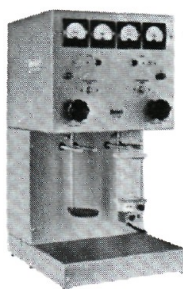
Area count measures the amount of iron that has migrated outward from the ink boundary and along a fibril. Each sample was tested in five areas, and the measurements were made in triplicate for each test site. Number of samples for paper, parchment, and vellum were 22, 8, and 7, respectively. (Adapted from Reference 15.)

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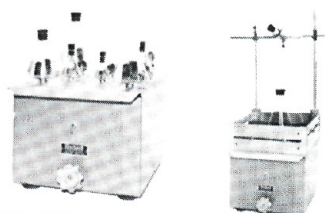
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