



# SAVING YOUR Treasures

*A Website about what you can do to protect and preserve the things of importance in your life*



## Gerald R. Ford Conservation Center Nebraska State Historical Society

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### FOXING (FOX MARKS)

Foxing is the term given to the small, irregular, brown marks that can occur on pages of books or on art works on paper or documents.

#### Fungal Stains and /or Iron Impurities:

There have been extensive studies to determine what causes the brown marks and two explanations have been proposed: fungal staining from mold growth and/or corrosion of iron impurities in the paper.

Most people now agree that one of the main causes for the stains is fungal growth (mold).<sup>1</sup> How or why this growth should appear on specific parts of the paper and not others is still a matter for conjecture. This cause is fully discussed by in an 1978 article by Meynell and Newsam in Nature magazine.<sup>1</sup>

<http://www.nature.com/nature/journal/v274/n5670/abs/274466a0.html>

The brown marks are usually areas of high acidity and occasionally traces of iron compounds have been detected in the foxed areas. As a result, some associate foxing with iron impurities in the paper.

#### High Relative Humidity:

It is, however, accepted that for the brown spots to appear, the paper must at some point have been exposed to very high relative humidity of around 75%.

#### Treatment:

Foxing marks **cannot** be reduced without the intervention of a conservator. Once a book page or artwork is foxed, storing it at a lower humidity will not cause the discoloration to disappear. At this point the owner will need to consult an experienced paper conservator if they want the marks removed or reduced. Often this can be done in the conservation laboratory, but sometimes the foxing marks remain resistant to the conservator's techniques.

**Prevention:**

The best thing to do is keep your paper objects in a suitable environment. (See the information on environmental conditions elsewhere on this website.)

<sup>1</sup> Meynell, G. G. and R. J. Newsam, "Foxing, a fungal infection of paper", Nature, 1978, 274, pp. 466-468.

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