

## A Blueprint for Conserving Cyanotypes

### ABSTRACT

The technical history of the cyanotype process has been elucidated from a study of the original experimental notes of Sir John Herschel and others, in order to replicate early cyanotypes for experimental testing. Their chemical vulnerability is threefold:

1. They are faded by visible light, when the Prussian blue (ferric ferrocyanide) is photochemically reduced to Prussian white (ferrous ferrocyanide): but this reaction is found to be substantially reversible, because the latter is slowly reoxidized by molecular oxygen. The importance of allowing cyanotypes access to the air is stressed. The zeolitic nature of the Prussian blue lattice can incorporate impurities which affect its stability to light: oxidizable organic molecules promote fading, but lead toning enhances the stability to light. Because the fading of cyanotypes does not obey the photochemical law of reciprocity, they may be safely exhibited under 50 lux illumination without fading; their recovery from fading caused by moderate exposure to full daylight was discussed.

2. Prussian blue is rapidly and irreversibly hydrolyzed to ferrocyanide and hydrated ferric oxide, even at the moderately alkaline pH of 9.4, corresponding to a saturated solution of calcium carbonate, which effectively bleaches the pigment color. This sensitivity to hydrolysis by alkali can be greatly diminished by treatment of the Prussian blue with nickel(II) salts, but may itself entail some image loss and a color shift. The importance of using unbuffered enclosures and wrappings for cyanotypes, contrary to the normal practices of paper conservation, is reemphasized.

3. Significant amounts of Prussian blue image can be irreversibly lost from cyanotypes during aqueous washing, which causes perceptible changes within a short time,

because the colloidal pigment is peptized and dispersed as a sol. Susceptibility can vary with the type of Prussian blue and water purity. It is concluded that wet treatments of precious specimens should only be undertaken with great circumspection.

### REFERENCE

Ware, Mike. 1999. *Cyanotype: the history, science and art of photographic printing in Prussian blue*. London: Science Museum; Bradford [England]: National Museum of Photography, Film & Television. The book is distributed in the USA by Michigan State University Press (ISBN 1900747073): <<http://www.msu-press.msu.edu/msi/cyanotype.html>>.

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