The Surface and Strengthening Effects of Resizing on Paper

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INTRODUCTION: Resizing of Paper is a common practice for strengthening weakened paper, usually following aqueous treatments. Various resizing agents and methods of application are currently in use in the conservation of paper objects. The objective of this research is to study the surface and strengthening effects of gelatin and methylcellulose when applied by spray, immersion, and brush to four historic papers.

1. Laid manufacture cotton rag paper with a calcium sulphate filler, 1748
2. Wove manufacture chemically processed wood pulp paper which contains lignin, 1870.
3. Laid manufacture chemically processed wood pulp paper which does not contain lignin, 1906
5. Whatman Filter paper No. 1 was used as a control.

Each paper was chosen to represent a specific period in the technology and materials used in paper making history.

EXPERIMENTAL: 5 papers with 16 sample types were treated and analyzed using the following experimental phases:

1. Preparation of sample strips
2. Weight of samples was recorded. Colour readings were taken using a Minolta Chroma Meter and gloss readings were taken using the BYK gloss meter. These analytical techniques were carried out following each experimental phase.
3. Samples washed in a bath with pH of 8.
4. Application of gelatin and methylcellulose by brush, spray, and immersion.
5. Aging of samples for 12 days at 65% RH and 80°C.
6. Fiber strength testing with Zero-span tensiometer according to TAPPI standard test method T231.
7. pH measurements of samples were taken with an Omega handheld PHH-7X pH tester.

RESULTS:
Surface Effects:
□ Gelatin created a surface gloss and visibly yellowed with aging.
□ Methylcellulose created a gloss to the surface of all sample types.
□ All application methods created the same degree of change to the paper samples.

Strengthening Effects:
□ Gelatin (samples 3-5) had a greater strengthening effect than methyl cellulose
□ Immersion and Brush (Samples 4, 5, 7, 8) had greater strengthening effects than the spray application both before and after aging.

CONCLUSIONS: Methylcellulose and gelatin are both suitable to use with spray, immersion, and brush applications of resizing treatments. Though gelatin has a greater strengthening effect, the yellowing that occurs upon aging is more visually harmful than the applications of methylcellulose.

ACKNOWLEDGMENTS:
QUEEN’S UNIVERSITY: Margaret Bignell, Marilyn Laver, John O’Neill, Robert Waller.
CANADIAN CONSERVATION INSTITUTE: Paul Begin, Greg Hill, Season Tse.
LOS ANGELES COUNTY MUSEUM OF ART: Chail Norton, Terry Scheffer.