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THE STUDY OF TWO HUMIDIFICATION AND FLATTENING METHODS FOR ALBUMEN PRINTS TO DETERMINE THEIR IMPACT ON THE EVOLUTION OF CRACKS IN THE ALBUMEN LAYER

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Abstract

The aim of this research was to study two methods for humidification and flattening of positive prints on albumen paper and to evaluate the impact of each treatment on the surface of the albumen. The research was undertaken at Library and Archives Canada and supported by the Carnot Foundation (France). The albumen process was the primary photographic print process between 1855 and approximately 1890. Prints consist of a lightweight, high quality paper support coated with a thin layer of egg albumen containing the image silver. The albumen layer of historic prints is generally brittle and often covered with a network of fine cracks. Various studies have shown a correlation between the introduction of high humidity and an increase in the number and/or size of cracks, leading photograph conservators to limit their use of "wet" treatments as are normally employed for other photographic processes.

The study proceeded in five stages:

1. Production of samples. Samples were manufactured according to typical 19th century formulations and methods. Ageing the sample albumen papers was accomplished by immersing them in successive baths of de-mineralized water followed by drying. This resulted in a network of measurable cracks.

2. Determination of a methodology for measuring changes in size and number of cracks following humidification and flattening. Several types of photography were evaluated for their ability to easily capture a sufficient amount of information. High resolution, digital macro-photography was selected and would be carried out before and after treatment. Points measuring approximately 1 millimeter would be enlarged 50 times. The images would then be altered in Photoshop® using filters from an image processing Plug-in called Image Processing Toolkit v5® by Reindeer Graphics. The resulting black and white images allow for easy comparison, pre and post treatment.

3. Humidification of the samples. Two "gentle" types of humidification were studied: humidification in a Gore-Tex® sandwich, and humidification in a humidity chamber. Different times in the Gore-Tex® sandwich and different times and different levels of RH in humidity chambers were tested. Weighing of the samples at regular intervals made it possible to measure the speed of

humidification. Two flattening methods were used: traditional weighted blotter stack and the "hard-soft sandwich".

4. Processing images and evaluating the results of treatment. The study of the evolution of the cracks was carried out following the procedure outline in step 2. Results showed a significant change to the cracks in as little as 10 minutes in the Gore-Tex® sandwich and little or no change after 24 hours in the humidity chamber. The flattening being strictly identical, the humidification rate seems to have an important role in the amplitude of the dimensional variations of the albumen layer. A possible explanation could be that the water introduced is still more in the external layers of the sample in the case of Gore-Tex®, whereas in the case of the humidity chamber the length of the treatment allows a more uniform penetration in all the layers.

5. Flattening of new and historic samples. Samples were humidified using the humidity chamber using a range of times and relative humidities. They were then flattened, face down, using the "hard-soft sandwich" technique as developed by Homburger and Kortel (Homburger, Hildegard and Korbel, Barbara: "Architectural Drawings on Transparent Paper: Modifications of Conservation Treatments:, The Book and Paper Group Annual, vol. 18, 1999, pp25-33.) Results were evaluated using the methodology described in stage 2 showing no changes to the cracks.

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