

Curing the Cure:

Treatment of a Manuscript Disinfected Post TB Exposure

With no cure for Tuberculosis until 1943, accomplished and notable chemist, principal, poet, revolutionary and mystic, Professor Puran Singh of India, died of the disease on March 30th 1931. His dwelling would have been 'cured' of Tuberculosis with the latest fumigation method of formaldehyde, chlorine, or sulphur gas, followed by scrubbing with chloride of mercury and potassium permanganate. His belongings were burned, save for a few precious and valued items including a lengthy manuscript. These items were disinfected and passed down to family members, the manuscript making its way to England with Singh's great grandson.

What the manuscript related to was unknown, and due to its crumbling state and darkened colour it was impossible to decipher, let alone transcribe and translate. It could be a new volume of poetry to be added to Singh's list of over thirty publications, or perhaps another scientific discovery, one to surpass his revolutionary method of purifying sugar. The manuscript travelled from England to Vancouver to Ottawa, arriving in the lab of Ubbink Book and Paper Conservation in the Fall of 2014

A familiar odour wafted up from the pages, but the owners had no idea as to what disinfectant could have been used to sterilize the TB microbes. Discovering what was used to 'cure' the manuscript was temporarily set aside to pursue potential remedies for the damage. The rag pulp paper had discoloured to dark brown and was extremely fragile with many tears, losses and loose bits. Solvents to push out the disinfectant were spot tested, starting with water and working up the activeness-scale until acetone showed promising results.

That familiar odour from the manuscript had now impregnated itself on my mind, reminiscent of pulling out the old canvas camping tent and spring cleaning at the local open-air museum. Investigating the possible disinfectants used on the manuscript led to medical texts and periodicals from the 1920's and 30's, and speaking with retired medical practitioners. It was a retired nurse that said "When I was a child, we would wear camphor in satchels around our neck to ward off diseases like TB", and I connected the odour of the manuscript to that familiar smell of moth balls in the camping gear and back sheds of the museum. Camphor oil as the most likely disinfectant used on the Manuscript was supported by historical research and its common use in Indian culture. Without access to further testing, the theory would have to satisfy my curiosity while continuing on to treatment.

A methodology for curing the 'cure', removing the camphor based disinfectant, was established through further testing and trial. Once the process was finalized, one by one, the fragile papers were placed individually onto a blotting paper and saturated with acetone applied with cotton balls. Within seconds the disinfectant was pushed out of the paper and into the blotter below, the Manuscript page was then placed onto a fresh blotter and another application of acetone was applied, rinsing out any residues. The page was then placed on a fresh blotter, along with any bits and broken sections, and left to air dry. As the acetone evaporated the Manuscript turned to an off-white colour rendering contrast between the ink and the paper.



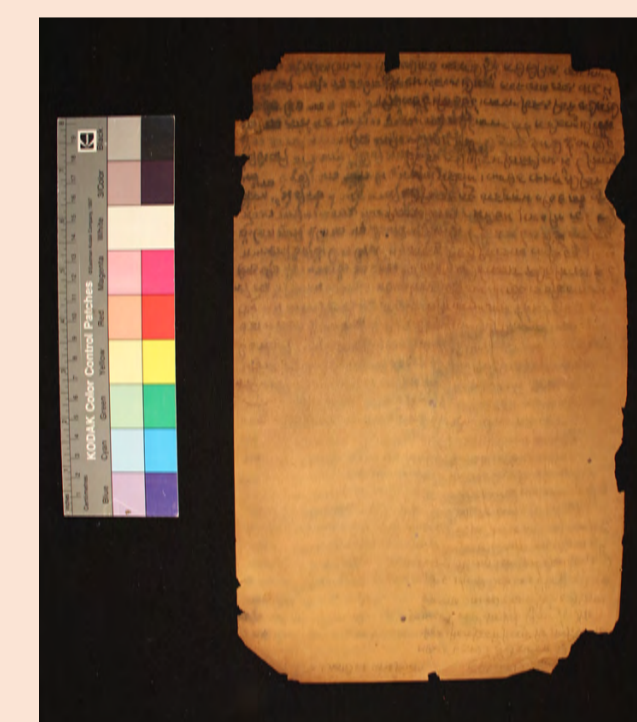
Manuscript Before Treatment



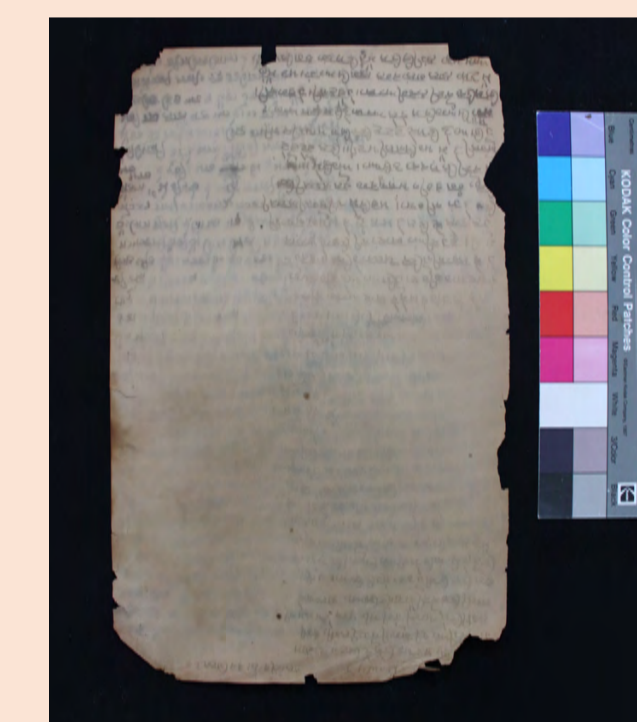
Saturating with Acetone



Blotter saturated with disinfectant pushed out by acetone, page still saturated with acetone



Before Acetone Treatment



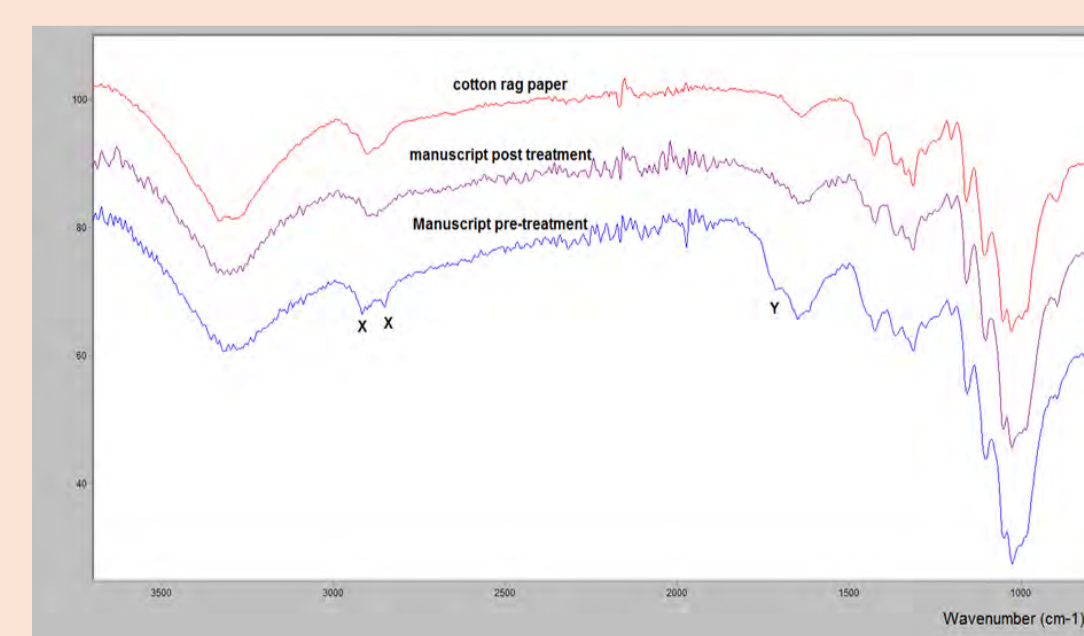
After Acetone Treatment



Applying Tinted Tengu-jo to Page Coated with Wheat Starch Paste



Smoothing Tengu-jo into Page



ATR-FTIR Results



Manuscript post Treatment

Due to fragility, no page count had been taken previous to the acetone treatment, and the papers were not numbered. To maintain their sequential order, a number was written onto each page's blotter, then once the page was dry, the number was transferred to the manuscript page with a soft graphite pencil. 'Curing' the 239 pages of the disinfectant required 34 litres of acetone, enough cotton balls to fill a large metal garage can, and two people working a full day. The appearance of the pages was greatly improved, but they were still very fragile and in dire need of strengthening.

The now collated pages were separated into manageable batches for washing and lining. The first batch was washed in carbon filtered water at room temperature. There was no change in the colour of the water to indicate that any dirt was being removed; therefore, subsequent batches were not bathed, saving many hours of labour. Working on a light table, each page was wet out with water, the tears aligned and any loose pieces fit in. 'Locking' the paper in place with polyester release material (Hollytex) applied to one side; Tengu-jo Japanese tissue was adhered to the other side with wheat starch paste, then covered with polyester release material and smoothed into the manuscript pages with a grout sponge. The pages were dried by pressing between blotting paper, changing the blotters as required. Over a period of one month all of the manuscript pages were lined, rendering them supple, strengthened, useable and odour free. Each page was digitized and then placed into a polyester sleeve.

Digitization at 600 dpi not only provided a copy of the manuscript to be shared and reproduced, but also allowed for digital enhancement of the pages enabling transcription and translation of the text. Scanning both sides of each page took 20 hours with a high speed scanner. Once appropriate enhancement settings were established, it took 20 hours to apply them to each of the 478 digital images clarifying the text even further.

Although the odour was now gone and the condition of the pages dramatically improved, there was still a desire to confirm the use of camphor oil as a disinfectant and the success of the treatment for removing all of the disinfectant. With many thanks to Gus Shurvell, Adjunct Professor in the Master of Art Conservation Program at Queen's University, both pre and post treatment samples of the manuscript were analyzed using ATR-FTIR spectroscopy. The graph shows two peaks in the pre-treated sample that could be attributed to camphor oil. More importantly these peaks are missing from the post treatment samples indicating the success of treatment.

Testing and trial found a way to 'cure' the damage inflicted by the disinfectant used to 'cure' the manuscript of Tuberculosis. After eighty hours of treatment, including the use of acetone to push the disinfectant out of the paper, followed by lining with Japanese tissue, and forty hours of digital work, the manuscript can now be added to the anthology and collected works of Professor Puran Singh; chemist, principal, poet, revolutionary, mystic, and now case study for conservation treatment.

With many thanks to Victoria Palmer; Conservation Assistant, Ubbink Book and Paper Conservation and Gus Shurvell, Adjunct Professor in the Master of Art Conservation Program at Queen's University; and Peter Turton (for editing this poster)

