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Conservation Treatment of The Mi'kmaq Prayer Book

David J. Hanington

Canadian Conservation Institute, Department of Canadian Heritage, 1030 Innes Road, Ottawa ON K1A 0M5, Canada.

This paper describes the treatment of a rare Mi'kmaq prayer book, written in a hieroglyphic script, that belongs to the Conne River Miawpukek Band (Miawpukek Mi'kamawey Mawi'omi, Council of the Conne River Micmacs) in Newfoundland. The manuscript was in an extremely vulnerable and deteriorated state. The leather cover was badly damaged and completely separated from the grey cover boards. The pages of the text block were dirty and water stained. In addition, there were tears and missing areas of paper. Several pages were detached from the text block and required the assistance of Mi'kmaq educator Helen Sylliboy to position them correctly in the manuscript. During the examination, Ms. Sylliboy intimated that due to the spirituality of the Mi'kmaq prayer book, it would be more respectful to leave it untouched. This led to a meeting in Conne River to discuss the treatment options, including that of not treating the prayer book. The Conne River Miawpukek Band Council Members opted for full conservation treatment. Treatment consisted of surface cleaning, washing and leaf-casting the folios, and rebinding the text block in a limp parchment cover. A padded book jacket, solander boxes to house the newly bound volume and original cover and binding materials, and a Plexiglas display stand were also constructed.

Cet article décrit le traitement d'un livre de prières mi'kmaq, rédigé dans une écriture hiéroglyphique, qui appartient à la bande indienne Miawpukek de Conne River, à Terre-Neuve. Ce livre rare était dans un état extrêmement vulnérable et détérioré. La couverture de cuir était très endommagée et complètement détachée des plats gris. Les pages des feuillets étaient sales et avaient été tachées par l'eau. Les pages comportaient de plus des déchirures et des lacunes. L'assistance de Helen Sylliboy, une éducatrice mi'kmaq, a été requise pour replacer correctement plusieurs pages détachées. Mme Sylliboy était d'avis qu'il serait plus respectueux de ne pas traiter le livre en raison de sa dimension spirituelle. Ceci a mené à une rencontre de toutes les parties intéressées à Conne River pour discuter des diverses options de traitement, incluant celle de ne pas traiter le livre. Les membres du Conseil de bande Miawpukek de Conne River ont opté pour le traitement complet du livre de prières. Le traitement a consisté à nettoyer les pages et à en colmater les lacunes, à relier le volume et à faire une nouvelle couverture souple en parchemin. Une jaquette molletonnée, des boîtes conçues pour entreposer le livre relié et les anciens matériaux de reliure, y compris l'ancienne couverture, ainsi qu'un présentoir en plexiglas ont été construits.

Manuscript received April 2000; revised manuscript received August 2000

Introduction

In the spring of 1998, the Canadian Conservation Institute received a Mi'kmaq prayer book from the Conne River Miawpukek Band (Miawpukek Mi'kamawey Mawi'omi, Council of the Conne River Micmacs) in Newfoundland for conservation treatment. This rare manuscript provided a very special challenge and a great opportunity to conserve a very valuable artifact**.** The powerful spiritual presence of the artifact and the significant place that it holds in its community meant a wide range of factors had to be considered prior to determining the most appropriate treatment.

The manuscript is an early Newfoundland Mi'kmaq prayer book containing hymns, prayers, and other religious texts used in divine worship according to Roman Catholic liturgy. The majority of the text is written in a hieroglyphic script adapted by the Canadian missionaries from Mi'kmaq pictographic symbols. This writing system is unique to the Mi'kmaq. The prayer book, which dates from the early 1800s, is the earliest known example of the hieroglyphic script to have survived on paper (although some specimens on birch bark, which pre-date it, have been preserved at the British Museum). The script is pictographic rather than phonetic, a rare example of a writing system in use two and a half centuries ago. The Mi'kmaq prayer book has a handwritten entry dated 1812, making it the oldest paper copy of the prayer book to survive.[1]

Condition

When the prayer book arrived at the Canadian Conservation Institute for conservation treatment, the manuscript was in an extremely vulnerable and deteriorated state. The leather cover had completely separated from the text block and the boards were warped and misshapen. The 150 page text block, measuring 37.0 cm H x 26.0 cm W x 5.0 cm D, was made of handmade paper with an 1807 watermark. The paper was exceptionally dirty, exhibiting water stains and in-ground surface dirt, particularly around the edges where the book was handled.

The leather cover (possibly caribou hide) had stains characteristic of water damage **(Figure 1)** and was completely separated from the grey cover boards. The leather had many wrinkles throughout the cover. The cover was badly stained and had areas where the leather was split and had become very brittle. On examination of the front surface of the cover, a pencil inscription was observed along creases in the leather which read:

Figure 1. Front cover of the Mi'kmaq prayer book before treatment.

"No man or woman living at Conne knows how old this book is." The year 1959, written above the inscription, suggested that it was added at that time. The corners of the cover were badly damaged by two cords that may have been used to keep the cover closed. The cover also had vertical leather strips attached along the front and back fore edge that did not appear to be part of the original binding. The endpapers on the inside cover boards were severely deteriorated, showing mould damage to the remnants of the paper still attached to the boards.

The text block was completely detached from the cover. This exposed the four vellum thongs onto which the text block was sewn. Over time the vellum thongs had become hard and brittle and had snapped in the area where they had been laced into the cover.

The pages had prominent water stains around the edges. In many cases, the water damage resulted in faded inks making the hieroglyphic symbols difficult to read. The pages were badly torn and degraded, especially where they were handled at the fore edge and in the lower right corner. Many of the pages had tears that extended across the width of the page and, in many cases, areas of the paper were missing. Many of the pages had drawings and annotations in pencil and in a variety of coloured inks. A number of pages throughout the prayer book had decorative designs **(Figure 2)**. These were usually a combination of black and red ink that may have been later additions to the manuscript.

The handmade paper was very soft and appeared to have lost most of its sizing. Observation under transmitted light showed the laid and chain lines in the paper and a watermark dated 1807. The watermark has a crown and shield design **(Figure 3)** and on the opposite side of the folio is the papermaker's name J. JELLYMAN. Research confirmed that Joseph Jellyman had an interest in the Downton Mill in Wiltshire, England, as early as 1781 and, according to the 1816 Excise List, Jellyman operated the mill in 1816.[2]

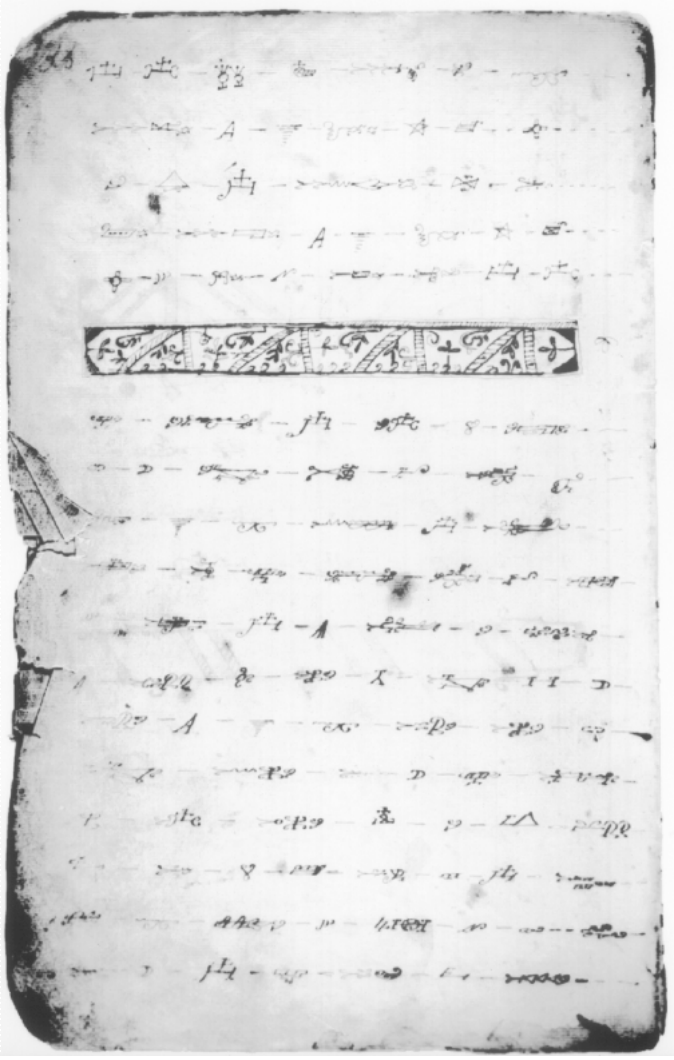

Figure 2. A page from the Mi'kmaq prayer book showing the hieroglyphic symbols, decorative design, and the deteriorated condition.

Figure 3. Watermark in the paper.

Examination

During the examination of the Mi'kmaq prayer book a number of detached pages were found throughout the volume. It was obvious from the water stains and some identification marks that these pages were in the wrong order. The dismantling of the book could not proceed without knowing the correct sequence of the pages.

At this stage, the Canadian Conservation Institute approached the Conne River Miawpukek Band for assistance in determining the correct location and order of the detached leaves of the prayer book. The Band arranged for Helen Sylliboy, a Mi'kmaq educator **(Figure 4)** who worked in Language Development with the Eskasoni School Board, Cape Breton, Nova Scotia, to come to Ottawa to ascertain the correct order of the detached leaves.

Figure 4. Helen Sylliboy, a Mi'kmaq educator, examining the prayer book to determine the location of several detached pages.

During her visit Helen often referred to a recent publication, *Mi'kmaq Hieroglyphic Prayers.*[3] This publication shows the hieroglyphic symbols, described as glyphs, which represent a word or words in the Mi'kmaq language with a translation in English. The meaning is printed below each glyph in the alphabetic Mi'kmaq language followed by a translation in English. Helen contributed to the research and translation of these hieroglyphic symbols. There are approximately 2,700 hieroglyphic symbols which are read from left to right.

While Helen Sylliboy was examining the manuscript, the author was struck by her comments regarding the spirituality of the Mi'kmaq prayer book and by her concern as to whether it would be more appropriate, more respectful of the object, to leave it untouched. It was clear from her response to this object that there was a very powerful spiritual element to the book, the importance of which could not be underestimated. As a result of her insightful comments, the treatment options were reconsidered and a "no treatment" option was included in the proposal. With the treatment options presented clearly in the treatment proposal, a meeting of all interested parties was arranged in Newfoundland to discuss the options prior to deciding on an appropriate treatment.

Meeting at Conne River

In July 1998, the author flew to Newfoundland to meet with the Conne River Mi'kmaq Band Council Members in the community of Miawpukek at Conne River **(Figure 5)**. During the meeting the condition of the prayer book and the difficulties associated with the treatment were presented. The advantages and disadvantages of treating or not treating the Mi'kmaq prayer book, as described in the treatment options in the proposal, were explained. After a lengthy discussion, it was the decision of the Band Council Members that the prayer book should be fully treated. The option chosen by the Band Council Members was to repair the pages of the text block using the leaf-casting technique and to rebind the volume.

Figure 5. Meeting with the Band Council Members to discuss the treatment options.

Photography

During the examination and treatment of the prayer book, before, during, and after treatment photography was carried out by the Analytical Research Laboratory at the Canadian Conservation Institute. In addition, visual examination was undertaken with the Visual Spectral Comparator imaging system in the ultraviolet and infrared regions of the electromagnetic spectrum to determine any possible fluorescence or luminescence of the iron gall, blue, and red inks.

As an experiment, a number of pages and the watermark in the paper were scanned and computer enhanced using Adobe PhotoShop software. The results show great potential for future scholarly study of the text. For example, should the Conne River Band choose to have the prayer book translated in the future, computer-enhanced, scanned images of the pages could be used by translators, rather than the original.

Analysis of Inks

The analysis of several samples of ink from the Mi'kmaq prayer book was undertaken by the Analytical Research Laboratory using Fourier transform infrared spectroscopy, x-ray microanalysis, and polarized light microscopy.[4] The results were as follows: three samples of brown black ink, which appeared to be typical of the ink used throughout the prayer book, were most probably iron gall ink; the red ink used in a design element in the text contained a red organic dye; the blue ink used in a drawing of a sailboat was pigmented with ultramarine blue while the ink of adjacent lettering contained a triphenylmethane-type blue dye; and methyl violet was present in the purple lettering.

Analysis of the Original Leather Cover

When the prayer book arrived at the Canadian Conservation Institute for conservation treatment, the documentation provided by the owner suggested that the cover was caribou leather. Analysis was undertaken by the Conservation Processes and Materials Research Division using a Leica polarized light microscope. The original cover, along with new leather samples of caribou, calf, sheepskin, and deer were analysed. The hair follicle patterns on the original cover were compared to those of the other leather samples. It was immediately apparent that the cover was not made of caribou skin. On caribou skin, the follicles are more numerous, closer together, and larger than the follicles visible on the prayer book cover. The results of the comparison suggested that the original leather was likely sheepskin. However, the identification remains tentative due to the poor condition of the surface of the original leather.

Treatment of the Text Block

Dismantling and Surface Cleaning

The paper treatment commenced with each folio being removed from the text block by opening the section in the centre and cutting the sewing thread. The sections were carefully removed from the text block and paginated with a small pencil number on the top right hand corner of each page. The folio was then placed into an individual manila folder to keep the book in order. The details concerning the tears and missing areas of each page were traced onto the folder and the damage recorded on the outside. Each page was brushed gently using a soft bristle brush to remove loose dirt. The prayer book was exceptionally dirty in the gutter area where dust and debris had collected. Each page was further surface cleaned using a combination of eraser compounds. Staedtler #2 erasing crumbs were applied overall with a small cotton pad to remove surface dirt. In areas with ingrained dirt, a Magic Rub vinyl pencil or block eraser was used to clean the paper. Care had to be taken when erasing, as the paper was very soft and easily damaged.

Lamination Removal

One page in the prayer book had been removed at some time and laminated with a plastic film. Fortunately, it was possible to remove the laminated material from the surface of the paper without the use of solvents. Underneath the laminate were strips of pressure sensitive tape along the fore edge and tail of the page. The resulting residue stain from the deteriorated tape was removed from the paper using acetone on a small suction table placed in a fume hood.

pH Measurements

Before and after washing, pH measurements were taken on a number of the pages randomly selected throughout the volume. Measurements before washing showed readings from pH 5.07 to pH 6.13, with after washing measurements ranging from pH 6.04 to pH 6.75.

Washing

Spot tests revealed that the inks were completely stable. This allowed the prayer book to be washed. Each page or folio was sandwiched between Reemay and washed for one hour in deionized water. The page or folio was lifted frequently from the water to assist with the removal of soluble impurities in the paper. The water was changed once during the washing period. The washed pages were removed and placed onto drying racks to air dry.

Leaf-casting

Leaf-casting is a mechanical method for infilling damaged areas of paper artifacts with a matching pulp. Leaf-casting is suitable for damaged books and documents that have large missing areas. The process requires that the book be dismantled and each individual flat sheet be repaired with an aqueous solution of pulp (a soft, formless mass composed of rags, wood, *etc.*, from which paper is made). Leaf-casting the folios from the prayer book was one of the most critical procedures of the conservation treatment.

Tests were conducted to determine a pulp which would provide a sympathetic colour match, thickness, and weight of leaf-

Figure 6. Beating the pulp in the Hollander beater.

cast paper. After many experiments with various fibres and information from previous leaf-casting recipes used in treatments, the following combination of fibres was selected:

50% Cotton 12R	Cotton linters (Alpha Cellulose, USA)
40% Dover Medium Toned	Handmade paper (Barcham Green, England)
10% Aiko's Old Gold	Japanese paper (Aiko's, USA)
+10% Jute Natr (Schleicher)	German prepared fibres

The prescribed combination of cotton linters, handmade paper, oriental paper, and a small amount of German fibres was torn up into small pieces, carefully weighed, placed into beakers, and soaked overnight in tap water. The soaking of the paper in water softens the fibres allowing the pulp to be disintegrated. Before beating, the pulp was disintegrated into a slurry (a liquid mixture of materials) and poured into a Hollander beater that is traditionally used in papermaking for producing good quality handmade paper. In the beater the slurry is circulated between the roll and the bedplate and is rubbed, cut, macerated, and separated until the required amount of beating is attained **(Figure 6)**. This is determined by using a Freeness tester to establish the amount of beating required to reproduce other batches of pulp.

During the beating process samples of the pulp slurry were removed from the Hollander beater and poured through a Freeness tester. The Canadian Standard Freeness Tester consists of a drainage chamber and a rate-measuring funnel mounted on a support. The test is designed to give a measure of the rate at which a dilute suspension of pulp may be dewatered. The drainage rate, or freeness, has been shown to be related to the surface conditions and swelling of the fibres and is a useful index of the amount of mechanical treatment given to the pulp.[5] During the measurement, the excess water passed through the chamber and collected in a graduated cylinder below. The amount of water collected was measured and the information documented. Beating continued until the required freeness measurement was obtained. Recording this information was essential in order that all future batches of pulp be produced in a consistent and homogeneous way.

The beaten pulp slurry was removed from the Hollander beater and the excess water was drained off. The pulp was placed in petri dishes and positioned onto a drying rack to air dry. This process allows the pulp to be stored and assists in the calculations that determine the amount of dried pulp required for the casts.

A series of paper controls used to calculate the thickness of the in-fills (areas where the paper is missing) were cast in the leaf-caster. To determine the amount of pulp required, the missing area of each page was calculated using a planimeter (an instrument for mechanically measuring areas of irregular plane surfaces) on the light table. The resulting measurement combined with the thickness of the paper was determined by a micrometer. This calculation determined the amount of pulp required for the in-fills.

After the size of the missing area of each folio had been calculated, the determined amount of air dried pulp was re-hydrated before disintegrating. This produces an even dispersion of fibres in water.[6] The folio was placed on a Reemay support which was then inserted into the upper chamber of the Vinyector leaf-caster. The perimeter of the folio was masked off with strips of black polyethylene. The measured amount of pulp was then poured into the upper chamber **(Figure 7)**, and the water and pulp fibres evacuated under vacuum. A fine web of fibres formed in the missing areas.

After casting, each folio was removed from the upper chamber on its Reemay support and pressed between blotting paper in the hydraulic press. Following the pressing, each dry folio was sized with a soft bristle brush using a 1% w/v solution of Klucel G (hydroxypropylcellulose) in ethyl alcohol and Irganox 10/10, an antioxidant. The folios were then placed on a drying rack to air dry. After drying and pressing, the folios were trimmed to size leaving a small margin of paper on the outside edge of each page. This small margin preserves the original cut edge.

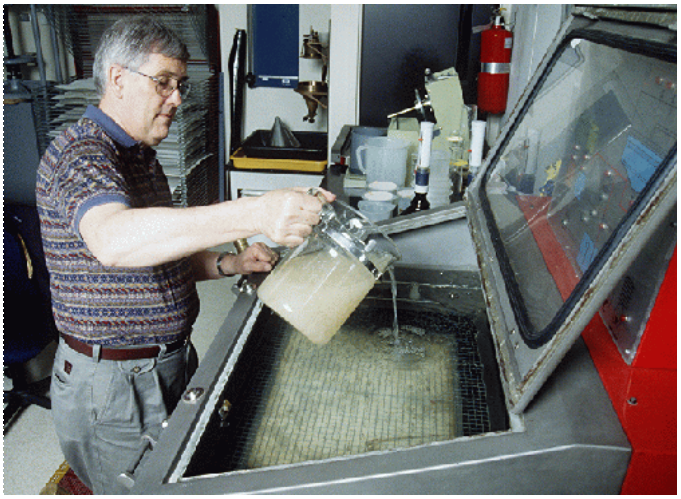

Figure 7. Pouring the pulp into the leaf-caster chamber.

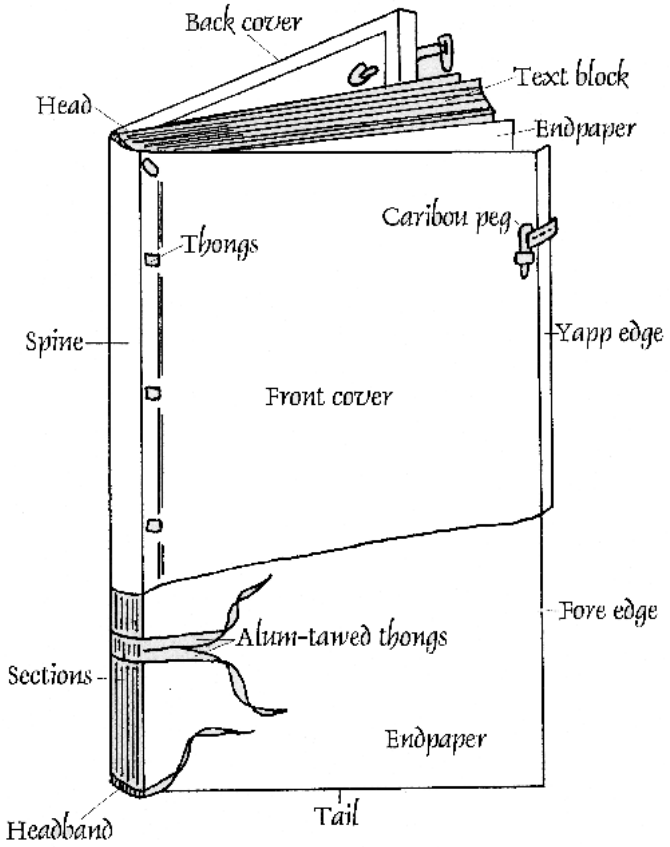

Figure 8. Schematic drawing of book parts.

Microfilming

In consultation with the owner and prior to rebinding, it was arranged to have the Mi'kmaq prayer book microfilmed at the National Archives of Canada, Conservation Microfilming, Photography and Digital Imaging Division[7] at the Gatineau Preservation Centre, Gatineau, Quebec.

The author was present for the microfilming process and handled the folios during the filming which took a day to complete. Three copies of the film were made, one copy went to the Conne River Miawpukek Band, one to the Queen Elizabeth II Library, Memorial University of Newfoundland, and, in exchange for microfilming, one copy was retained by the National Archives of Canada.

Binding

In consultation with the Miawpukek Band it was decided that the original cover would not be used in the rebinding. The leather was very deteriorated, no longer supple and flexible, and would have hindered the opening of the prayer book. Furthermore, the leather may have darkened from the adhesive used to adhere the original cover to a new binding. It was also likely that the annotations written in pencil on the surface of the leather would have been disturbed. This would have removed the historic evidence intrinsic to the original cover. Although the prayer book was not rebound in the original style, the author had numerous consultations with the Miawpukek Band to find a compromise binding style. The author felt that the style selected provided similar characteristics to the original binding in both the colour and the flexible nature of the cover. It would also allow for the original binding and sewing materials to be exhibited beside the prayer book while on display. It was decided to bind the book with a limp style parchment cover. Limp vellum or parchment bindings meet many conservation principles in that they provide an opportunity for disassembly, maintenance, and reassembly, with no damage to the text block.[8,9] A limp parchment style cover was selected with yapp edges[10] and thongs that are laced through the parchment to secure the text block to the cover **(Figure 8)**.

The text block was hand-sewn onto four 8 mm alum-tawed thongs using a traditional wooden sewing frame **(Figure 9)**. A linen thread was passed backwards and forwards through the centre fold of each section until all sections were attached. A strip of alum-tawed goatskin was cut 5 mm wide and stained to form the core of the headband. The headbands were sewn onto the head and the tail of the text block using a linen thread. The headband formed the secondary thongs which were eventually laced through the parchment cover to secure the text block to the cover.

Two handmade paper endpapers were constructed with a reinforcing strip of alum-tawed goatskin leather. These were handsewn onto the front and back of the text block with a linen thread. The spine of the volume was then rounded, forming a curvature along the length of the spine. The text block was then placed into a press between wooden pressing boards. Two thicknesses of Japanese paper were attached to the spine between the thongs with wheat starch paste.

A custom-prepared parchment of goatskin was obtained from a local supplier in Ottawa. The goatskin was dyed brown to create a colour sympathetic to the original cover. A pattern for producing the cover was made of paper to form a template to custom fit the text block. The corners of the cover were constructed combining

Figure 9. Sewing the folios onto alum-tawed thongs.

Figure 10. Close-up of the caribou peg attachment and detail of yapp edge to protect the pages.

a yapp edge at the fore edge turn-in. This interlocking corner technique requires no adhesive and can be reversed at a later date if the cover needs to be removed. When forming the yapp edge, the parchment was folded along the fore edge **(Figure 10)** approximately 5 mm wide to provide protection to the pages. Small round holes for the thongs and the headbands were made with a Japanese screw punch into the parchment to allow the thongs to be laced through the cover. A custom-made cover was constructed by cutting and folding the parchment to fit the text block. A piece of 2 ply matboard was inserted in the centre of the front and back cover for added support.

After completing the manufacture of the cover, the four thongs and headband ties were laced-in and out of the cover to attach the text block (**Figure 11**). The thongs also laced through a reinforcing strip of alum-tawed goatskin that was incorporated to strengthen the endpaper joint. The thongs and headband ties were cut to length and the endpapers positioned under the cover turn-ins to conceal the thongs.

Two pegs were manufactured of caribou antler provided by the objects laboratory at the Canadian Conservation Institute to keep the Mi'kmaq prayer book closed **(Figure 10)**. Small pieces of the antler were cut to size on the band saw and shaped to size using files and sandpaper. A small slot was cut in the pegs to affix the alum-tawed goatskin fore edge ties. These were hand sewn onto the ties and laced into the cover. Two small leather loops were secured to the front cover to hold the pegs in place and to keep the book closed **(Figure 12)**.

Figure 11. Lacing the thongs into the cover.

Figure 12. Front cover of the Mi'kmaq prayer book after treatment.

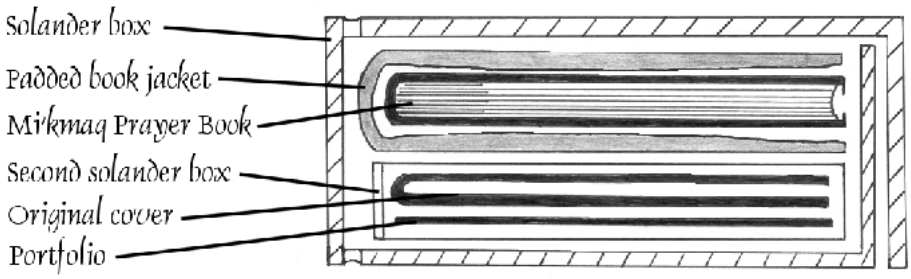

Figure 13. Schematic drawing of solander storage box.

Protective Enclosures

A solander box (a storage box, usually of a drop-back construction) was fabricated to house the Mi'kmaq prayer book **(Figure 13)**. The box was manufactured with millboard covered in neutral coloured bookbinding cloth. A label made from a dark brown skiver (usually, a split sheepskin used extensively for labels) was titled and attached to the spine of the solander box.

A second solander box was manufactured to house the original cover and a portfolio containing the old sewing thread and the vellum thongs. These materials were encapsulated in 3 mil Mylar before placing them into the portfolio. The second solander box fits inside the first solander box and the Mi'kmaq prayer book, enclosed by a padded book jacket, rests on top of it.

Plexiglas Stand

A Plexiglas display stand was produced at the Canadian Conservation Institute for the prayer book to rest on while on display. The Plexiglas stand was cut to size from a matboard pattern and the edges scraped and polished. To form the bends, a hot element bender was used to heat the Plexiglas and form the stand to the required shape. A padded book jacket was constructed from a caribou leather skin provided by the Miawpukek Band to protect the binding. This will be placed under the prayer book when it is displayed on the Plexiglas stand and around the volume when it is stored inside the solander box **(Figure 14)**.

Conclusion

The treatment of the Mi'kmaq prayer book in the paper laboratory proved to be of great interest to everyone who passed through the laboratory. Very few days went by without someone asking to see the prayer book. People were intrigued to view this sacred artifact which is steeped in historical value. The Mi'kmaq prayer book is a unique artifact with great spiritual presence and it was a privilege to treat it. When the prayer book was returned to the Conne River Miawpukek Band, Chief Saqamaw Misel Joe explained that the book itself was regarded by his people, for generations, as an object imbued with spiritual power that could be called on to cure sickness or ward off evil. He spoke about plans to build a display case and to give the prayer book a position of prominent display in the Band's Administrative Building while awaiting the construction of a reserve museum.

Acknowledgements

The author would like to thank the following colleagues from the Canadian Conservation Institute: Sherry Guild for her guidance throughout the treatment; Elizabeth Moffatt and Marie-Claude Corbeil for the analysis of the ink; Gregory Young for the analysis of the leather cover; Season Tse for advice on cleaning and washing the paper; Bob Barclay for assisting with the Plexiglas stand and the caribou pegs; and Carl Bigras for the photography. Thanks are also extended to Juliet Graham, a volunteer paper conservator, for her assistance in the leaf-casting; Micheline Sarrazin, Michèle Beauchamp and Francine D'Amour from the National Archives of Canada, Gatineau Preservation Centre for microfilming; and Rick Cavisin for producing the parchment skin for the cover.

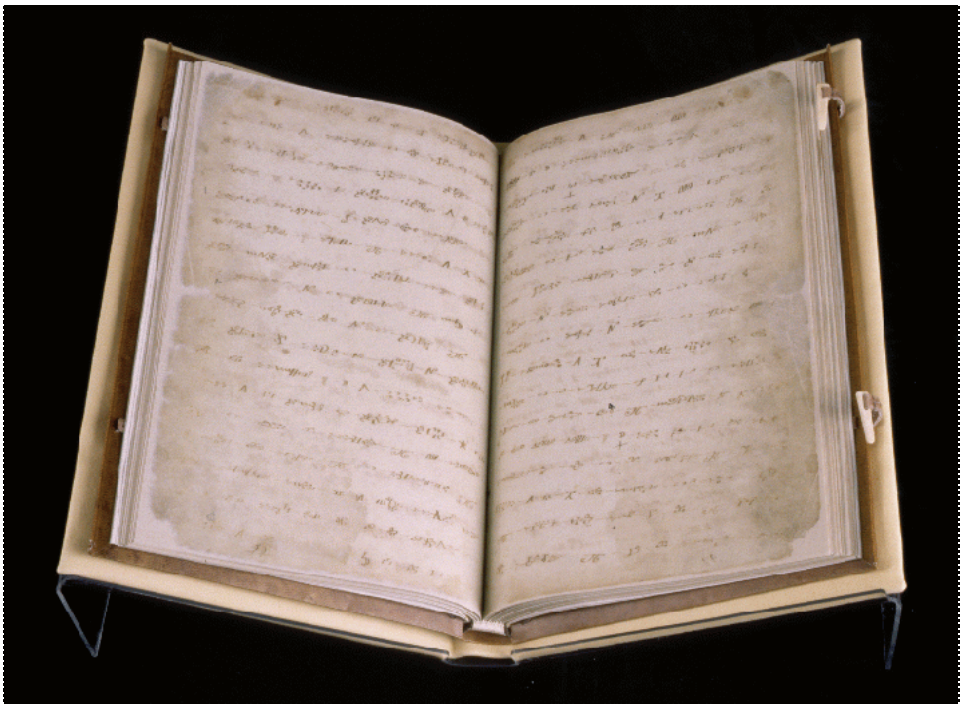

Figure 14. Mi'kmaq prayer book displayed on Plexiglas stand resting on padded book jacket.

Finally, for their assistance throughout the treatment, the author thanks Martin Howley, Humanities Librarian, Queen Elizabeth II Library, Memorial University of Newfoundland, and Gerald Penney, an archaeologist and heritage consultant who was negotiating on behalf of the Conne River Miawpukek Band. Special thanks is given to Helen Sylliboy and to the Band Council Members of the Conne River Miawpukek Band.

Equipment

Canadian Freeness Tester (instrument for testing the freeness of pulp): Lorentzen & Wettre Canada Inc. (originally Noram), 125 Hymus Boulevard, Pointe-Claire QC H9R 1E6, Canada, (514) 694-4522.

Disintegrator (for disintegrating pulp into suspension): Lorentzen & Wettre Canada Inc.

Hollander Beater (for beating pulp): Lorentzen & Wettre Canada Inc.

Japanese screw punch (useful for limp vellum bindings): BookMakers International, Lt., 6701B Lafayette Avenue, Riverdale Park MD 20737, USA, (301) 927-7787.

Micrometer (instrument for measuring the thickness of paper): Lorentzen & Wettre Canada Inc.

Planimeter (instrument for measuring missing areas of paper): A. OTT, Jägerstr. 4-12, P.O. Box 2120, 8960 Kempten, Germany, +49 831 25566.

Vinyector leafcaster (for casting paper): Coinsa, Controles Industriales, S.A., Hermanos Garcia Noblejas, 45, 28037, Madrid-17, Spain, +34 91 268-1405.

Materials

Bookbinding cloth Loom State Union Fabric: J. Hewit and Sons Ltd., Unit 28 Park Royal Metro Centre, Britannia Way, London, England, NW10 7PR, +44 181 965 5377.

Goat parchment (limp parchment binding material): Rick Cavisin, Handmade Parchment and Vellum, 68 Lightfoot Place, Kanata ON K2L 3L9, Canada, (613) 591- 8612. http://www.niagara.com/~acavasin/rick/rcav.htm, January, 2000.

Magic-Rub Peel-Off pencil erasers and vinyl block erasers (for surface cleaning): conservation supply houses.

Reemay (non-woven polyester sheet available in several thicknesses): conservation supply houses.

Staedtler Mars Plastic eraser crumbs (for surface cleaning): William Minter, Bookbinding and Conservation, Inc., 4364 Woodbury Pike, Woodbury PN 16695-9516, USA, (814) 793-4020.

References

1. Hewson, John, "An 18th-Century Missionary Grammarian, Micmac Studies of Father Maillard," *Historiographia Linguistica*, vol. XXI:1/2, 1994, pp. 65-76.

2. Gravell, Thomas L., *A Catalogue of Foreign Watermarks Found on Paper Used in America 1700-1835* (New York & London: Garland Publishing, Inc., 1983).

3. Schmidt, David L., and Marshall, Murdena, *Mi'kmaq Hieroglyphic Prayers: Readings in North America's First Indigenous Script* (Halifax, NS: Nimbus Publishing Ltd., 1995).

4. Moffatt, Elizabeth, and Corbeil, Marie-Claude, "Analysis of Ink Samples from a Mi'kmaq Prayer Book," Analytical Research Laboratory Report No. ARL 3734 (Ottawa: Canadian Conservation Institute, 1998). Unpublished report.

5. The Physical and Chemical Standards Committee Technical Section, Canadian Pulp and Paper Association, *The Determination of Freeness, Standard C1*, April 1972.

6. Petherbridge, G. T., "Analysis Specification and Calculations in the Preparation of Leaf- Casting Pulps: A Methodology," *Preprints of the Cambridge Conference 1980 – The Conservation of Library and Archival Materials and the Graphic Arts* (London: The Institute of Paper Conservation and the Society of Archivists, 1980), pp. 189-209.

7. Hall, Susan, *Guidelines for Microfilming Records of Archival Value* (Ottawa: National Archives of Canada, 1996).

8. Lindsay, Jen, "A Limp Vellum Binding Sewn on Alum-tawed Thongs," *The New Bookbinder, Journal of Designer Bookbinders*, vol. 11, 1991.

9. Clarkson, Christopher, *Limp Vellum Binding and its Potential as a Conservation Type Structure for the Rebinding of Early Printed Books: A Break with Nineteenth Century Rebinding Attitudes and Practices* (Hitchin Herts, England: Red Gull Press). [n.d.]

10. Roberts, Matt T., and Etherington, Don, *Bookbinding and the Conservation of Books: A Dictionary of Descriptive Terminology* (Washington, DC: Library of Congress, 1982), http://palimpsest.stanford.edu/don/don.html, January 2000.