

George Harbour: The First Resident Museum Conservator in Canada

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George Harbour: The First Resident Museum Conservator in Canada

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This article explores the early evolution of conservation at the National Gallery of Canada envisioned by director Eric Brown and conservator George Harbour. The article tracks the similarities of their backgrounds and subsequent experiences in the formation of in-house conservation at the Gallery. Harbour's early training in England is touched upon; his introduction of descriptive written reports and a selection of materials Harbour used during the course of his career are described in tabulated format and briefly explained. The article also cites the early introduction of micro-climate boxes for the protection of wood panel paintings and the recommendation by Brown and Harbour that a university science degree be a prerequisite in employing restorers.

Cet article aborde les débuts de la restauration au Musée des beaux-arts du Canada à travers la prévoyance du directeur Eric Brown et du restaurateur George Harbour. Il retrace les similarités de leurs formations respectives et de leurs expériences subséquentes dans la mise sur pied d'une unité de restauration au Musée. La formation initiale de Harbour en Angleterre est présentée, de même que son initiative d'introduire des rapports écrits de documentation. Des produits utilisés par Harbour durant sa carrière sont énumérés et commentés brièvement. L'article traite également de l'introduction de cadres-boîtiers à micro-climat pour la protection de peintures sur panneaux, ainsi que de la recommandation commune de Brown et Harbour quant à la nécessité de l'obtention d'un diplôme universitaire en science comme pré-requis pour les restaurateurs à être embauchés au laboratoire du Musée des beaux-arts du Canada.

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Introduction

The influential team of director Eric Brown and conservator George Harbour, “the first resident museum conservator in Canada”¹, initiated the establishment of the conservation profession at the National Gallery and by extension in Canada. This early shared responsibility for the well-being of the collections set the tone for subsequent co-operation between the curatorial and conservation staff at the National Gallery. As a result, the Gallery was one of the first museums to establish an in-house conservation studio² and one of the first to hire an apprentice restorer with a university degree in chemistry.³

Early Days in England and Canada

George Joseph Harbour (**Figure 1**) was born in Torquay, Devonshire, England, on January 20, 1871.⁴ As F. Maud Brown, wife of Eric Brown, notes in her publication *Breaking Barriers: Eric Brown and the National Gallery*, by the age of twelve George found life around the harbour in Torquay more to his liking than school. As a result his father, Jacob, a carver and gilder of fine wooden objects, enjoined George to train under an old-time carver and gilder. A magistrate, learning of the new arrangement and failing to persuade George to go back to school, indentured him to the craftsman for five years. An apprenticeship of the kind Harbour served had hardly changed in its instruction techniques, tools or materials since medieval times. While learning his craft, Harbour agreed to attend night school until he was fifteen, and he found the combination demanding but worthwhile: “George still chuckles as he remembers the magistrate decreeing that because of his tender age he must go to

night school ...”. In the fifth year of his apprenticeship he became an ‘improver’ and finally a master gilder and framer.⁵

George Harbour landed in Canada, along with other members of the Harbour household, when he was seventeen years of age. Harbour made his way to Ottawa and in 1887 he was employed by the city's leading art dealer, James Wilson & Company on Sparks Street⁵ where he was employed for twenty-five years. Harbour in all probability treated paintings as well as frames while employed with Wilson as the written reports, which he initiated soon after joining the National Gallery, dealt with both paintings and frames.⁶

Eric Brown (**Figure 2**), who became the first director at the National Gallery and who had a significant impact on Harbour's career, was born at Nottingham in England in August 1877. Maud Brown notes, “[Eric's] father bequeathed to his youngest son his rare appreciation of the arts and his high principles in dealing with them.” Brown suffered a long illness resulting from a football accident on the playing field, ruling out college and he subsequently spent his convalescence reading. “Under his father's guidance he turned to the classics, gained an absorbing love of good literature, and developed the talent for writing that was to stand him in good stead in later years.”⁷ As Maud Brown further notes:

Eric had a happy capacity for asking pertinent questions and absorbing knowledge where-ever he might find it. Fortunately, he had unusual opportunities to learn about the technique of painting from members of his own family. His elder brother Arnesby (later Sir Arnesby) had acquired

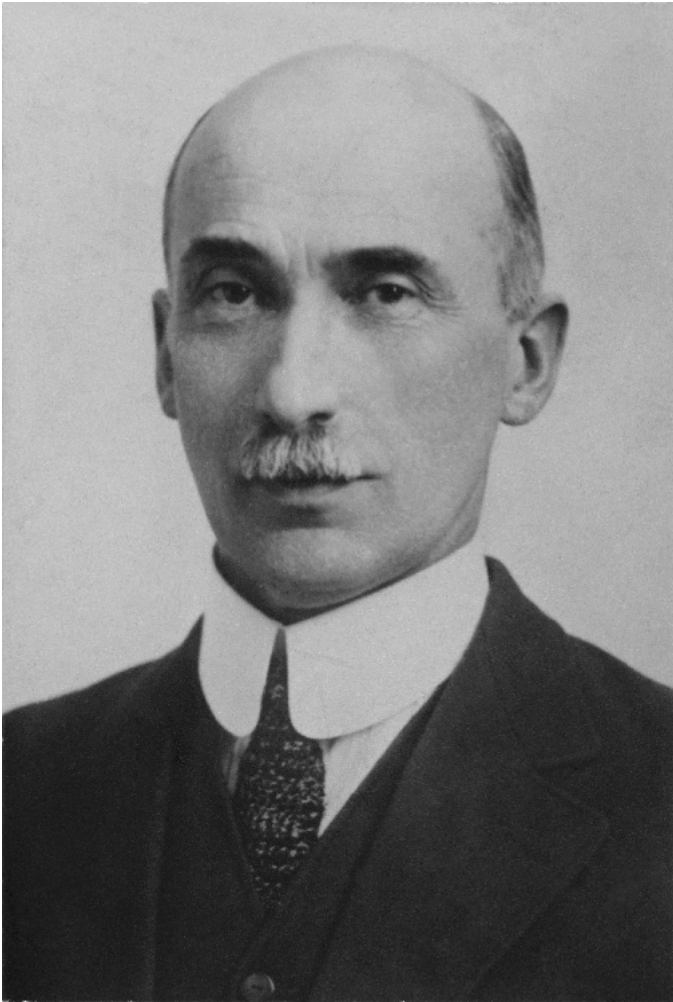


Figure 1. George Harbour 1871-1964, in an undated photograph. Photograph courtesy of Nancy M. Snowden and Murray Kelley.

*a reputation as a landscape painter and was made a full academician while still young. He usually had three or four pictures "on the line" and found a ready market for them. Mia, Arnesby's wife, was known for her imaginative portraits of children. Both of them studied at the Herkomer School of Art at Bushey.*⁷

After his illness Brown visited his cousins at Nevis in the West Indies and on returning to England he took up farming for a short time; however, Brown was "more interested in the colour of a cow with sun on it than in its pedigree."⁷ It was during this period that Eric and Maud met and were soon engaged to be married. Brown, on visiting his brother in St. Ives, an artists' community in south-west England, met F. R. Heaton, "the head of Scott and Sons, the Montreal picture dealers, and was invited to visit him if he ever came to Canada."⁷ Maud Brown further notes:

From the time Eric first landed in Canada in 1909 things went well for us. His first work was taking care of a loan exhibition of British pictures in Montreal. Afterward he worked for the Art Gallery of Toronto. In both cities he met Byron Edmund Walker (soon to be Sir Edmund) who was choosing pictures for the newly appointed Advisory Arts Council in Ottawa. Apparently he realized something of

*Eric's ability for he asked if he would undertake a canvas of Toronto for the new members so badly needed for the Art Association there. This Eric carried out successfully [...] almost immediately afterward Walker asked him if he would care to go to Ottawa and bring some order into the affairs of the long-neglected National Gallery.*⁷

National Gallery of Canada

In September 1910, Eric Brown came to the National Art Gallery of Canada, as it was first known, as Curator⁸ where he found the empty east wing of the newly built Victoria Memorial Museum in Ottawa waiting for the Gallery's paintings. After dealing with federal government red tape, Brown was able to complete the alterations required to accommodate the hanging of a small group of paintings. The Gallery opened its doors with little celebration early in 1911.⁹ The official establishment of the Gallery was not until 1913 with the National Gallery of Canada Act of Parliament and the appointment of its Board.⁸ The first official meeting of the Trustees was held in October of that year.



Figure 2. Eric Brown 1877-1939, the first director of the National Gallery of Canada, Ottawa in 1927, photographed by John Vanderpant; in the collection of the National Gallery of Canada, ID # 3384. Photograph © National Gallery of Canada Library and Archives Canada, Ottawa.

Care of the Collections

Eric Brown began a professional relationship with George Harbour when Harbour was employed by James Wilson. It was Wilson's company that undertook the framing, hanging and repairs of the diploma paintings from the Royal Canadian Academy of Arts¹⁰ and other paintings that had passed into the care of the Department of Public Works in 1880.¹¹

Brown is known to have been committed to the maintenance of the collections and he kept a critical eye on the condition of the paintings in his care until his "unexpected and sudden death" in 1939.¹² One of Brown's earliest acts as the first director¹³ of the Gallery was naming George Harbour as foreman of the Gallery's Workshop on July 8, 1912.¹⁴ **Figure 3** is a sketch drawn by Arthur Lismer while a member of the jury for the Canadian art section for the British Empire Exhibition at Wembley, England in 1924.¹⁵ Harbour, as handler for the works submitted for the jury's consideration, identifies a rejected painting—hence the inscribed "Out" at the base of the sketch.¹⁵

Harbour was initially employed to oversee the day to day maintenance and movement of the collections and to take charge of the treatment of frames and the examination and occasional treatment of paintings. Harbour was also responsible for exhibition and display, packing of works of art, and the hanging of paintings, a skill perfected while working with Brown.¹⁶ Harbour's twenty-five years of experience at Wilson's placed him in a uniquely qualified position to set up the Workshop—purchasing materials and equipment (see **Figure 4**), and training experienced assistants. The workshop was Harbour's domain and he ruled it with a firm hand and a sure knowledge of all his materials and what was expected of him.⁵ Maud Brown notes:

As a skilled artisan, he knew his tools and materials to perfection. Burlap in place of canvas was anathema to him; paint squeezed from tubes was barely acceptable. He knew something of the value of grinding one's own colours; and tempera, the real kind in which the medium is white of egg, had his whole-hearted approval. The carelessness of some modern artists who painted on almost any material that came to hand distressed him sorely, and if the offenders found their way into his workshop for a chat they might argue and chaff but they left with a sound respect for his opinions and knowledge.⁵

Just three years after Harbour started at the Gallery, Brown wished to promote him. To accomplish this, however, Harbour first had to resign and be hired in the re-classified position.¹⁷ Harbour's promotion went forward in this unusual fashion in 1918. His official title? Chief Mechanic. The job description of Restorer was not in the federal government's lexicon of the day.

Early Contract Restorers at the Gallery

In the 1920s, Brown utilized the services of restorers such as H. Rutley of Toronto,¹⁸ followed by Frederick W. Colley, an itinerant restorer, who periodically visited from England, Bermuda or California¹⁹ and subsequently Herbert E. Thompson,



Figure 3. *Portrait of George Harbour, 1924, by Arthur Lismer, one of the artists who became a member of the Canadian painter's circle known as the Group of Seven; pen and ink on wove paper in the collection of the National Gallery of Canada, ID # 15963. (Gift of F. Maud Brown, Ottawa, 1970.) Photograph © National Gallery of Canada, Ottawa.*

an independent conservator working privately out of the Boston



Figure 4. *Tubes of oil paint and container 10 cm (h) x 5 cm (diameter) from The A. S. Boyle Company, Windsor, Ontario, supplied to "Vincent Arbour" [sic, i.e. George Harbour], Victoria Memorial Museum (at the time, housed the National Gallery of Canada collections), Ottawa. Photograph © and courtesy of the National Gallery of Canada Library and Archives, Ottawa.*

Museum of Fine Arts, Massachusetts, USA.²⁰ Communication on the progress of treatments during this period was often by letter and telegram, with occasional meetings in Ottawa or Boston, for example, in the case of Thompson. The paintings were often shipped back and forth to Boston by rail using the American Express Company as carrier and usually accompanied by a Gallery representative such as Harbour. Thompson's letters to Eric Brown and his assistant director, H.O. McCurry, denote a man with a quirky sense of humour; in one letter to McCurry, Thompson referred, obliquely, to Victoria, Queen of England, as "a heathen goddess."²¹

As earlier museum buildings in Canada were often at the mercy of rapid shifts in temperature and humidity,²² Harbour and Thompson introduced the use of dedicated sealed metal boxes in 1928 to help buffer the Gallery's vulnerable wood panel paintings; for example, Anthonis Mor's *Portrait of a Man*.²³ The glass fronted, sealed (with black rubber), two part metal boxes were fitted, out-of-sight behind the frame of the paintings. A material such as Beaverboard (similar to fiberboard) was placed within the box, under the painting, to further buffer any changes in humidity. **Figure 5** shows an example of one of these boxes. Harbour and Thompson collaborated over the years, and discussed in detail, the use of such micro-climate boxes after Thompson's pioneering success with his "experimental metal box" fabricated in Boston in December of the previous year.²⁴

In-house Conservation Studio

Brown, satisfied with Thompson's work, must have been disconcerted to learn of Thompson's death on August 5, 1932 some six months after he had undergone "major surgery" in March of the same year.²⁵ Brown did not want to employ the services of Rutley or Colley because of disputes over certain treatments.²⁶ The Gallery's Board of Trustees, having already requested a review of the Gallery's organization and functions by W.G. Constable (formerly Assistant Director, National Gallery, London, and then Director of the Courtauld Institute at the University of London, England), followed through on Constable's 1931 recommendation that a full-time restorer be hired to work in a newly created in-house conservation studio.²⁷ In the interim the Gallery may have utilized the services of John Finlayson, to line paintings, for a short period.²⁸

The in-house studio was proposed as a practical and cost-effective way to care for the Gallery's paintings. Harbour was in a good position to take over the responsibility of restoring the paintings as he had built on his training in the restoration of paintings by first assisting Colley and finally by working with Thompson.²⁹

Through the years George gained a sound knowledge of picture restoration. His two maxims were "You mustn't be tied for time: restoration work must go along slowly" and



Figure 5. An example of the sealed micro-climate metal boxes introduced to protect wood-panel paintings by George Harbour and H. E. Thompson, early 1928. The box contains a reduced copy of the painting *The Perras Children* 1823, by an unknown American artist, in the collection of the National Gallery of Canada, ID # 9057. The front glass is not shown, nor is the Beaverboard as humidity buffer. Photograph © and courtesy of the National Gallery of Canada Library and Archives, Ottawa.

*"Look out that you don't do something to a picture which the next man can't undo even if it's a hundred years later."*⁵

Jean Sutherland Boggs, then Director at the National Gallery of Canada, notes in 1971:

*By 1935 Eric Brown was arguing that the Gallery should set up its own conservation studio under Harbour. During the past 12 years [Harbour] specialized in the study of picture restoration, studying not only at the National Gallery but at the Boston Museum of Fine Arts and elsewhere. There is no doubt that by his initiative he has acquired an amount of expert knowledge and technical skill.*³⁰

Shortly after being promoted as supervisor of both the conservation studio and the workshop, Harbour met George Stout of the Museum of Fine Arts in Boston. During the course of the visit, the use of wax as a varnish for paintings and as an adhesive for the lining of paintings was discussed. George Harbour was hesitant about the use of wax, but was willing to consider its application if Eric Brown:

*[...] compares the general look of their pictures with our own, and likes theirs best [...]. I guess the wax way is [simpler] to do than the varnish, and I believe with a little practice it could be made like Charity, to cover a multitude of sins.*³¹

Materials and Treatments

George Harbour's original typewritten notes on the treatment of frames and paintings are contained in a small grey cloth-covered notebook *History of Picture Frames: National Gallery of Canada* (Figure 6) now housed in the Gallery's Library and Archives. The notes, which list the contents by year of treatment, span the period from 1912 to 1922. The early 1920s saw the Gallery utilize the services of itinerant restorers such as F. W. Colley, which may explain the discontinuation of Harbour's reports after 1922. Although captioned *History of Picture Frames*, in several instances, the notes cite the condition and treatment of a specific frame followed by the condition and treatment of the painting as well. Harbour's descriptive documentation of materials and treatments was unusual, as restorers of the time, for example, F. W. Colley, more often than not, briefly noted that paintings had been "cleaned, repaired & fed".³² H. E. Thompson noted his treatments informally within his handwritten letters to Brown and assistant director McCurry.

A brief description of selected materials used by Harbour, and mentioned in his notebook, is given in Table I. A number of these materials, a few of which are still in their original bottles and/or containers, are stored in the Restoration and Conservation Laboratory's solvent storage facility at the National Gallery of Canada. When reading Table I, it is important to keep in mind that Harbour began working in the field of restoration one hundred years ago. Restorers working in the late 19th and early 20th centuries were not as aware of the hazards many of their materials posed as we are today. Substances such as corrosive sublimate, benzine or lead putty are harsh or quite dangerous by today's standards, not only with regard to the objects being treated but to those handling the materials as well. Many of these substances are not recommended for use anymore. Harbour must have been working cautiously as he lived well into his 94th year.

As well as providing important information about the materials he used for restoration, Harbour's notebook contains around one hundred reports on the treatment of frames and paintings. Excerpts from four of these treatments are given below. Terms and materials mentioned in these reports that are defined in Table I are given in boldface type.

(1) *Spanish School 16th century, The Beggar*:⁵⁵

The frame is carved wood apparently Chestnut, and was badly worm eaten, the whole ornament on the outer left hand side was sound, but the tops either peeled off or loose. The frame first was given a hot coat of thin white [chalk ground] with a large proportion of red lead. Casts of the destroyed ornaments were made, and the broken parts replaced and made up of composition, then a second coat of thin white was given both back and front of the frame. This coat had a solution of corrosive sublimate added to the white, after which the ornaments were worked in pencil, white as though for burnish. The frame was then shellaced and put in oil, and gilded with metal leaf, then lacquered with a gum lacquer, and finished by toning down the whole

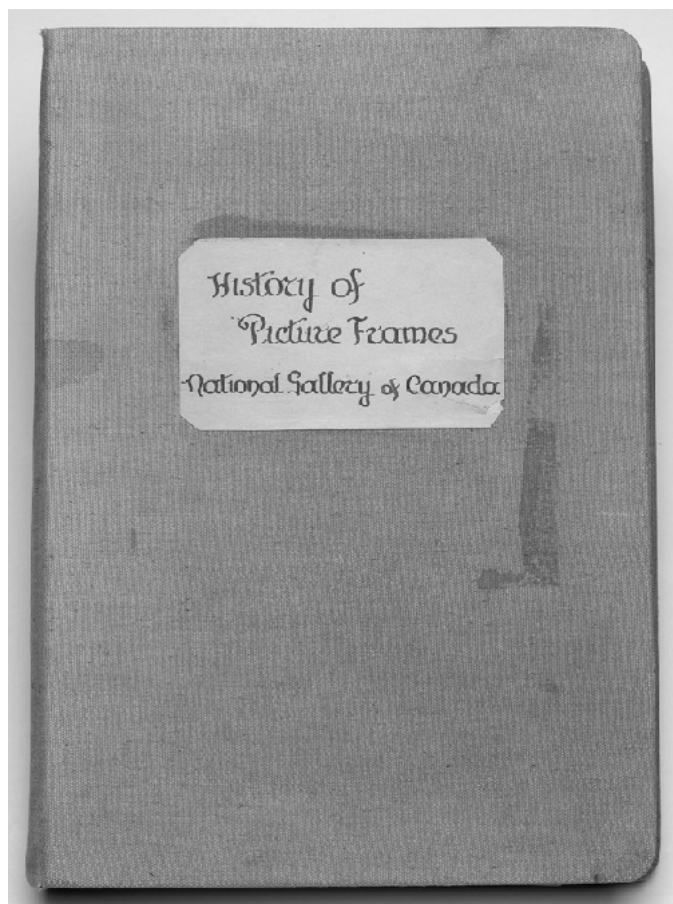


Figure 6. George Harbour's notebook, *History of Picture Frames National Gallery of Canada*, 25 cm (h) x 18 cm (w) x 4 cm (d): Photograph © National Gallery of Canada Library and Archives, Ottawa.

frame with a dry colour mixed with gelatin, the heavy flat parts between the ornaments were finished with a flat coat of colour mixed with benzine and oil. Nothing on this occasion was done to the painting.

November 1912.

(2) *William Cruikshank R.C.A., Breaking a Road*:⁵⁶

This was a new frame supplied by the Newcombe Maclin Co. of Chicago, the ornaments are composition and the whole frame is worked up in thick white with a top coat finish, when received by the National Gallery it was given a coat of thin white and red lead, shellaced, put in oil and gilded with metal leaf, lacquered with gum lacquer and toned with dry colour mixed with gelatin, the bottoms being darkened with colour mixed with benzine and oil. The painting was in bad shape, the canvas being rotten and having five cuts through it most likely caused by other pictures having been piled against it. The painting was rebacked on heavy linen which was carefully shrunk before re backing. It was put on with fish glue and [flour] paste to which was added a solution of corrosive sublimate, the cuts were then filled up with lead putty and

(Continued on p. 48)

Table I: Selected Materials Used by George Harbour, 1912 - 1944.³³

(Note: Often the designations for materials as used by Harbour are not as precise in their meanings as used today.)

Material	Brief Description	Comments
Banana oil	"A colorless volatile liquid solvent that smells and tastes like bananas. Amyl acetate is a mixture of five isomers and is sometimes sold under the names banana oil or pear oil. Its primary isomer is isoamyl acetate. Amyl acetate was introduced in 1888 as a solvent for cellulose nitrate and was also later used for cellulose acetate [...]. Amyl acetate is still used as a solvent in nail polishes, leather polishes, waterproof varnishes, bronzing liquids and metallic paints." ³⁴	Harbour used this material as a lacquer solvent in the restoration of frames, for example in the 1916 report for G. A. Reid's <i>Dreaming</i> : "[...] bronze mixed with Banana oil and coloured with size mixed colour". ⁶ This material is no longer used in the National Gallery of Canada (NGC), Restoration and Conservation Laboratory, paintings conservation studio. Inhalation and contact can cause irritation. High fire risk.
Beaver-board	"Originally a trademark [Canadian product] of the Beaver Board Company (1905) for a pulp composite wallboard made from wood pulp and/or waste paper. Now the term beaverboard is generally used for a variety of rigid, laminated fiberboards. Beaverboards became a popular interior finish wallboard because they were available in many types of finishes, such as pebble-surfaced, and could be painted or decorated with stenciled designs instead of with wallpaper." ³⁴	In the NGC paintings conservation studio, <i>Beaverboard</i> has been used in a number of ways; in the early 1920s and 1930s as a type of cradle/support attached to the verso of a canvas painting, for example, as described by Harbour in his treatment report on J. L. Graham's <i>Landscape</i> , as noted in excerpts within this article. Harbour used the term <i>cradle</i> and <i>board support</i> interchangeably [see: "Cradle"]. <i>Beaverboard</i> has also been used as a humidity buffer inserted behind wood-panel paintings within the early metal micro-climate boxes. Silica gel is now generally used as a humidity buffering agent. <i>Beaverboard</i> has been used more frequently as a protective backing for framed paintings. <i>Beaverboard</i> becomes brittle quite rapidly and is no longer used in any of the above functions in the NGC paintings conservation studio. Protective backings are now made with rigid synthetic materials such as <i>Coroplast</i> ³⁵ or <i>Foamcore</i> . ³⁶
Benzine	"An archaic misleading name for a liquid petroleum distillate product usually designated as the fraction collected from 90-150°C. Thus, the benzine fraction falls between the distillate ranges used for mineral spirits and gasoline. However, the names "benzine" and "petroleum benzine" have also been used for lighter distillate fractions. Because of the confusion of the name "benzine" with the more toxic aromatic solvent "benzene" an alternate name of ligroin is recommended by ASTM for this hydrocarbon fraction." ³⁴	Harbour used benzine, for example, in the 1912 and 1913 frame treatments for the paintings <i>The Beggar</i> and <i>Breaking a Road</i> , for inpainting areas "[...] with colour mixed with benzine and oil", as noted in the treatment report excerpts within this article. This material is highly flammable and is toxic by ingestion and inhalation.
Black glue	An asphalt or coal-tar based cement/glue used in the building and carpentry trades. ³⁷ (The word glue has often been extended to many other substances that are not considered glue at all.)	<i>Black glue</i> is a component of a "cement" used by Harbour in the 1920 treatment of the painting J. L. Graham's <i>Landscape</i> , as noted in the report excerpts within this article. The word "cement" appears to be interchangeable with any adhesive when used by Harbour.
Cleat	"A wooden wedge; a piece of wood bolted on for securing ropes." ³⁸	Harbour described the use of a <i>cleat</i> in the 1912 treatment of the painting by Glynn Warren Philpot, <i>The Morning Prayer</i> , as noted in the report excerpts within this article.
Coal oil	"A crude oil obtained from the destructive distillation of coal. Coal oil was used for illumination and was originally called kerosene." ³⁴ Harbour may have used the term Coal oil to mean <i>Coal-tar solvent</i> . "Coal-tar solvent is a volatile solvent obtained by the distillation of coal tar; benzene, toluene and xylene are the principle solvents so obtained [...]. A fourth coal-tar derivative called solvent <i>naphtha</i> has a strong naphthalene or mothball odour and contains mixed hydrocarbons; and it is in general a weak solvent, useful for the superficial cleaning of coatings that would be damaged by stronger solvents." ³⁹	A component of Feed [see: "Feed"]. The vapours of benzene are rated as dangerously toxic and considered carcinogenic.
Composition or Compo	Most often <i>compo</i> is a mixture of calcium carbonate with glue, drying oil, resin and plasticizers. By careful craftsmanship and selection of the best materials, a fine surface and stone-like durability can be obtained both on flat areas and in decorative elements that were modeled or pressed into the surface of hollow-carved wooden molds. ³⁷	Harbour used <i>compo</i> as described using a similar technique when constructing and repairing frames. Probably learnt during his apprenticeship in England prior to coming to Canada. For example Harbour noted in his 1916 report for the treatment of the frame for Mark Fisher's <i>Sheep Shearing in a Barn</i> : "[...] the frame was repaired with <i>compo</i> , prepared up in thick white, worked for gilding in red gold [...]" ⁶
Coopers glue	Coopers glue is a hide-glue ⁴⁰ used in the carpentry trade. ³⁷	Harbour used <i>Coopers glue</i> in the construction of cradles (see: "Cradle"). For example Harbour noted in his 1917 treatment report for Arthur D. Rosaire's <i>The Garden of Lights</i> : "[...] seasoned (not kiln dried) whitewood [ribs] were fastened to the beaverboard with good Coopers glue." ⁶
Corrosive sublimate	"An old name for mercuric chloride. Corrosive sublimate is a highly toxic chemical that was used for years as a wood preservative, rat poison, insecticide and fungicide. A violent poison, it can be fatal in minutes with ingestion of 0.5 grams. ³⁴ Toxic by ingestion, inhalation and skin absorption. Egg white is used as an antidote." ³⁴	Mercuric chloride was generally used in the restoration field for the preservation of anthropological and biological specimens during the late 19 th and early 20 th centuries. Harbour used this material as a component in his glue recipes, as noted in the 1913 treatment of William Cruikshank's <i>Breaking a Road</i> : "[...] fish glue and paste to which was added a solution of corrosive sublimate [...]" and also noted in the report excerpts provided within this article. Corrosive sublimate is highly toxic and should be handled, if at all, with great care.

Cradle	<p>1. A brace of hardwood ribs and crosspieces attached to the back of wood panel paintings to reinforce the panel and to prevent warping.</p> <p>2. <i>Beaverboard</i> has also been used occasionally in the past as a type of support or “cradle” for canvas paintings. And occasionally beaverboard and wooden ribs were utilized together as one unit and termed a “cradle”.</p>	<p>1. A fixed cradle of this type was used by H. E. Thompson in 1928 on the National Gallery of Canada’s panel painting by Anthonis Mor, <i>Portrait of a Man</i>²³ before it was fitted and sealed within the micro-climate box designed by Thomson.²⁴</p> <p>Coopers glue [see: “Coopers glue”] would probably have been used warm, to attach the vertical hardwood ribs of a <i>cradle</i> along the grain of the wood panel painting; the hardwood cross braces are slotted for free movement through the glued vertical ribs. The cross-braces can become fixed in time. As a result, this method of cradling is not normally used any more as changing relative humidity conditions, no matter how slight, tends to introduce new stressors resulting in further damage to wood panel paintings.</p> <p>Support <i>cradles</i> are now customized in the NGC paintings conservation studio. The current practice is to allow panel paintings to be supported by (but not fixed to) a custom formed cradle that conforms to the verso shape of the panel. This allows any natural movement of the panel without restraint.</p> <p>2. Harbour has described such a <i>Beaverboard</i> support as a type of cradle, as did F. W. Colley, an itinerant contract conservator used by the Gallery in the early 1920s. A <i>beaverboard</i> “cradle” was used on J. L. Graham’s <i>Landscape</i> as described by Harbour in his 1920 treatment report for this painting [see: “Beaverboard”].</p> <p>3. Harbour also used “iron slats” in conjunction with whitewood “bars” to cradle a number of paintings which had <i>beaverboard</i> as their original support and had subsequently become distorted; for example in the 1917 treatment for J. E. H. Macdonald’s painting <i>Asters and Apples</i>.⁶</p>
Driers	<p>“A compound of any of several metals, notably lead, iron, manganese and cobalt, which has a siccative (drying) effect when cooked at a high temperature with linseed oil. When a small amount of such a linolate is added to an oil paint or oil varnish, it will greatly accelerate the speed [...] with which the coating becomes dry to the touch.”⁴¹</p>	<p>Harbour used <i>driers</i> when restoring frames, for example in the 1918 treatment for E. Wyly Grier’s painting <i>The Master of Northcote</i>: “After repairing [the frame] it was leaded and gilded in oil with metal leaf and gold leaf burnishes, finished in lacquer and toned with Benzine and Dryers and dry colour.”⁶</p>
Dutch leaf, metal leaf	<p><i>Dutch leaf</i> or <i>Metal leaf</i> as it is also known, is “A malleable brass alloy prepared as an inexpensive imitation gold leaf. Dutch metal, or Dutch gold, contained approximately 80-88% copper and 12-20% zinc. It was invented by Prince Rupert (1619-1682) in Bavaria. Dutch metal is pressed into thin foil sheets to imitate gold leaf for gilding frames, polychrome sculptures and furniture. It tarnishes rapidly and must be coated with varnish, shellac, or wax for protection. Dutch metal is sensitive to pollutants, such as hydrogen sulfide, and to some plasticizers.”³⁴</p>	<p>Harbour often used <i>metal leaf</i> in the restoration of frames, for example in the 1919 treatment of William Orpen’s <i>Mary</i>: “Frame[...] was then shellaced and gilt in goldsize with metal leaf, then burnish on blue goldsize with gold leaf [...]. Two books of Metal leaf and nine (9) leaves of gold leaf used.”⁶</p> <p>Toward the end of Harbour’s notebook he reports on how much metal leaf or gold leaf has been used to treat a frame with the dollar cost. In one instance he notes that the cost to the Gallery was cheaper when done in-house rather than by an outside source; for example in the 1922 report on William Cruikshank’s <i>Breaking a Road</i>: “[...] The cost of the work in time and material was \$45.00. At the prevailing rates the cost would have been \$70.00.”⁶</p>
English leaf	<p>Thin metal leaf used in the gilding of frames.</p> <p>See <i>gilding</i> as described by Max Doerner in his 1949 book <i>The Materials of the Artists and Their Use in Paintings</i>.⁴²</p>	<p>Harbour also used the term <i>English gold leaf</i> in his treatment notes for frames. He used English leaf in the 1914 treatment of the frame of Thomas Gainsborough’s <i>Ignatius Sancho</i>: “[...] gilt in matt with English leaf, but it was coloured with oil and benzine colour.”⁶</p>
Feed (or verb ‘Fed’)	<p>Feed is a generic solution of oils and solvents. A NGC <i>feed</i> recipe dated June 18, 1958, consists of 2 cups Raw Linseed Oil; 2 cups Russian Light Oil; 1½ cups Coal Oil; 5 tablespoons Oil of Spike. An original sample of this recipe is kept in the NGC conservation solvent storage facility.</p>	<p>This material was used in the past as what was known as <i>museum varnish</i>; it was utilized in the late 19th and early 20th centuries by restorers, mainly in museums, applying the ‘feed’ to the surface of paintings to help rejuvenate the colours, usually while <i>in situ</i>.³⁷ H. O. McCurry, then NGC Assistant Director, wrote in 1926 to Eric Brown “[...] the Fogg Museum is doing original investigation into restoration — they don’t think much about ‘feed’[...]”⁴³ The painting would then have been described as having been “fed”.</p> <p>This mixture is no longer used as it discolours substantially over time and can become extremely difficult to remove, if it is possible at all.</p>
Fish glue	<p>“A proteinaceous, water soluble adhesive made from fish parts containing collagen, keratin, or elastin [...]. In general, fish glue is lighter in colour than hide glue and forms a weaker adhesive bond. It dries to a hard, sandable surface and adheres well to glass, ceramics, metal, wood, cork, paper and leather. Fish glue is sold in liquid form and is used in painting, gilding, bookbinding, case making, gummed tapes, blueprint paper, and letter press printing plates.”³⁴</p>	<p>Harbour used fish glue as a component in some of his lining adhesive recipes, as well as for sizing (see: “Size”). For example, Harbour used fish glue as a component of the adhesive used in 1917 for the treatment of Glyn Warren Philpot’s <i>The Morning Prayer</i>, as noted in the excerpts within this article.</p>
Flour paste	<p>This common paste is made by mixing flour or starch smooth with a little water, adding more water as necessary to make a thin milky consistency while heating the mixture and stirring until the batch thickens to the desired consistency.</p>	<p>Harbour used this material in some of the recipes for the lining of paintings. Flour paste is still used as a component today by some conservators using traditional materials and techniques.</p>
Fussel or Fusel oil	<p>“A mixture of volatile, oily liquids produced in small amounts during alcoholic fermentation. A typical fusel oil contains 60-70% of amyl alcohol, smaller amounts of <i>n</i>-propyl and isobutyl alcohols, and traces of other components, which are major ingredients of lacquer solvents. The fusel oil alcohols are produced during fermentation from amino acids. In industrial alcohol plants, fusel oil and ethyl alcohol are recovered from the fermented liquors and separated by distillation.”³⁴</p>	<p>Harbour used this material as a component in some of his lining adhesive recipes, for example, in his 1913 treatment for J. L. Graham’s <i>Landscape</i>, as noted in the treatment report excerpts within this article.</p>

Gelatin	<p>“A mixture of proteins prepared by hydrolyzing, via boiling, collagen obtained from skin, ligaments and tendons [...]. Its production differs from that of animal glue in that raw materials are selected, cleaned, and treated with special care so that the product is cleaner and purer than glue. Gelatin is strongly hydrophilic. In cold water dried gelatin can absorb up to ten times its weight of water forming a viscous mass. Adding alum to gelatin produces a harder gel. Gelatin is used for photographic film emulsions, sizing, adhesives, inks, encapsulation and food.”³⁴</p>	Harbour used gelatin as an inpainting medium in the 1912 treatment of the frame for the painting <i>The Beggar</i> : “[...] finished by toning down the whole frame with a dry colour mixed with gelatin.” It was also used in the 1913 treatment of the frame for the painting <i>Breaking a Road</i> ; and in the 1917 treatment for <i>The Morning Prayer</i> as a component of a gap-filling putty: “[...] the joint filled with a putty of gelatin and whitening [...]”. See excerpts of the treatment reports within this article.
Glycerine	<p>“A transparent, colourless, viscous liquid that is hygroscopic and has a sweet taste. Glycerol, first isolated in 1779 by Scheele, is a by-product from the saponification of fats and oils. It is used in the production of alkyd resins, ester gums and dynamite. The thick, neutral liquid is also used as an emulsifier/plasticizer in printing inks, watercolor and gouache paints, glues, cements and regenerated cellulose (rayon, cellophane) [...]. The term glycerin is used for commercial materials containing more than 95 percent glycerol.”³⁴</p>	Harbour used this material as a component in some of his lining adhesive recipes, for example in his 1917 treatment of Glyn Warren Philpot's <i>The Morning Prayer</i> , as noted in the excerpts within this article.
Gum lacquer	<p>Gum lacquer is most probably a gum resin/alcohol solution. “Gum resins [such as gum copal] are a small class of gums with resinous ingredients” obtained from various shrubs and trees. The typical gum resin has the appearance of a resin, and it is insoluble or incompletely soluble in water but dissolves freely in alcohol.”⁴⁴</p>	Harbour used a “gum lacquer” for example in the 1912 treatment of the frame for the painting <i>The Beggar</i> : “[...] The frame was then shellaced and put on oil, and gilded with metal leaf, then lacquered with a gum lacquer [...]”. It was also used in the treatment of the frame for the painting <i>Breaking a Road</i> . (See excerpts within this article.)
Lacquer	<p>Lacquer is a broadly used term for a solvent based resinous solution that dries to a hard, high gloss. They can be clear or toned if pigments or dyes are added. Lacquer is “A natural resin; the liquid exudation from trees grown in several countries in the far East such as Japan.”⁴⁵</p>	Harbour used gum lacquer [see: <i>Gum lacquer</i>] and shellac lacquer [see: <i>Shellac</i>]. For example in the 1913 treatment of the frame for Michel Aniole Amerighi's <i>Portrait of a Cardinal</i> : “[...] lacquered with shellac lacquer [...]”. ⁴⁶ Harbour's usage of the word “lacquer” is not always precise.
Lead putty	<p>“A type of putty that contains lead white. White lead putty contains linseed oil thickened with calcium carbonate and 10-89% lead white”³⁴ and was used by restorers in the past for filling losses in frames and paintings. Other components can be a dryer such as cobalt, and, if desired, a tinting pigment.</p>	Lead white is rarely used today due to its severe toxicity. It can be absorbed by breathing or swallowing the dust. Chronic lead poisoning may be fatal. ³⁴ This material is no longer used in the treatment of paintings by the NGC paintings conservation studio.
Linseed oil	<p>“A drying oil used in artist paints that is obtained from the seeds of the common flax (<i>Linum usitatissimum</i>) plant. [...] Linseed oil is the most important and most widely used oil for paints and varnishes. It produces a hard, insoluble film when it dries. The yellow-gold colour oil is commercially extracted by various methods. The seeds can be crushed in hydraulic or screw-type presses to produce cold-pressed oil. The same process performed on steam-heated seeds produces hot-pressed oil. Cold-pressing is a less efficient manner for extraction but it produces a higher quality for artists paint. Many types of aging, refining, and bleaching procedures have been used to purify the oil and make it dry faster [...]”³⁴</p>	Raw linseed oil was used for example as a component of Feed (see “Feed”). “Linseed oil is the fastest drying of the painting oils. By absorbing oxygen it hardens to form insoluble linoxyn. Artists use special types of linseed oil that yellow less strongly. These are used to grind all normally slow-drying pigments. They should not be used in painting vehicles excepts very sparingly, since oil paint contains all the medium necessary and sometimes even an excess, which can separate in the tube during prolonged storage. Although bleached linseed oil looks at first more attractive, it will yellow with age to the same extent as the unbleached materials. Painters can make allowance for the slight yellowish tinge of unbleached linseed oil.” ⁴⁶
Mastic resin	<p>“A pale, yellow natural resin produced by the evergreen mastic shrub, <i>Pistacia lentiscus</i> which occurs in southern Europe and northern Africa. Mastic is a triterpenoid resin; some of its identified components are euphane, oleanic acid and bicyclic diol [...]. Mastic is sold commercially in small, transparent “tears” of a pale straw colour. The resin collected from the Greek island of Chios has a reputation for the highest quality. Mastic was used in 16th and 17th century recipes for oil/resin varnishes and later in with mixtures of other resin. In the 19th century, mastic was a popular clear, glossy spirit varnish for oil paintings and was also used as an additive in oil medium called meglip. By the 20th century, its use was superseded by dammar. Mastic varnish is prepared by placing the resin bits in a gauze bag suspended in solvent. Mastic varnishes yellow and can become insoluble with age.”³⁴</p>	Harbour used a mastic resin varnish from 1912 to 1922, ⁶ as did the early itinerant restorers utilized by the Gallery in the early 1920s. Harbour began using dammar resin in the late 1930s. ⁴⁷
Ormolu	<p>“1. Gilded bronze or brass used as pure or functional decoration [...]. Ormolu is used chiefly for mounts and ornaments on furniture, clock-cases, candlesticks [...]. Authentic ormolu is cast and chiseled by hand and its finish is gold leaf, or formerly by fire gilding.”³⁴</p> <p>2. A transparent reddish-orange varnish used to give luster and a warm tone to surfaces gilded with gold leaf or <i>dutch metal</i> and make silvered surfaces look like gold.”³⁴</p>	<p>1. Harbour in all probability was skilled in the first definition of <i>ormolu</i> as learnt in his early training in England as a master gilder and carver.</p> <p>2. However it is probable that the <i>ormolu</i> referred to in his notebook is the second — a transparent warm-toned varnish for frame restoration. For example Harbour noted in his 1915 report on the treatment of the frame for Edmund Dulac's <i>The Three Princesses</i>: “[...] the frame was prepared with a clear coat put in oil and gilded in gold leaf and finished in ormolu.”⁴⁶</p>
Poppy oil	<p>“A naturally, colourless, transparent drying oil obtained from the ripe seeds of the opium poppy (<i>Papaver somniferum</i>) native to the western Mediterranean region. [...] Manufactured poppy seed oil comes primarily from India, Russia, France and Asia Minor. Cold pressed poppy oil is nearly colourless, but the hot pressed oil is reddish. Poppy oil dries more slowly than linseed oil, but it yellows less, so it was sometimes used with white pigments starting about the 17th century. It produces a soft, rubbery paint film with a long wet-in-wet work time that was popular with Impressionist painters. Thick layers of poppy oil paint films tend to wrinkle and crack on aging.”³⁴</p>	Poppy oil was used by Harbour in the 1917 treatment of W. E. Atkinson's <i>Willows Evening</i> : “[...] the picture was washed, cleaned and treated with Poppy Oil.” ⁴⁶

Red lead	<p>“Pure red lead — lead tetroxide — although having a severe toxicity rating still plays an important role in oil gilding and in the preparation of fast-drying linseed oil used for lettering on stone surfaces that will subsequently be gilded.”³⁴</p>	<p>There is a sample of <i>red lead</i>, probably similar to one used by Harbour, in the NGC conservation solvent storage facility.</p> <p>High toxicity rating. Red lead is toxic by inhalation or ingestion and is considered a carcinogen. Skin contact may cause irritation or ulcers.</p>
Russian light oil	<p>The author has been unable to find a description of this material at time of writing.</p>	<p>A component of Feed (see: “Feed”).</p> <p>There is a sample of this pale clear liquid, probably used by Harbour, in the NGC conservation solvent storage facility.</p>
Shellac	<p>“An alcohol-soluble resin, the most highly refined form of lac; also, the varnish made by dissolving it in alcohol. Two grades are made, orange shellac and bleached or white shellac. Fluid shellac varnish has a characteristic cloudiness, which is due to waxes that are imperfectly soluble. It dries, however, to a clear finish that is hard and glossy with a characteristic orange-peel effect. Shellac is used mostly for varnishing floors and furniture. It is also used on a mold in plaster casting to separate the plaster mold from the plaster cast. Because of its tendency to darken on aging, shellac is not used on surface layers in permanent painting but it is valuable for some purposes where it is covered by paint. For example, white shellac diluted with several parts of alcohol is used as a size for gesso.”⁴⁹</p>	<p>Shellac was used by Harbour for example, in the 1912 and 1913 treatments of the frames of the paintings <i>The Beggar</i> and <i>Breaking a Road</i>, applied prior to oil gilding; it was also applied over the lead putty filler used in the treatment of <i>The Morning Prayer</i>. (See the report excerpts within this article.)</p>
Size, sizing	<p>“Size (or sizing as it is sometimes called) is an extremely dilute solution of a gluey or resinous substance applied to a surface in order to reduce its absorbency or porosity and make it more receptive to an application of paint or another type of coating material. In oil grounds on canvas the application of size is especially important, since direct contact with oils causes the canvas fibers to become brittle and to decay. Hide glue is commonly used for sizing; on rigid surfaces such as panels and walls, weak shellac is also used [...]”⁵⁰</p>	<p>Harbour used a fish glue size to prepare a linen lining canvas prior to applying a water soluble adhesive. This method of preparing canvases was still in use in the NGC paintings conservation studio in the 1970s and the early 1980s. However the size used during the 1970s and early 1980s was a parchment size made in-house from goat skins which contained the preservative Dowicide B. The parchment size was also used to adhere ‘facings’ of paper to secure areas of damaged paint layers - until well into the late 1990s.</p>
Oil of spike-lavender	<p>“Oil of spike is distilled from a broad-leaved variety of lavender <i>Lavandula spica</i> (not to be confused with the fragrant oil of lavender used in perfumery) which grows wild in Europe and is extensively cultivated in Spain. It was first produced in the sixteenth century, about when turpentine was introduced, and for some time was rather more widely employed, perhaps because it was more conveniently available. Its large scale use became obsolete with the commercial production and distribution of American turpentine. Its properties and chemical characteristics are similar to those of turpentine. Because it has a slower rate of evaporation, it has been recommended for use in varnishes in order to improve the leveling or flowing out of brush marks. Most painters have rejected it in favor of turpentine.”⁵¹</p>	<p>A component of Feed (see: “Feed”).</p> <p>There is a sample of this solvent, probably used by Harbour, in the NGC conservation solvent storage facility.</p>
Tempera	<p>“Tempera paint is prepared with the whole egg, the yolk, or the white as a medium. Egg yolk is a natural emulsion containing a homogeneous mixture of lipids and water. Lecithin and albumen act as emulsifying agents. Traditionally, the pure egg yolk sac, with its surface delicately dried by rolling the sac around on the palms of ones hands, was then pricked allowing the yolk to flow. Vinegar or clove oil was sometimes added as a preservative. Other recipes use a whole egg, as an emulsifier, mixed with linseed oil and water [...]. Occasionally a natural resin was also added. Some sulfur containing pigments such as vermillion, and cadmium colors, are incompatible with egg tempera [...]”⁵⁴</p>	<p>Used for example in inpainting (“<i>Serious or unsightly scars are sometimes disguised with water-colour or tempera [...]</i>”⁵⁹). See Inpainting policy of circa 1934 discussed within this article.</p> <p>There are many different methods of producing and applying tempera paints. One method used in the restoration of paintings is a <i>modified</i> oil egg tempera technique developed and used by the Hamilton-Kerr Institute, University of Cambridge, United Kingdom.⁵² It was used occasionally for inpainting purposes in the NGC paintings conservation studio, during the late 20th century.</p>
Wax coatings	<p>“Wax-turpentine coating does not yellow and [...] it has a low refractive index. It should always be applied in the thinnest possible layer: otherwise it will dry too slowly and remain sticky for a long time. The soft beeswax-turpentine paste is applied in a circular motion with the palm of the hand or with a flannel cloth stuffed with cotton wool. The most practical formula is a paste made of one part bleached beeswax and two parts rectified turpentine or mineral spirits. Some types of beeswax are rather soft and have to be hardened with additions of ten to thirty percent bleached carnauba wax, a Brazilian vegetable wax with a higher melting point [...]. Combinations of resin solutions and wax paste are also popular. For these, approximately five percent wax paste is added to ordinary turpentine-resin varnish, which is then slightly warmed. The amount of wax may be increased, but it rarely exceeds ten percent. Varnishes containing wax become turbid when cold and have to be slightly warmed before application. They are applied with a brush and are then immediately stippled with a large badger brush. They give a surface a subtle, silky sheen. After their solvents have evaporated (i.e., after about one day), wax-paste coatings are usually brushed with a soft, clean, brush in order to obtain a sheen. Polishing with a woolen cloth to increase the sheen is rare.”⁵³</p>	<p>Harbour was hesitant about the use of wax in the treatment of paintings, but was willing to consider its application if Eric Brown “[...] <i>compares the general look of their [Museum of Fine Arts, Boston] pictures with our own and likes theirs best [...]. I believe with a little practice it could be made like Charity, to cover a multitude of sins.</i>”³¹</p> <p>Wax coatings can be very successful. However resin-wax-solvent coatings can also age poorly. Such coatings can, in time, manifest a grey-like veil over the surface of the painting. Dust tends to accumulate on the surface more readily.⁴⁸</p> <p>Wax-resin lining adhesives were introduced in the National Conservation Research Laboratory⁵⁴ at the NGC in the 1950s. The warmed beeswax-multi wax-dammargum elemi adhesive mixture permeated all layers of the painting, often successful, however on occasion wax-resin linings could change the saturation levels, often darkening the light colours unduly thus changing the balance of the colours in the image. This type of adhesive for the lining of Gallery paintings was used during the 1960s and largely phased out in the 1970s when the synthetic adhesives such as the polyvinyl acetate and acrylic resins, and the proprietary adhesive Beva 371 came into use.</p>

the made up positions restored, and finished up by restretching on a new stretcher, and a coat of medium strength **Mastic** Varnish.

April 1913.

(3) Glyn Warren Philpot, *The Morning Prayer*:⁵⁷

Oil painting, '*The Morning Prayer*' by Glyn Warren Philpot was painted by the artist on two pieces of canvas joined five inches from the right side. This stitched joint contracted and expanded in dry and damp weather respectively, showing the stitches and a white line under the former condition and a small ridge down the joint under the latter. To remedy this it was decided to rip the pieces apart and reback the painting on a new piece of shrunken linen. This was carried out in the following manner; The back of the larger piece of the painting and the new canvas were both well coated with a warm solution of **fish glue** and **Flour Paste** with a small quantity of **Corrosive Sublimate** and ½ Teaspoonful **Glycerine** added, the latter to give pliability, then the two pieces were well pressed together and later ironed with a warm iron to make perfectly smooth and free from air blisters. The result was unsatisfactory as after being left over night to dry out the painting was found to have shrunk 2½ inches in the length causing the paint to form into hundreds of small puckers. To rectify this the painting was stretched as follows: the top was fastened to a strong horizontal bar [with] a stout **cleat** fastened to the bottom to which was attached to a weight of between 100 and 125 lbs, then the canvas slowly dampened, this resulted in a stretch of 1½ inches in one hour and the full 2½ inches in two and a half hours. The part of the painting under treatment was then stretched on to the key stretcher and left to dry out. When dry it was found to have shrunk again ¾ inch in length and that the puckers noticed after the previous shrinkage had now split along the top and had left numerous cracks over a width of about 12 inches right across the middle of the painting. As a result of the foregoing it was decided that should a similar case be handled it would be advisable to stretch the new canvas and stick the painting to same while stretched and also allow to dry in this position, this would prevent shrinkage and any chance of paint puckering.

It was further considered probable that had more time been taken in stretching painting after the first shrinkage, (either by using less weights or dampening slower) the puckers might have stretched without splitting.

The small strip of painting was fitted and stuck to the larger part with the preparation before mentioned and when all was thoroughly dry the joint filled with a **putty** of **gelatin** and whitening, treated with oil and **shellac** and coloured and toned to the picture. The small cracks left from the puckering were filled and coloured by rubbing thin paint into them, care being taken to remove all wet paint from the surface and when thoroughly hardened the whole painting was given two medium coats of **Mastic**

Varnish.

The foregoing work was carried out in March and April 1917.

The painting *The Morning Prayer* is presently framed behind glass and has not been treated since 1917 other than an intervention ("repairs & fed") noted by F. W. Colley in 1923. The conservation file for the painting⁵⁷ indicates that it was examined in 1960 ("Condition satisfactory"), in 1978 ("Paint cleavage and lining separating") and in 1993 ("small tented areas over surface of painting, varnish yellowed"). The painting was examined briefly by the author, in storage, in mid 2008, confirming the 1993 comments. The canvas is flat, with little evidence of discoloration of the inpainted areas.

(4) J. L. Graham's *Landscape*:⁵⁸

George Harbour used various recipes for the lining of paintings; one such is provided within the 1920 treatment documentation of this painting:

[...] It [the painting] was first removed from the stretcher and the edges on the back, left from sewing the pieces together, were carefully shaved and cut down until it was perfectly smooth, then a piece of **Beaverboard**, having been **cradled** on the back and painted and the front prepared in size, upon which the picture was re-backed with the following mixture as a cement:

1 pint Fish glue; ½ pint Black glue; ¼ oz. Glycerin; ¼ oz. Fussel oil.

This mixture was used for two reasons. First it would set and hold the picture in contact with the **Beaverboard** before any dampness could go through the old linen and affect the paint; second, enough of it would go through the old linen to help recement the paint of the picture back onto the canvas [...].

In addition to treatment reports such as those noted above, Harbour's close collaborators Eric Brown and Mervyn Ruggles also documented Harbour's approach to conservation treatments in a more general way. For example, on the following subjects:

a) **Inpainting**: (This Inpainting Policy dates probably from 1934.) For many years [...] the National Gallery has adhered strictly to the principle common to all first class public art galleries of refusing to permit any repainting of pictures in its possession. The accepted policy was to remove all repaints on pictures as acquired on the theory that a damage is to be preferred to a modern repaint and that to be of any real value and worthy of a place in the National collection as a artistic document, the picture must be wholly the work of the artist. Serious or unsightly scars are sometimes disguised with water-colour or tempera, but in no case is any attempt made to counterfeit the work of the artist, and the damages are always plainly discernible with the unaided eye.⁵⁹

*Inpainting was mainly with tube colours. They were drained of oil first on blotting paper, for several days. The colours were then taken from the blotting paper and used on a palette and diluted with dammar varnish thinned down with turpentine. Water-colour was also used occasionally for laying in the first matching.*⁴⁷

b) Solvents for cleaning paintings: *Harbour had quite a range of solvents for removing coatings. One of the standard solvent mixtures he used was turpentine and methyl alcohol. As these two solvents are not miscible, there was a particular way of manipulating the liquid when cleaning paintings. One method Harbour used, was to start off with four parts turpentine to one part methyl alcohol in a small glass bottle, shake it vigorously, then use small cotton swabs to apply the solvent to the surface of the painting. The proportion of methyl alcohol was increased if necessary. This traditional type of alcohol-turpentine solvent mixture was mentioned in Michael Faraday's 1853 report to the British House of Commons Select Committee on the National Gallery, London.*⁴⁷

c) Lining of paintings: *Harbour made the aqueous lining adhesives, used at this time, based on parchment size; using this adhesive to coat both the pre-stretched cotton lining canvas — linen was seldom used [Author's Note: linen was used by Harbour from 1912 to 1922,⁶ for example it is mentioned in his treatment notes for the paintings *Breaking a Road* and *The Morning Prayer* previously presented] — and the back of the original support of the painting. The lining canvas and the painting were then ironed in position with a hand iron, and usually while the painting was face down on a padded table.*⁴⁷

d) Infilling: *Luting was completed using calcium carbonate mixed with parchment size.*⁴⁷

e) Varnish: *Coatings were of dammar resin. [However, Harbour did use a mastic resin varnish from 1912 to 1922. This changed in the late 1930s when Harbour and Mervyn Ruggles began preparing their own dammar varnish in the following manner:] [...] by dissolving Singapore number one crystals in a cheese cloth bag suspended in turpentine thus straining out debris such as bark fragments. Fuller's earth, a hydrous aluminum silicate of variable composition belonging to the clay group of minerals, was then used to clarify the yellow coloured solution. In this manner they produced a clear solution for varnishing.*⁴⁷

Eric Brown wrote about the finishes on paintings in the early 1920s, suggesting that the subject of varnishing had not received the attention it deserved. He also indicated that paintings should be "bone dry" before a varnish was applied by artists and restorers alike, and advocated a two year span between completing the painting and applying its varnish.⁴⁸



Figure 7. National Gallery of Canada workshop staff, 1935: From left, Herbert Walker, Vic Schnobb?, Supervisor George Harbour in centre, Jack Page and Frederick P. Harbour — brother to George. Photograph © and courtesy of the National Gallery of Canada Library and Archives, Ottawa.

over the years, Herbert Walker, Vic Schnobb, Jack Page and his brother Frederick P. Harbour⁶⁰ among them (shown in a photograph dating from 1935 in **Figure 7**). Harbour's colleague, David H. Baker, a photographer, in addition to his administrative duties as Principle Clerk at the Gallery, photo-documented the before and after treatment of paintings for Harbour. Baker was already using black and white photography with ultra-violet light and infrared film for conservation documentation.⁶¹ Baker left the Gallery to join the Royal Canadian Air Force (RCAF) in 1939, he returned after the war only to resign three years later to rejoin the RCAF.

When Harbour was nearing the mandatory retirement age of sixty-five, Eric Brown and Harbour recommended a museum assistant with a university science degree be appointed. This became a reality in 1938 when C. Mervyn Ruggles was hired to train under Harbour and Baker.⁶¹ Like Baker, Ruggles left the Gallery in 1940 to join the RCAF, but returned to stay in 1945.⁶² Jean Sutherland Boggs writes in 1971:

*In 1938, before his approaching retirement (he was by then sixty-seven); Harbour was given his first apprentice to train. He insisted that this young man, who had his B.Sc. in chemistry, spend six months learning about packing, framing and handling pictures before he touched a work of art. The Gallery's Senior Conservator, Mervyn Ruggles, can now forget his youthful irritation with these tasks in his gratitude for the lesson of patience, caution and an inherent respect for the sanctity of the work of art, as the artist conceived it, which George Harbour transmitted to him.*⁶³

Harbour was a careful worker and Mervyn Ruggles "learnt some very useful methods from him" adding "that each stage of any treatment was completed with great care."⁴⁷

Supervisor of the Conservation Studio and Workshop

Harbour supervised and trained a number of museum assistants

The Final Years

Harbour, having gained an exemption from the federal government



Figure 8. George Harbour with his daughter at left, his granddaughter and great grandson circa 1945. Photograph courtesy of Nancy M. Snowden and Murray Kelley.

on the requirement to retire at age sixty-five, left the Gallery on July 20th, 1944 when he was seventy-three.⁶⁴ The then Director H.O. McCurry hosted a gathering to celebrate Harbour's "outstanding"⁶⁵ contribution to the Gallery. Harbour was given the traditional retirement watch; his wife Christina⁶⁶ was presented with a corsage of flowers.

After leaving the Gallery, Harbour continued to live in Hull⁶⁷ (now part of Gatineau) with his family (**Figure 8**), maintained contact with the National Gallery of Canada in an advisory capacity⁶⁷ and set up a private practice in Ottawa restoring portraits (**Figure 9**). Harbour worked on projects such as three Emily Carr paintings belonging to Hamilton S. Southam. He travelled occasionally, for example to Fort William, Ontario where he treated twenty-two paintings belonging to Senator N. M. Paterson which hung in the Royal Edward Hotel.⁶⁸ Harbour also treated several portraits of judges housed at Osgood Hall in Toronto, Ontario where he had the Art Gallery of Toronto as a client.⁶⁸

One newspaper article of 1946 described Harbour as a tall, dignified gentleman and noted that:

*In his quiet spoken way, Mr. Harbour explains he is one of four men in Canada engaged in portrait restoration. Mr. Harbour admits there maybe more than four in the field, but if there are he doesn't know about them [...]. One is in Montreal, one in Toronto, and one with the national gallery in Ottawa. The latter specialist trained under Mr. Harbour. Despite his 63 years as a portrait restorer, Mr. Harbour doesn't think he should be classed as an oracle. Quite the opposite, "You never learn the profession completely through," he says. "What I don't know would outweigh what I have learnt."*⁶⁸

Another newspaper article of 1948 records that Harbour had become increasingly concerned about the materials modern artists

were using: "[...]nowadays artists are putting their pictures on anything, even plywood [...]how a restorer is going to work with that I've no idea."⁶⁹

George Joseph Harbour died in Hull Quebec, in his ninety-fourth year, on October 16, 1964.⁷⁰ His great-granddaughter remembers her "Gramp" well, noting that he was quite formal in addressing others.⁷¹

Conclusion

Harbour's rigorous apprenticeship training in England established a lifelong work ethic that stood him in good stead, first with Ottawa's leading art dealer, James Wilson and later when employed by the National Gallery of Canada. George Harbour and Eric Brown, coincidentally being of an age, with similar backgrounds, developed a mutual respect for one another; a respect which promoted the well-being of the Gallery collections more ably than might have been the case otherwise. Harbour, as a highly principled supervisor of both the conservation studio and the workshop, would have imparted in those he supervised and trained, a strong appreciation and consideration for the works of art in the collection. In addition, Harbour's early introduction of written treatment reports and sealed metal boxes for the protection of the National Gallery of Canada's wood panel paintings "bears witness to the value of Harbour's services to the Gallery".⁷² As Jean Sutherland Boggs has noted, "As Director,

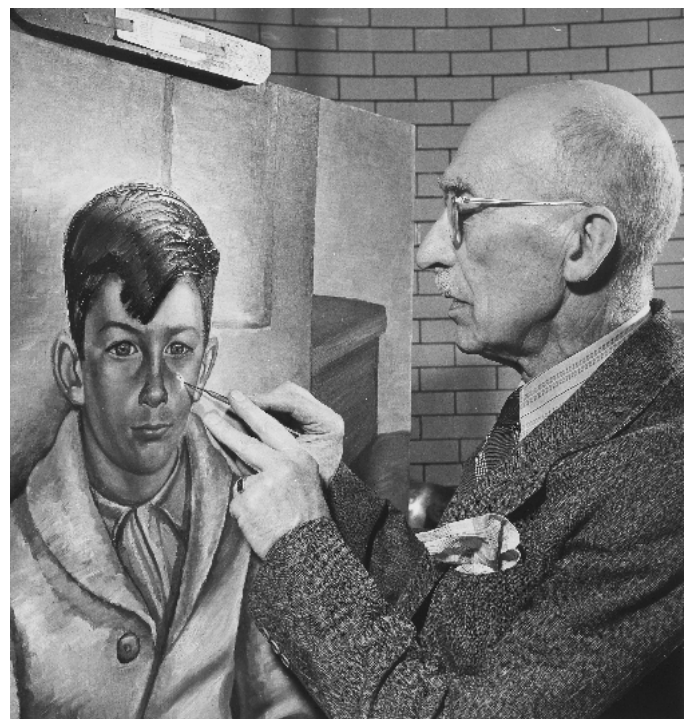


Figure 9. George Harbour, first resident museum conservator in Canada, treating the painting *Rosaire*, 1935, by Prudence Heward (in the collection of the Montreal Museum of Fine Arts, Montreal, Quebec, ID # 1944.895). Photograph taken at the National Gallery of Canada, Ottawa, in the conservation studio, by Capital Press Service, Ottawa in May 1949. Photograph © and courtesy of the National Gallery of Canada Library and Archives, Ottawa.

Brown had a powerful ally in a remarkable man, George Harbour.”⁶³

Harbour’s strengths lay in his ability to understand and adapt to the outcomes of his materials interactions and treatment methods, his penchant to inform others through his treatment reports, the mentoring of his assistants, his foresight in predicting the need for reversibility of the materials/techniques used to treat works of art, and finally his recommendation that a university science degree be a major component of a restorer’s repertoire. Harbour’s accomplishments nourished the roots of conservation at the National Gallery of Canada which have matured over the years and which continue to bear fruit so ably today. The restoration and conservation laboratory is internationally renowned for the forward thinking, multi-faceted approach and the contributions it has made, not only to the care of the gallery’s collections, but to the entire discipline of the conservation and restoration of historic and artistic works.

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