CCI Newsletter

Canadian Conservation Institute
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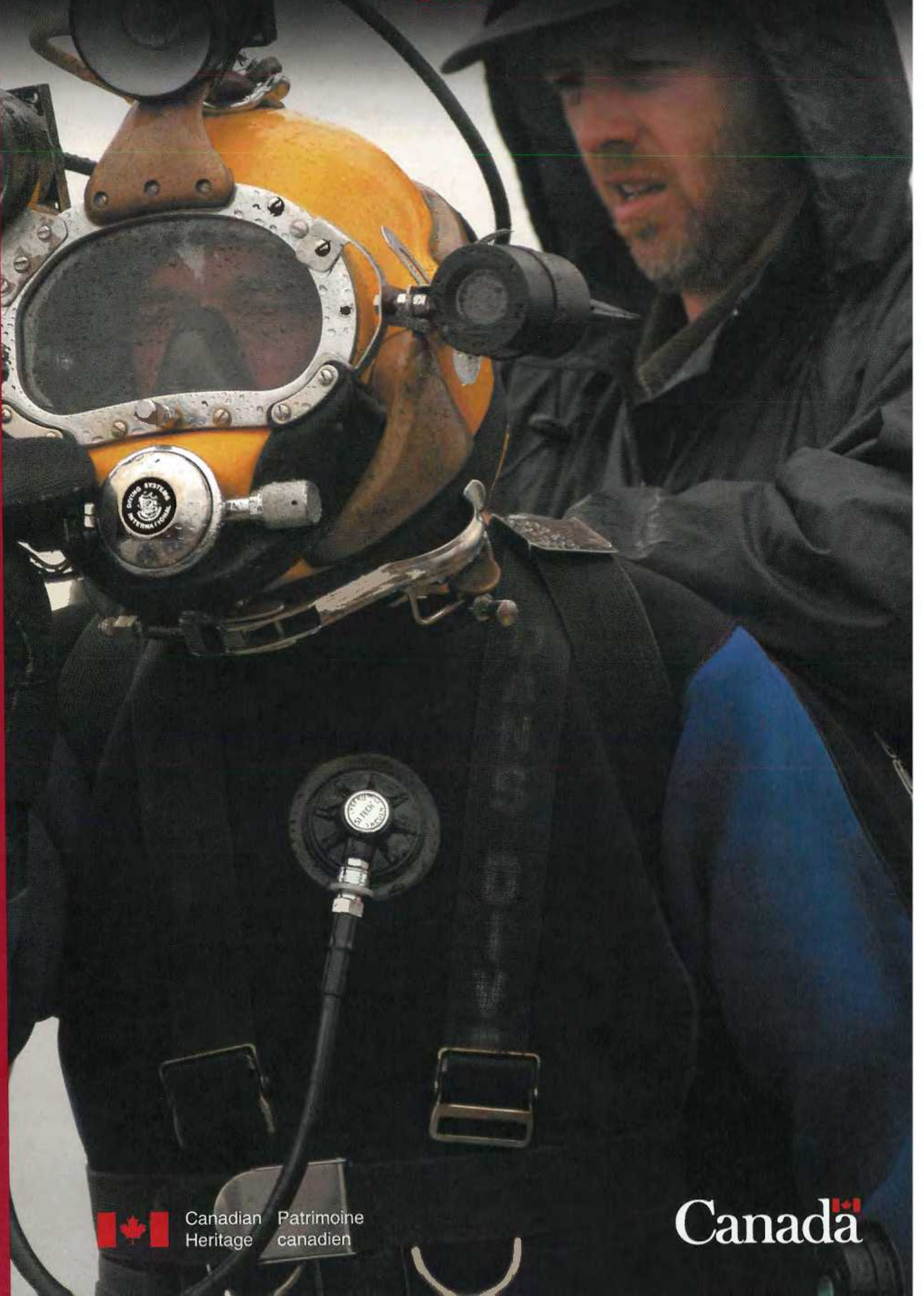

No. 33
May 2004
ISSN 1180-3223

Canadian Heritage Patrimoine canadien
Canada

Preserving my Heritage

The Canadian Conservation Institute has launched a new Web site — "Preserving my Heritage" — aimed at helping you care for and preserve your family treasures, heirlooms, and works of art. The site also provides an introduction to the fascinating world of heritage conservation and the work carried out by the Canadian Conservation Institute.

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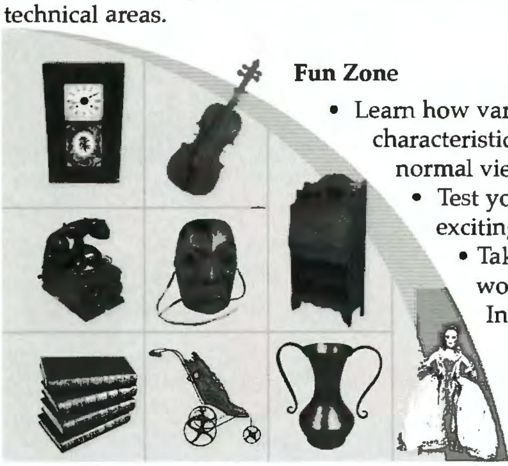

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Cover: Diver Mike Fletcher prepares for a deep-water dive in Lake Ontario to examine wreckage of a Hercules booster rocket. Photo courtesy of openroadproductions.com.

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The *CCI Newsletter* is published two times per year by the Canadian Conservation Institute. It is available free upon request. To change your subscription address, please send your former and current addresses to:

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Canadian Conservation Institute
1030 Innes Road
Ottawa ON K1A 0M5 Canada
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WWW site: http://www.cci-icc.gc.ca

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In Search of the Avro Arrow

by Nancy E. Binnie, Conservation Scientist (Chemist), Conservation Processes and Materials Research

CCI prepared conservation plans in 2001 and 2002 to help two advocacy groups [Arrow Recovery Canada and the Aerospace Heritage Foundation of Canada (AHFC)] that were planning to search for and recover a number of aircraft models of the Avro Arrow CF-105. These models were launched on top of booster rockets from the RCAF CARDE Range (Point Petre, Ontario) between 1954 and 1957. Nine of these 217 kg/2.8 m long, 1/8 scale models are resting on the bottom of Lake Ontario, near Picton, Ontario. They are the only material remains of the A.V. Roe aircraft company's CF-105 Cold War project that was suddenly shut down in 1959 by Prime Minister John Diefenbaker.

A conservation plan was prepared to deal with the operational requirements for an in situ condition assessment before recovery, and to deal with the activities required during the recovery operations in order to meet the Ontario Ministry of Culture's archaeological permit requirements. The plan also included an investigation into potential deterioration rates of the construction materials used for the models (aluminum and magnesium alloys, steel, wood, rivets, welds, etc.) and recommendations for post-excavation procedures for storage, cleaning and condition assessment.

In September 2003, Major General Lionel Bourgeois of the RCAF Memorial Museum (Trenton, Ontario) contacted CCI and extended an invitation to me to be present on behalf of the museum for several days of underwater filming with Mike Fletcher's Eco-Nova Productions.[1] This Halifax company would be filming an episode for *Sea Hunters* about the search for the Avro Arrow and would include film footage from deep-water dives on potential Arrow targets identified during side-scan sonar surveys, as well as the land-based activities of researchers who have been carrying out this search.

Photo courtesy of openroadproductions.com.

Dave Gartshore, Nancy Binnie, James Delgado, and Mike Fletcher (left to right) discuss the condition of wreckage found during a deep-water dive on the booster rocket site.

The RCAF Memorial Museum has formed a working partnership with several Ontario researchers who have been searching for years for the Arrow models. The Museum hopes to help recover an Arrow model, Nike booster rocket and Velvet Glove missile. A new exhibition hall will house a Halifax bomber that was recovered in 1995 after 50 years on the bottom of Lake Mjøsa, Norway, and other acquisitions such as an Arrow model. The invitation to participate in Eco-Nova's deep-water filming was an unequaled opportunity to view the condition of the wreckage, and would provide useful information for future survey and recovery plans for the RCAF Memorial Museum.

Eco-Nova Productions provided the funding for four days of operations in October 2003 on the commercial diving tug, *Nadro Clipper*, extra safety divers, dive tenders, hyperbaric chamber operator and film crew. Eco-Nova Productions also coordinated with Jim Garrington of Shark Marine Technologies (St. Catherines, Ontario) to provide a surface-powered remote operating vehicle (ROV) for underwater inspection and filming. Dave Gartshore provided target locations. James Delgado, the on-site supervisory archaeologist and Director of the Maritime Museum of Vancouver (who is a regular on the *Sea Hunters* episodes), Dave Gartshore and myself provided top-side commentary to interpret the live video images from diver Mike Fletcher for the team filming surface activities. Because the targets were deep-water sites, and filming production is considered a commercial activity by the Ontario Ministry of Labour, all diving was carried out using surface supply breathing air of mixed gases following industry standards for such work.

Surface observers had the best vantage point for inspecting the pictures sent back by three live-feed video images from the ROV unit, helmet-cam and hand-held video unit. Mike Fletcher was extremely generous in taking the time to film details of the wreckage that were interesting to observers even though bottom-time

Photo courtesy of openroadproductions.com.

Aboard the Canadian tug Nadro Clipper, *the crew waits out the two-hour ride to the target site.*

was extremely limited, and even though the primary purpose of the visit was to capture images for use in the documentary. The first site inspected was an undisturbed two-masted schooner sitting upright in 60 m (200 ft.) of water, and the second turned out to be a booster rocket (rather than an Avro Arrow model) resting at a depth of about 30 m (100 ft.). Both targets lie within an area that Parks Canada is considering as a new National Marine Sanctuary.

An extensive set of field notes has been prepared describing the schooner and booster rocket, which includes contributions from James Delgado and Paul Adamthwaite, a maritime historian and Executive Director of the Archives and Collections Society of Picton. Eco-Nova has offered to provide still images taken from the video footage to illustrate the reports. The images and notes about the schooner will be particularly interesting to archaeologists and maritime historians because this wreck is mostly intact, and appears not to have been disturbed by recreational scuba divers. Planking, masts, bowsprit, ships wheel, bilge pump, windlass anchors and other small portable artifacts are in their original locations. The cargo holds are full of coal. James Delgado has used evidence from the position of the rigging elements, localized damage to specific masts, rudder position and unusual anchor rigging to suggest how the schooner might have foundered. A review of video images dates the schooner between 1840 and 1865. However, it is possible that it was an earlier vessel with later changes and additions, or a later vessel with recycled, older parts.

Unfortunately, the second target turned out to be a booster rocket (possibly a Hercules type) rather than an Avro Arrow model. It has four exhaust nozzles (instead of two), four fuel cylinders and four fins arranged in an "X" array. Because of silting, only the top half of the rocket, lying horizontally on the lake bottom with two fins exposed, could be examined. Exhaust nozzles appear to be of ferrous composition; however, the fuel cylinders are still covered in red paint and show no sign of corrosion. The serial number stamped on the side of one cylinder may help determine the booster's age. The fins have a composite structure that includes an internal wood core and external aluminum-alloy sheathing. Fin tips are broken and twisted back towards the nozzles. The basic structure appears sound, possibly due to the low corrosion rates for ferrous metals and aluminum alloys in fresh water. However, the composite materials will provide conservators with a challenging project as they attempt to dry the booster and stabilize it over the long term.

Military authorities with RCAF Trenton have requested postponement of any recovery pending resolution of technical issues such as potentially explosive fuel residues. The RCAF Memorial Museum would like to obtain Avro Arrow models, booster rockets, and missiles from nearby freshwater sites for exhibition, and is collaborating with Robert Saunders, Project Coordinator AHFC, which has obtained ownership of the nine Arrow models in Lake Ontario from Crown Assets Disposal Corporation. AHFC is planning additional search efforts and possible recovery in 2004. CCI will continue to help plan the recovery and land-based conservation stabilization of the recovered materials from these historically significant aircraft models.

1. Eco-Nova Productions produces *Sea Hunters* and *Oceans of Mystery* for National Geographic Television International. Both shows are shown in nearly 200 countries around the world.

Photo courtesy of Eco-Nova Productions.

Diver films underwater wreckage.

Treatment of a 16th-Century Spanish Panel Painting

by Wendy Baker, Conservator, Treatment and Development Division - Fine Arts

Descente de croix was sent to CCI for treatment pending an exhibition of paintings from Nouvelle France scheduled to open in the spring of 2004 at the Canadian Museum of Civilization, Gatineau, Quebec. The painting, which belongs to the Musée des Augustines du Monastère de l'Hôtel-Dieu in Quebec City, was acquired by them in 1940, donated by Mme. Rousseau, the widow of Dr. Arthur Rousseau. He was, most notably, the founder of the Laval and Saint-Sacrement hospitals in Quebec. How and when the panel arrived in Canada, and how it came to be in the possession of the Rousseau family, are not known.

Origins

The artist is anonymous, but the painting is considered to be of 16th-century Spanish origin. *Descente de croix* bears some resemblance, in its composition, to a sacred work by Pedro Machuca, *The Deposition* (1520–1525, Madrid, Prado), although stylistically the two are quite different. Some suggestion of portraiture in one of the figures of *Descente de croix* could date the painting to the latter half of the 16th century when realism in Spanish devotional painting became the trend. It is possible that this panel was commissioned by a wealthy merchant or city official whose portrait is painted into the composition. The panel painting likely adorned a chapel or altar in the donor's church and may have formed part of a larger, sacred composition.

Biblical Iconography

The biblical figures standard in "Deposition" scenes are found in *Descente de croix*. Joseph of Arimathea, a wealthy member of the Jewish Sanhedrim, appears in a red robe to the left of the composition. He holds the *sangraal;* the "Royal Blood" or Holy Grail. It was Joseph of Arimathea who demanded the body of Christ and who offered up his own tomb for the burial. He is almost always depicted close to the body of Christ, along with Nicodemus. These two biblical figures are associated with the embalming and entombment of Jesus. Nicodemus (centre right), clothed in a green robe, holds the feet of Christ. The figure in the lower left of the composition with an arm around the Virgin's waist is Saint John the Evangelist. The woman kneeling at the extreme left, with loosened hair, is Mary Magdalen. The two women directly behind the Virgin are Mary, the mother of James the Less and Joseph, and Salome, mother of the sons of Zebedee; possibly the sister of the Virgin. This latter Mary, Salome and the Mary Magdalen are described in the Gospels as present at the Crucifixion. They are also the three women who discover the empty tomb on Easter Sunday — hence their iconographic importance in paintings of the Deposition. Saint Longinus is also standard in Deposition scenes. He is the Roman soldier who pierces Christ's side with the "Spear of Destiny." Longinus is always shown wearing armour. In *Descente de croix,* he is placed in the extreme right of the composition, behind the donor, and holds the "Spear of Destiny." The one crucified thief painted into the composition is likely the Good Thief — the one who asks for forgiveness and ascends into Heaven. The donor appears in the lower right and is dressed in a remarkable patterned costume, likely his best regalia. He points, as is customary, towards the Virgin Mary.

Descente de croix *after treatment.*

Panel Construction and Painting Materials

This panel is constructed in a fashion typical of Spanish panel paintings of the period. It is composed of five poplar planks assembled before the wood was completely seasoned. The original method of connecting the planks was by nailing from the front of the planks to the cross battens placed on the back. The nail heads were sunk into the panel front and the nail ends were clenched over the battens on the back. The original battens have long since been removed and the planks reduced in thickness during a previous restoration. The planks, once joined, were allowed to fully dry and shrink slightly. The ensuing and expected gaps between planks were then filled, by the panel-maker, with a putty and a mat of stiff grass fibres glued to the panel's front surface. Multiple layers of gesso (a mixture of calcium carbonate, gypsum and glue) were then applied over the grass fibres, sanded smooth and a composition sketched out. Before executing the composition in colour, the artist brushed a thin coating of burnt umber in oil over the gessoed surface and proceeded to paint out the composition in oil and tempera using natural ultramarine, azurite and smalt for the blues; cinnabar or dry-process vermilion and an organic pink/red for the reds; and malachite and terre verte for the greens. Lead white, lead-tin yellow, orpiment and various iron-oxide pigments were also identified in the painting.[1]

Condition

The panel has undergone at least one previous major intervention, and several minor restorations. As a result of this previous intervention, a convex warp at the back of the planks was removed by planing down the plank back until a flat surface was achieved. The overall plank thickness was reduced to 1.2 cm. The now flattened back of the panel was reinforced by a carpenter-restorer with a wood framework made of old stretcher members glued into place around the perimeter as well as across the planks. From the back, gaps at the joins between planks were roughly filled with a gilder's putty that, in most cases, did not penetrate through to the front of the panel. Heavy cracks and losses at the joins were filled from the front of the panel with a variety of putties. Filling of the losses along the joins at the front of the panel appears to have been an ongoing process. The nature of fill materials varied with each subsequent restoration. The wood, both of the panel and batten framework, was weakened by wood-boring insects and, although not completely honeycombed, the wood is fragile. A number of cracks have developed in the planks. These penetrate through to the paint layer and likely occurred after the planks were thinned. Large islands of delaminated gesso and paint can be found over much of the surface of the panel. Fortunately, losses to paint and ground, apart from those at the joins, are mostly located along the edges of the panel. Failure of adhesion between paint and ground are very localized. Most problematic, from an aesthetic point of view, are the numerous heavy fills that bridge the unevennesses in the joins between the planks. These fills stand proud of the surface and are cracked. The overlying retouches are often visibly different in colour to the original paint. Occasional overpaints were applied to the surface and conceal damages to the background. A heavy brushed layer of varnish, that is identified as either a mixture or a layering of shellac and colophony,[1] was also present on the surface.

Descente de croix *during treatment; varnish and overpaints removed, fills completed.*

Treatment

The assessment and treatment of *Descente de croix* at CCI has passed from hand-to-hand within the Treatment and Development Division. The hands involved include those of Debra Daly Hartin, Agatha Souchon and Wendy Baker (Fine Arts), and Alastair Fox (Furniture).

The first step in treating this panel was to remove the heavy layer of highly insoluble varnish and overpaint. After testing, a method was developed that swelled the varnish layer and allowed it to be removed almost completely mechanically. A selected surface area was swabbed with benzyl alcohol and then covered with Gortex for between 20 and 30 minutes. The varnish, along with the overpaints, swelled and could then be removed with dry swabbing. This approach left the surface completely intact, even over the sensitive red paint layers. Step two involved tapping the panel face lightly to "sound out" areas of delamination and consolidating these regions using a 6% solution of isinglass in water and ethanol. Step three consisted of removing overfills at the joins.

Structural stabilization of the joins and the worst of the cracks was the next phase of treatment. Cracked restoration putty on the back of the painting was removed from those joins where there was no support for the paint and gesso at the front. Once the old putty was removed, a thinned-out mixture of West System 410 Microlight Fairing Filler suspended in a 5% solution of Acryloid B72 in n-propanol and butanol was injected against the back of the paint and gesso layers through the gap at the back of the panel. This provided a thin, elastic support for the overlying gesso and paint layers. A hide glue-coated basswood insert was then pushed into the gap until contact was made with the wet Microlight Fairing Filler. The wood insert was shaved level once the glue dried. Cracks in the planks that did not meet level at the front of the painting were cleaned out using a fine-blade saw knife, then filled with basswood slivers, glued with hide glue and weights were placed above the repaired join until the glue dried. All losses to paint and gesso have been compensated with a calcium carbonate and rabbit skin glue mixture.

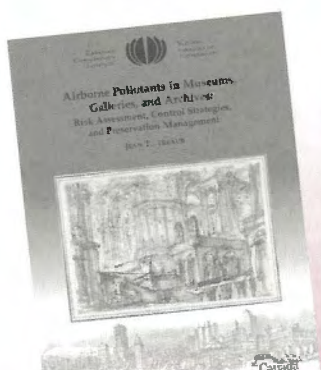
The next steps were infilling, inpainting, varnishing and then securing the panel in a framed humidity-controlled box. The fills were toned with watercolours, followed by powder pigments suspended in PVA inpainting medium. A varnish layer of MS2A was applied. This has the appearance and wetting characteristics of the natural resin dammar, but does not have the latter's brittleness.

Reintegration of smalt-painted regions was carried out in order to complete the restoration. Smalt, an historic pigment made of ground glass coloured with cobalt blue, has faded, losing its blue colour (see the robe of the figure with upraised arms below Christ and to the right of Joseph of Arimathea). The brown colour that now remains is basically discoloured medium. Affected areas were infused with a 30% solution of Regalrez 1094 in naphtha[2] in an effort to saturate out the blanching or slightly white and foggy appearance of the old smalt layer. This helped to saturate out the discoloured medium, but still left it slightly blanched and brown. The blanched and brown regions were glazed with cobalt blue suspended in PVA inpainting medium in order to reintegrate them into the composition.

To ensure the long-term stability of this work of art, the 19th-century frame that arrived with the painting from the Musée des Augustines has been modified with a sealed back, a glazing layer and provision made for maintaining a stable interior humidity.

1. *Analysis of Samples from* Descente de croix, Analytical Research Laboratory Report, No. 3988 (June 6, 2001); *Analysis of Supplementary Samples from* Descente de croix, Analytical Research Laboratory Report, No. 3988.2 (October 9, 2001) and No. 3988.3 (December 18, 2002).

2. Suggested by Stephen Gritt, Chief of Restoration and Conservation, National Gallery of Canada, personal communication.



Airborne Pollutants in Museums, Galleries, and Archives: Risk Assessment, Control Strategies, and Preservation Management

by Jean Tétreault

This book attempts to define the key airborne pollutants for indoor museum environments and provide some basic tools to assess the risk to collections exposed to these pollutants. It also establishes guidelines for control strategies that give flexible, pragmatic solutions and provides a simple tool for cost–benefit analyses that can fulfil the principles and policy of individual museums. It will be an ideal reference for anyone (e.g. museum directors, building and collection managers, conservation professionals, material scientists, exhibit designers, HVAC engineers, indoor air consultants, and architects) involved in making decisions regarding the preservation of collections.

ISBN 0-662-34059-0 – 21.5 x 28 cm (8.5 x 11")
paperback, 168 pp. – 2003
In Canada: CAN$50 – Other countries: US$50

Conserving Art and Resources — Humidity Control in Enclosures and A New High Capacity RH Control Module Design

by Paul Marcon, Conservation Scientist (Engineer), Preventive Conservation Services

The maintenance of correct relative humidity (RH) conditions is an important aspect of preventive conservation. Museums have two options for providing controlled humidity environments for their collections: building-scale controls and smaller-scale control methods for individual rooms, storage cabinets, display cases, glazed paintings (silica gel backings) and works on paper (encapsulation). While some enclosures such as display cases may not always be compatible with exhibit design criteria, substantial advantages are possible wherever enclosures can be used. The most notable advantage is the ease and cost-effectiveness of maintaining high-quality environments inside an enclosure while avoiding building envelope problems such as the strain that winter humidification imposes on structures (especially historic ones) in a cold climate. It is also easier to provide substantially different humidity conditions to groups of enclosures than might otherwise be possible on a building scale by controlling separate building areas. And finally, objects inside enclosures will be less susceptible to sudden and possibly large RH swings than those on open display if a building system malfunction occurs.

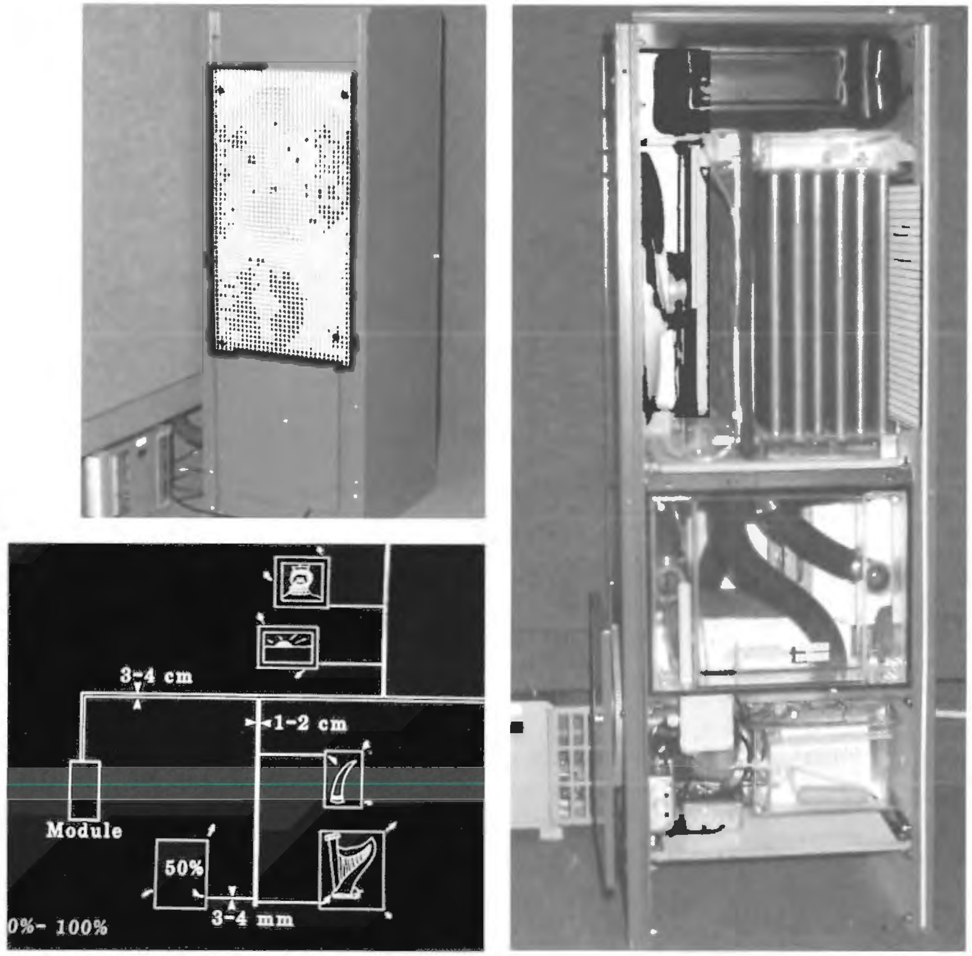


Figure 1. Original CCI RH Control Module. An inexpensive machine that could be fabricated in a typical museum shop, but with considerable labour. Low-output capacity serves a combined case volume of 200 m^3 (very well sealed cases). Quiet operation enables unit placement inside an exhibit hall (also needed to ensure uniform temperature of the machine and cases).

One way of achieving humidity control inside a well-sealed enclosure is by incorporating a buffering material such as silica gel. In display cases, silica gel is usually hidden from sight inside the bottom of the case. This RH control method is highly effective and remains an excellent alternative when the number of cases is small. In practice, there are two limits to this approach: 1) the cost and maintenance needs of silica gel for large numbers of leaky cases; and 2) situations where silica gel containment features, such as false display case bases, are not compatible with exhibition design objectives. For situations where buffers are impractical, there has long been an interest (cited as early as 1929) in an appropriate machine for supplying a stream of humidity-controlled air to large numbers of cases. CCI developed a specialized machine (the RH Control Module shown in Figure 1) for this purpose in 1982 (Michalski 1982).

RH Control Module Approach

The RH Control Module provides a stream of humidity-controlled air to enclosures, but its most notable and innovative feature is a unique and somewhat unconventional air distribution system that consists of a network of small-diameter plastic pipes. The main air supply line from the machine is typically 50 mm in diameter. Supply lines to individual cases are 12 mm or less in diameter. The air distribution system is, therefore, relatively inexpensive and is easy to install and conceal. Small-diameter piping is used because humidity control of a well-sealed enclosure is possible with an RH-controlled air supply that is delivered at several times its natural leakage rate. The supplied air then leaks out into the ambient environment — there is no return airflow. This slightly pressurized scenario has a side benefit of excluding dusty room air and expelling internally generated pollutants from display cases or other types of enclosure. In the unlikely event of an equipment malfunction, the supply rate to individual enclosures is so low that RH conditions inside well-sealed cases that contain conditioned organic materials will be very slow to change even if the output RH of the Module changes. In the event of a humidifier or dehumidifier malfunction, a large silica gel buffer inside the Module will limit the rate of RH change in the output air stream. The combined effect of this feature and the low air supply rates is that RH conditions inside cases that contain conditioned materials may take days or weeks to change appreciably. Therefore, ample time is available to detect malfunctions and carry out any necessary repairs.

One point to bear in mind when considering the use of mechanical control methods is that an effective installation requires that all of the enclosures be at approximately the same temperature. Fortunately, uniform temperature control is easy to obtain in most buildings at reasonable cost using conventional equipment. Local temperature problems originating from case lighting or building features (air supply grilles, windows, exterior walls) are generally possible to anticipate and avoid.

In 1982, CCI produced a set of plans to enable a reasonably skilled craftsperson to manufacture this RH Control Module in a typical museum shop. The equipment and material cost was low but the fabrication process was labour intensive. Although these plans are no longer available as part of CCI's publications, a refined version of the original RH Control Module can be obtained as a manufactured product from Kennedy Trimnell (see additional information below). Another manufacturer, MicroClimate Technology (see additional information below), also fabricates a range of machines that employ a different operating principle to produce a controlled RH output air stream. Their machines can supply one case (using a closed circulation loop with 50-mm-diameter pipes) or many cases (using an air distribution principle based on small-bore tubing that is similar to that described above for the RH Control Module).

CCI has recently designed a new version of the RH Control Module. The new machine maintains the favourable features (silica gel buffer and compact air distribution method) of the original, but is easier to fabricate and provides a much higher output airflow. The higher airflow enables better control for large numbers of leaky enclosures that may not perform well with passive agents like silica gel and are costly or impractical to improve. Details of this new design are available in an assembly manual that is sufficiently detailed to allow interested manufacturers or individuals to duplicate the machine. The assembly manual package also includes software for the machine's electronic controller and a data terminal program (see "Machine Diagnostics and Remote Notification" below).

Interconnected Component Designs

A key improvement in the new machine design is a fabrication method that consists of interconnecting commercially available components. This greatly simplifies the construction of the machine. Familiar commercial components, such as humidifiers and dehumidifiers, offer a number of benefits themselves, such as their inherent reliability, built-in safety features and the extensive support

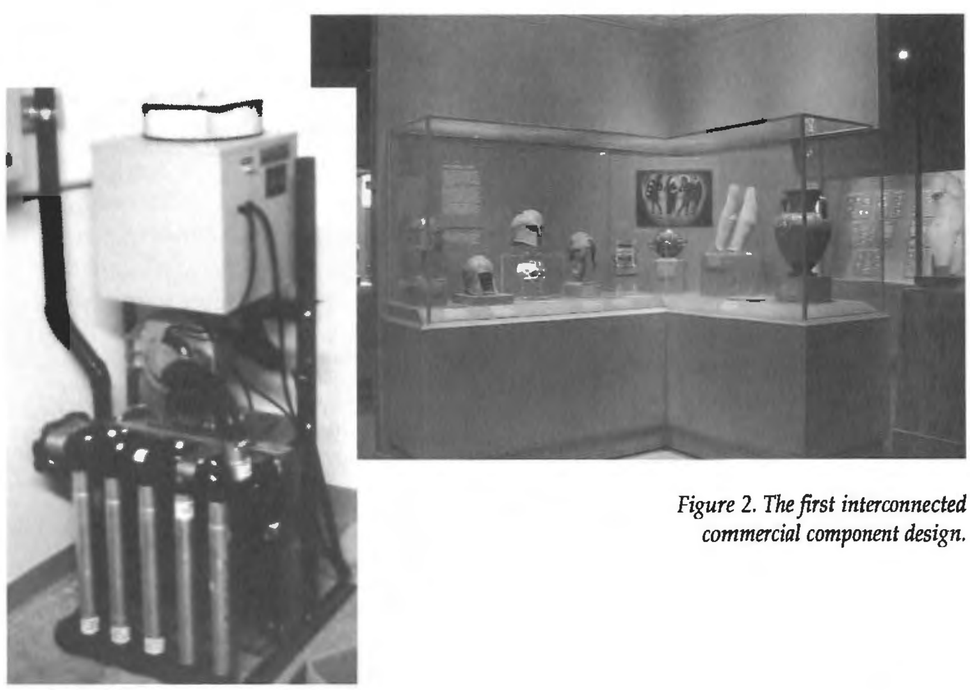


Photo courtesy of the Royal Ontario Museum.

Figure 2. The first interconnected commercial component design.

Figure 3. RH Control Module installation No. 1 at the Canada Science and Technology Museum archives. Housed in its own dedicated room and supplies storage cabinets, a rare book room, and a display case in the lobby.

infrastructures that exist for their maintenance. The fact that the machine components are also familiar to building maintenance staff underlines an important practical aspect of the new design — it can be purchased, operated and maintained as part of the building system. Whether part of the building system or managed by a conservation department, conservators can always know the status of the machine due to its simple, but comprehensive, diagnostic features and its extensive remote notification capabilities.

The first RH Control Module to be constructed using an interconnected component approach was developed for the Royal Ontario Museum in 1986 to supply a low-humidity air stream to an entire exhibit hall of display cases containing ancient bronze artifacts (Figure 2). This prototype machine was based on a commercial desiccant dryer and a few other components. It operated for five years with virtually no maintenance. Since the development of that unit, CCI has had an ongoing interest in using this interconnected component design strategy to fabricate a mid-RH (e.g. in the range of 50% RH) Control Module. A client request from the Provincial Museum of Newfoundland and Labrador actually initiated the development of such a machine. A subsequent client request from the Canada Science and Technology Museum (CSTM) enabled further research and development that ultimately led to a final design and two working installations (Figures 3 and 4). Under this arrangement, the contributions of Myles Bailey of the CSTM's Conservation Division were instrumental in refining the design of the original prototype and for fabricating the two machines that are now used at the CSTM. Both installations have been trouble-free. The first machine has now been in operation for over two years.

The general configuration of the new RH Control Module is illustrated in Figure 5. Fabrication requirements for tinwork, electrical wiring and plumbing can be contracted to the relevant trades. Only the buffer column requires some specialized assembly at this time. A printed circuit board pattern is available for the controller and the board and controller can be manufactured by an Ottawa firm (see PhotoCAD below). Other commercial controllers can also be used. The main humidity sensor that operates the Module is a chilled mirror hygrometer that, until recently, was only available as a laboratory instrument. Advantages of this technology include high accuracy, the absence of RH drift and no need for calibration. Periodic cleaning of the mirror (a five-minute operation) is all that is required. The remaining commercial components used in the machine operate under light loads and in much cleaner environments than typical industrial applications; therefore, long component life and reliability can be expected. Adequate space is available in the machine frame to accommodate humidifiers and dehumidifiers from a variety of different manufacturers.

Machine Diagnostics and Remote Notification

The RH Control Module is a stand-alone machine. All of its operations are controlled by a microprocessor-based controller. This controller oversees the basic operation of the machine and also displays status and diagnostic information. If power is interrupted, the controller will re-start automatically. The controller also contains relay contact terminals that enable the Module to be monitored by existing building management systems or by inexpensive peripheral devices such as telephone auto-dialers.

Software has been developed to enable any 486, or higher, computer running Windows 9x, or better, to display diagnostics, log data and send out daily e-mail reports. Diagnostic and logging functions are included in a compact, user-friendly data terminal software program. E-mail reporting requires that the client purchase a third-party e-mail program (currently Alchemy Labs AutoMail, about US$50). An ethernet connection accessory, such as the Nport Express DE-311, can eliminate the need for a computer at the RH Control Module site. Instead, one or more Module data terminals can be viewed from a single computer attached to the network. An RS-232 port on the back of the controller enables simple, direct connection of the Module to this ethernet accessory or to a computer.

Additional Information

Further information on the RH Control Module described in this article will soon be available on a CD that can be obtained from CCI (watch the CCI Web site for news of its release). The author also welcomes inquiries for further information on the new Module design or on general aspects of environmental control for enclosures. In addition, CCI offers consultation to individuals or firms who may be interested in duplicating the machine design. Readers seeking information on fabrication details should contact Myles Bailey at the CSTM (613-991-3061).

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Lafontaine, R. *Silica Gel*. Technical Bulletin, No. 10. Ottawa, ON: Canadian Conservation Institute, October 1984.

Figure 4. RH Control Module installation No. 2 at the Canada Science and Technology Museum. Serves the main exhibit area of the museum and is housed in what was formerly a small kitchen area. Provides controlled environments to artifacts in a display case at a fraction of the cost of proposed building-level systems due to a much lower airflow requirement (for cases). Eliminates the need to modify or upgrade the building envelope.

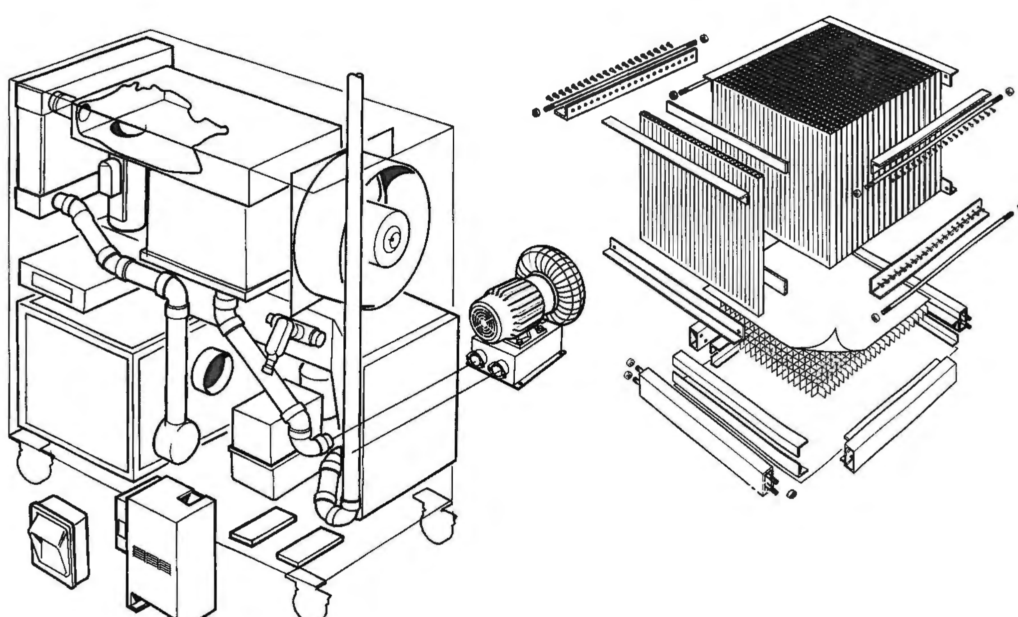


Figure 5. Detailed drawing of the new RH Control Module illustrating the various components of the machine and details of the silica gel buffer. The enclosed upper portion contains low-maintenance items and channels airflow through the buffer and heat exchanger. Higher maintenance components and components that contain water are located in the bottom portion of the machine. The main air filter is a premium-quality, pleated unit of common size that is available from most hardware stores for furnace applications.

Michalski, S. "A Control Module for Relative Humidity in Display Cases." pp. 28–31 in *Science and Technology in the Service of Conservation.* London: International Institute for Conservation of Historic and Artistic Works, 1982.

Michalski, S. "Leakage Prediction for Buildings, Cases, Bags and Bottles." *Studies in Conservation* 39 (1994), pp. 169–186.

Additional information

AutoMail, see Alchemy Lab Network management
http://www.alchemy-lab.com

HVW Technologies (Canadian distributor of Basic Stamp microcontrollers, other controllers and related products)
http://www.hvwtech.com/pages/default.asp

Keepsafe Systems (supplies Microclimate Technology products)
http://www.keepsafe.ca/

Kennedy Trimnell (manufactures a refined version of the original RH Control Module)
http://www.for-inventors.com/index.html

Microclimate Technology (manufactures enclosure control machinery)
http://www.microclimate.ca/index.html

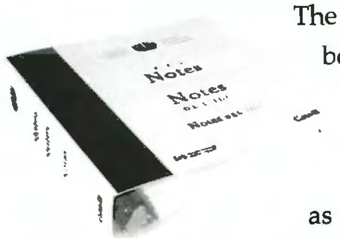
Nport Express Serial Device Server
see http://www.moxa.com/product/Serial_Device_Servers/index.htm

PhotoCAD (provides a wide variety of services for the electronics industry, from initial circuit engineering to final board assembly)
http://www.photocad.com

Specifications

- Capacity: 400 m^3 to 2000 m^3 (7200 ft^2 to 14,400 ft^2) (supply at 2x leakage rate, case leakage 1 acd to 5 acd)
- Output RH: 10% RH to 90% RH
- RH tolerance variable (by software): +/- 1% possible, wider tolerance will reduce cycling
- Working temperature: 18–35°C (65–95°F)
- RH Control Module cost: CAN$15,000–$25,000
- Air distribution system cost: variable, depends on installation
- Noise: approximately 68 dBA
- Weight: 200 kg (440 lbs.)
- Dimensions: H 1473 mm; W 1299 mm; D 695 mm
- Electrical: 3 pole grounding outlet, rated 25 amps or more
- Water: ordinary water supply, 207–552 kPa (30–80 psig)
- Drain: water drain for condensate drain pump outlet (can be some distance from machine)

Notas del ICC



The *CCI Notes* have always been a mainstay of CCI publications, and we are pleased to offer them in Spanish as well as English and French. The translation was done by the Centro Nacional de Conservación y Restauración (CNCR) in Santiago, Chile, under the auspices of a Memorandum of Understanding with CCI and with funding from the Fundación Andes. Clients in Central and South America and the Caribbean can obtain *Notas del ICC* directly from CNCR. All other clients can order the complete set from CCI.

21.5 x 28 cm (8.5 x 11")
3-hole punched and inserted into binder – 1999
In Canada: CAN$85 – Other countries: US$85

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cci-icc_publications@pch.gc.ca

CCI's Building Undergoes Its Own "Treatment and Development"

by Michael Harrington, Manager, Treatment and Development

As I write this, the CCI building has been under siege for over two years. Consultants have peered, probed and tested. Construction crews have torn out walls, drilled holes and rebuilt walls. CCI personnel have been displaced and building systems have been assessed, upgraded and replaced. Despite this upheaval, our staff have continued to deliver an admirable range of valuable client service.

In 1999, it was clear that the current facilities no longer met the needs of the Institute. A series of studies and a search for an available building or location suitable for the four CCI sites in the National Capital Region looked promising. A comprehensive functional plan developed in 2001 for a new building described in detail the facilities we would need to carry out our work in the coming years. The delivery of this plan coincided with the events of September 2001. It soon became clear that funding for a new facility was far from the Government of Canada's top priority.

As this planning was underway, we were also trying to find the source of the negative health effects being experienced by an unusually high number of staff members. An intensive survey of indoor air quality and building components led to a disturbing discovery — a toxic mould growing throughout the exterior wall cavity of the building. This discovery, in turn, led to an extensive disruption of all CCI activities. The mould is the result of introducing a high level of relative humidity (RH) into a building shell that began life as a large warehouse. Retrofitted in 1976 for our use, the exterior wall system eventually failed to contain the up to 15 500 litres of water per day that were injected into the airstream to maintain a museum environment.

Once the mould colonies established themselves in the wet cavities, they flourished on the nourishment provided by wooden elements and the paper surface of the drywall sheets.

Public Works and Government Services Canada (PWGSC) hired Dunlop Architects, a Toronto firm with extensive health care and laboratory experience, to develop a solution for our problem. Working closely with CCI staff, they proposed a prototype remediation, following the New York Protocol, to remove the mould and contaminated material from the exterior walls. They would install a robust insulation and vapour seal system that could contain the high RH that we need to maintain to protect our client's objects, entrusted to us for treatment and research. Lessons learned in the prototype process were then applied to the design of the full-scale remediation project.

The mould remediation project obliterated a swath 3 metres wide around the interior perimeter of the building, where people had offices, labs, etc. This displaced every staff member. As this project progressed, it became clear that rebuilding as found was no longer an option. Changing operational needs and code compliance drew a significantly different floor plan. The need to separate office space from lab areas led to creating two new mezzanine areas — one to house office activities and the other to become the new home for our archival conservation research team, housed until now on the Tunney's Pasture Campus. Mining the information collected in the 2001 functional plan, we reduced the number of laboratory areas needing precisely controlled RH, then limited them to the interior core as much as possible. We surrounded those areas with offices that will act as dynamic buffer zones. The laboratory extraction systems and the building air handling systems are being completely reconfigured to provide a safe working environment for all of our staff, interns and visitors.

Throughout this project, CCI staff have shown incredible patience and commitment to professional service. They have been challenged to find innovative ways to continue to deliver client service. As our capacity to maintain an appropriate environment diminished, artifacts were moved to sister organizations, and laboratory-based treatments were delayed. Site visits, writing projects and in situ treatment projects increased.

Our clients and the larger conservation community have also displayed patience and generosity. Our colleagues at the Parks Canada Ontario Service Centre very kindly made room in their facility for us to continue treating a number of important projects. Perhaps the most affected group outside of our organization is the conservation students, who have not been able to access our library, or the interns who have been denied internship opportunities by these events.

The reward for this sacrifice is clear. By the time you read this, most staff will be housed in bright functional office areas and the laboratory reconfiguration will be well underway. The CCI Library will once again be a powerful research resource, but will feature a larger collections area and a reading lounge bathed in natural light. CCI will be housed in a facility that better meets its needs, and that offers a healthy, functional, safe workplace where staff and interns can focus on the challenges of conservation.

Editor's Note

These three regular features appear in each issue of the *Newsletter*. "The History of Conservation" looks at conservation treatments of the past, "The Science of Conservation" examines recent scientific analyses that have been conducted at CCI, and "On Display" highlights recent conservation treatments. Watch for them in future issues!

History of Conservation

The Contribution of Henry VIII

by Robert L. Barclay, Senior Conservator, Treatment and Development Division - Objects

Henry VIII, who came to the throne of England in 1509, was an avid bibliophile. Not only did he collect books of all kinds, many of them extremely rare, but he also wrote several. His books were not the usual scribblings of monarchs — published under their names, but largely ghost written by others. He really was highly literate, very intelligent and widely cognizant of the minutiae of European political, philosophical and religious trends. Although he is also said to have been an accomplished musician, a touchingly clumsy setting of a popular song that exists in manuscript (apparently in the king's hand), shows that perhaps his literary skill was the greater. In a man of such refined and cultured tastes, it is so difficult for us, given our modern attitudes, to reconcile these highly refined aesthetic sensibilities with the dissolution of the monasteries, which, deplorably, was accompanied by widespread destruction of works of art and crafts. However, this wholesale purging of Catholic imagery and thought did not extend to the books or the manuscripts. Henry very astutely ordered the organization of a huge inventory of written works, and demanded that material of any historical and aesthetic value from every religious house in the country be collected, catalogued and preserved. Much of the early English material available to scholars today was conserved as a result of Henry's forethought — or perhaps his avarice for the written word. Conservation by design maybe, but not quite the way we would pursue it these days.

Science of Conservation

Pesticides in Museum Collections

by Jennifer Poulin, Conservation Scientist, Analytical Research Laboratory

Since 1987, CCI's Analytical Research Laboratory has analysed over 1100 natural history specimens and 600 artifacts in Canadian Aboriginal collections. The goal was to detect the presence of lead-, arsenic- and mercury-containing pesticides, such as arsenical soaps, lead arsenate and mercuric chloride. A portable X-ray fluorescence spectrometer (XRF) was used for the analysis.

The pesticides used to treat and protect collections from infestation and deterioration were not, however, limited to inorganic pesticides. There are hundreds of organic pesticides that one might encounter while working with museum objects. In the past, it was normal to treat artifacts with organic and inorganic pesticides. Often the type and amount of pesticides and preservatives applied to objects varied from collection to collection. However, treatment records may be incomplete or may not even exist at all. Detecting and identifying these compounds is crucial to assess health risks and to develop protocols for handling and storing the objects to minimize health risks.

The Analytical Research Laboratory is currently developing methods to detect organic pesticides using gas chromatography mass spectrometry (GC-MS) to supplement the inorganic screening methods and, therefore, to provide a complete survey of a collection. During a recent visit to the McCord Museum in Montreal, the pilot program of this new service was launched. Documentation suggested that some of the objects in its Aboriginal collection may have been treated with DDT before the museum acquired them. Approximately 100 Canadian Aboriginal artifacts were surveyed. The artifacts were all in very good condition and appeared to be well-preserved — one sign that pesticides may have been applied at some point. The on-site analysis XRF indicated that most of the collection was not contaminated by inorganic pesticides. Samples to be analysed by GC-MS were collected using three different, non-destructive techniques:

- The air in the storeroom was sampled with passive diffusion air cartridges.

Jennifer Poulin using the micro-vacuum filter sampling procedure on a headdress at the McCord Museum, Montreal.

- Artifacts were individually sampled using cotton swabs, lightly drawn across surfaces and into crevices where unseen residues may have collected.
- A gentle micro-vacuum filter system was used to draw air and lightweight particles from the surface of the artifacts onto glass fibre filters.

The analysis indicated that some, but not all, of the artifacts were treated with or contaminated by organic pesticides such as DDT, DDD, methoxychlor and perthane. In some cases, only trace amounts of these compounds were detected, yet other artifacts were found to have much higher levels. Analysis of the air monitors did not indicate the presence of pesticides in the air, perhaps because most of the pesticides found on the artifacts have very low vapour pressures.

One very encouraging outcome of the survey was the success of the handmade cotton swab as a sampling tool. The swabs were used to gently gather residue, then sealed in containers for future examination. This may prove to be an inexpensive and useful preliminary screening method for collections where it is suspected that organic pesticides have been applied.

These surveys help assess the health risk for those who will have contact with the artifacts, such as museum staff or Aboriginal communities to which artifacts are repatriated.

CCI is currently involved in national and international conferences, seminars and working groups concerning the contamination of museum collections by pesticide residues.

On Display

The Physics Collection of Queen's University

by Bernard Ziomkiewicz,[1] Technologist, Queen's University, Kingston, Ontario

The Department of Physics at Queen's University in Kingston, Ontario, has over the years accumulated a number of rare and valuable scientific instruments. These pieces of demonstration and laboratory apparatus were used at the beginning of science teaching at Queen's (and, indeed, in the whole country) in the 1840s, and throughout the history of physics teaching at Queen's.

In order to catalogue, restore and display items related to the early days of science teaching at Queen's, the Department of Physics Historical Museum Project was initiated in 1989 with a grant from the Principal's Development Fund.

The collection includes several hundred pieces of apparatus related to teaching mechanics, heat, light, sound, astronomy and measurement. There has been practical interest in astronomy in the Queen's community since the 1850s. Although the combination of engineering and astronomy may seem very odd to us, the growth of astronomy in the 19th century owes its origin to solving the practical problems associated with surveying, mapmaking and navigation, for which the determination of longitude and time were essential.

The first optical observatory in Ontario was erected in 1856 in Kingston's City Park by a committee of "Gentleman Amateurs" who purchased a 6 1/4 in. refracting telescope from Alvan Clark of Boston. After five years of operation, Queen's College took over management of the Observatory, which was later moved onto the campus. Nathan Dupuis, a recent graduate, was appointed as observer. In order to reduce operating costs, Dupuis himself built several of the required clocks and other apparatus. In the Physics Department's building, a display commemorating Dupuis and the centenary of engineering at Queen's contains several of his handmade clocks as well as the Alvan Clark telescope and two transit telescopes (for determining latitude, longitude and time).

Two objects from the department's collection related to Dupuis' era were treated at CCI — a transit telescope and a Universal Ring Sundial. Figure 1 shows one of the transit telescopes, which has a 4 in. aperture. These telescopes were used to make celestial measurements. Below the telescope is a level for calibrating the instrument. The Universal Ring Sundial (Figure 2) is undated and unsigned, and is probably a replica of an 18th-century design. It can be adjusted to determine the local time at any location and can be folded flat for carrying.

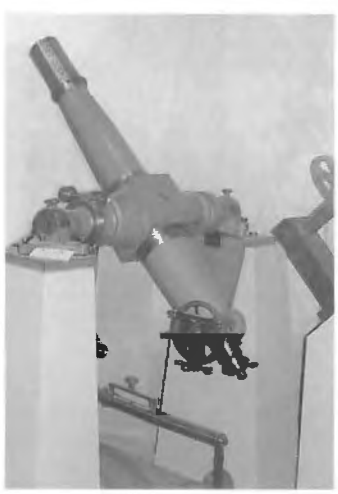


Figure 1. Transit telescope.

Figure 2. Universal Ring Sundial.

As well, other objects have been restored by students in the Queen's Art Conservation Department, with which the Physics Department is very fortunate to have established a collaboration.

1. Mr. Ziomkiewicz, a technologist with the Queen's University Physics Department, took on the care of the department's collection. He learned the techniques of cleaning, stabilization and repair of historical instruments during his visiting internship at CCI over several summers.

e-Services: Introducing a New Way to Connect with CCI

by Bruce Gordon, Web Designer/Programmer, Information Services and Marketing

Since the mid-1990s and in support of the federal government initiative, Government On-Line (GOL),[1] CCI has embraced the Internet as a prime means of communicating and interacting with its clients. In the past year alone, CCI's Web site traffic has increased substantially. Clients can order publications online, register for events, communicate with CCI, and search a large technical document repository. Clients can also request services from CCI by downloading forms in PDF format, filling them out by hand and returning them to CCI.

The next logical step in CCI's Web site evolution is to allow clients to fill out these service request forms directly online. CCI's e-Services initiative will offer its clients the opportunity to do this. As well, clients will be able to view the status and history of their request, and manage their contact information. e-Services will also act as an interface to CCI's internal business system. This system is a database application that can be accessed only by CCI staff. The application will allow CCI staff to initiate action on a request and, in turn, the application will update e-Services so that clients can view the status of their requests.

The first version of e-Services, to be launched in the near future, will allow users to perform the following tasks:

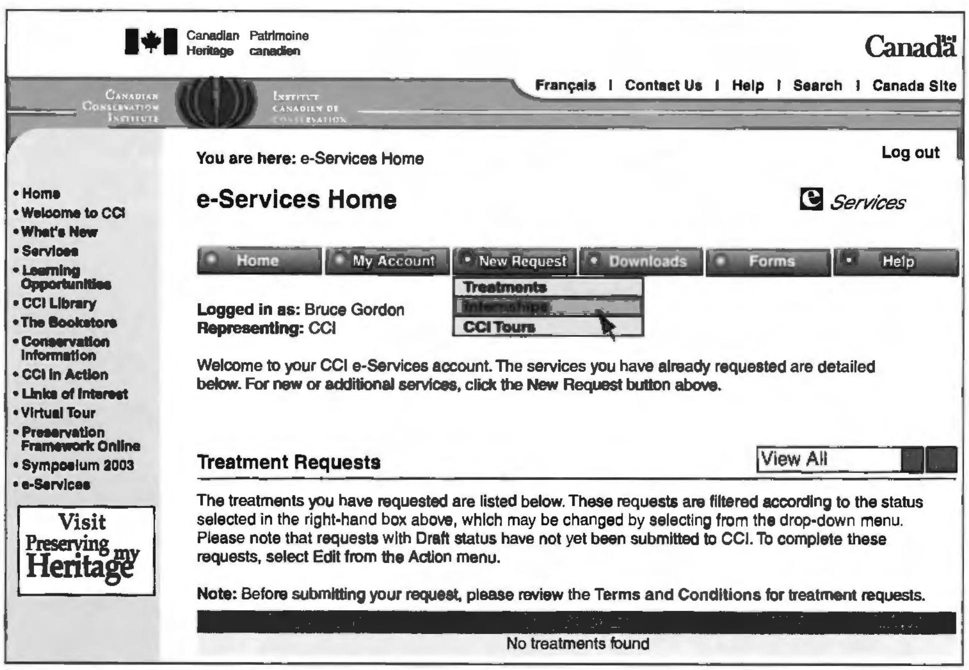
- create and maintain e-Services accounts
- manage requests
- request treatments
- request tours of CCI facilities
- apply for internships

Create and Maintain e-Services Accounts — Before clients can use e-Services, they must create an e-Services account. Once this is done, clients can login to e-Services and, if necessary, edit their personal information. e-Services clients can represent multiple organizations and make service requests on behalf of them. Existing bookstore customers will be able to access e-Services using the account they have already set up to purchase a publication. Similarly, bookstore purchases can be made through newly created e-Services accounts.

Manage Requests — When clients successfully log in to e-Services, they will be redirected to their personal e-Services home page. This home page acts as an entry page where clients can manage their e-Services requests. Any modifications to existing requests or creation of new ones can be made from this page.

Request Treatments — e-Services clients representing Canadian organizations will be able to make a treatment request through e-Services. The e-Services clients simply fill out and submit the treatment request form online. They will be able to monitor the treatment's progress by viewing its status from their e-Services home page. Clients will also be able to view project reports, generated by CCI's internal business system, which include associated project documentation such as treatment agreements, treatment proposals, reports, etc.

Request Tours — e-Services users will be able to request a tour of CCI's facilities online. Clients can enter all information required to book a tour and then send the form electronically to CCI staff for them to process. Their e-Services home page will be updated to indicate if CCI has approved the tour.



Prototype of an e-Services home page. Note that this page will list all client requests made to CCI, divided by request type. Clients can view, edit, cancel or create requests from this page.

Apply for Internships — Traditionally, CCI has three internship application cycles a year. Each cycle has three stages: an application submission stage, an evaluation and selection stage, and a notification of results stage. Applicants can prepare their application online at their convenience and then store it in their e-Services account until they submit the application at the appropriate stage of the application cycle. Applicants can also view the status of their application from their e-Services home page.

Because some of these request forms are lengthy, e-Services users will always have the option to click a "Save as draft" button that appears at the bottom of each request form. Once the request is saved as a draft, users will be able to edit or complete it at any time by clicking the appropriate link from their e-Services home page. CCI will only review completed requests.

e-Services will help establish the foundation for facilitating communication with CCI clients through the Internet. As e-Services grows, it will offer more ways for clients to make additional CCI service requests and to personalize their own CCI Web experience.

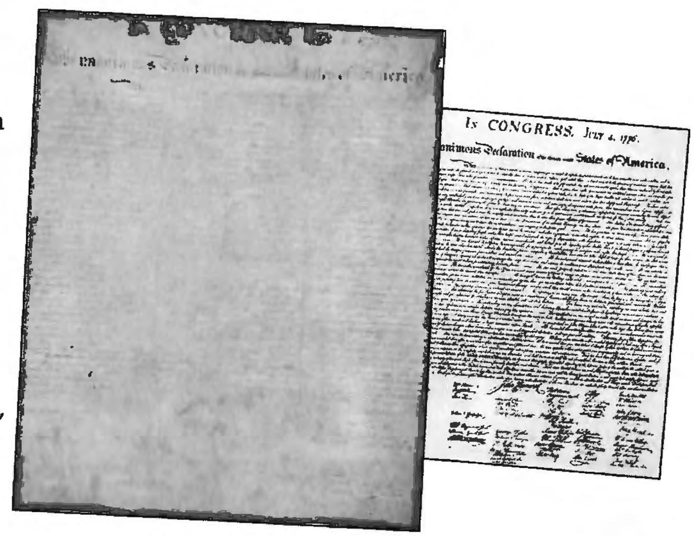
1. The Canadian government, in an attempt to make greater use of Internet technologies, launched GOL. GOL provides Canadians with enhanced access to citizen-centred, integrated services — anytime, anywhere and in the official language of their choice.

Preservation Study of the Declaration of Independence, Constitution and Bill of Rights

by Gregory Young, Senior Conservation Scientist, Conservation Processes and Materials Research

The British parliament passed the *Stamp Act* in March 1765. Intended to help pay for the global Seven Years War that Great Britain had just won and to help keep an army in the Americas, this new tax on paper and documents precipitated growing sentiment against British rule and foreran another decade of political and economic conflict. The open hostilities that eventually broke out in Lexington and Concord, New Hampshire, set the American Revolution in motion. On July 4, 1776, a year after the war began and weeks before 30,000 British troops sailed into New York harbour, a majority of the 13 colonies adopted the Declaration of Independence; by July 19 it was unanimous. In September 1787, four years after the signing of the Treaty of Paris that officially ended the war, the Constitution of the new United States was adopted. At the First Congress of the new republic in 1789, the Bill of Rights comprising the first 10 amendments to the Constitution was drafted to allay long-standing concerns about potential future violations to individual freedoms.[1]

These three parchment documents comprise the Charters of Freedom of the United States of America. For 50 years, ending in 2001, the individual pages of the Charters were sealed in hermetic glass cases in a humidified helium atmosphere. For most of those years, the three, including just pages one and four of the Constitution, were on display in the Rotunda of the National Archives Building in Washington, DC.



The current appearance and condition of the Declaration of Independence (left). Stone engraving of the original text (right).

On July 5, 2001, the Charters were removed from the Rotunda during major renovations. Microscopic crystals and liquid droplets had been detected by microscopy in 1987 on the inside surface of the original glass cases. During the following eight years, the cases and parchments were monitored for any change using the Charters Monitoring System developed by the Image Processing Lab of the Jet Propulsion Laboratory. The conclusion reached was that the crystals and droplets were the result of glass deterioration. Therefore, during the renovations, the parchments were removed from their degraded cases, examined and placed into newly designed encasements that employ a humidified (45% RH) argon atmosphere held at 19°C. Rededication of the Charters in the renovated Rotunda took place on Constitution Day, September 17, 2003. The seven new cases were built by the National Institute of Science and Technology;

six for the Charters and one for the Transmittal page of the Constitution. Unlike the old cases, the new ones can be re-opened to examine the parchments if and when necessary.

CCI participated in examining the Charters' parchment. Conservators at the National Archives and Records Administration (NARA) requested that thermal stability (shrinkage temperature) measurements be taken from microscopic samples to determine the current state of the parchments' preservation. The work included studying any detectable difference in stability between the pages that had been on display during the past 50 years and those that had not. As well, the effect of the iron gall ink used to handwrite the documents was studied.

Sample quantities were, of course, severely limited. This presented real challenges both for the measurement technique and for sample preparation. In response, CCI began redeveloping much of the technology. The short article "Quantitative Image Analysis in Microscopical Thermal Stability Measurements" in *CCI Newsletter* No. 31 (June 2003, pp. 10–11) described just one of the current three methods that use combinations of computer algorithms to obtain numerical data from microscopical images of the parchment samples.

Just as egg whites change during cooking from clear and fluid to white and solid because of heat-induced protein denaturation, the collagen fibres in the parchment samples shrink up to 70% in length because of denaturation. Each of the three methods teased out data on this shrinkage phenomenon from 220 time-lapse digital images taken of the fibres in each sample. The images were collected as the samples denatured and shrank during heating in the microscope. What is significant in the data is that the temperature range within which the shrinkage occurs depends on the degree of chemical and physical deterioration in the fibres. Lower temperature ranges indicate greater levels of deterioration.

At this writing, the project has produced over 100 gigabytes of image data, which are currently being used to determine the starting temperature of fibre shrinkage by the three methods. Early on, during examinations at NARA, initial results helped set limits to handling and to designing potential treatments. When completed, the project will also establish benchmark values for the parchments to which any new measurements can be compared in future studies monitoring change over time.

Meeting the demands in the Charters project for improved precision and accuracy in the measurement technique has allowed CCI to renew this avenue of broad practical research on collagenous materials. Above all, the project gave CCI the extraordinary opportunity and privilege to make a contribution to the preservation of some of history's most significant documents espousing democracy.

1. The Declaration of Independence and Bill of Rights owe much to the deliberations of George Mason, the author of the *Virginia Declaration of Rights* (1776). The ideas expressed concerning inalienable individual rights arose during the Age of Reason and contributed to popular revolutions on two continents in the late 1700s.

TB #26 - Mould Prevention and Collection Recovery: Guidelines for Heritage Collections

by Sherry Guild and Maureen MacDonald

Mould infestation in heritage collections can damage artifacts and may pose a health risk to individuals who work with these collections. This Technical Bulletin presents information on mould morphology, prevention of mould growth, actions to take should mould occur, and health effects relating to mould exposure. It informs the reader how to remove mould growth from artifacts and it describes the appropriate personal protective equipment to wear when working in a mould-contaminated environment or when working with mould-infested artifacts.

ISBN 0-662-35932-1 – 21.5 x 28 cm (8.5 x 11") – paperback, 35 pp.
2004 – In Canada: CAN$20 – Other countries: US$20

The Gentle Art of Applied Pressure

by Robert Barclay, Carole Dignard, and Carl Schlichting

Conservation treatments often involve setting parts of an object in position and applying pressure to them in a gentle and controlled manner. The clamping solutions that have been devised for this purpose are as varied as the practitioners themselves. Yet the art of applying pressure still remains a relatively unexplored topic in the conservation literature. This publication addresses the subject with examples of pressure application devices and procedures drawn from the wide experience of the authors and their colleagues in the museum profession. Illustrated with 81 line drawings and photographs, this book will be a useful resource for anyone undertaking conservation treatments that require joining things together or reshaping them.

ISBN 0-662-36161-X – 21.5 x 23 cm (8.5 x 9") – paperback, 44 pp.
2004 – In Canada: CAN$26 – Other countries: US$26

The History and Treatment of Works With Iron Gall Ink

Advanced Professional Development Workshop

November 2–4, 2004

Library and Archives Canada (LAC) and the Canadian Conservation Institute (CCI) have organized a three-day workshop on the history and treatment of works containing iron gall ink for the professional development of conservators and collection managers.

Format:
This three-day workshop will combine hands-on lab sessions with demonstrations, lectures, and group discussion. The workshop will be held at the Gatineau Preservation Centre in Gatineau, Quebec.

Topics Include:
- lecture on iron gall ink recipes, composition, analysis, and degradation
- preparation of iron gall ink using an historical recipe
- examination of artifacts [UV light, iron(II) test, Multi-spectral Imaging System (MuSIS)]
- condition rating of artifacts with iron gall ink (using protocol developed by the Netherlands Institute for Cultural Heritage)
- lecture on various treatments for ink-corroded paper objects and their short- and long-term effects
- discussion of treatment options for selected artifacts
- lecture on simmering water treatment for a 19th-century sketchbook of iron gall ink drawings
- lecture on the effect of simmering on the chemical and mechanical properties of paper
- practise paper simmering, calcium phytate treatment
- practise mechanical stabilization of ink-corroded works (re-moistenable tissue, Klucel G coated tissue)
- practise a survey technique for collections with iron gall ink

Learning Outcomes:
- understanding of the history and composition of iron gall ink
- experience making iron gall ink according to an historic recipe
- knowledge of examination techniques for works in iron gall ink
- understanding of iron gall ink degradation
- exposure to LAC and CCI research on iron gall ink degradation and the effect of various treatments
- first-hand experience with treatments for paper deteriorated by iron gall ink
- experience with stabilization treatments for paper deteriorated by iron gall ink
- exposure to survey methodology for collections with iron gall ink

Instructors:
- Maria Bedynski, paper conservator, LAC
- Season Tse, conservation scientist, CCI
- Sherry Guild, paper conservator, CCI

Registration:
The workshop is open to conservators and collection managers with experience working in archives, libraries, and museum collections. The workshop will focus on works on paper with iron gall ink but may also be of interest to textile conservators. Enrollment is limited to 15 participants. The language of instruction will be English. The organizers reserve the right to cancel the workshop one month prior to presentation of the event if there is insufficient registration, and to make program changes as deemed necessary.

Registration fee (includes lunches and breaks, course materials, participant's manual, and all applicable taxes):

CAN$450.00 for Canadian participants
US$450.00 for all others

Canadian Museums Association (CMA) bursaries are available for eligible Canadian participants. Please apply directly to the CMA (http://www.museums.ca).

Application procedure:
Applicants should submit their application form by June 30, 2004.

Applicants will be notified of their standing by July 16, 2004. Accepted participants must forward the full workshop fee by September 17, 2004 in order to secure a place in the workshop.

Application form should be submitted to:
Christine Bradley
Canadian Conservation Institute
1030 Innes Road
Ottawa ON K1A 0M5 Canada
Tel.: (613) 998-3721 ext. 250
Fax: (613) 998-4721
E-mail: christine_bradley@pch.gc.ca

Upcoming Workshops

CCI's educational initiatives are an essential means of communication. They allow us to share the results of our current research and conservation practices with you, the heritage community, while simultaneously learning about your emerging needs and concerns. We are pleased to provide the following workshops in collaboration with various Canadian heritage associations and organizations across Canada during 2004-2005. Additional workshops will be posted on our Web site at www.cci-icc.gc.ca [under Learning Opportunities] as they are confirmed.

Fall 2004

Works of Art on Paper
Hosts(s): Federation of Nova Scotia Heritage, Council of Nova Scotia Archives, Visual Arts Nova Scotia
Location: Halifax, NS
Date: September 24–25, 2004
Contact(s): Margrete Kristiansen
Tel.: (902) 423-4677
E-mail: fnsh@hfx.andara.com
Leader(s): Edward Kulka

Preservation Management for Seasonal Museums
Hosts(s): Association of Manitoba Museums
Location: Steinbach, MB
Date: to be determined
Contact(s): Monique Brandt
Tel.: (204) 947-1782
E-mail: amm@mts.net
Leader(s): Deborah Stewart

Preservation Management for Seasonal Museums
Hosts(s): Prince of Wales Northern Heritage Centre
Location: Hay River or Fort Simpson, NT
Date: to be determined
Contact(s): Rose Scott
Tel.: (867) 873-7664
E-mail: Rosalie_Scott@gov.nt.ca
Leader(s): Deborah Stewart

Artifacts in Aboriginal Cultural Centres
Hosts(s): Ontario Museum Association
Location: Woodland Cultural Centre, Brantford, ON
Date: to be determined
Contact(s): Cathy Blackbourn
Tel.: (519) 571-1576
E-mail: cathyb@museumsontario.com
Leader(s): Tom Stone, Janet Mason

Gestion de la préservation des musées saisonniers
Hosts(s): Association des musées du Nouveau-Brunswick
Location: Bathurst, NB
Date: to be determined
Contact(s): Jean-Robert Frigault
Tel.: (506) 452-2908
E-mail: muse@nbnet.nb.ca
Leader(s): Carole Dignard

Industrial Artifacts
Hosts(s): Prince Edward Island Museum and Heritage Foundation
Location: Orwell Corner Historic Village, PE
Date: to be determined
Contact(s): Linda Berko
Tel.: (902) 368-5473
E-mail: ljberko@edu.pe.ca
Leader(s): George Prytulak

Storage Planning for Cultural Facilities
Hosts(s): Museum Unit, Cultural Services Branch, Government of Yukon
Location: Beringia Centre, Whitehorse, YK
Date: to be determined
Contact(s): Valery Monahan
Tel.: (867) 667-3431
E-mail: Valery.Monahan@gov.yk.ca
Leader(s): Siegfried Rempel, Helen McKay

Winter 2005

Works of Art on Paper
Hosts(s): Museums Alberta
Location: Calgary, AB
Date: to be determined
Contact(s): Carrie Herrick
Tel.: (780) 424-2651 ext. 223
E-mail: Learning@museumsalberta.ab.ca
Leader(s): Sherry Guild

Emergency and Disaster Preparedness for Cultural Institutions
Hosts(s): British Columbia Museums Association
Location: Kelowna Art Gallery, Kelowna, BC
Date: to be determined
Contact(s): Jim Harding
Tel.: (250) 356-5694
E-mail: JHarding@museumsassn.bc.ca
Leader(s): Deborah Stewart, David Tremain

CCI Services: Lectures, Workshops, and Site Visits

In cooperation with provincial museum and art gallery associations, CCI responds to specific needs within the heritage community by offering workshops, lectures, and site visits related to the conservation and care of museum and art gallery collections. CCI staff also participate in and present lectures to meetings of professional groups and associations.

For the period November 1, 2003 to April 30, 2004, CCI staff were involved in the following activities:

Conferences/Meetings

Fourth Biennial North American Textile Conservation Conference (NATCC) "Tales in the Textile: The Conservation of Flags and Other Symbolic Textiles," New York State Museum, Albany, NY, November 6-8, 2003
Jan Vuori chaired a session on symbolic textiles, attended a meeting of the NATCC Board of Directors, and participated in a pre-conference workshop "Pressure Mounts—History, Variations and Options"; Renée Dancause and Janet Wagner also attended the conference.

International Centre for the Preservation and Restoration of Cultural Property (ICCROM) General Assembly (November 19–21, 2003) and Council Meetings (November 17–18 and 22, 2004)
Charles Costain attended the General Assembly as Alternate Delegate for Canada; during the General Assembly, as Chairperson of the outgoing Council, he presented a report on the activities of Council 2001–2003, as well as explaining other motions and recommendations; he was re-elected to ICCROM Council for 2003–2007 and as Chairperson of Council for the next two years.

CURRIC LEONARDO Final Partners' Meeting, Budapest, Hungary, November 28-30, 2003
Marie-Claude Corbeil participated as an Evaluator (the CURRIC LEONARDO project is aimed at addressing the lack of training for scientists interested in specializing in the conservation field, by developing, testing, assessing and disseminating innovative post-graduate curricula for conservation scientists).

"Workshop on X-ray fluorescence for tribes and museums," University of Arizona, Tucson, AZ, January 20, 2004
Jane Sirois attended this workshop to share CCI knowledge in this area, and learn more about these techniques from others.

"Comment jouer les instruments des musées," Cité de la musique, Paris, March 6, 2004
Bob Barclay participated in this public roundtable discussion.

Editorial Committee meeting for the proposed book *Readings in Conservation*, University College London, England, March 7–8, 2004
Stefan Michalski attended this meeting organized by Kathy Dardes and Chris Kelly of the Getty Conservation Institute.

"What is Valued" (forum about "totem" or crest poles), University of British Columbia, Vancouver, BC, March 9–10, 2004
James Hay discussed work done on totem poles at CCI and the Canadian Museum of Civilization during the last two decades.

Roundtable on African Canadian Heritage, Ottawa, ON, March 26, 2004
Charles Costain and Mary-Lou Simac participated in a meeting comprising about 50 participants from organizations involved in the promotion and protection of African Canadian Heritage, and senior officials from the Department of Canadian Heritage and portfolio agencies.

Society for American Archaeology Conference, Montreal, QC, March 31 – April 4, 2004
Judy Logan presented "Learning through Conserving: Filling in the Picture through Collaboration" (co-authored with James A. Tuck, Memorial University of Newfoundland); Nancy Binnie, Christine Bradley, and Mary-Lou Simac staffed the CCI booth.

Association of North American Graduate Programs in the Conservation of Cultural Property 30th Annual Conference, Ottawa, ON, April 22–24, 2004
Shanna Ramsay, Marie-Claude Corbeil, and Michael Harrington staffed the CCI booth.

Canadian Museums Association 57th Annual Conference, Quebec, QC, April 27–30, 2004
Bob Barclay demonstrated mount-making techniques in the CCI booth, which was also staffed by Charles Costain, Mary-Lou Simac, and Lucie Paquette.

Lectures

"Metals and Corrosion" was presented by Lyndsie Selwyn on November 24, 2003, at Sir Sandford Fleming College in Peterborough, ON, to students in Collections Conservation and Management.

"Reasons Why Archaeological Iron and Lead Corrode During Storage" was presented by Lyndsie Selwyn on December 5, 2003, at the Memorial University of Newfoundland in St. John's, NL, to staff and students in the Archaeology Unit of the Department of Anthropology.

"The Historic Musical Instrument: To Play or to Preserve?" was given by Bob Barclay on February 5, 2004, at the University of Ottawa in Ottawa, ON, to students in the Department of Music.

"Current Research Projects: An Analytical Potpourri" was presented by Kate Helwig on February 25, 2004, at Queen's University in Kingston, ON, to students in the Master of Art Conservation program.

"Conservation and Community — Archaeology and Stewardship" was presented by Judy Logan on March 17, 2004, at Queen's University in Kingston, ON, to students in the Master of Art Conservation program.

"From Pigments to Colours: The Change in Artists' Oil Painting Materials 1840–1900" and "Historically Accurate Oil Paint Reconstructions" were presented by Leslie Carlyle (currently on secondment with the Netherlands Organization for Applied Scientific Research in Amsterdam) on April 22, 2004, at the National Gallery of Canada in Ottawa, ON.

Workshops

Les supports de présentation des objets de musée was presented by Carole Dignard and André Bergeron (of the Centre de conservation du Québec) on November 5–6, 2003, for the Société des musées québécois at the David M. Stewart Museum in Montreal, QC.

Artifacts in Aboriginal Cultural Centres was presented by Tom Stone and Janet Mason on November 14–15, 2003, at the Prince of Wales Northern Heritage Centre in Yellowknife, NT, and on March 1–2, 2004, at the Mi'kmaq College Institute at the University College of Cape Breton, Sydney, NS.

CCI Adhesive Research was presented by Jane Down on November 17–18, 2003, at the American Museum of Natural History in New York, NY, and on March 15–16, 2004, at the Weissman Preservation Center, Harvard University Library in Cambridge, MA.

Care of Collections was presented by Stefan Michalski on November 17–22, 2003, as part of the Cultural Resources Management program at the University of Victoria.

Mount-making for Museum Objects was presented by Bob Barclay on November 20–21, 2003, for students in the Master of Art Conservation program at Queen's University in Kingston, ON; and by Bob Barclay and Carole Dignard on February 12–13, 2004, for the Association of Manitoba Museums in Winnipeg, MB, and March 9–10 and 11–12, 2004, at Helsingborg Museum, Sweden.

Packaging Ceramics and Glass for Travel was presented by Paul Marcon and Judy Logan on November 29, 2003, at the Burlington Art Centre, Burlington, ON.

Storage Planning for Cultural Facilities was presented by Siegfried Rempel, Helen McKay, and Wendy Baker on January 30–31, 2004, for Museums Alberta at the St. Albert Heritage Museum in St. Albert, AB.

Emergency and Disaster Preparedness for Cultural Institutions was presented by David Tremain and Deborah Stewart on February 2–3, 2004, for the Ontario Association of Art Galleries at the Tom Thomson Memorial Art Gallery, Owen Sound, ON.

New Environmental Standards for Collection Preservation was presented by Jean Tétreault on February 18–19, 2004, at the Library and Archives Canada Gatineau Preservation Centre in Gatineau, QC.

Permanence of Artists' Materials was presented by Debra Daly Hartin and Sherry Guild on March 3–4, 2004, at the Art Gallery of Nova Scotia in Halifax, NS.

Preservation of Modern Information Carriers was presented by Joe Iraci and Tom Strang on March 4–5, 2004, for the Saskatchewan Council for Archives and Archivists in Regina, SK.

Archaeological Conservation Field Techniques was presented by Judy Logan on March 6–7, 2004, for the Saskatchewan Association of Professional Archaeologists at the University of Saskatchewan, Saskatoon, SK.

Emergency Planning was presented by David Tremain and Deborah Stewart on March 19, 2004, to representatives of the City of Ottawa museums at the Ben Franklin Centre in Ottawa, ON.

Site visits for facilities development or upgrading

Site visits conducted by Siegfried Rempel and/or Brian Laurie-Beaumont include the following:

British Columbia — Alberni Valley Museum, Port Alberni; Art Gallery of Greater Victoria, Victoria; Entertainment and Media Arts Society, Vancouver; BC Interior Forestry Museum, Revelstoke.

Alberta — Alberta Foundation for the Arts (with Helen McKay), Provincial Museum of Alberta, and Edmonton Art Gallery, Edmonton; Sir Alexander Galt Museum & Archives (with Helen McKay), Lethbridge; Wetaskiwin and District Museum (with Wendy Baker), Wetaskiwin; Medicine Hat Museum and Art Gallery (with Wendy Baker), Medicine Hat.

Saskatchewan — Museums Association of Saskatchewan, MacKenzie Art Gallery, and RCMP Centennial Museum, Regina.

Manitoba — Winnipeg Art Gallery, University of Winnipeg Archives and Records Centre, Oseredok Ukrainian Cultural and Education Centre, and University of Manitoba Archives and Special Collections, Winnipeg; Northern Plains Museum, Brandon; National Residential School Museum, Portage la Prairie; Métis Interpretation Centre, Saint Laurent.

Ontario — Art Gallery of Ontario, Toronto; Ontario Provincial Police Museum, Orillia; Whata Museum, Bala.

Quebec — Wyandot Huron First Nation Museum and Royal 22nd Regiment Museum, Quebec City; Musée régimentaire les Fusiliers de Sherbrooke, Sherbrooke; Bagotville Air Defence Museum, Bagotville.

On February 16, 2004, artist Alex Colville (left) met with CCI staff members Debra Daly Hartin (right), Kate Helwig, Jennifer Poulin, Michael Harrington, and Jeremy Powell to discuss the current examination and treatment of his painting *Horse and Train*, currently owned by the Art Gallery of Hamilton. Later in the day, Chief Conservator of the National Gallery of Canada (NGC) Stephen Gritt hosted the artist, his daughter Ann Kitz, and various CCI and NGC staff for a discussion of several of the artist's other paintings in the NGC labs.

United States — Cultural Resource Centre of the Smithsonian's National Museum of the American Indian, Washington, DC; Carlisle Residential School Museum, Carlisle, PA; Chesapeake Bay Maritime Museum, St. Michaels, MD; and Calvert Marine Museum, Solomons, MD.

Other site visits

Supreme Court of Canada, Ottawa, ON — On December 1–3, 2003, James Hay, Alastair Fox, and Kate Simmons (Parks Canada) treated panelled walls and woodwork details in various offices; on January 7, 2004, James Hay and Alastair Fox consulted on the condition of wooden panelling in court offices; and on February 17 – March 11, 2004, James Hay, Alastair Fox, and Eric Stewart (private conservator) treated panelled walls and woodwork details in various offices and hallways.

Parliament Hill, Ottawa, ON — On January 7, 2004, James Hay and Alastair Fox investigated swollen floor boards in various government offices; on March 16, 2004, they consulted on the condition of various heritage furniture items and new furniture maintenance procedures in the Senate Chamber.

Musée national des beaux-arts du Québec, Québec, QC — On January 26, 2004, Marie-Claude Corbeil reviewed the research project on the materials and technique of Jean-Paul Riopelle and discussed future projects.

Centre de conservation du Québec (CCQ), Québec, QC — On January 27–28, 2004, Marie-Claude Corbeil took samples for various analytical projects and discussed the results of some active and completed projects with clients; she also provided CCQ conservators with information on the range of analytical services offered by CCI and reviewed procedures for removing and sending samples for analysis.

Edmonton Art Gallery, Edmonton, AB — While in the location on January 29, 2004, Helen McKay followed up on a request for treatment for one painting, providing observations and advice on that painting and addressing other issues presented.

Fulford Place, Brockville, ON — On March 30, 2004, James Hay and Alastair Fox verified the condition of a 19th-century French paravent or "dressing screen" that had been treated at CCI the previous year.

CCI collaborated with the Canadian Museum of Nature to present a colloquium on "Computerization of Artifact Condition Surveys" at the Victoria Memorial Museum building in Ottawa, ON, on February 19–20, 2004. This event comprised one day of presentations followed by one day of panel discussion. Among the participants were fifty-three conservators and collections information management staff from seven different institutions in the Ottawa area (including the host organizations), three from elsewhere in Canada, and seven from the United States and Europe. Also in attendance were nine students from various conservation programs.