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The completed sculpture mounted on its display base

Solvent Extraction of Oil from a Whale Bone Sculpture

by Robert L. Barclay

The sculpture described here was carved from the mandible of a bowhead whale by the Inuit artist Henry Evaluardjuk in 1968. Unfortunately, circumstances dictated using fresh bone which still contained a great deal of the oil and fat which characterise this family of marine mammals. This choice resulted in a continual oozing of oil from the surface of the sculpture and an unpleasant odour as a fraction of the exudate became rancid on exposure to the atmosphere.

Analysis of samples of the oil revealed that it was unlikely to dry out and that the bone would therefore continue to ooze oil for a long time to come. It was decided that complete extraction of the oil by solvent would be necessary to clean the bone and prevent a recurrence of this problem. It was understood that the surface colour of the bone would probably not be altered by this process; dark areas where the spongy, inner bone had been exposed during carving, and areas where the dark, outer surface remained would not be visibly lightened. As these contrasting areas contributed to the sculptural quality of the piece this was considered advantageous.

Solvent extraction of oils and greases from bones (primarily for natural history specimens) has been traditionally carried out with large quantities of volatile solvents. This is expensive

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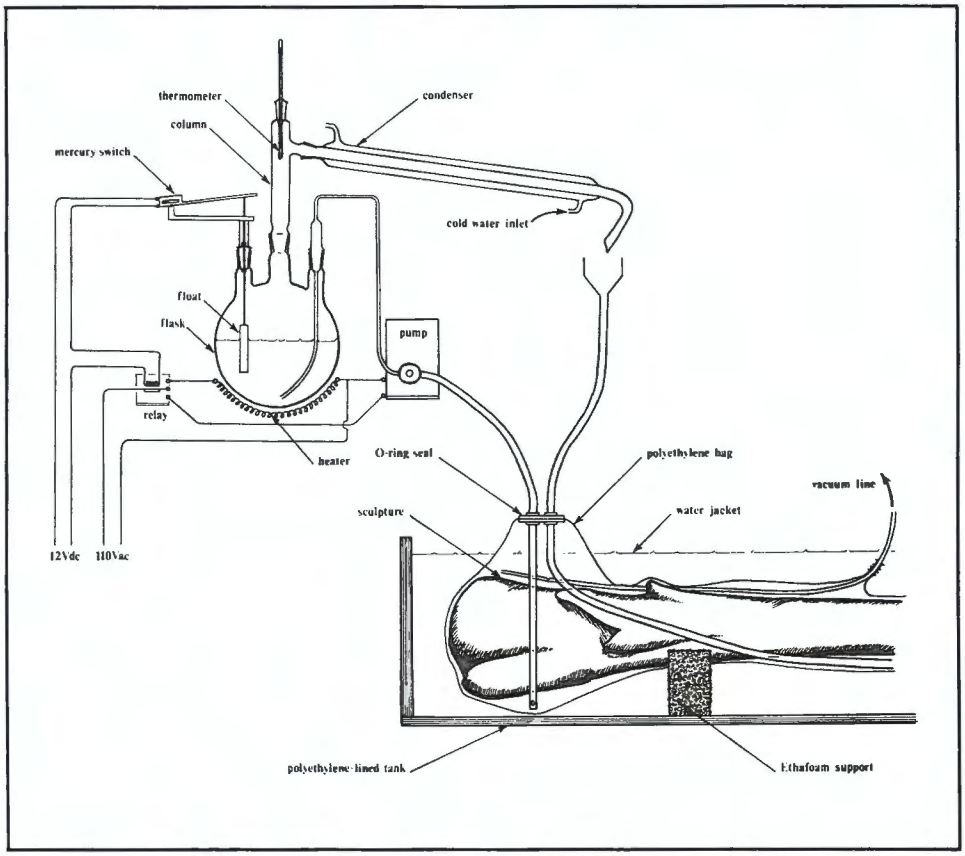
and also hazardous to the health of operators. For the treatment of the Evaluardjuk sculpture a variation on this method was devised where the solvent trichloroethane was enclosed in a close-fitting polyethylene bag surrounded by a water jacket. Thus, a much smaller volume of solvent was used and losses and health hazards due to evaporation were minimised. Such a small volume of solvent became quickly contaminated with the extracted oil so, rather than discard it, it was purified by distillation and returned to the bag.

The apparatus shown at right was constructed. The input and output pipes were arranged so that solvent would flow from one end of the enclosure to the other. The output pipe to the pump was at the lowest point of the bag. After mechanical cleaning to remove dried connective tissue from the interior, the sculpture was sealed into a double-layered polyethylene bag and laid in the tank on Ethafoam blocks carved to shape. The bag was connected to the solvent output and input pipes and the water jacket filled, causing the bag to be pressed evenly against the surface of the sculpture. Fifteen litres of trichloroethane were run into the bag and left overnight. After this initial soaking the solvent appeared a dark brown colour. Distillation was begun using the apparatus shown above and the purified solvent run back into the bag. A mercury switch connected to a float in the distillation flask caused the pump and heater to operate alternately, making the distillation an automatic process. Losses due to evaporation were occasionally made up with fresh solvent. In order to assess the effectiveness of extraction a rudimentary densitometer was constructed from a photovoltaic cell connected to a voltmeter. The optical density of samples of solvent was measured in volts and it was shown that over a period of several days the solvent was becoming less contaminated. The process of extraction of the oil was judged to be complete when the solvent appeared almost clear. At this point all the solvent was drained from the bag and the sculpture removed. Once the solvent was dried out the sculpture was prepared for mounting.



The extraction apparatus and distillation system. The air space above the sculpture would be periodically evacuated with a vacuum pump to cause the bag to fit more closely to the sculpture.

The sculpture was mounted on a base formed from filled epoxy resin laid over a steel plate. A padded steel rod was attached to the base and inserted into the hollow interior of the bone. This heavy base and interior rod provided rigid support and also gave enough mass to prevent toppling. The visible parts of the base were veneered in a dark wood varnished to match the decor of the display gallery.•

Time Capsules

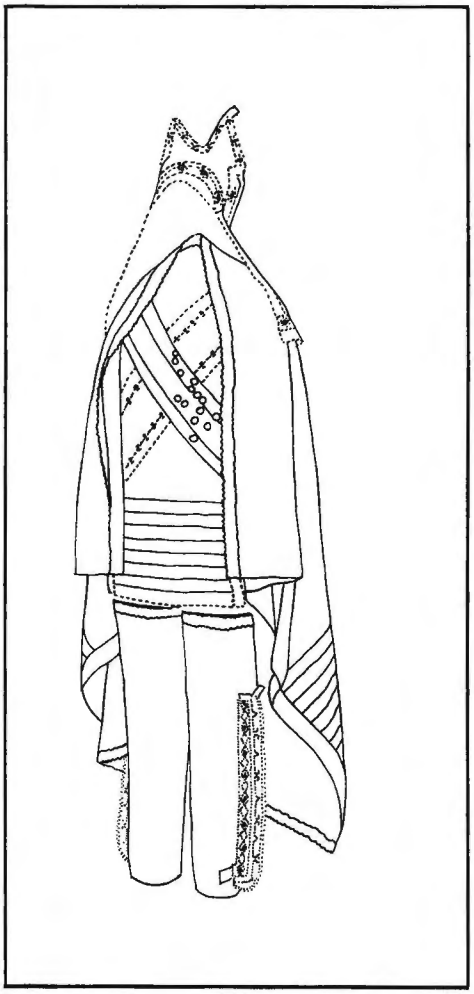
CCI regularly receives enquiries regarding the opening of old time capsules and the construction and filling of new ones. As little information is available in the literature on this popular pursuit, CCI has in the past treated such enquiries on an *ad hoc* basis. A recent rash of enquiries prompted the creation of a more thorough document which could assist would-be interrers of potentially historical material. A draft document containing useful guidelines on opening time capsules, conditioning contents, and building and enclosing containers is now available on request. Nevertheless, this is a wide and diverse subject and the authors have limited practical experience. Bob Barclay is coordinating this project and would welcome any information, either practical or theoretical, which might enhance this document.

An 18th Century Malecite Costume

by Jan Vuori

In the summer of 1983 a rare 18th century Malecite costume was purchased by the New Brunswick Museum with the aid of the federal and provincial governments. The Malecite Indians traditionally lived in the area of the St. John River Valley in New Brunswick and Maine and this costume is considered to be a very rare example of their early material culture.

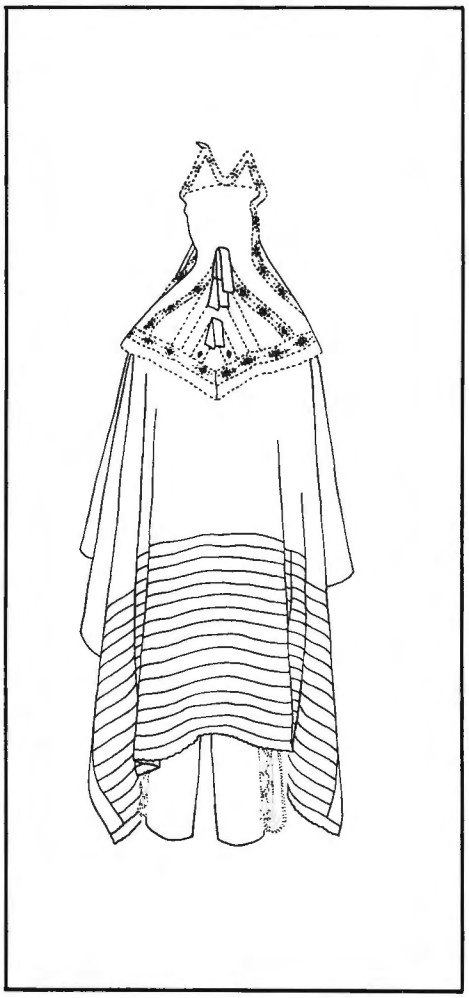
Consisting of a cloak, a hood with two peaks, a breechcloth, a pair of leggings and two sashes, the costume was manufactured from materials available to the Malecite as trade goods. These include red, blue and brown wool fabric, silk ribbons, both tubular and "pony" glass beads, and trade silver disc brooches.



Considering its age, the costume is in fairly good condition. By far the greatest damage was suffered by the silk ribbons used as appliqué decoration on all of the costume pieces. Silk is notoriously susceptible to light damage and where the appliqué had been exposed to light for many years, it was largely lost or fragmented. The conservation treatment consisted mainly of stitching a suitably coloured sheer fabric over the remaining ribbons taking care not to obscure any beaded decoration. This method also helped to visually fill in areas of loss without adding too much to the originals. Other aspects of the treatment included cleaning and securing the beaded decoration, aligning and couching down the loose and tangled metal brocade present in some of the ribbons, and chemically cleaning and lacquering the heavily tarnished trade silver disc brooches.

Although physically secured, the degraded condition of the silk ribbons meant that the costume pieces could not be flexed or bent without risking further damage. In order to reduce this possibility and to facilitate display, storage and handling, all of the costume pieces except the hood were stitched onto solid supports of linen covered paper honeycomb. Special storage and display mounts were also made for the three-dimensional hood.

In addition to the usual recommendations concerning display and storage conditions, it was strongly recommended that a reproduction of the costume be made. Although not a routine practice for conservators, making a reproduction can certainly be justified when its use can help to prolong the life of an artifact.* In this case, the rarity of the costume meant that display would be an important consideration. However, the already degraded condition of the silk ribbons and the fact that the damaging effect of light is both cumulative and irreversible meant that any such display would have to be very limited. By displaying only one piece of the costume at a time, in conjunction with a reproduction of the entire costume, the total length of time that the individual pieces would be subjected to light could be kept to a minimum. In addition, because the condition of the costume required a flat method of display, it was anticipated that museum visitors might have difficulty understanding how the various pieces were worn.



*A similar situation in which reproductions were made to protect original textile artifacts is described in an article by Isabella Krasuski and Cara Reeves, "All That's Bright Must Fade," *Rotunda* (Toronto: Royal Ontario Museum, Spring 1986), pp. 12-14.

A reproduction of the costume displayed on a mannequin would greatly help viewers to understand and appreciate the costume.

In order to make an accurate reproduction, a list of the necessary supplies was drawn up. Over 10,000 beads, 53 metres of silk ribbon, 47 silver disc brooches and seven metres of wool fabric were required.

Fortunately, many of the materials required to make the reproduction could be found in the CCI Textile lab. In particular the lab had supplies of red, blue and brown fabrics very similar to those of the original costume. The red wool was overdyed with black to tone down its brilliant new colour so that it more closely resembled the aged look of the original. Since it was not possible to locate silk ribbons of the dimensions and colours required, their appearance was simulated using silk fabric dyed in the lab. After much searching, glass beads which very closely resembled the originals were purchased and the beaded patterns including irregularities were carefully copied on the reproduction. As the cost of custom made trade silver disc brooches was excessively high, reproductions were made out of aluminum discs and flattened wire.

Once mounted on a mannequin, the reproduction costume makes an impressive and informative display. Hopefully its use will aid interpretation and significantly help to protect this valuable artifact.

The Malecite Costume was part of the exhibit *The Spirit Sings*, Glenbow Museum, Calgary, Alberta (January 15 - May 1, 1988), Canadian Museum of Civilization in the old National Gallery of Canada building, Ottawa, Ontario (June 30 - November 6, 1988).•

Treatment Services at CCI

by Raymond H. Lafontaine

While travelling in different parts of the country, CCI staff have been struck recently by the confusion that exists within the museum community regarding services available from the institute. The availability of treatment services has caused the most confusion, to the extent that many institutions even believe that CCI is no longer involved in the treatment of artifacts. With the many reports, evaluations, and recommendations appearing in the last few years concerning conservation and more specifically CCI, the community has reason to be confused. In the near future the Federal Museum Policy will be released and will, among other things, clarify the federal position on conservation, and describe CCI's role for the coming years. The treatment of artifacts will remain an integral part of CCI's mandate.

Although CCI continues to do treatments, the types of projects carried out by CCI conservators has changed in recent years. The emphasis is now placed on objects that require more complex treatments or which offer unique problems. In the last issue of the *CCI Newsletter*, some of the criteria for assessing treatment requests were listed. At first glance, one might believe that these criteria restrict treatment services to objects from major institutions. On the contrary, some of the most challenging problems have resulted from the treatment of objects from small museums. It may not always be apparent to museum personnel that an object could serve as the basis for the development of new and innovative techniques. All of the conservation community as well as the museums benefit, because knowledge is generated as a result of the work. CCI is pleased to advise museums of all sizes on the suitability of specific objects.

The shift towards complex treatments does not completely exclude the acceptance of objects requiring more routine and conventional interventions. CCI continues to have an important role in conservation training. For example, CCI offers various internships, including curriculum internships to students of conservation training programs. It is unrealistic to expect these interns to work on complex treatments and suitable artifacts must be available for them to work on during their stay at CCI. Since CCI does not have a collection of its own, it must rely on Canadian collections, large and small.

Objects arriving at CCI are treated in one of six sections, covering the majority of artifacts found in Canadian collections. Applications for treatment are screened by both CCI and provincial committees and objects suitable for training purposes do not normally follow the same path and are called in on an "as required" basis. CCI finds it very useful to have a list of objects from which it can select appropriate pieces. This list is generated by surveys and visits, but also by applications from institutions.

In summary, CCI is still very much in the treatment business. It is essential for maintaining the skills of our conservators and for generating new procedures and the application of new materials. CCI relies on the museum community for suitable treatment projects, be they complex in nature or otherwise. If your institution has an artifact that appears to be in need of conservation treatment, do not hesitate to contact CCI for advice. Please direct all such inquiries or applications for treatment service to:

Director,
Conservation Services

A Double Painting by Emily Carr: *Yan Mortuary Poles*

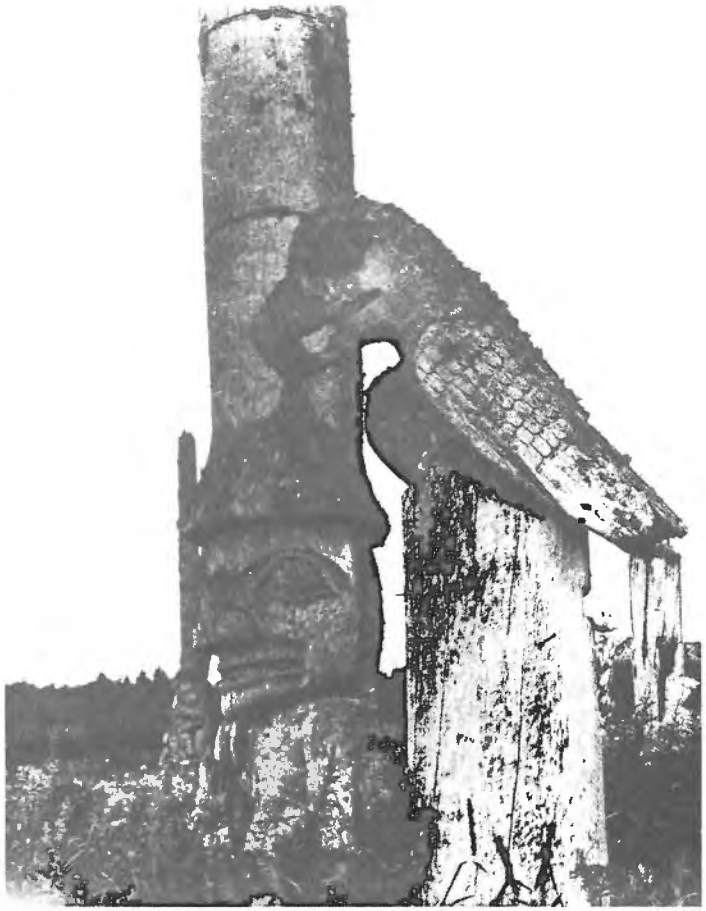
by John M. Taylor and Marilyn E. Laver

A painting by Emily Carr which was recently treated at CCI provides an excellent example of observations of art historical interest which are often made in the course of a technical study of a work of art. *Yan Mortuary Poles*, which is owned by the Art Gallery of Windsor, was painted *circa* 1928-1929 and is a depiction of two memorial poles which once stood at the Haida village of Yan in the Queen Charlotte Islands. The poles appear in photographs taken by George Dorsey in 1897. Carr made two trips to the Queen Charlotte Islands, one in the summer of 1912 and another in 1928, also sketching along the Nass and Skeena Rivers.

Paintings conservator Leslie Carlyle of the Fine Arts and Polychromes laboratory, in examining the painting, observed that its surface exhibited evidence of extensive texturing unrelated to the visible image. X-radiography of the overall painting revealed a second composition below the present one and upside down to it. When the x-radiographic image was shown to Dr. George F. MacDonald, Director of the Canadian Museum of Civilization and an authority on the art of the Northwest Coast, he immediately recognized the shape and form of poles from another Haida village at Chaatl which is on an island at the western end of Skidegate Inlet. A photograph of these, taken in 1913 by Charles F. Newcombe, is reproduced in MacDonald's book, *Haida Monumental Art - Villages of the Queen Charlotte Islands.*

In addition to the photograph of the Yan poles by George Dorsey mentioned earlier, there is another from 1915 taken by Edward S. Curtis which appears in Volume XI of his book *The North American Indian.* This photograph closely corresponds to *Yan Mortuary Poles*. The left hand pole, which represents a man holding a fish club with potlatch cylinders on top, can be seen in profile in another photograph in *Totem Poles* by Marius Barbeau which

***Yan Mortuary Poles,** Art Gallery of Windsor (Accession No. 64.9) by Emily Carr, Circa 1928-1929.*



Photograph by Edward S. Curtis in 1915 which appears in Volume XI of The North American Indian. (Opposite p. 120).

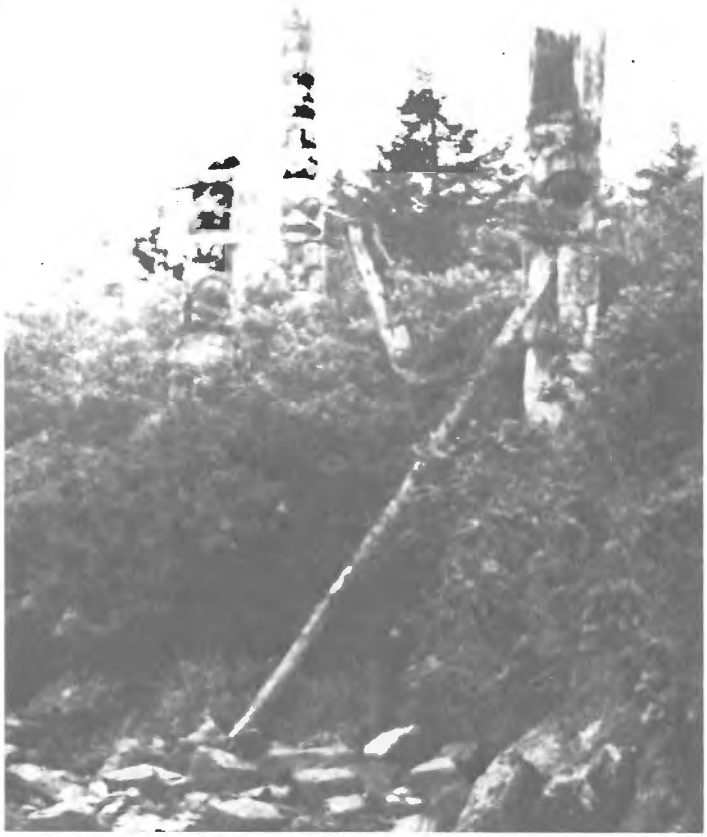
was taken *circa* 1880. It is not inconceivable that Carr worked from such photographs or at least used photographs to refresh her memory of the scene. It is accepted that another of her paintings, *Blunden Harbour*, owned by the National Gallery of Canada, was developed from a photograph. *Blunden Harbour* has also been shown to be a double painting. Edythe Hembroff-Schleicher, in *Emily Carr – The Untold Story*, writes that the artist " . . . did not even bother to stretch a new canvas for it, but worked on an old, somewhat bumpy picture that had been over-painted with flat white." (p. 273). When the painting was x-radiographed the existence of a painting beneath was confirmed.

An interesting feature of *Yan Mortuary Poles* is that the underlying painting registers rather clearly on the x-radiograph whereas very few features of the superimposed painting can be distinguished. This is not the case with many double paintings. An examination of the painting by x-ray spectrometry indicated the chemical elements lead, zinc, cadmium, tin, cobalt, and iron were present in the paints used by the artist. In order to understand the radiographs it was necessary to study the sequence of paint layer application. For this purpose, three microscopical samples were removed in green areas, two near the tacking margin, one near an area of damage. Polished crosssections of these were examined by light microscopy and by scanning electron microscopy and x-ray microanalysis.

A thick layer of lead white paint was found separating the upper painting from the lower, which Carr applied to cover the earlier painting so that a new painting could be done on the same canvas. The layers in the first painting, below the white layer, are built up in a relatively complex way. Three or four layers, sometimes of quite different colours, were applied over the ground. In the upper painting, however, a single layer was used in the areas sampled indicating a difference in technique between the early and late work. Not only are the tones and colours quite different, the early work tending to lighter, pastel colours or alternately, extremely dark ones, but there seems to have been more reworking of the earlier composition relative to the decisive second design.

The layers of the earlier painting, including the ground layer, had a high relief in areas. The white separating layer and second painting are much

X-Radiograph of Yan Mortuary Poles. Note that the radiograph has been oriented upside down for comparison with the photograph by Charles F. Newcombe. Few details corresponding to the present image of Yan Mortuary Poles are visible. On careful examination, at least two verticle poles and a narrow diagonal post can be seen which correspond to those in the Newcombe photograph.



Poles at Chaatl photographed in 1913 by Charles F. Newcombe. Photograph courtesy Royal British Columbia Museum (Neg. No. PN 620). See also Plate 171, p. 127 in Haida Monumental Art.

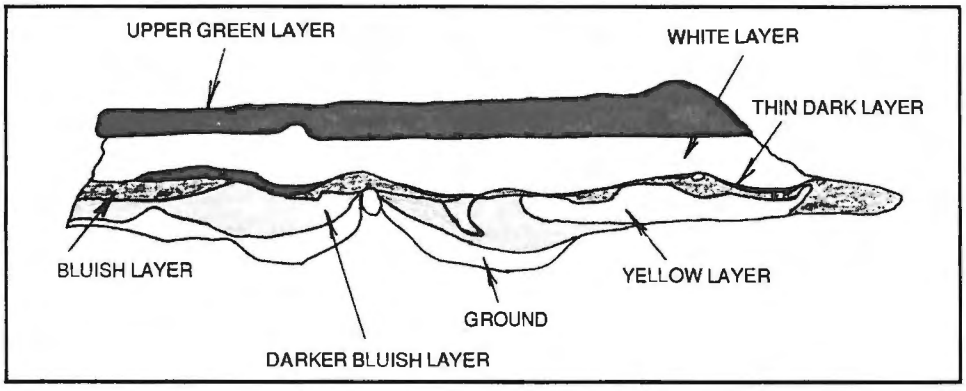
smoother. It is not possible to determine from this whether the relief was a deliberate impasto or perhaps the result of applying paint under conditions which would cause it to dry quickly and leave ridges. It is interesting to note also the relative thickness of the early painting — dark layers are quite thin and light coloured layers usually appear many times thicker. Given that Carr had little money to spend on materials, one might speculate that this was an effort to conserve the concentrated, dark paints; however, when diluted with an inexpensive extender such as lithopone, the paler colours could be used more freely.

The key to the interpretation of the x-radiographic images lies in the identification of the materials and in the relative thickness of layers. X-ray microanalysis of the three cross-sections indicated that radiopaque elements such as barium and lead were concentrated in layers of the early painting, particularly the light-coloured layers containing white extenders. Lithopone (a mixture of barium sulfate and zinc sulfide), or barium sulfate alone, is the major material which is present in the lower painting and not the upper, and accounts for the radiopacity giving rise to the x-radiographic image of the Chaatl poles.

The lead white layer separating the two paintings contributed little detail to the x-radiograph because of its relatively uniform thickness. The layers of the later painting tend to be fairly uniform in thickness, and are also darker in colour; containing less radiopaque white pigment and no significant amounts of other radiopaque elements, they are consequently less evident in the x-radiograph.

The presence of a range of pigments, all of which were in common use during the period in question, is indicated by the results of the x-ray spectrometry and microanalysis. These likely included lead white, zinc white, cadmium orange, cerulean blue, vermilion, whiting or chalk, gypsum, lithopone or barium sulfate, chrome green, cobalt blue, cobalt yellow, Prussian blue, bone black, a silicate or aluminum silicate extender, and iron oxide/hydroxide pigments (ochres, siennas). These tentative identifications are based only on the detection of chemical elements and so other possibilities cannot be ruled out including other inorganic pigments or organic pigments and lakes.

For artistic reasons, and because of her financial circumstances, Emily Carr often turned to less expensive materials, for example paper instead of canvas for her paintings in oil, and house paints instead of artists' tube colours. That she used the same canvas over again is established in the case of *Blunden Harbour* and, now, *Yan Mortuary Poles*. Perhaps other aspects of the artist's work will be uncovered in the same way in future.



A drawing of one of three cross-sections prepared from samples removed from the painting. Note the thick layer of white paint over the more complicated paint layer structure of the earlier painting. The green layer of the later painting on top is comparatively much simpler.

Further Reading

MacDonald, George F., *Haida Monumental Art - Villages of the Queen Charlotte Islands* (Vancouver: University of British Columbia Press, 1983).

Shadbolt, Doris, *The Art of Emily Carr* (Toronto: Clarke, Irwin; North Vancouver: Douglas and McIntyre, 1979).

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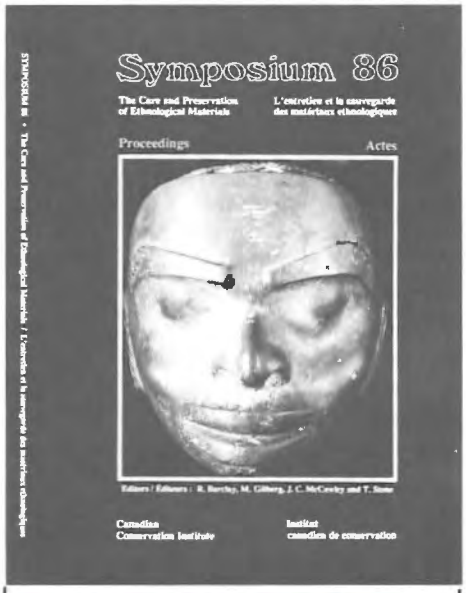

Symposium 86: The Care and Preservation of Ethnological Materials; Barclay, Gilberg, McCawley and Stone, Editors. (Ottawa, Canada) 1987, 272p. Soft Cover, 15x19cm.

The proceedings of Symposium 86: The Care and Preservation of Ethnological Materials have now been published and can be obtained by writing to CCI. The cost is $15.00 a copy, and cheques or money orders should be made payable to "Symposium 86". Thirty four papers and three posters make up the contents which are illustrated in black and white and colour.

Antoine Plamondon's *The Assumption of The Blessed Virgin Mary*

by Peter Vogel

One of several projects carried out in the Fine Arts laboratory over the past year was the restoration of Plamondon's copy, *Assumption of the Blessed Virgin Mary*, from the Assumption Church of the Basilian Fathers in Windsor, Ontario (oil on canvas, 197 x 145 cm). While the painting was being treated, efforts were made to research its history as well as to obtain some insight into Plamondon's importance as a copyist.

Plamondon copied assiduously throughout his long career. More than one-half of his approximately 270 works consist of religious paintings, many of which he copied from engravings of the Old Masters. He was thus forced to invent his own colour scheme. The painter considered these copies more important than his own original paintings and perceived them as being intimately linked to the original. When he was finally satisfied with one of his copies, Plamondon considered it to be the ultimate achievement of his artistic ideal.

The painting discussed here is a copy of an engraving after a painting by Murillo. The original is in the National Gallery, London, England. It was commissioned by a judge from Quebec City in 1845 and presented to the Assumption Parish Church the following year.

Archival records show that it hung above the main altar until 1874, when it was moved to nearby Assumption College. In 1972 it was returned to the Church and this time formally installed in the vestibule next to the main Church entrance. In 1979, additional Church renovations were begun. Because of its deteriorating condition, the painting was subsequently turned over to the Art Gallery of Windsor, which in turn sent it to CCI for conservation.

Before transportation to Ottawa, however, several large tears and areas of flaking paint required consolidation. Given that several different materials had been used, it became obvious during treatment that the painting had undergone at least three previous restoration efforts, the earliest dating back to about the time when it was moved to the Assumption College in 1874. The most recent treatment was carried out in Detroit in 1959, when large areas of the painting were overpainted.

Treatment of the painting at CCI involved time-consuming cleaning procedures during which all later aqueous and resinous overpaints were removed. The painting was then mounted onto a custom-made aluminum honeycomb panel with Multiwax X145A and polyester fabric as an interliner.

Several considerations governed the choice of this marouflaging technique for this painting. They included the presence of large tears in the canvas with marked distortions, the long-term durability and stability of the materials used, and the mechanical stress during shipping and exhibition.

Filling and inpainting of the many paint losses and abrasions completed the treatment.

Aside from the purely conservational case history, the restoration of the Plamondon painting offers a rather interesting observation. Art historians have tended to criticize Plamondon for lack of originality. They have claimed that his interest in copying contributed little to the independent evolution of painting in Lower Canada, and that his chromatic effects were dull and overly simplified.

The restored painting, on the other hand, reveals many attractive features. It is the work of an artist sincerely dedicated to his chosen task of copying the Masters, with a good understanding of their intent and a fine sense of colouring. Perhaps the time has come to re-evaluate Plamondon's contribution to Canadian art, especially in light of the considerable popularity he enjoyed during his lifetime.

A smaller, almost identical Plamondon painting entitled *Mary's Assumption* is on display at the Musée de Joliette. These works may be of interest to both the scholar and the art lover.

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John R. Porter. - Antoine Plamondon (1804-1895). "Le tableau religieux: Perception et valorisation de la copie et de la composition." *Annales d'histoire de l'art canadien*. Vol. VIII, 1984.•

Analysis of Wall Painting Fragments from Dunhuang

by Elizabeth A. Moffatt, P. Jane Sirois, Gregory S. Young and Ian N.M. Wainwright

The town of Dunhuang, in western Gansu Province of the Peoples' Republic of China, was an important oasis reached by foreign merchants entering Chinese territory along the Silk Road. From the fourth to the fourteenth centuries A.D., Dunhuang was a major centre of Buddhism. In 366, the first of hundreds of caves — the Caves of the Thousand Buddhas — was dug into a sandstone cliff by monks. Today, four hundred and ninety two such grottoes, the walls and ceilings of which are covered with murals, and some of which house statues, survive. Interest in the caves is tremendous and concern by those who are responsible for their conservation has redoubled, particularly since they have been declared a World Heritage Site by UNESCO.

CCI collaborated with Li Zui Xiong, Deputy Director of the Dunhuang Research Academy, in a six month study of pigments and other materials used in the paintings. Li's visit, which was supported by the Canadian International Development Agency, was twofold in purpose. He was, first of all, interested in investigating the nature of the pigments and vehicles used to paint the murals in order to more fully understand problems of discolouration and loss of adhesion. Second, he wanted to gain some familiarity with the methods of chemical and physical analysis which we use to approach problems of this kind.

An essential aspect of this kind of project is the bibliographic research which must be undertaken to determine what other relevant analyses have been done previously. Fortunately, a considerable amount of work on Asian painting materials has been done by other laboratories including the work of John Winter and Elisabeth West FitzHugh of the Freer Gallery of Art and the Arthur M. Sackler Gallery. They brought to our attention an interesting parallel study by a group at the Dunhuang Cultural Relic Research Institution in which a large number of pigments were analyzed by x-ray diffraction.

In our study, ten fragments of wall paintings from the Dunhuang caves, representing a range of colours, were examined, as well as several raw materials which it was thought might have been used by the artisans to bind the pigments - peach pitch, fish glue, bone glue, and animal skin glue. A number of techniques were used to characterize the paints and other materials. These included Fourier transform infrared spectroscopy, x-ray diffraction (Gandolfi camera method) and fluorescence microscopy. X-ray microanalysis, using a scanning electron microscope and x-ray energy spectrometer, was conducted on polished cross-sections of the fragments. Our analyses confirmed that the typical structure of a wall painting at Dunhuang begins with a supporting layer of clay. This was applied to the sandstone grotto wall to obtain a more even surface for working. Next, a preparation layer, consisting of finer clay in which calcium carbonate was often mixed, was applied prior to the execution of the designs themselves.

The coloured pigments identified in our study were hematite, azurite, red lead, and a number of copper compounds including possible identifications of atacamite or paratacamite and a copper chloride hydroxide hydrate. Such compounds as quartz, calcite, gypsum, talc, and possibly muscovite were identified as paint fillers. The identification of copper chlorides as pigments, which has also been observed by other laboratories, is curious, since we normally think of these compounds as products which result from the undesirable corrosion of copper alloy artifacts known as "bronze disease". Here, they are being used intentionally as green pigments.

Statue in cave with fingers missing on right hand, severe pigment loss on left shoulder and serious deterioration of other pigment layers.

Wall mural with pigment loss.

Portico covering a thirty-seven metre tall statue of Buddha carved in the sandstone cliff. Note retaining wall at upper right to hold back loose sand.

A black lead dioxide (PbO_2), an analogue of the mineral plattnerite, was found in association with the pigment red lead in some fragments. Rutherford J. Gettens, working in the 1930s, also observed this transformation of the red lead tetroxide (Pb_3O_4) to the black lead dioxide phase and was able to produce a similar discolouration in the laboratory. We cannot be certain, without further work, what causes the discolouration. It may result from a combination of agents acting quickly or over time - relative humidity, light, or microorganisms. The result is that many murals do not appear as originally intended by the artists.

Equally interesting was that calcium oxalate hydrates were found in virtually all samples. Calcium oxalates exist in nature in a number of hydration states, primarily weddelite ($CaC_2O_4.2H_2O$) and whewellite ($CaC_2O_4.H_2O$). Oxalates were also found in an earlier study at CCI of three Chinese wall paintings which were treated several years ago at the Royal Ontario Museum and had been treated previously. The discovery of oxalates in fragments taken in situ at Dunhuang is, therefore, noteworthy and suggests that more research into the environmental history of the caves may lead to an understanding of their formation. Although oxalates of microbiological origin are widespread in nature we have found no evidence which allows us to say what precise agent or agents is responsible for this occurrence.

A central finding of the analyses by infrared spectroscopy and microscopical staining is that no evidence for the presence of a binding medium could be found. If a proteinaceous or other binding medium was used by the artists it must now remain in very low concentrations. The absence of typical levels of binding medium found in paints in other cultural contexts, the presence of calcium oxalates, and the presence of plattnerite suggest that the paintings have been subject to a complex process of deterioration and change which may include one or more microbiological processes.

A crucial aspect of further work on the conservation of the Dunhuang grottoes must be the careful monitoring and assessment of both visitor impact and natural environmental agents of deterioration including water, wind and microbes. Diurnal or seasonal variations in moisture, relative humidity and temperature within the grottoes could cause anisotropic expansion and contraction of clays and other materials resulting in a loss of adhesion to the sandstone, within the clay layers, and between the preparation layer and paint (pigment) layers. The cross-sections show that cleavage and exfoliation is, indeed, occurring in these places. Other areas for future research include the nature and origin of oxalates and plattnerite and the possible reconversion of black lead dioxide to red lead.

Further Reading

Moffatt, Elizabeth A., Adair, Neil T. and Young, Gregory S., "The Occurrence of Oxalates on Three Chinese Wall Paintings," in: *Application of Science in Examination of Works of Art*, Pamela A. England and Lambertus van Zelst, editors, Proceedings of the Seminar, 7-9 September 1983 (Boston: Museum of Fine Arts, 1985), pp. 234-238.

FitzHugh, Elisabeth West, "Red Lead and Minium," in: *Artists' Pigments - A Handbook of their History and Characteristics*, Volume 1, R.L. Feller, editor (Washington: National Gallery of Art, 1986), pp. 109-139.•

Moisture Measurement Using Embedded Moisture Probes

by David Grattan

Wood is a material which conservators approach with considerable caution, with good reason. In humid conditions, wood absorbs moisture and expands; in dry conditions the opposite effect occurs and it shrinks. Most of these changes take place across the grain: this is why wood is so prone to cracking and warping. In very wet conditions wood can also rot or be attacked by wood-boring insects.

There are thus many situations in which it would be useful to be able to monitor the loss or gain of moisture in wood. Often, it is important to know how much moisture is present to make sure that the object is in stable condition (incidentally, a stable humidity reading is also a good way of determining whether the environmental control is adequate).

CCI has developed a simple, cheap and effective way of measuring moisture in wood with a standard Delmhorst resistance moisture meter with permanently implanted stainless steel screws as electrodes. Resistance meters are used by kiln operators to season wood. They normally employ nail-like electrodes which are hammered in for each measurement. What we have developed is a method of moisture measurement which is precise, repeatable and rapid and which is also much less damaging to objects when compared to the hammer-driven probes. In a set of careful trials we have found no difference between using permanent probes and obtaining readings in the normal way, even over periods of up to a year. Recently we have found it useful to fit several items with electrodes. The following examples show some of the applications of the technique.

Cliff Cook of the Historic Resource Conservation Branch of Environment Canada using the embedded electrode technique to monitor the drying of a large waterlogged timber.

The "Thunderbird of Wawkyas"[1] is a totem pole recently obtained by the Canadian Museum of Civilization (CMC). The Kwakiutl erected the pole in about 1899; it was the first large pole erected in Alert Bay, Cormorant Island. Later, it was moved to Stanley Park in Vancouver, where it remained as a major tourist attraction for many years.

This grand old totem pole was brought into the Museum's storage in a rather wet condition and had to be dried slowly over several months to minimize the possibility of cracking. We had only rough estimates of how long the drying might take, because no relevant data is available in the literature. Electrodes were thus implanted in several places, and Museum staff enclosed the pole in a polyethylene enclosure fitted with humidity control. Over the winter of 1986-87 conservators took the moisture content at weekly intervals. From this information we were able

[1] Barbeau, Marius. *Totem Poles*, Vol. 2. Ottawa: National Museum of Canada. 1950: 673.

Installation of the timbers of the Rideau Chapel in the National Gallery of Canada.

to watch the progress of drying accurately and adjust the humidity in the enclosure surrounding it accordingly. It took about seven months to dry the pole so that it was at complete equilibrium with the humidity in the Museum.

After this first successful use of the permanently implanted electrodes, Charles Hett, Head of Artifacts Conservation at the CMC decided to use them again to monitor the drying of a recently acquired North West Coast cedar "feast dish" about 10 metres long, which had been specially carved for the Museum, and which was still in the green state. It, too, had to be dried carefully to prevent cracking.

The Historic Resource Conservation Branch of Environment Canada, has a number of large waterlogged timbers to conserve. Cliff Cook, the Conservator responsible for these items, must be able to measure moisture content so that drying can be controlled and followed to completion. He has found that this technique has produced an excellent record of the drying rate and enabled much better control than was possible previously.

The timbers and boards making up the roof the Rideau Chapel, recently installed in the new National Gallery of Canada, had been stored in a dry warehouse and were dessicated. Geoff Hoare, overseeing the installation of the Chapel on behalf of the Gallery, was concerned about how the newly installed roof would react to the higher humidity of the new Gallery. Electrodes were fitted in several places in the roof, and connected with long cables to a control panel so that the ceiling's condition can be read from one point. Weekly observations by the author and a summer student, Samantha Drouin, soon revealed that the ceiling had adjusted well to its new surroundings and that no cracking or warping were observed.

Perhaps the most unusual application so far is the installation of the electrodes in a stump of the fossil wood from the Fossil Forest on Axel Heiberg Island[2]. In an almost waterlogged condition, the stump was drying and visibly cracking apart as a result. Cliff McCawley installed the probes and was able to control the drying to minimize damage. Subsequent work revealed that the probes gave a reasonably accurate measure of moisture even in this very ancient wood.

In each of these examples there was a need to find out the amount of moisture present in wood. In each case, the new CCI method has provided a simple, accurate and inexpensive answer to this problem.•

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[2]Canadian Conservation Institute. *CCI Newsletter*. Ottawa: Canadian Conservation Institute. December 1987: 10.

Winter Recording of Churchill River Rock Paintings

by Ian N.M. Wainwright

Rock paintings, petroglyphs, and petroforms throughout the world share many traits. They represent common themes of the human experience of both early and contemporary societies. Rock art, whether found in caves and shelters or in the open, whether of great age or of more recent origin, has enormous appeal. Thousands of people, in Canada and abroad, visit rock art sites each year, drawn to them for several reasons — archaeological interest, curiosity, and by a deeper desire to better understand the ways and beliefs of earlier peoples. The scenes they depict of the natural and mythological worlds are compelling.

Rock paintings are found throughout Canada. Concentrations of sites are found in the South Okanagan, Stuart Lake and Similkameen Valley areas of British Columbia, and in a broad region near the southern perimeter of the Canadian Shield. While each site is unique in some respects, most in the Shield were executed in red ochre pigment, on exposed granite cliffs on the shores of lakes. These sites represent a fragile resource, prone to vandalism, and vulnerable to deterioration by natural agents such as frost weathering, lichens and algae, geochemical dissolution, and the formation of mineral accretions.

Three rock painting sites are found near the town of Leaf Rapids, Manitoba along the shores of the Churchill River — Caribou Nest Site, Face Site, and Oil Drum Site. The paintings are affected by groundwater seeping over them from cliffs above, by lichen encroachment, and by frost weathering on a microscopic level. Frost has caused gradual loss of pigment and diminished image clarity. Hydroelectic development in Manitoba, specifically the Churchill River Diversion Project, has resulted in seasonal high water levels which wholly or partially inundate two of the sites. It is not known to what extent this may alter the rate of weathering and, therefore, a monitoring programme has been implemented for the sites.

The Face Site (HdLx-11) on the Churchill River, near Leaf Rapids, Manitoba photographed on Eastman Kodak Plus-X Panachromatic Professional 120 Roll Film using cross-polarized electronic flash.

Earlier work at CCI on the analysis of rock painting sites, which included a review of the literature on rock weathering, has led to the conclusion that very little can be done to arrest or retard the eventually complete deterioration of such exposed rock paintings. This conclusion stems primarily from the inability to prevent water — whether rain, ice, wave splash, or groundwater — from reaching the painted rock surface. Preservation is simply not possible given the shoreline location of rock art sites in the Canadian Shield and the extremes of temperature they experience. Fortunately, deterioration in most cases is occurring very slowly.

In order to assess their present condition and to record the sites, an expedition was organized and financially supported by the Historic Resources Branch, Manitoba Culture, Heritage and Recreation and Manitoba Hydro. Photographer Carl Bigras and I were accompanied by Tom Sawyer, an experienced photogrammetrist with Heritage Recording Services, a Public Works Canada unit dedicated to the Canadian Parks Service of Environment Canada. Also joining the team were producer Pat Friesen and cameraman Doug Glover of Manitoba Educational Television, who recorded the work on video. The expedition reached Leaf Rapids by Twin Otter aircraft from Thompson on Monday 7 March 1988.

Tom Sawyer of Heritage Recording Services, Canadian Parks Service, Environment Canada, uses a theodolite to establish control points for the photogrammetric recording while the author takes down the measurements.

Organization of the project in Manitoba was the responsibility of Gary Dickson while site logistics were handled by archaeologist Dave Riddle. Transportation to the actual sites proved to be more difficult than anticipated because ice in the main channel of the Churchill River was too soft for snowmobile travel and we had to use a more circuitous route, partly overland, partly hugging the shoreline, and occasionally traversing points of land, manhandling the sleds over freshly cut portages. We could not have met our recording objectives without the help of Doug Hallam and Daryll Hedman, Conservation Officers with the Manitoba Department of Natural Resources, and Keith Anderson, whose trapline is in the vicinity of the sites.

With their help, and two or three snowmobiles, we dragged our equipment in wooden sleds and toboggans to the sites, a trip of about an hour each way. In addition to a Hasselblad camera which was used for colour and black-and-white recording, a Wild P31 metric camera was brought to the site for the photogrammetric work. In order to obtain the best possible colour fidelity in the colour photographs, two 1200 watt electronic flashes were used which drew their power from a gasoline-fuelled generator. Our checklist included a theodolite, levelling rods, tripods, films and plates, and photographic colour and grey scale standards, among other essentials. The job was completed in two days.

Eastman Kodak Plus-X Panchromatic Professional 120 Roll Film and Kodachrome 64 Professional 120 Roll Film were used both with ambient light and with electronic flash. For some photographs, polarizing filters were used on the flashes and on the

Carl Bigras recording the Face Site with a Hasselblad camera. Note the gasoline generator on the toboggan which was used to power two electronic flash heads.

camera lens — cross-polarization — to obtain optimal saturation of the images and minimal diffuse reflection from the rock surface.

Red ochre rock paintings often have a very low inherent subject contrast making them difficult to record in black-and-white. The combination of Kodak High Contrast Technical Pan Film 2415 and a Kodak Wratten 38A blue filter has proven an effective tool in recording and was used here with good results.

Black and white glass negatives were exposed using the Wild P31 photogrammetric camera. In addition to recording highly accurate three-dimensional data on the sites, the plates, along with the black-and-white films, are recognized as being perhaps the most archivally-sound photographic medium for posterity recording.

Tom Sawyer was able to use facilities provided by Mary West of Leaf Rapids to process his plates and confirm that they had been properly exposed. Development of the colour material and films had to await our return to Ottawa. Some of the colour transparencies will be submitted to a process of digital image enhancement to try and improve the contrast between the red ochre and the background rock.

In addition to providing photographic records of the sites for archaeological research and for posterity, the recording project has established a 1988 baseline for assessing the ongoing preservation of the site. From a purely technical point of view the expedition confirmed that winter recording from the ice is the best way to record rock art sites on Canadian lakes and rivers. It also demonstrated that rock art conservation and recording is a task requiring the best of collaboration and cooperation between various groups, for which CCI thanks Heritage Recording Services in Ottawa and our friends and colleagues in Winnipeg and Leaf Rapids.•

Who's Who at CCI

by Charlotte Newton

Craig Lauber

Storesperson

Officially, Craig Lauber is known as the storesperson at CCI. While he does stand inside the metal cage that is our storeroom, and he has been seen to hand out pens or beakers or bottles of acetone, "storesperson" only begins to describe the assortment of jobs that Craig carries out.

Of course being storesperson involves more than just doling out supplies, particularly when you have to manage a large and varied inventory to meet the needs of nearly a hundred people. Craig is also responsible for ordering, for stocking the storeroom and chemical storage facility, and for keeping track of what goes in and out of stores. In addition to this there are always requests for new materials, as jobs and projects change. This can mean tracking down new sources and suppliers for unusual products.

With the various seminars, training sessions, lectures and tours that CCI is involved in, the operation and maintenance of the audio visual equipment is another important job that Craig carries out. Sometimes this also involves getting behind the video camera or tape recorder to make a record of special events.

Craig also does repair, installation and maintenance of equipment at CCI and builds apparatus for special projects. He is often called upon to help rearrange offices or labs by moving anything from filing cabinets to drums of polyethylene glycol.

Once a year a full inventory of the furniture and equipment at CCI is done, with everything from desk lamps to microscopes to chest freezers being sought out and checked off the list. Craig is in charge of this operation, which, given the size of CCI, the number of inventoried items, and the way that inanimate objects tend to move, is not an easy job.

Craig also watches over CCI's warehouse space, where materials and equipment not in current use are housed. This involves knowing what is there, where it is, and which lab is the owner –as well as being able to retrieve it at short notice.

Craig has been with CCI since 1979 and in that time has become familiar with the special and sometimes odd requirements of the people who work here. His good work makes life a little easier for the rest of us.•

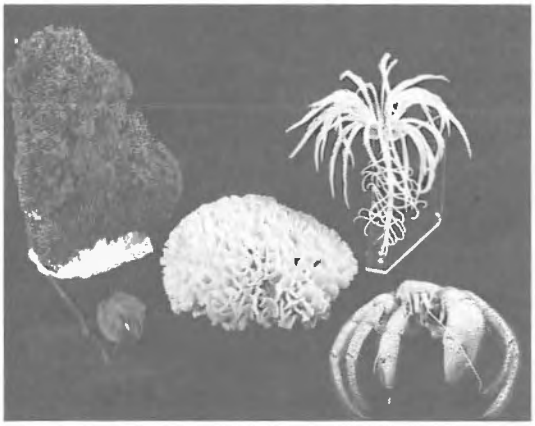
Parylene at CCI

by David Grattan

Parylene is a trade name of the Union Carbide Corporation for poly para-xylylene. It is a polymer which is synthesized in a unique way by direct deposition on a substrate, from which derives its use in conservation as a stable coating or consolidant.

In an earlier item in *CCI Newsletter* (December 1987) there was a brief account of some of the CCI work in the preservation of specimens from the Arctic Fossil Forest on Axel Heiberg Island, Northwest Territories. The earlier article dealt mainly with wood from the site and briefly mentioned cones and leaf mat sections. At that time we had only begun to consider their conservation.

When the leaf and cone specimens were separated from their surrounding matrix and allowed to dry, we realised that there was a severe problem. The cones became so fragile that many were unable to survive even the most gentle handling without damage. The leaf fossils were even worse, some crumbling under their own weight. Clearly the specimens were in severe danger of being totally destroyed, and equally clearly normal liquid impregnation/consolidation procedures were likely to be destructive. The mere touch of a camel hair brush could easily dislodge a scale from a cone. It was decided that the only method with any hope of saving the specimens would be one in which the consolidant was applied in the gas phase. The Parylene process, which had been developed by the Union Carbide Corporation's subsidiary Nova Tran Corporation, therefore seemed the most hopeful means of solving this problem. In the Parylene process, objects to be treated are placed in a chamber in a vacuum. Parylene dimer is heated to the point at which it dissociates to form active molecules which polymerise or link up with each other to form a clear film when they come into contact with any surface. An object thus becomes coated with a perfectly even coating which conforms perfectly to the surface. Since this process takes place at the molecular level the coating conforms to the microscopic rather than the macroscopic surface. Thus Parylene has some degree of penetration in porous objects.



Natural history specimens experimentally treated with Parylene.

A group of cones were transported in a specially constructed holder (designed and built by Carl Schlichting of the Ethnology and Furniture laboratory of CCI), to the Nova Tran Laboratory in Wisconsin. The cones were treated with a 15 micrometer layer of Parylene C, and the results were excellent. The cones after treatment were unchanged in appearance but had lost their fragility. They are so strong that they can survive being dropped. The success of the treatment was so evident that it was clear that the Fossil Forest specimens were best dealt with using Parylene. After this rather spectacular demonstration of the unique capability of Parylene, CCI held discussions with Dr. Terry Austin and Mr. Bruce Humphrey of Union Carbide and negotiated an arrangement whereby CCI would participate in a study of Parylene as a conservation technique. Other museums also participating in this study include the Library of Congress, the American Museum of Natural History, The Getty Conservation Institute and the Royal British Columbia Museum. Thus, in June 1988 a Parylene deposition device was installed at CCI and was operational within a day. Since then CCI has been carrying out an evaluation of Parylene jointly with several institutions in the vicinity of the National Capital Region. These include the National Museum of Natural Sciences, the Canadian Museum of Civilization, the National Library of Canada, the National Archives of Canada, the Central Forensic Laboratory of the Royal Canadian Mounted Police, the Air Crash Investigation Unit of Transport Canada and the Royal Ontario Museum.

Numerous kinds of specimens have been coated, including a wide variety of fossils, books and paper, textiles, insects and crustacea. It is planned to treat many more items and in addition we will be carrying out a long term evaluation of the stability of Parylene.

Parylene has been used industrially for several years as a coating especially suitable for delicate electronic components. The thermal stability (i.e., stability in the absence of light) has been extensively studied and thus it is known to be very stable in this regard. The effect of light has not been studied so much and there is much we would like to know. However, we are convinced that Parylene provides a means of dealing with the most fragile of materials so that they become effectively consolidated and strengthened. In so doing they leave the appearance almost completely unaffected. There is none of the darkening normally caused by consolidants.

If you are interested in learning more about Parylene or are interested in participating in the CCI trial please get in touch with Cliff McCawley or David Grattan.•

Symposium 88 – An Enormous Success

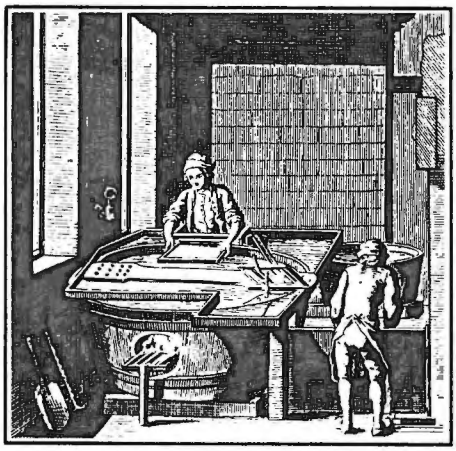
by David Tremain

In October 1988 CCI hosted a major international paper symposium at the new National Gallery of Canada. It formed part of an on-going series of symposia initiated by CCI in 1979 and was also the first conference to have been held at the National Gallery since it opened in May, 1988. Approximately 300 delegates from all over the world came to Ottawa from October 3 - 7, 1988 to attend *Symposium 88*. Major institutions in Canada, the United States and Britain were particularly well represented. Other delegates came from such countries as France, the Netherlands, Belgium, West Germany, Switzerland, Italy, Brazil and as far away as Japan, Australia, and New Zealand.

The opening address was made by Mr. Alain Gourd, Deputy Minister of Communications, who referred to the fact that "a great amount of the cultural heritage throughout the world is found on paper" and went on to say that since the medium "is not always as permanent as the sentiments of the message . . . it falls to the conservator to lengthen the lifespan of the medium". Later, at the Banquet at the National Arts Centre on Thursday, Mr. Gourd added that "I am very happy to find out that *Symposium 88* is alive and well and that it has provided you with the opportunity to share your knowledge, which, I am convinced, will allow your profession to take another step forward".

The conference programme covered a wide range of topics, from books and other library-related materials, archival, works of art on paper, to presentations of an art historical nature (of interest to both curators and conservators) and conservation science.

On the first morning, presentations evaluating the technique of "inlaying" works of art on paper and the use of oriental papers in conservation were presented by Vincent Daniels of the British Museum (alias Charlie Costain, standing in for Daniels who sadly was unable to make it) and Susan Page of the National Archives in Washington; two different studies of the use of enzymes and their effects on the degradation of paper were presented by Judith Segal of the Bodleian Library, Oxford and Season Tse from CCI.



In anticipation of the afternoon panel discussion, the various problems of dealing with bound material in library collections were discussed by John Barton, of the Ontario Provincial Archives, Jan Michaels, newly appointed to the National Library of Canada, Nancy Bell from West Dean College, England, and J. Franklin Mowery of the Folger Shakespeare Library, Washington D.C.

Immediately following the panel discussion, delegates were invited by Dr. Shirley Thomson, Director of the National Gallery, to attend a welcoming reception in the Great Hall.

Tuesday's sessions dealt with the Turner collection at the Tate Gallery (Larminie and Norville, Tate Gallery, UK), the recent Degas exhibition presented from a conservator's point of view (Anne Maheux, National Gallery, Canada), and the complex problems faced by Susanne Holm (Centre de Conservation du Québec) when treating the nine-foot long 'Panorama of Sherbrooke'. Everyone was enlightened by the ingenious Bob Futernick (Fine Arts Museums of San Francisco), whose adaptation of current technology was a perfect lead-in to two papers about leaf-casting by David Hanington (CCI) and Cathy Craig-Bullen (National Archives of Canada). David discussed methods of dyeing pulp, and the potential of high-tech for the calibration of colour measurements, while Kathy presented an evaluation of various leafcasters and how they suited the Archives' requirements.

On Wednesday, the topics covered conservation science - Christine McKay (Camberwell School of Arts and Crafts, UK) described the use of wetting agents on the tensile strength of paper; an analysis of old transparent papers was presented by Françoise Flieder (Centre de Recherches sur la Conservation des Documents Graphiques, Paris); Vincent Daniel's (this time alias Cliff McCawley) paper dealt with foxing caused by copper alloy inclusions in paper, and Chandru Shahani (Library of Congress) described the catalytic effects of copper on the ageing of paper. Finally, Derek Priest (University of Manchester Institute of Science and Technology, UK) talked on the effects of aluminum salts on paper.

The afternoon opened with a presentation by Thea Jirat-Wasiutynski (Queen's University, Canada) on charcoal in the 19th century, and John Krill (Winterthur, USA) on English paper 1795-1815. These, together with David Tremain's (CCI) on the history and technique of reverse-glass prints, enabled conservators to consider the art historical background to the artifacts and materials encountered in their conservation laboratories.

Thursday focussed first on the treatment of moisture-sensitive artifacts,

with papers presented by Shannon Zachary (private, USA) and Keiko Keyes (private, USA); then on the effects of various bleaching techniques, with papers by Robert Feller (Carnegie-Mellon Institute, USA), who discussed light bleaching, and Michael Pascoe (Camberwell, UK) who presented the results of the effects of borohydrides and hydrogen peroxide on artists' pigments. Dr. Pascoe also brought to our attention the possible significance of certain stains on paper, and, like the bibliographer, what we may learn from them about the artifact's provenance. At the Banquet later that evening, we were entertained by the thoughts of Charles Haines, well-known writer, broadcaster, and Carleton University lecturer, on the conservation of the English language (not Restoration comedy, as some might have expected).

Symposium 88 participants in the Great Hall of the National Gallery of Canada.

The final day, Friday, dealt with the training of paper conservators at Queen's University by Ian Hodkinson and at the National Archives of Canada by Fiona Jones. The history of the treatment of prints was the subject of the paper by Christopher G. Foster (Fogg, USA). Claude Laroque (Canadian Centre for Architecture, Canada) talked on the Dutuit collection in Paris, and the problems of removing pressure-sensitive tape were described by Jane Dalley (Manitoba Provincial Archives, Canada). Finally, the restoration of an 18th century logbook was presented by Hubert Leurs (National Archives of Canada), and how to treat a collection of 1,600 mining maps by Sharlene Grant (Arizona State U., USA).

The panel discussions on Monday entitled "The Ethics of Disbinding Books, Manuscripts, Atlases, Notebooks, Sketchbooks" (chaired by Don Etherington) and "The Conflict Between Conservation Treatments and the Preservation of Artists' Materials and Intent" (chaired by Margaret Holben Ellis) on Wednesday provoked lively debates on two very "hot" issues. The points of view of conservators, curators, librarians, print dealers, art historians and artists were all articulately presented.

During the Symposium, the delegates had the opportunity of taking tours and seeing demonstrations at the conservation laboratories at CCI and the National Gallery during two half-day sessions on Tuesday and Thursday. Dr. Jean-Pierre Wallot hosted a reception at the National Archives of Canada on Wednesday evening, after which the conservation laboratories were open for tours.

The general consensus was that - *Symposium 88* was very well-organised and informative. Perhaps of particular significance too was that delegates were also very impressed with the comfortable auditorium at the National Gallery — very important for a week-long conference! That it was a great success can be borne out by such comments as "The best conference I've ever been to" and "I'm impressed" to "Overwhelming" and "It was worth crossing the Atlantic just to hear his [Bob Futernick's] paper". Those comments, and others like them, helped to make the hard work of all those involved worth while.

The symposium was officially closed by Raymond Lafontaine, Director of Conservation Services at CCI who declared it to have been "an enormous success". He thanked the many people who were involved in registration, translation, graphics etc. and the Department of Communications for their support.

On behalf of all my colleagues on the Organizing Committee who were involved in the planning — Bob Arnold, Helen Burgess, Sherry Guild, David Hanington, Wanda McWilliams (CCI), Anne Maheux (National Gallery of Canada) and Mike Thompson (National Archives) — we feel proud to have been associated with *Symposium 88* and to have been able to bring together so many knowledgeable and talented people. A special thanks must go to the speakers and chairs, who provided a programme of such substance. Finally, I should like to add that *Symposium 88* could not have succeeded without the participants themselves. Let us hope that the knowledge we have all gained from this experience can be used so that the heritage of all our countries may benefit and continue to survive.•

The Light Damage Slide Rule

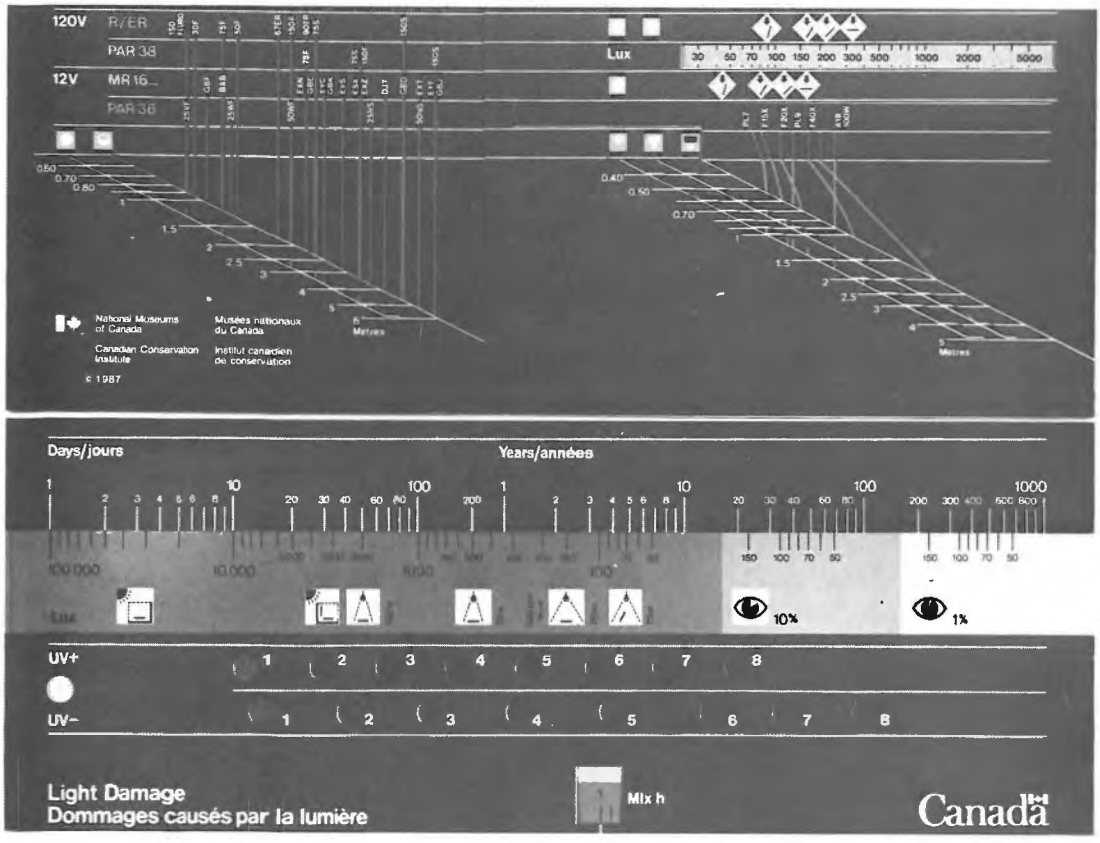
by Charles Costain

After many years of planning, design and fabrication, the CCI Light Damage Slide Rule is now finally available. This tool has been designed to assist conservators, curators and designers in making decisions concerning the lighting of artifacts and works of art. The slide rule, with the accompanying CCI Note which describes its use, is available from CCI at a cost of $20.00 (Cdn).

The idea of the slide rule is quite simple, although it has become more sophisticated as more information has been added to it. The major scale on the front of the slide rule allows the user to establish a relation between the time an artifact is exposed to light and the intensity of the light. For example, it shows that an artifact that is exposed to light levels of 10,000 lux for 80 days has received a light dosage that is roughly equivalent to 18 years at 150 lux, or 180 years at 150 lux if the artifact is only displayed 10% of the time. It also shows that any of the above exposures results in a dosage of 8 Mlx h (megalux hours) of light.

The front of the slide rule also relates a light dosage to a degree of damage. For the above example, it predicts that 8 Mlx h will cause slight fading to ISO Blue Wood Standard #4, and very noticeable fading of Blue Wool Standard #3, and almost complete fading of Blue Wool Standard #1. This amount of fading can also be related to the CCI Light Damage poster, "Put It Where The Sun Never Shines", which has been available for several years. The slide rule equates a light dosage of 8 Mlx h to an exposure of "C" on the light damage poster, which can be seen to cause noticeable fading of some of the lake pigments and severe damage to some printing and drawing inks. A future *CCI Note* will give correlations between some fugitive colours and the Blue Wool Standards, so that realistic exposure limits can be established for a variety of artifacts.

The back of the Light Damage Slide Rule will be primarily of interest to those who are involved in the exhibition of artifacts. It contains information on commonly used incandescent and fluorescent bulbs, and predicts their intensities at various distances from the artifact. For example, if a designer wants to use a 120 volt 75 watt spot light to illuminate an artifact that is to be displayed at 90 degrees to th e light beam, the slide rule predicts that the artifact must be approximately 3.5 meters from the artifact in order to achieve 150 lux. However, a 12 volt PAR 36 very wide flood will give the same amount of light (150 lux) at less than 1.5 meters from the artifact.



The Light Damage Slide Rule and an accompanying *CCI Note* explaining its use can be purchased by sending a cheque or money order for $20.00 Canadian made out to the Receiver General for Canada, to CCI, 1030 Innes Road, Ottawa, Canada, K1A 0C8. Please be sure to enclose your complete return address with your order.•

Inuit Skin Preparation Workshop

Conservators of skin and leather artifacts have long recognized the usefulness of having experience in the preparation and tanning of hides. With this in mind the Canadian Conservation Institute is pleased to announce a workshop on Inuit skin preparation techniques. The workshop will be held August 21-25, 1989 at the Churchill Northern Studies Centre, Churchill, Manitoba.

Under the direction of Dr. Jill Oakes of the University of Manitoba, participants will have the opportunity to work with Inuit craftspeople in the preparation of both caribou and seal skin. In addition to "hands on" work with skins, the workshop will include lectures and discussions relating to Inuit clothing design and manufacture and conservation problems pertaining to Inuit skin artifacts.

Churchill, which is located on the western shore of Hudson's Bay, provides a unique northern setting for the workshop yet can be reached by direct jet service from Winnipeg, Manitoba. The workshop will be limited to 12 participants and the registration fee is $200.00. Deadline for registration is 31 May 1989.

More information and registration forms are available by writing to Extension Services at the address below.

Canadian Conservation Institute
1030 Innes Road
Ottawa, Ontario
K1A 0C8
Canada•

CCI FAX NUMBER

CCI is happy to announce that it now has a FAX machine.

Our FAX number is:

(613) 998-4721.

We hope that our clients and colleagues will find this useful when communicating with us.

SHARED RESPONSIBILITY: A Seminar for Curators and Conservators National Gallery of Canada 26-28 October, 1989

The National Gallery of Canada and the Canadian Conservation Institute are co-hosting a seminar *Shared Responsibility: A Seminar for Curators and Conservators*, 26-28 October, 1989. The Seminar is intended to be a forum for the exchange of ideas concerning works of art both traditional and contemporary, for the benefit of art historians, curators, artists, conservators and conservation scientists. It is intended to dispel some of the myth and mystery surrounding the conservation profession and its activities. It is also intended to help conservators understand more fully the concerns that art historians, curators and artists have in the decision-making processes involving works of art: in other words shared responsibility.

The topics to be discussed include:

- Roles, Goals and Needs of the Conservator and Curator
- Historical Interpretation of Paintings
- Change in Paintings Due to Time and Interference
- Lending Exhibitions: To Loan or Not to Loan
- Museum Policies: Roles and Responsibilities
- Packing and Transport
- Copyright
- Conservation and Curatorial Issues from the Viewpoint of the Artist, Curator and Conservator

In order to encourage balanced participation and a forum for an effective exchange of ideas and viewpoints, it is planned to limit attendance for the first two days to a maximum of 75 with approximately an equal professional balance of curators and conservators. The final day, which will include presentations on the issues by major artists, conservators, curators and directors, will be open to the public. The proceedings will be published.

For more information, contact:

Marion Barclay
Restoration and Conservation Laboratory
National Gallery of Canada
380 Sussex Drive
Ottawa, Ontario, KIN 9N4
or phone (613) 990-1941•

Library Services

by Alicia Prata

The CCI Library now houses two important national resource collections. The conservation collection is considered to be the most comprehensive collection of literature on conservation and restoration of movable cultural property in Canada. It contains approximately 6000 books, 300 current journals and 9000 reprints. The Museological Collection was transferred from holdings of the former National Museums of Canada Library. Comprised of books, periodicals, vertical file, audio-visual and pamphlet materials, this collection is the oldest collection of museological literature in Canada. The collection is strong in journal holdings, many of which were obtained on exchange from other museums and historical societies throughout the world. The vertical file contains articles, bibliographies, historical documents and working papers from a number of sources. Material is organized by subject, by association or by author. There is a good collection of working papers produced by the corporation and components of the National Museums of Canada. The museological collection also inherited the original newspaper clippings from the former National Museums of Canada Information Services Directorate and the photographs and planning documents of the former Mobile Exhibits Programme.

Services provided by the CCI Library include:

Selection and acquisition of literature on conservation and restoration of historic objects and works of art and related topics.

Selection and acquisition of museological literature, with particular emphasis on museum history and administration, architecture, educational and interpretative programmes, curation of collection and museological research methods.

Loans from the collections

Inter-library loans

Alicia Prata searching the museology on-line index.

Reference services, including:

- assistance in verifying bibliographic information and in using library catalogues and indexes
- on line literature searches from the Conservation Information Network (CIN) DIALOG and CAN/OLE
- list of new acquisitions
- Index to Museological Literature
- coordinating translations of foreign language articles
- cataloguing and indexing new materials

The Library is open Monday to Friday from 8.00 a.m. to 4.30 p.m. to anyone with an interest in museum studies and the conservation and restoration of historic materials and works of art. Visitors are welcome to examine our materials on-site, or to borrow them through inter-library loans.

Information and assistance:

Chief, Library Services
Canadian Conservation Institute
1030 Innes Road
Ottawa, Ontario K1A 0C8
(613) 998-3721 •

Vicki Davis and Maureen Clark researching a reference request using library indexes and abstracts.

CCI Library: New Acquisitions

Annual conference of the Canadian Museums Association. (41st: 1988: Saint John, N.B.) Proceedings (audio-tape).

Archaeological bone, antler and ivory. Edited by K. Starling and D. Watkinson. Occasional Papers No. 5. London: United Kingdom Institute for Conservation, c1987. (NK6020 A72 CCI)

Artistes artisans et production artistique au Moyen Age : colloque international, Centre national de la recherche scientifique, Université de Rennes II - Haute-Bretagne, 2-6 mai 1983. Edité par X. Barral I Altet. Paris: Picard, c1986. Volume I. Les hommes. (N5961 A78 CCI v.1)

Banks, Joyce M. Guidelines for preventive conservation = Directives régissant la conservation préventive. Rev. ed.

Ottawa : Council of Federal Libraries. Committee on Conservation/Preservation of Library Materials, c1987.

Coe, Ralph T. Lost and found traditions: native American art 1965-1985. Seattle: University of Washington Press in association with The American Federation of Arts, c1986. (E98 A73 C63 CCI)

Congrès annuel de l'Association des musées canadiens. (41ème : 1988: Saint John, N.B.) Procès-verbaux (enregistrements).

From pinheads to hanging bowls: the identification, deterioration and conservation of applied enamel and glass decoration on archaeological artefacts. Edited by L. Bacon and B. Knight. Occasional Papers No. 7. London: United Kingdom Institute for Conservation (NK5001 F76 CCI)

Gottsegen, Mark D. Manual of painting materials and techniques. New York: Harper & Row, c1987. (ND 1500 G61 CCI)

Handbook for Small Museums. Edited by Elizabeth Willis and Seddon Bennington. Perth, Australia: Western Australian Museum, 1985.

Hatchfield, P. and Carpenter, J. Formaldehyde: how great is the danger to museum collections? Boston: Harvard University Art Museum, c1987.

History from the sea: shipwrecks and archaeology. Edited by Peter Throckmorton. London: Mitchell Beazley, c1987. (CC77 U5 H57 CCI)

ILVS Bibliography and Abstracts. 2nd ed. Milwaukee, Wisc.: International Laboratory for Visitor Studies, 1988

Lighting in museums, galleries and historic houses. Organised by the Museums Association, the United Kingdom Institute for Conservation and the Group of Designers and Interpreters in Museums. Bristol: The Association, c1987. (AM127 L53 1987 CCI)

"Muséologie et information : nouvelle technologie, nouvelles pratiques, nouveaux lieux." Brises n- 10, septembre 1987.

Museum Studies International. 1988. Washington, D.C.: Smithsonian Institution, Office of Museum Programs, 1988.

Rempel, Siegfried. Care of photographs. New York, NY: Lyons Books, c1987. (TR465 R46 1987 CCI)

South European Conference in Archaeometry (1st: 1984: Delphi). First South European Conference in Archaeometry, Delphi, 9-11 November, 1984 / edited by Yannis Liritzis and Tony Hackens. Strasbourg: Council of Europe, c1986. (CC75.7 S65 1984 CCI)

Zollinger, Heinrich. Color chemistry; syntheses, properties, and applications of organic dyes and pigments. Weinheim, FRG: VCH Publications, c1987. (TP910 Z65 CCI)•

Fellowships and Internships

In response to the diverse training requirements of the conservation community in Canada and abroad, the Canadian Conservation Institute offers Fellowship and Internship programs. The following individuals have recently participated or are currently involved in either of these programmes at CCI.

Interns

Ruth Atwood, a Master of Art Conservation student at Queen's University, Kingston, Ontario, worked in the Archaeology laboratory from May 9, 1988 to July 29, 1989.

Gertrude Blasum from the Hamburgisches Museum fur Volkerkunde, Hamburg, West Germany, is in the Ethnology laboratory from October 3, 1988 to March 31, 1989.

Jennifer Dickens, on a scholarship from the New South Wales Office of the Minister for the Arts, Sydney, Australia, worked in the Archaeology laboratory from August 15, 1988 to December 6, 1988.

Audrey Yardley-Jones, a student from the University of Alberta, Clothing and Textiles Program in Edmonton, Alberta, was in the Textiles laboratory from August 29, 1988 to December 31, 1988.

Fellows

The Fellowship programme encompasses work in the designated laboratories at CCI, as well as participation in CCI Services to museums, galleries and related institutions and associations throughout Canada (e.g., workshops, surveys, etc.)

The following three individuals will be completing their 2-year fellowship at the end of March 1989:

Amanda Gray, Fine Arts Laboratory. During the past year, she has worked on two paintings on birchbark, a 19th C. portrait, a reverse painting on glass and assisted with the consolidation of a section from a 16th C. polychrome altarpiece. She is currently treating two contemporary oil paintings on canvas and a 19th C. ship's portrait which is an oil painting on paper, adhered to canvas.

Laura Nagora, Furniture and Wooden Objects Laboratory. The two major projects during her fellowship were water-gilded artifacts. The first was an early Victorian gilded parlour chair. The second, a 17th C. English pier table, required total regilding. Both were from the Royal Ontario Museum in Toronto.

Wanda McWilliams, Works of Art on Paper Laboratory. Major projects included: the "Time Book, 1863", a paper pamphlet ledger containing newspaper clippings, and two School Charts composed of coloured lithographs on paper, varnished, adhered to a cloth backing, and attached to wooden dowels. She also served on the Organizing Committee for *Symposium 88: The Conservation of Historic and Artistic Works on Paper.*

Debbie Juchem, Textile Laboratory. Debbie will be completing her first year of the two-year program in March. During this time, she has treated several headdresses from the Canadian Museum of Civilization in addition to preparing a reference collection of adhesive samples used in textile conservation. •

CCI Services: Seminars, lectures, workshops and visits

To respond to specific needs within the museum community, CCI offers, in cooperation with provincial museum and art gallery associations, a series of workshops, seminars and lectures 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.

May 1988

Madame Katia Baslé, from Paris, France, presently working at the Library of Congress, Washington, D.C., visited CCI to discuss the former Mobile Conservation Laboratory Programme and tour a mobile lab vehicle. She also visited the Paper laboratory. Madame Baslé is interested in setting up a similar type of mobile lab service in Paris but on a much smaller scale, with emphasis on paper conservation.

A highly successful tour of CCI facilities was given to some sixty attendees of the Archival Conservation Conference held at the National Archives of Canada. A reciprocal tour of the National Archives was held in conjunction with CCI's *Symposium 88.*

Carl Schlichting and Bob Barclay taped an interview showing conservation work on the Chatham-Kent "Mummy", for T.V. Ontario.

The French network of T.V. Ontario filmed a segment featuring Dr. Marie-Claude Corbeil on the scientific techniques used in authenticity examinations.

Ian Wainwright and Jane Sirois accompanied visiting Professor Li Zui Xiong, Dunhuang Research Academy, to Washington for discussions on Chinese wall paintings with staff of the Smithsonian.

A meeting of parties from Canada, the United States and the United Kingdom involved in research in Works of Art in Transit: Vibration and Packaging took place in Washington. An *ad hoc* committee chaired by Charles Costain was set up to plan a 1990 conference on Art in Transit. While in Washington, tests on sample paintings were discussed with staff of the Conservation Analytical Laboratory (CAL) at the Smithsonian Institution. Tests will be carried out to test a mathematical model developed at CAL. The National Gallery of Canada has provided a packing crate for drop testing. The National Gallery in Washington is preparing two cases with framed paintings for testing by CCI.

Aerial photography of the Fossil Forest site in the Geodetic Hills of Axel Heiberg Island was undertaken during the summer. Conservation studies were carried out and a selection of negatives have been enlarged. Mapping data from this area is being prepared.

On May 26, 1988, meetings were held between Norman Tennent, Honorary Research Fellow, University of Glasgow, Glasgow, Scotland and CCI staff members to discuss mutual interests in adhesive and epoxy resin research. Mr. Tennent gave a short talk on his research interests to CCI staff.

Stefan Michalski presented a paper entitled "The Museum Climate" to the Society for the Preservation of Natural History Collections Annual Meeting in Pittsburgh, Pennsylvania.

Susan Maltby presented a paper entitled "Conservation of a Padlimiut Inner Boot" to the Inuit Clothing Conference in Montréal, Québec.

Raymond Lafontaine, Robert Arnold and David Hanington attended the conference "Conservation in Archives" in Ottawa.

Judy Logan attended the Canadian Archaeological Association Annual Meeting in Whistler, B.C.

Eva Burnham attended the Costume Society of America Meeting in Cincinnati, Ohio as a member of the Board of Directors.

Ian Wainwright and Marilyn Laver attended the International Symposium on Archaeometry in Toronto, Ontario.

Joe Dorning attended the Association des musées québécois Annual Conference in Quebec City.

CCI staff members presented papers at the International Institute for Conservation — Canadian Group Annual Conference in Toronto.

SEMINARS

"Construction of Mannequins for Historic Costumes"
Chris Paulocik and Debbie Juchem
Truro, Nova Scotia

"Opening and Closing a Seasonal Museum"
Susan Maltby
Whitehorse, Yukon

"Care of Furniture and Wooden Objects"
Gordon Fairbairn and Marsha Selick
Charlottetown, P.E.I.

June 1988

Amanda Gray and Wanda McWilliams visited the MacKenzie King Estate, Kingsmere, Quebec, to provide advice on the display of photographs and other artifacts in the estate collection.

Carole Dignard and Amanda Gray visited the Musée historique d'Argenteuil to advise summer student employees on general cleaning techniques on a variety of artifacts.

Peter Vogel visited the Confederation Art Gallery, Charlottetown, P.E.I. to carry out treatments on several paintings in the gallery's collection.

John Taylor, Marie-Claude Corbeil, David Tremain and Marsha Selick visited the Château Dufresne in Montréal on June 20th. Nineteen posters were examined to identify their printing technique and their conservation needs. A follow-up report and possible second visit will be scheduled later this fall.

Eva Burnham visited the National Archives of Canada to examine a world map, *circa* 1790, printed on silk.

Carl Schlichting conducted a number of mobile lab type visits in British Columbia. In total, eight museums were visited. Of these, four contained significant industrial collections. The survey helped Carl assess conservation needs and point out the direct applicability of the CCI research project on protective coatings for metal.

At the American Institute for Conservation Annual Conference in New Orleans, Ela Keyserlingk gave a presentation on the Conservation Information Network to the Textile Specialty Group. Gordon Fairbairn also presented a poster on "Creating the Right Impression", describing a method he developed in the Furniture and Wooden Objects lab for matching missing areas on textured surfaces.

SEMINARS

"Care of Ethnological Collections"
Tom Stone and Carl Schlichting
Winnipeg, Manitoba

"Care of Mixed Collections"
Marsha Selick and Amanda Gray
Yellowknife, N.W.T.

July 1988

Tom Stone and Phil Ward conducted a survey of totem poles in the Skeena River Valley, B.C. Examination and photographic documentation was made of earlier restorations to determine future conservation and restoration needs.

Tom Stone gave a radio interview to a Fredericton FM radio station on the conservation of the "Coleman Frog". It was broadcast during the city's "Froggie Week" which is held each summer.

Amanda Gray and Helen McKay visited Ste-Agathe, Quebec to undertake basic treatment and provide advice on the rehanging of a damaged painting.

Colette Naud visited the Heritage Museum, St. Albert, Alberta to face two paintings. She also examined and provided advice on a mural at the Mutlart Conservatory in Edmonton.

Dave Hanington and Wanda McWilliams visited the Gloucester Historical Society to complete a survey of the museum's collection.

Malcolm Bilz and David Grattan spent from June 16 to July 7 at the sites of various fossilized forests in the High Arctic, providing field assistance to the National Museum of Natural Sciences.

At the request of the Community Museum Association of P.E.I., Deborah Stewart spent the week of July 16-22 with Suzanne Howatt to help launch the province's new "Mobile Conservation Laboratory Programme". Deborah provided assistance and advice on all facets of running the programme as well as on how to drive a mobile lab. CCI extends its congratulations and best wishes to the Community Museum Association and the Province for continued success.

Susan Maltby presented a paper entitled "Saving Money" to the Canadian Numismatic Association Conference in Charlottetown, P.E.I.

SEMINARS

"Care and Cleaning of Metal Objects"
Bob Barclay and Carole Dignard
Moose Jaw, Saskatchewan

"Care of Paintings"
Debra Daly Hartin with the assistance of Adam Karpowitz, Conservator, Owens Art Gallery
Sackville, New Brunswick

"Conservation in the Arctic"
Dr. David Grattan
Resolute Bay Settlement, N.W.T.

August 1988

Sherry Guild and Wanda McWilliams visited the Lindsay Art Gallery the week of August 22 to carry out on site work and to provide instruction to gallery staff on matting and framing of works of art on paper.

Amanda Gray visited the Hastings County Museum on August 30 to examine and treat two pastels.

On August 31, Colette Naud and Amanda Gray visited the Homer Watson House in Kitchener to examine a number of murals executed on the walls of the house by the artist. A follow-up report outlining needs and recommendations was sent to the museum.

Marie-Claude Corbeil, Chris Paulocik, Marsha Selick and Gordon Fairbairn visited the Château Dufresne, Musée des arts décoratifs de Montréal August 16-19 for analysis and conservation treatment of Canadian furniture and fittings from the 1940's.

SEMINARS

Filming of the videotape production for "Closing a Seasonal Museum" and "Opening a Seasonal Museum" took place August 2-5, 1988 for DUET (Distance University Education through Television) at Mount Saint Vincent University Art Gallery in conjunction with the Nova Scotia Museum Complex and the Federation of Nova Scotian Heritage. Instructors were Mary Peever, CCI and Jane Holland, NSM.

September 1988

The video "Closing of a Seasonal Museum" which involved Mary Peever (CCI) and Jane Holland, Nova Scotia Museum, was shown on Atlantic Television three times. During the third presentation, Mary Peever and Tom Strang (CCI) were involved in a teleconferencing link-up with course participants who had specific questions about what they had seen on the program. The response to the telecast was very positive with an outlook to future video presentations on a variety of preventive conservation topics.

David Grattan attended a meeting of the Technical Study Team of the Hamilton Scourge Project.
Dr. Grattan assisted in the "Proposed Plan for Conducting the Hamilton/ Scourge Feasibility Study".

Paul Marcon carried out a building survey September 17-28 at the Palais de la civilisation, Montréal.

David Grattan gave an interview on the fossil forest Parylene project to Radio Canada. Michel Rochon conducted the interview.

Charlotte Newton attended the Archaeological Wood Symposium, a session of the American Chemical Society Meeting, in Los Angeles, California.

John Taylor attended the 12th Congress of the International Institute for Conservation in Kyoto and the International Symposium on Analysis and Examination of Art Objects by Imaging Techniques in Tokyo, Japan.

Phil Ward attended the British Columbia Museums Association 32nd Annual Conference in Harrison Hot Springs, B.C.

Joe Dorning attended the Museum Association of Newfoundland and Labrador Annual Conference in Goose Bay, Labrador.

Marie-Claude Corbeil attended a course entitled "Microscopy for Art Conservators", at the McCrone Research Institute in Chicago.

SEMINARS

"Opening and Closing a Seasonal Museum"
Susan Maltby and Carole Dignard
Huntsville, Ontario

"Care of Paintings - Parts I & II"
Colette Naud and Amanda Gray
Saskatoon, Saskatchewan

"Care and Cleaning of Metal Objects"
Bob Barclay and Carl Schlichting
Wetaskiwin, Alberta

"Care, Cleaning and Basic Repair of Ceramic and Glass Objects"
Judy Logan and Stan Frydryn
Calgary, Alberta

"Conservation préventive de l'œuvre dès le choix des matériaux"
Colette Naud
Montréal, Québec

October 1988

CCI hosted *Symposium 88: The Conservation of Historic and Artistic Works on Paper* in Ottawa, October 3-7, 1988. (See article by David Tremain elsewhere in this issue.) Four papers were presented by CCI staff:

"The Colouring of Pulp for Leaf-Casting"
David Hanington, Conservator
Works of Art on Paper

"Report on Adhesive Testing at the Canadian Conservation Institute"
Jane Down, Conservation Scientist
Environment and Deterioration Research

"Reverse Glass Prints: Their History, Technique and Conservation"
David Tremain, Conservator
Works of Art on Paper

"Degradation of Paper by Commercial Amylase and Protease Enzymes"
Helen Burgess, Senior Conservation Scientist
Season Tse, Assistant Conservation Scientist
Conservation Processes Research

A workshop on "New Techniques in the Cleaning of Paintings" was presented at CCI by Richard Wolbers, Associate Paintings Conservator at the Winterthur Museum, University of Delaware. Participants included sixteen fine arts conservators from across Canada.

Eva Burnham attended the symposium "Culture and Comfort, The Draped and Upholstered Interior 1850-1930", held at the Strong Museum, Rochester, N.Y.

Eva Burnham attended a meeting of the Board of Directors for the Costume Society of America, Montréal, Québec.

Sandy Easterbrook, Paintings Conservator, Saskatoon, Saskatchewan visited CCI to consult with Debra Daly Hartin on the operation of vacuum lining hot tables.

Jim Parker, University of Alberta, Edmonton visited CCI to consult with David Tremain and Eva Burnham on the design and equipment requirements for establishing a combined paper and textile conservation facility.

A tour of all the labs and the library at CCI was provided to students from Sir Sandford Fleming College, Art Conservation Techniques Programme.

Charlotte Newton and Tara Grant spent two days in Peterborough at the York North Archaeological Services Inc. to provide advice on proper storage of a collection of archaeological material from the University of Toronto.

Dr. Lyndsie Selwyn presented a lecture entitled "How Science Serves the Arts" to students and faculty of the Department of Chemistry, Concordia University, Montréal, Québec.

Joe Dorning attended the Ontario Museums Association Annual Conference in Peterborough, Ontario.

Nancy Green attended the Federation of Nova Scotian Heritage 11th Annual Conference in Sydney, Nova Scotia.

A demonstration of the Conservation Information Network was given by Jane Down and Helen Jelich (CHIN) to the CHIN Users Conference at the National Gallery of Canada.

The International Gilding Conservation Symposium in Philadelphia, Pennsylvania was attended by Laura Nagora, Gordon Fairbairn, who was a participant on the panel discussion on "Aspects of Training Conservators in Gilding" and Stefan Michalski, who presented the paper "Crack Mechanisms in Gilding".

SEMINARS

"Basic Care of Furniture"
Gordon Fairbairn and Laura Nagora
Sir Sandford Fleming College, Art Conservation Techniques Program
Peterborough, Ontario

"Opening and Closing a Seasonal Museum"
Deborah Stewart and Carole Dignard
Brandon, Manitoba and Barkerville, B.C.

"Care of Mixed Collections"
Helen McKay and Laura Nagora
Montague, P.E.I.

Comings and Goings

Marilyn Laver has taken a five year leave of absence from CCI. Marilyn, who was a Senior Conservation Scientist with the Analytical Research Services laboratory, has been named CCI's first Research Associate and in that capacity is completing her research on the artists' pigment titanium dioxide white as her contribution to the third volume in the series *Artists' Pigments: A Handbook of Their History and Characteristics* to be published by the National Gallery of Art in Washington. Since her arrival at CCI in 1973, Marilyn has made an outstanding contribution to many aspects of its programmes not only as a scientist and engineer, but as occasional manager and editor as well. Marilyn's creative approach in studying a range of materials and problems is greatly missed.

Marilyn took a keen interest in archaeometry from her first project on the characterization of Alaskan obsidian by atomic absorption spectrophotometry, to more recent metallographic

and x-ray spectrometric studies of Amerindian trade silver and iron and copper artifacts from the Arctic. ARS is often called upon to assist museums and galleries in questions of attribution. These projects were frequently assigned to Marilyn as were a handful of major cases of art fraud which were undertaken for the Royal Canadian Mounted Police (Interpol) and the Metropolitan Toronto Police.

While chairperson of the CCI Editorial Committee, Marilyn shepherded some forty CCI *Notes* and *Technical Bulletins*, as well as many manuscripts for external publication, through CCI's review and editorial process.

A Registered Professional Engineer in Ontario since 1976, Marilyn has been on the Queen's University Advisory Council on Engineering and has contributed to a number of professional organizations including the ICOM Committee for Conservation Metals Working Group, the Ottawa Section of the Chemical Institute of Canada, and the International Institute for Conservation - Canadian Group. For the past three years, Marilyn has been a member of the CCI Team in the Run for the ROM 24 Hour Relay. CCI looks forward to an ongoing association with this dedicated scientist as she starts a new phase of her career in Metropolitan Toronto.

Anik Morrow has left CCI to complete a one year Advanced-Level Internship in the paintings division of Harvard University's Fogg Art Museum. During Anik's two years at CCI, she completed an Advanced-Level Internship and a one year Fellowship. This past year, Anik was contracted by the Fine Arts and Polychromes laboratory to undertake various projects including treatment of *Vellut Granate* by Antoni Tapies from the Musée d'Art Contemporain in Montréal and the completion of the treatment of *Saint-Pierre aux Liens* by Joseph Legaré from the Musée Acadien in Caraquet, New Brunswick.

Gregory Young has been pursuing graduate studies at the Institute of Archaeology, Department of Archaeological Conservation and Materials Science, University of London during the 1988 Fall semester. The theme of his research is the physical and chemical stability of collagen and its purpose is to develop a better understanding of the deterioration and conservation of skin and leather artifacts. The project is continuing at CCI.

Lynn Grant completed her fellowship contract in the Archaeology laboratory in mid-May. Lynn has accepted a permanent position as Assistant Conservator with the University Museum of Archaeology and Anthropology in Philadelphia, Pennsylvania.

Elise Dubuc, on a grant from the Institute of Social and Economic Research, Memorial University of Newfoundland worked in the Archaeology laboratory from May to September, taking patterns of a number of complex textiles from the 16th century Basque whaling site at Red Bay, Labrador. These included the large collection of textiles associated with human remains which were excavated in 1982/83.

Danielle Allard worked in the Fine Arts laboratory at CCI from May until the end of June. She is currently working at the Musée des beaux-arts de Montréal, Québec.

Gary Lowderman, who completed an eight-month curriculum internship in the Works of Art on Paper lab, continued working in the Paper laboratory preparing samples of coloured leafcasting repair papers until the end of June.

Luci Cipera, who worked in the Archaeology laboratory in the summer, is presently enrolled in the Queen's University Master of Art Conservation Programme.

Wendy Vance, a visual arts student at University of Ottawa, worked as a summer student in the Paper laboratory, assisting with the documentation of leafcasting of coloured repair papers and in the Fine Arts laboratory on the preparation of model paintings.

Christie Paquet, working as a volunteer in the Fine Arts laboratory on a project to study methods of lining paintings during the winter of 1987-88, accepted a short-term contract from August to October to undertake the peel testing for the lining project.

Season Tse, Assistant Conservation Scientist, Conservation Processes Research laboratory, returned from maternity leave in June 1988.

Samantha Drouin, a student in Chemistry at the University of Toronto, completed a second summer at CCI. Samantha was working on a project to investigate applications of "Ageless" oxygen absorber (products of Mitsubishi Gas Chemicals of Japan - see *CCI Newsletter* June 1988).

Colette Naud, Conservator, Fine Arts Laboratory, completed the ICCROM course on "Mural Restoration" held in Rome, Italy, February 11 to June 3, 1988.

Minda Bojin attended the Canadian Museum Association annual conference in Halifax in June to represent the Librarians' Special Interest Group in a discussion with CMA staff and executive about the role and relationships of special interest groups within the Association. A meeting of the Librarians' SIG was held to discuss future directions and the state of NMC libraries.

Tara Grant joined CCI as Assistant Conservator in the Archaeology laboratory on July 4. Tara was formerly with the Parks Canada conservation lab in Winnipeg.

Sherry Guild returned from a three-month work assignment at the Royal Ontario Museum on July 5th.

Shawn Aitkin, Librarian, joined the library staff to work on the editing of data in the BCIN bibliographic data base of the Conservation Information Network.

Nancy Kerr, Professor of Textile Science and Conservation, University of Alberta, is on an eight month sabbatical until May 1989 in the Conservation Processes Research laboratory. Nancy is working on analytical techniques to determine the degradation of protein fibers in wool and silk.

France Bertrand, who was on contract with the Canadian Council of Archives, working in the Conservation Processes Research laboratory at CCI, accepted a full time position with Health and Welfare Canada.

Carole Dignard, in her final year of CCI's Conservation Fellowship Programme, accepted a term position in the Ethnology laboratory, CCI, as of October 1988.

Barbara Tose completed an eight-month curriculum internship in the Archaeology laboratory at the end of April 1988 and was subsequently hired on contract from mid-May 1988 to March 1989. In addition to the treatment of a variety of artifacts from Red Bay, Labrador and Prince of Wales Northern Heritage Centre, she has been assisting in the final stages of treatment of a cannon from the Musée militaire et maritime de Montréal.

Terry Keith was hired in December by The Library of Parliament to treat *The Birds of America*, Vol. 2 from the original drawings by John James Audubon, published in 1826-1838. This volume belongs to The Library of Parliament, Ottawa, Ontario. Terry will be doing this work at the CCI Works of Art on Paper Laboratory.•

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CCI Commercial Product Analytical Reports

The Canadian Conservation Institute is offering for sale a set of over 470 Analytical Research Services reports on commercial products. These reports describe the analysis of a wide variety of materials encountered in conservation such as adhesives, cleaning materials, surface coatings and display/storage materials. Long term aging studies and performance testing were not conducted as part of the analyses but, where possible, recommendations were made regarding the suitability of the products for conservation applications. Although every attempt has been made to ensure the reliability of the reports, they were written over a thirteen-year period and some may now be obsolete as a result of products being discontinued or changed in formulation.

The complete set of reports is available at a cost of $100.00 (CDN) plus a $10.00 postage and handling charge. Photocopies of report summaries from the ICARUS database are provided in a three-ring binder. Annual updates will be made available in July of each year at a price to be determined. As in the past, copies of up to ten reports will be provided free of charge. These reports are currently available in English only. To order the list of available reports, copies of individual reports or to purchase the entire set, please complete the accompanying form and send it to:

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