Chasing Phantoms - A collaborative approach to improving access to the National Gallery of Australia's collection of 19th century Aboriginal drawings.

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ABSTRACT

The National Gallery of Australia has a small but significant collection of Aboriginal drawings from the 19th century, the majority being by Tommy McRae. The works are drawn in a variety of inks, including iron gall ink, with some exhibiting signs of advanced deterioration. Due to their cultural significance and rarity, the drawings are in constant demand for loan and display. A number of factors have been restricting this access – the nature of the works, their fragility and the fact that some are bound in sketchbooks. The complexities of the collection are compounded by confusion over the loose and bound components, exacerbated by a significant number of interleaving sheets showing phantom images of works, not in the collection.

The project involved close consultation with the Curatorial Department. An approach was developed to allow increased access without compromising the integrity of the works. Establishing the original format of each sketchbook was of primary concern to this research and would allow facsimile sketchbooks to be constructed as part of this approach to access. Conservation treatment was aimed at repairing and strengthening the drawings and investigating methods to arrest degradation.

This paper provides an overview of the collection and its associated problems, with particular reference to the issue of access. Results of materials and techniques analysed, undertaken in collaboration with the University of Canberra, will be presented, highlighting the implications for display.

BACKGROUND

It is not known exactly when Tommy McRae was born; however the literature indicates that it was sometime in the 1830s and he died in 1901(Sayers 1994, 27). As a young man he worked as a stockman on various properties on the Northern side of the Murray. Much of his art was produced late in his life. During his last two decades he lived with his family group around Lake Moodemere near Wahgunyah (Victoria) and Corowa (New South Wales) next to the Murray River. Tommy McRae is said to have been discovered by the Wahgunyah Postmaster who saw his drawings in the river mud.

> One day in about 1858, Tommy McCrae was observed making of … his curious drawings in the river mud by the Wahgunyah postmaster. Mr Kilborn was apparently so impressed by Tommy's unique ability that he offered encouragement by supplying the young artist with some drawing materials and ink. (Arnold n.d., 60).

The drawings in his sketchbooks were mostly produced specifically to order and comprised only a part of his income which was supplemented by raising poultry and selling fish and possum-skin rugs. Tommy McRae is recorded as having sourced his materials from a local stationer's shop in country New South Wales, near the station where he lived. He did not have access to specialist art suppliers, nor the funds to purchase expensive pigments and paper. The materials were often bought on his behalf by his patrons.

The works, produced to commission, observed aspects of traditional Aboriginal life through the eyes of an indigenous artist using European materials. For this reason he was disregarded for many years, his important place in Australian art history being reassessed only relatively recently. He was making his drawings at a time when life around him was changing in a dramatic manner and at an unparalleled pace. The observations in his work are significant, as he records the momentous changes to traditional Aboriginal life, acknowledged by the inclusion of both European and Chinese figures in the sketches. Elsewhere there are other indications of the incursion of industrialised societies such as his depiction of tall ships and firearms.

THE COLLECTION

Initially it was assumed that the collection comprised one complete and one incomplete sketchbook, with a number of loose sheets. Each sketchbook also held interleaves with mirror images of the drawings on the adjacent page as a result of the burn-through effect of the iron gall ink media. This made it possible to match loose interleaves with the original works. On further examination, our initial thoughts proved inaccurate as a number of interleaves were identified which did not match the existing drawings in size or image. It was therefore important to alleviate confusion over the loose and bound sheets by identifying discrete parts of the collection.

Following careful inspection of the drawings and interleaves, we found that this collection consisted of four incomplete sketchbooks rather than two as we had initially thought.

History of the Collection

The NGA's collection of drawings and sketchbooks was purchased at three stages. The small sketchbook was bought at auction in October 1989. It had originally been acquired from McRae by the great-grandfather of the previous owner for the sum of 10 shillings (Arnold n.d., 60). The two treated sketches, plus tissue interleaves and blue cover were donated to the Gallery in June 1990. They were passed by descent to family of Roderick Kilborn of Wahgunyah (Sayers 1994, 124). The large sketchbook and nine-and-a-half loose drawings (one of the pages is incomplete) were purchased from Christies in Sydney in August 1994. The following is an excerpt from the auction catalogue:

> Two sketchbooks, joined: The first thirteen drawings are inscribed with titles in a contemporary hand and introduced as 'The following sketches done with pen and ink by Mr. Thomas McCrae Aboriginal'. The latter

nine drawings are in a second sketchbook and are inscribed with titles in another contemporary hand, one inscribed 'Thomas McCrath (sic.) Corowa New South Wales'…

PROVENANCE:
Tommy McRae worked on the present owner's great grandfather's property near Corowa. Reputedly he provided Tommy with the book and pens, encouraging him to do a series of sketches for him...

Condition of the Collection
Small Sketchbook
The small sketchbook, probably executed during the 1880s, is virtually complete and in relatively good condition. This sketchbook is in fact a hardbound pocket notebook, not an artist's sketchbook in the traditional sense. Each page is 20.2 x 16.3 centimetres. The marbled covers have minor damage, but the paper pages, which are ruled with faint, blue lines on both sides, are sound and the inks are vibrant and fresh. Through fibre analysis (microscopy and stains) the paper was found to be chemically processed, lignin free, consisting predominantly of wheat straw with some linen fibre. The paper is cream, medium-weight and machine-made with a laid impression. The drawings, executed in a simple range of coloured inks, are in very good condition, probably largely due to the sketchbook having been stored closed for most of its life. The coloured inks comprised black, blue, bright pink and violet. The conservation concerns are related to the problems of safely accessing and displaying such a unique and significant item without engendering damage. Some of the sketches have been previously published in reproduction, but the book itself has seldom been on display.

Larger Sketchbook
The larger sketchbook comprises seven folios of unruled wove paper, originally bound as a 'Royal Academy Drawing Book', but rebound in hard cloth-covered covers with floral end papers encasing the original covers. There is a tissue interleaf tipped onto the spine edge of each page, with the exception of the first page. The paper is unruled, cream, wove and machine made. Fibre analysis indicated that it was probably a mixture of chemically processed wood fibre with some bast fibre. Each page measures 23.8 x 36.2 centimetres. The final page of the outer folio has been torn out. The binding was clearly not original and the new binding arrangement was engendering some stress in the pages. This is most severe in the first page where a paper strip had been glued around the text block spine, causing the page to split at the spine edge. The first and last pages of the sketchbook are extremely brittle, discoloured and acidic as a result of their proximity to the original limp boards. Iron gall ink appears to be the only medium used for the creation of the drawings in this sketchbook. Although there is significant characteristic iron gall ink deterioration of the paper in the sketchbook, including burn-through of the images onto interleaf sheets, compared to other McRae works in the collection the level of deterioration is less severe. This could be because the works remain bound and have thus experienced less exposure to the environment.

Loose Pages and Interleaves
The loose, unruled, cream, medium-weight, wove paper pages and tissue interleaves, originally thought to be part of Collection Item 2, are similar in size and furnish but are in much poorer condition. With the loose page drawings the iron gall ink is much more intense in nature and thickly applied. It has been modulated with a blue pigment on a number of occasions. These drawings exhibit bleeding and haloing around the iron gall ink image and in two cases the ink has promoted significant paper and image loss. A white, crystalline bloom was apparent, intimately associated with the surface of the ink. This occurred in a number of areas, including figures, flag and ship motifs.

The interleaves are a light-weight, machine-made, mechanically processed paper based on wood pulp with a small bast fibre addition. They have suffered edge tears, creasing and severe acid-induced deterioration, compounded by extensive burn-through due to their proximity to the iron gall ink images,

resulting in substantial losses due to embrittlement. The interleaves comprise folios with the exception of one which has been torn and separated at the centre fold.

Tommy McRae, iron gall ink drawing, loose sheet, Larger sketchbook format

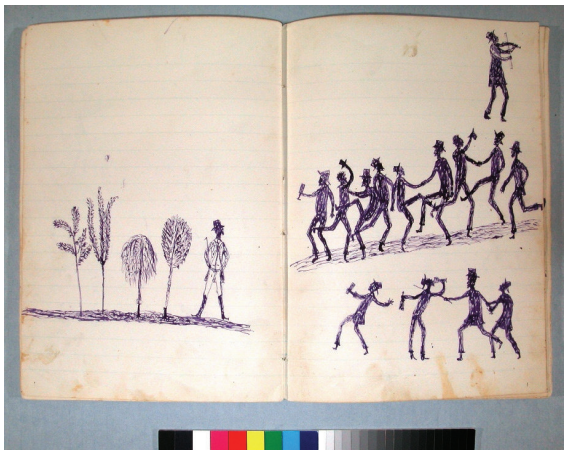
The Phantom Sketchbook

This item, comprising a set of interleaves (stapled together), a cover and two drawings, was in reasonably good condition. Each page is 21.8 x 27.8 centimetres. The two drawings, executed in iron gall ink on unruled pages, have been previously treated, evidenced by lining papers on the verso. The interleaves, although subject to some creasing are otherwise intact, with minimal burn-through from their original adjacent iron gall images. Examination of the offset images on the tissue interleaves has led to tracing the location of a number of the original sketchbook pages in other collections throughout Australia, including the collection of the University of Melbourne and private collections in Canberra and Melbourne.

ANALYSIS OF SMALL SKETCHBOOK

The analytical information in the following sections on the composition of inks, using Raman and FTIR, is based on a report by David Wise from the University of Canberra.

The small sketchbook was highlighted for analysis. As part of a general inquiry into the materials used by Tommy McRae and also as an assessment of the suitability of the sketchbook for exhibition, the composition of the inks was investigated.



Tommy McRae, drawing in violet ink, small sketchbook format

While the coloured inks remained relatively bright and clear it was noted that changes had occurred in the black ink. From the strong absorption observed on examination under ultraviolet (UV) light and the deterioration of the paper which had occurred around the black ink, it was obvious that the black was likely to be based on an iron-gall formulation. Iron-gall inks are known to be extremely variable. A number of contemporary documentary sources state that McRae did not manipulate his materials in any way, applying them directly in the state in which they were purchased. However, other sources record that McRae added to his iron gall inks in an unspecified manner. A majority of the sketches in the small sketchbook are executed in black, blue or violet inks, with the majority being in blue or violet. The pink ink is used only occasionally and is typically found underlying one of the other inks. At the time the sketches were made there were a number of intensely-coloured and highly fugitive inks in commercial production, a major concern in proposing the book for display.

All the inks are present as stains directly on the paper, with very little obvious particulate matter available for sampling. A decision was made therefore to attempt to analyse the inks in situ using infra-red micro-spectroscopic techniques. The two

techniques considered for use were Raman and FTIR. Both have a variable track record with inks but other more traditional methods such as TLC or HPLC for examining these materials would have required the removal of an unacceptable amount of material from the drawing surface. Analysis was initially carried out by Raman directly from the images in the sketchbook, followed by analysis on single-fibre samples.

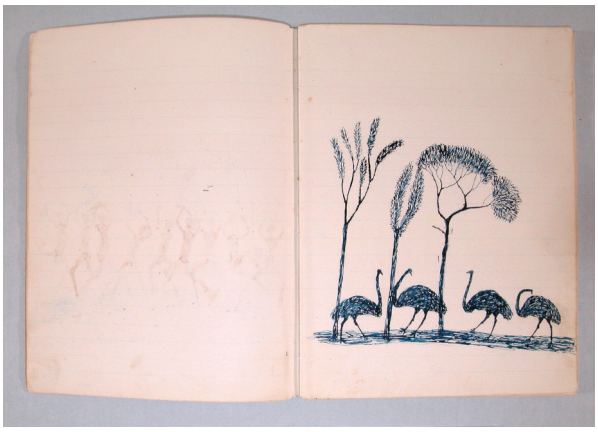
Equipment

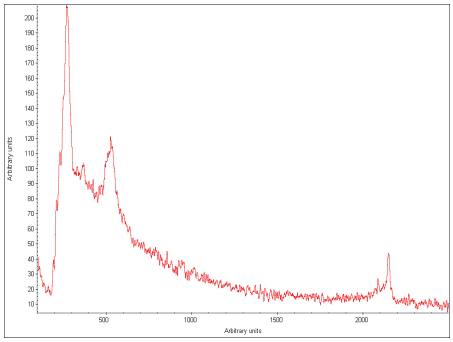
The instruments used were a Renishaw 2000 Raman spectrophotometer linked to an Olympus BH2 microscope. Analysis was carried out using a near infra-red diode laser through a x50 objective. The FTIR was a Thermo-Nicolet Nexus FTIR bench unit linked to a dedicated Centaurus FTIR microscope This latter unit incorporated facilities for transmitted and reflected work as well as ATR.

Ideally this work should have been carried out with a remote probe linked to the microscopes. Unfortunately none was available. In consequence considerable difficulties were experienced in keeping the beam focussed during the gathering of the spectra as the paper support tended to move in response to the heating effect of the laser. Having to fit the sketchbook onto a standard microscope stage also limited the areas which could be reached for analysis.

Raman

The results were variable. The iron gall ink, pink and violet inks exhibited extreme fluorescence with no indication of any characteristic peaks. SERRS techniques were also applied, but no improvement in the Raman response could be gained.[1] Raman produced only one positive result but was able to rule out a number of possibilities. The dark-blue ink gave a characteristic spectrum for Prussian blue, ferric ferro-cyanide with the distinguishing peak at 2200 wave-numbers. Prussian blue is lightfast, strongly staining and has been widely used in most media since its introduction around 1710. By the latter half of the 19th century it was a cheap, readily available and reliable pigment for use in all paints and inks. It was replaced only after the 1930s with the newly-developed blue copper phthalocyanine pigments which were not alkali-sensitive like Prussian blue and therefore capable of more reliable use in any situation, especially the growing plastics industry.





Tommy McRae, drawing in Prussian blue (top)
Raman spectra, with characteristic peaks for Prussian blue (lower)

Of the other colours none could be identified with Raman. All were subject to intense 'fluorescence', an inherent response to the excitation energy of the laser which masks any identifying peaks. For iron gall inks this is a recognised problem with dispersive Raman; it is also a common experience with many inks. However having found that the pink and the violet showed strong fluorescence with Raman a number of possible materials can be discounted. The red natural dyes common at the time in artist's paints, cochineal and madder, both fluoresce strongly but it is still possible to obtain some weak, though undiagnostic, peaks. These were not present in the McRae pink. Similarly two synthetic materials

which were used in inks at the time, eosin and Rhodamine B also show fluorescence but do give some strong peaks; again they were not present in the spectrum from the pink. Other synthetic organic dyestuffs which were appearing around the 1870s – 1890s were the azo dyes but these generally give relatively reliable spectra with Raman.

A comparison of the McRae spectra with two aniline based dyes, Gentian Violet and Malachite Green, show a similar degree of fluorescence with the only peaks being background detector noise. It is possible therefore that the two unidentified colours are based on aniline. These were extremely common at the time and used in everything from fabric dyes to food colouring. They are also, in general, of poor lightfastness and some are prone to rapid fading.

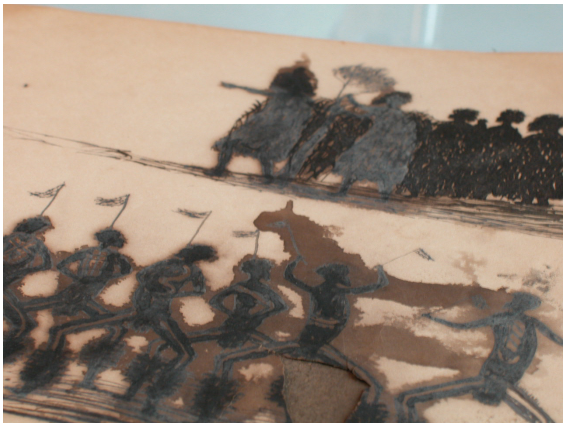
Given the date of the sketchbook, the physical appearance of the pink and violet inks, and the reputed source, the range of materials they were likely to be based on is relatively limited. As the inks are probably cheap commercial products rather than materials prepared specifically for use by artists, there is a strong likelihood that they are examples of the triphenylmethane or aniline dyes developed in the two decades following Perkins' introduction of Mauve in 1856. By the 1880s the range of aniline dyes was large with small variations in formulation resulting a huge range of colours (Arnold 1973). A range of archival and modern aniline dyes were prepared as stains for comparative purposes and examined by Raman. All produced a similar strongly fluorescent response.

FTIR

FTIR microscopy proved more successful. Each of the colourants examined produced distinct spectra; however this was almost wholly derived from the unstained paper support. For the pink ink there was no difference in spectra between the stained and unstained paper. For the violet there was an additional band observed at 1600 wavenumbers. This band was also observed in staining tests with a number of known aniline dyes and equates to the strongest band present in the raw dye spectra.

Bloom on Loose Sheet Iron gall Ink Drawings

Two works, loose sheets, (designated Collection Item 3) exhibited a white bloom over discrete areas of the image. Cross-sections were taken to determine whether the bloom related to the application of a surface coating or if it was a component of the ink leaching out. Cross-sectional microscopical analysis confirmed that the bloom was, in fact, an integral component of the ink.



Tommy McRae, iron gall ink drawing, detail of bloom

Considerations for Treatment and Pre-treatment Testing

Iron Gall inks are commonly derived from the reaction between iron salts and plant galls, subsequently bound in a gum. The conservation literature indicates that the degradation of iron gall inks occurs via a range of complex mechanisms and is triggered by a number of factors including variations in the original formula of the ink. This might have excess ferrous sulfate or sulfuric acid as an additive, thus making free iron ions available for chemical reaction. It is well known that iron has the ability to change easily from one oxidation state to another, enabling it to initiate auto-oxidation of cellulosic materials (Daniels 2001, 33-34). The thicker the application of the ink and the greater the degree of penetration into the fibre matrix, the greater the potential for more severe degradation. (Reissland 2001, 67-68).

There is conflicting information in the conservation literature regarding the use of aqueous or non-aqueous treatments on iron gall ink. Reissland (2001, 109-110) highlights the dangers of aqueous treatments while Donnithorne (2001, 62) states, in certain circumstances, partial aqueous treatments may be useful or even necessary. The mobility of the iron ions during treatment is a major concern – iron II can be easily solubilised into paper supports, where it can remain as a residue for future degradation (Eusman and Mensch 2001,121). Recent research disputes this. Eusman (2002, 126) found that iron II ions were not present in the paper support after aqueous treatment but were detected in the washing solution. Documentary sources can be similarly confusing in relation to deacidification of iron gall inks. While deacidification is known to sometimes cause colour change in iron gall ink, inks with a pH below 5 are considered to be unstable (Wunderlicht in Daniels 2001, 34).

Solubility testing was undertaken on a selection of the works, including tissue interleaves with transfer images and also the loose iron gall ink drawings. This was done using water, 50:50 water/ethanol and 95% ethanol. Very minor bleeding was observed on the tissue interleaves using water alone. No bleeding of inks or discolouration was observed on the loose iron gall ink drawings.

The tissue interleaves were found to be by far the most brittle and damaged items in the collection, due to the extremely light weight and mechanically processed nature of the paper. A decision was taken to line them using an aqueous method. This was necessary to fully support the areas of extensive loss, raise the pH of the sheet and allow for safe handling and storage. A non-aqueous lining method was chosen for lining three of the most severely damaged loose-sheet, iron gall ink drawings. The non-aqueous method was selected because of the thickly applied ink, the fact that the ink had bled previously and had become an integral part of the paper. In addition, the supports had fracturing and losses in areas of ink application. The remaining treatments for the collection were limited to minimal surface cleaning and edge repairs.

TREATMENT

Small Sketchbook

Treatment of the small sketchbook was carried out by Heather and Darryl McPherson. The focus of the treatment was to ensure that the sketchbook was structurally sound. Initially the intention was to keep the sketchbook intact and carry out minimal repairs. However it was necessary to pull the sketchbook down in order to guard the loose pages. The pages were minimally surface cleaned and other minor repairs undertaken with Japanese paper and wheat starch paste. The sketchbook was rebound with its original covers and an archival storage box was made to house it.

Larger Sketchbook

It had been established that the binding on the larger sketchbook was not original and was causing chemical and physical damage to some pages. With Curatorial input, a decision was made to take it down to make more of the drawings available for display on a rotation basis. The binding thread was carefully undone and stored, making the folio pages fully accessible. Each folio page was lightly dry surface cleaned and minor edge tears repaired using Japanese paper and wheat starch paste.

Loose Pages and Interleaves

Loose pages – non-aqueous lining. Losses were patched using repair paper of a similar weight and tone to that of the drawings. The patches were toned with watercolour to match that of the surrounding areas. Curatorial staff were again consulted and a decision was made not to inpaint missing image areas of the drawings. Non-aqueous methods of repair were used to avoid potential movement of ink components or degradation products. The patches were adhered with 5% Klucel-G w/v in 95% ethanol. Medium-Light-weight Japanese Kozo tissue was selected as lining paper. It was pasted out onto an acrylic sheet with 5% Klucel-G w/v in 95% ethanol and allowed to dry. A

second coat of Klucel-G in ethanol was applied and again left to dry overnight. The lining papers were positioned on the reverse of the drawings, adhesive side down, and the adhesive was reactivated by brushing through with ethanol. The lined drawings were pressed between blotters and Reemay.

James Ward repairing areas of loss to two Tommy McRae Iron gall ink drawings.

Interleaves – aqueous lining. Severe folds and creases in the interleave tissue were reduced by ironing with dampened blotter and a heated spatula. The interleaves were gently relaxed individually for a few minutes under a humidification dome using an ultrasonic humidifier and were subsequently lined on the reverse side with Tengujo tissue. Thin wheat starch, buffered to pH8 with calcium hydroxide, was used. The tissue interleaves were in folios and therefore the offset images appeared on both sides of the paper sheet, albeit one on the left page and one on the right. Both pages of each folio, therefore, had to be lined separately and on opposite sides of the paper sheet. This was accomplished by first lining one page and allowing it to dry unrestrained. The entire sheet was then remoistened and the opposite page was lined on the other side. Each folio was then adhered to the *karibari* by the lining paper borders, with thin wheat starch paste. Small strips of Japanese tissue were applied at the joins of the lining paper to prevent overstretching and tears at the joins.

The Phantom Sketchbook
No treatment was necessary as the two drawings had been treated previously.

Access

The results of the Raman analysis have highlighted the need to minimise exposure of some of the drawings, specifically those with red/pink inks and the purple/violet inks in the small sketchbook, due to their extremely fugitive nature. The idea of producing a high-quality facsimile sketchbook was developed in consultation with the Curatorial department. This project is in progress and will allow access to the content of the images whilst protecting the originals. It is intended that the facsimile will be made available for public access and study purposes without restriction.

The decision to debind the large sketchbook was also made in collaboration with the Curatorial department. In addition to reducing physical stress on drawings in the sketchbook, this has enabled greater access to a wider group of drawings. These drawings will be subject to the same display restrictions as any other sensitive work on paper in the Gallery.

Conclusions

Ultimately, *Chasing Phantoms* provided an interesting challenge for Paper Conservation. The 'ghost' images on the tissue interleaves provided invaluable information for the project. They gave clues as to the format and content of at least one of the sketchbooks that no longer exists in its original state; its individual drawings are now distributed throughout public and private Australian collections. In addition, the interleaves assisted in identifying the different sketchbooks in the collection and provided an indication of page order.

The two primary concerns for the project were the desire to provide greater access to the drawings and the requirement to curb the extent of iron gall ink degradation.

The question of access to such fragile works was discussed closely with the Curatorial department. The small sketchbook remains incredibly delicate with regard to the light sensitivity of the ink media and display must be limited; however the production of a high-quality facsimile book will allow access to images that would not otherwise be able to be displayed.

The treatment of iron gall ink is widely discussed in the Conservation literature with various treatment options proposed, many of which are considered to be controversial. For example phytate treatment has been shown to reduce the rate of cellulose degradation caused by iron gall ink (Neevel, 2001, p.125); however, research is still ongoing regarding potential changes to the appearance of the ink.

A project of this nature required a collaborative approach, with input and expertise from NGA conservation and curatorial staff, UCAN staff for analysis, private book conservators Heather and Darryl McPherson, and also other conservation and curatorial staff from institutions in Australia.

FUTURE WORK

There is continuing discussion about providing digital images of the Tommy McRae drawings and sketchbooks via the NGA website. This would alleviate concern about increasing access to these fragile works while reducing the potential for damage.

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ENDNOTES

[1] Standard SERRS silver colloid solutions were obtained from Foster Freeman and used according to the recommended procedure on known samples and samples from the McRae sketchbook.

MATERIALS AND SUPPLIERS

Lining papers
Kamogawa Conservation
GPO Box 744
Canberra ACT 2601
PH: 0422-446-418
Email: info@kamogawa-conservation.com.au

Klucel G
Zin Shofu (Wheat Starch Paste)

Talas
568 Broadway
New York, NY 10012
PH: 212-219-0770
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Andrea Wise has a BA(Hons) in Design form the University of Metropolitan Manchester and an MA in Conservation (Works of Art on Paper) from the University of Northumbria. She was a Conservator for the Regional Galleries Association of NSW from 1989-1991. From 1993-1997 she was Regional Conservator at Auckland Art Gallery, New Zealand and is now Senior Paper Conservator at the National Gallery of Australia.

Fiona Kemp has a BA in Visual Arts (Fine Arts) from Charles Sturt University and a BAppSc in Conservation of Cultural Materials from the University of Canberra. She has been a Paper Conservator at the National Gallery of Australia since 1996.

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