

Sidney Nolan's Materials and Techniques: A case study of three Pebble monotypes

Katie Wood*, Briony Pemberton and Sophie Lewincamp

ABSTRACT

As a prominent Australian artist, Sidney Nolan's paintings are well researched and collected both internationally and within Australia. Less well known are his works on paper, in particular his monotypes, held in collections such as the National Gallery of Australia, the Art Gallery of New South Wales, the National Gallery of Victoria and Heide Museum of Modern Art. Three monotypes made by Nolan in the 1940s will be investigated to better understand the materials used and methods of application. Nolan is known for his use of unorthodox materials and these works were created during an era of intense experimentation. A technical art history methodology will be employed, involving primary and secondary source research and examination and analysis of the monotypes. This research has implications for both treatment and long-term preservation of Nolan paper collections.

The research contained within this article was enabled by the long-term treatment collaboration between the Centre for Cultural Materials Conservation and Heide Museum and greatly informed by minor thesis research of one of the authors.

Keywords Sidney Nolan, monotypes, materials and techniques, technical art history, microscopy, lakedyes, madder

INTRODUCTION

Sidney Nolan (1917–1992) is arguably Australia's most famous artist. His paintings challenge and influence the way in which the landscape is viewed and interpreted, and his significance as an artist stems from his contribution towards a truly 'Australian' art form. In a land lacking ancient European myths and legends, or historical events that were so often depicted in traditional art practices, Nolan elevated his subjects, such as Ned Kelly and Mrs Fraser, to the status of mythical characters. In terms of artists' materials, Nolan introduced a range of colours and materials that were informed by his background in commercial art and his desire to subvert the traditional art practices of the day (Morgan 2012, pp. 5-8).

Due to his status as a prominent Australian artist, Nolan's work and life have been extensively researched, with particular focus on his paintings. Less well known are his monotypes on paper, which are held in major Australian art institutions including the National Gallery of Australia (NGA), the Art Gallery of New South Wales (AGNSW), the National Gallery of Victoria (NGV) and Heide Museum of Modern Art (Heide). Most of these monotypes were produced during the 1940s, an era of intense experimentation for the artist (Morgan 2012). Despite the significance of these works in documenting Nolan's early artistic development, only a small body of literature is dedicated to them and the materials used are yet to receive analytical attention.

One of the subjects Nolan used for his monotypes were small pebbles of varying colours, shapes and sizes. These monotypes were produced around 1945-47 and the authors were fortunate to have access to three of them for close examination and analysis in a conservation laboratory. The purpose of this paper is to present the findings of the analysis, together with a review of the literature, and build a picture of how and why Nolan made this particular type of work.

MONOTYPES

A monotype is a print, yet unlike any other printmaking techniques it does not produce multiple identical images. It involves painting onto a plain surface and transferring the paint to another surface (Rasmusen 1960, pp. 3-8). A wide range of materials are available for both the plate and media when making monotypes. Metal, glass and paper plates are traditionally the most common, while printing ink, gouache, oil paints and a range of non-traditional artist materials can be used for the media. Even though it is not possible to make two identical impressions, artists sometimes print the same plate twice and these are referred to as 'cognates' or 'ghost prints' (Middlemost 2009, p.17). Transfer drawings are a kind of monotype that are created by applying ink to a surface, lying the printing paper upon this and drawing on the back so that ink is transferred through the application of pressure (Rasmusen 1960, p. 172). Nolan made a number of these transfer drawings, however the type of works being examined here are the 'traditional' monotype. Research undertaken into Australian monotypes at AGNSW concluded that materials such as ink, boot polish and watercolours have been commonly used and that monotype materials can be highly unpredictable as there is virtually no restriction governing the artist with regard to material choice (Treacy 2010).

NOLAN AND THE 1940S

Nolan's background in commercial art and subsequent introduction of unorthodox materials into the painter's pallet has been well documented (Adams 1987, pp. 13-20; Clark et al 1961, pp. 37-38; Morgan 2012, pp. 6-8). The influence of European artists on Nolan has similarly been thoroughly discussed (Adams 1987, p. 46; Clark et al 1961, p. 39; Clark 1987; Morgan 2012). In 1934 Nolan enrolled at the National Art School in Melbourne, yet instead of attending the classes

he preferred to spend time in the then adjoined Public Library (now the State Library of Victoria). In the library he read widely and studied reproductions of works by artists including Gauguin, Matisse, Picasso, Moholy-Nagy, Miró and Klee (Adams 1987, p. 16; Hease 1981, pp. 23-24). In doing so, Nolan rejected the traditional teaching method of imitating forms from nature and instead represented objects through abstract forms in the manner of the European avant-garde artists.

During the 1940s Nolan was a regular visitor and houseguest at the home of John and Sunday Reed in Melbourne. Known as 'Heide', the house had become a hub for many artists including Albert Tucker, Joy Hester, John Perceval and Arthur Boyd. It was during his stay from 1941 to 1947 that Nolan produced a large number of his monotypes. These were significant years in the establishment of a vocabulary of Australian Modernist Art and Nolan was very much at the forefront of this development (Hease 1981). Art historian Richard Hease (1981, pp. 92-94) describes Nolan's work as the most idiosyncratic and challenging in comparison with that of his contemporaries. While they were mystified by him, he was extremely self-assured, affording him the tenacity to produce works of such experimentation and individuality. As argued by Kendrah Morgan (2012), it was not only imagery that Nolan experimented with, but materials too. This was especially true for the 1930s and 40s. For example, following his decision to paint full-time in 1938, 'he entered a period of creative ferment utilizing whatever he had to hand...tissue, blotting and photographic paper, textile scraps, printed matter, boot polish, brick reddening, chalk, cardboard, plywood' (Morgan 2012, p. 8). Furthermore 'in the months leading up to his conscription in the army in April 1942, he continued to be fascinated by almost every conceivable creative procedure' (Morgan 2012, pp. 13-14).

The combined influences of a background in commercial art and design and exposure to European avant-garde artists evidently informed Nolan's painting practice. For example, it is known that Nolan's use of the house-paint Ripolin® was inspired directly by Picasso's own use of the paint (Dredge 2012(a), p. 19). The European avant-garde circle may also have influenced Nolan's monotypes, as many of the artists, including Picasso, experimented with this technique (Ives 1980, pp. 49-50). Another channel might have been the Australian-based European artists experimenting with monotype in the early twentieth century, including Hirshfeld-Mack, Erwin Fabian, Klaus Friedeberger and Bruno Simon (Ives 1980, pp. 49-50; Middlemost 2009, p. 17).

Of further interest with regard to the monotype technique is the fact that Nolan's first paid job during the 1930s involved painting signs on glass in transparent enamels (Morgan 2012, p. 6). It is not known which type of plate Nolan chose to use for his monotypes, however glass is certainly a possibility, and it makes sense that he might have used it given his familiarity with painting on glass. Nolan's understanding of commercial materials was further enhanced when he began work in the art unit of the Fayrefield Hat Company in Abbotsford in 1933. Evidently, Nolan showed 'aptitude for spray painting, again using stencils and layers of colour', techniques which may also have influenced his monotypes (Morgan 2012, p.7).

SPECIFIC REFERENCES TO NOLAN'S MATERIALS

The John and Sunday Reed Archives at the State Library of Victoria offer some information on Nolan's painting materials. For example, previous research by Maria Kubik (2007, p. 8) found that in two separate letters from 1943, Nolan refers to his use of dyes. He mentions in particular buying some more aniline dyes in red, blue, yellow and black from Deans art supply store in Melbourne and that 'the spirit ones are all that is necessary', as opposed to the water-soluble variety. Nolan also writes of mixing dyes with the Dulux® (alkyd) paint he was using in order to produce stronger colours. In a third letter from the same year, Nolan talks about mixing printing ink with Ripolin® (natural oil based enamel) paint; 'Printers ink will probably water the Ripolin, a lot depends on whether the ink will click in the way' (Kubik 2007, p. 8). In other research, Dredge (2012(b), p. 55) refers to a 1942 letter from the same archive in which Nolan suggests mixing nitrocellulose paints with aniline dyes.

Three authors refer to Nolan's use of materials in his monotypes. Elwyn Lynn, an artist and friend of Nolan's mentions 'oil and chalk monotypes on paper', as well as his use of dyes (Lynn 1967, p. 9). Hease (1981, p. 277) describes Nolan's 'red chalk monotypes' in relation to the bushranger series. Thirdly, in a retrospective exhibition catalogue, curator Jane Clark (1987, p. 87) discusses a technique of mixing printing ink and shoe polish on a glass plate to create monotype transfer drawings.

CASE STUDIES OF PEBBLES MONOTYPES HISTORY

Two of the case study works are from the Heide collection. They are catalogued as the same work in two parts: *Untitled (Pebbles, St Kilda)* 1946. For the purpose of this paper they will be referred to as *Pebbles 1* and *Pebbles 2* (Figures 1 & 2). The works were gifted to Heide in 2000 by Barrett Reid, who was a great friend of both Nolan and the Reeds. Evidently Nolan gave them to Reid while they were in Queensland together (Object Summary, Curatorial File, Heide). The works came to the laboratory at the Centre for Cultural Materials Conservation (CCMC) for treatment prior to exhibition.

The third case study work titled *Pebbles, St Kilda* is from the NGA collection. It was examined by one of the authors during her student internship in the conservation department. The work was purchased in 1983 from the John Buckley Gallery alongside nine other works on paper (S. Noordhuis-Fairfax 2013, pers comm., 2 December). It is very similar to the Heide *Pebbles* though the media is generally darker and more saturated. For the sake of clarity it will be referred to as *Pebbles 3* (Figure 3). The date given in the NGA catalogue entry for this work is c.1945, however the fact that it is similar to *Pebbles 1* and *Pebbles 2*, even down to a particular rectangular pebble, suggests that they were created at the same time. *Pebbles 1* has an inscription on the verso that contains the date and the artist's signature 'Dec 28th 46 N', suggesting all the *Pebbles* monotypes were produced around December 1946.

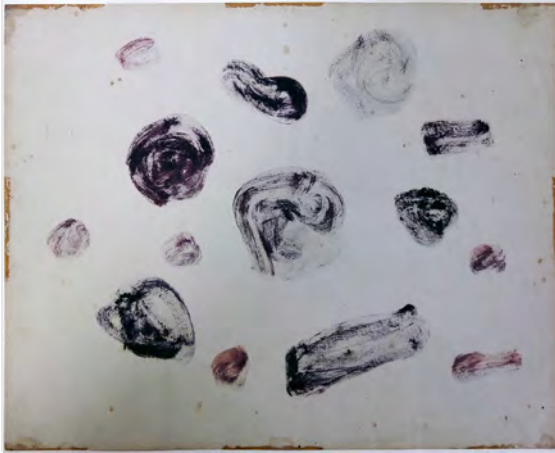


Figure 1. Sidney Nolan, *Pebbles 1*, 1946. 250 x 315 mm, monotype on paper. Melbourne, Heide Museum of Modern Art, acc. 2000.125.1, photographed by Katie Wood.

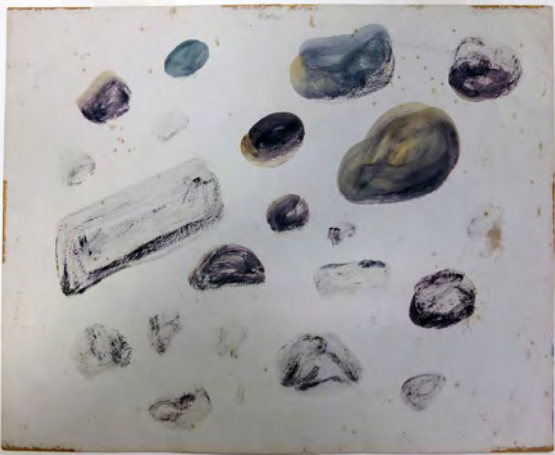


Figure 2. Sidney Nolan, *Pebbles 2*, 1946. 250 x 315 mm, monotype on paper. Melbourne, Heide Museum of Modern Art, acc. 2000.125.2, photographed by Katie Wood.

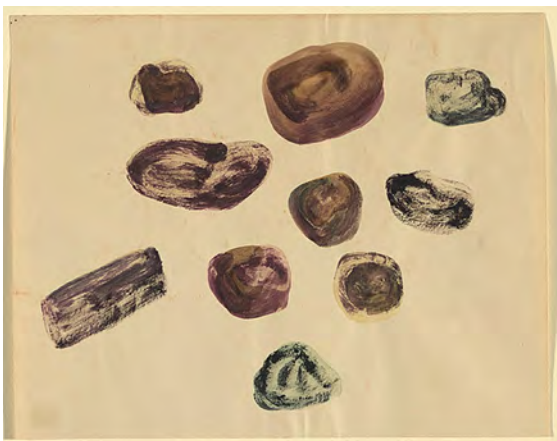


Figure 3. Sidney Nolan, *Pebbles 3*, c. 1945. 238 x 301 mm, monotype on paper. Canberra, National Gallery of Australia, acc. NGA 83.3027.

A close comparison of the images was made to determine if the same marks appear on different works, indicating a ghost print. A number of the marks on *Pebbles 1* and *2* are extremely faint and one can imagine that a first “pull” onto another sheet of paper removed the bulk of the paint. No exact matches were discovered, however other pebble works may be in existence elsewhere which do match. The authors are aware of at least one other pebble monotype in a private collection, which may be examined in the future.

VISUAL OBSERVATIONS

The support for all three works is a wove, machine made, medium to light weight, off white paper. The fibre furnish is most likely woodpulp and in all cases overall discolouration has occurred. The dimensions of each sheet are on average 240 x 310 millimetres. The media used is not readily identifiable, however it is consistent across the three works in terms of colour, texture and application. The media can be broken into two distinct types within each print: a dry, purple, opaque media of varying intensity which has very distinct brushstrokes; and smooth, even, dilute applications of green, yellow, blue and purple, positioned over the top of the opaque purple marks.

The method of applying the opaque paint is characteristic of monotype as the marks have clean edges and the brushstrokes look printed. There is also a faint plate-mark along one side of *Pebbles 3*. The method of applying the translucent colours is not as obvious but they could be either brushed on by hand or printed as part of the monotype process, possibly even with a stencil. Their transparent, even nature suggests they are watercolour, however, the fact that several of these colours have penetrated through to the back of the paper (Figure 4) indicates other possibilities such as an oil-based media thinned with turpentine, and/or the use of dyes. As previously discussed, Nolan was mixing dyes in his paint, so it follows that he might have used them for works on paper. The yellow, blue and green translucent colours that have bled through to the back of the work appear very intense on the verso, indicating the corresponding colours have faded on the recto.

With regard to the type of binder used, it was observed on the verso of *Pebbles 1* and *Pebbles 2* that the paper fibres were discoloured yellow-orange in the areas that corresponded to media on the recto. This indicates the migration of an oil-based binder such as printing ink. *Pebbles 1* and *2* had some fine white efflorescence or mould sitting on the heavier areas of purple media. This was removed during treatment and tested using Fourier Transform Infrared Spectroscopy (FTIR). Unfortunately not enough material was present to give a reading. In terms



Figure 4. Sidney Nolan, *Pebbles 2*, 1946. Verso showing strike through of dilute media, photographed by Katie Wood.

of solubilities, none of the media in *Pebbles 1* or *2* were soluble in water, they were slightly soluble in ethanol and when tested with acetone, the purple had a highly soluble pink component. The remaining colours were not tested with acetone due to risk of leaving a mark.

ANALYSIS

To assist with identifying the pigments and dyes present in the works, a combination of analytical techniques were used. Not all of the techniques were performed on all three *Pebbles* due to limitations with equipment in the different locations and a lack of funding to transport the works. For *Pebbles 1* and *Pebbles 2*, examination under the stereomicroscope, ultraviolet (UV) light and infrared (IR) radiation were chosen. Examining painted objects under UV light can yield information on the various components present as many inorganic and organic pigments produce characteristic fluorescence (Stuart 2007, p. 77)¹ and IR is useful for the detection of carbon-based materials². *Pebbles 3* was investigated using optical microscopy and polarised light microscopy. In these techniques examination of the size, shape, colour and the measurement of refractive index and birefringence of different particles can help to confirm the identity of pigments (Stuart 2007, p. 84; Feller & Bayard 1986). Examination requires sampling from the artwork, however small micro-samples are sufficient, which are barely visible therefore leaving the work unchanged to the naked eye³.

RESULTS

The results of the analysis are summarized in three tables below:

DISCUSSION

PURPLE

The purple colouring agent in *Pebbles 3* appeared as a stain on a base material when viewed at 400 x magnification (Table 1). This indicates a dyestuff and the close association of the dye to the base suggests a lake pigment (A. Wise 2013, pers comm., 4 September). When the purple sample from *Pebbles 3* was viewed under crossed polars at 400 x magnification the light-pink colour of the base material, as well as its low refractive index, indicated aluminium hydroxide. Aluminium hydroxide is typically used as a base material for lake dyes (Eastaugh et al 2004, p. 359).

The purple wash media in *Pebbles 1* and *Pebbles 2* fluoresced a bright pink-orange colour when viewed under UV light, which is consistent with madder dye (Stuart 2007, p. 77) (Figure 5). This characteristic fluorescence combined with the evidence of a lake pigment in *Pebbles 3* provides almost certain evidence that Nolan used madder lake in these monotypes.



Figure 5. Sidney Nolan, *Pebbles 1*, 1946. Close up showing orange-pink fluorescence of purple wash media under UV light at 254 nm, photographed by Katie Wood.

Media colour	Microscope at 400x magnification	Microscope at 400x magnification under crossed polars	Possible pigments
Black	Large heterogeneous particles; sharp and angular. Some transparent particles.	—	Carbon black
Green	Black pigment with finely divided and homogenous particles; so fine they were smeary in places. Relatively large black heterogeneous, angular particles. White angular particles. Blue particles; round in shape, homogenous, opaque and relatively small.	The white angular particles appeared a pink colour with a low refractive index and low birefringence.	Ultramarine blue
Purple	Separate particles were not visible, purple colourant appeared more like a stain on a white substrate. Relatively large black heterogeneous, angular particles.	White substrate was a light pink colour with no particle boundaries indicating a low refractive index (Eastaugh et al 2004, p. xxvii).	Madder dye
Yellow	Separate particles were not visible, yellow colourant appeared more like a stain on a white substrate. Relatively large black heterogeneous, angular particles.	White substrate was a light pink colour with no particle boundaries indicating a low refractive index (Eastaugh et al 2004, p. xxvii).	Lake pigment

Table 1. Results of analysis for *Pebbles 3* (NGA)

Media colour	Appearance under normal light	Stereo-microscope 40 x	IR	UV	Possible pigment
Deep purple to black/ brown	Dry, opaque, uneven application in several dilutions	Chunky black particles of varying shapes & sizes over mauve stain on paper	Darkest areas absorbed strongly	Lighter purple shades fluoresce bright pink-orange. Darker shades show some pink-orange fluorescence	Carbon black and madder dye
Light pinky-orange	Thin, even translucent layer	Black particles of varying shapes and sizes over mauve stain on paper	No strong absorption	Bright pink-orange fluorescence	Carbon black and madder dye

Table 2. Results of analysis for Pebbles 1 (Heide)

Media colour	Appearance under normal light	Stereomicroscope 40 x	IR	UV	Possible pigment
Deep purple to black/ brown	Dry, opaque, uneven application. One pebble has thin translucent purple layer	Chunky black particles of varying shapes & sizes over mauve stain on paper	Darkest areas absorbed strongly	Lighter purple shades fluoresce bright pink-orange. Darker shades show slight pink-orange fluorescence	Carbon black and madder dye
Yellow	Thin, even translucent layer	No particles visible, just yellow stain on paper	No strong absorption	Strike-through on verso fluoresced golden-yellow	Gamboge
Green	Thin, even translucent layer	Fine black particles over blue-green stain on paper	No strong absorption	No fluorescence	Carbon black and green-blue dye
Blue/green	Thin, even translucent layer	Fine black particles over blue-green stain on paper	No strong absorption	No fluorescence	Carbon black and green-blue dye

Table 3. Results of analysis for Pebbles 2 (Heide)

YELLOW

The strike-through of the yellow media on the verso of *Pebbles 2* fluoresced a golden-yellow colour under UV, suggesting an organic yellow such as gamboge (Townsend 1993, p. 38). Interestingly, the fluorescence did not occur on the recto, which could be attributed to the fading. Microscopy results of the yellow media in *Pebbles 3* provide evidence of a lake pigment, with similar observations to those of the purple media (Table 1).

GREEN

The blue particles seen under 400 x magnification in *Pebbles 3* are consistent with synthetic ultramarine (Eastaugh et al 2004, p. 44; Plesters 1993, p. 57) (Table 1). It appears the green colour was formed by mixing synthetic ultramarine with a yellow pigment. The identity of this yellow was not characterised further.

BLACK

Pebbles 1 and *Pebbles 2* were confirmed to contain a carbon-based pigment with IR (Stuart 2007, p. 73) (Tables 2 & 3). Further information into the type of carbon pigment Nolan used was gained through microscopy.

The large black heterogeneous particles seen in all of the samples from *Pebbles 3* is not typical of commercially produced oil paints or printing inks, which usually employ a finely ground pigment such as lamp black or carbon black (Winter & West FitzHugh 2007, p. 12) (Table 1). Associated with these large black particles were some transparent areas. These suggest the presence of a resinous material, which is characteristic of vine, bone and ivory blacks (Eastaugh et al 2004, p. 233). This resinous material could also be resultant of Nolan having burnt natural materials such as sticks in order to add to his media. Some of the black particles seen in this sample are sharp and angular similar to those seen in a reference sample for charcoal.

It is not clear exactly what material Nolan was adding, however the evidence suggests it was either burnt sticks or crushed charcoal. Due to the large particle size, it is unlikely these are commercially produced pigments.

In contrast to these large and irregular particles, another black pigment seen in the green sample was finely divided and homogenous, indicating a commercially produced pigment (see Table 1). There were also some white angular particles associated with these fine particles which, under cross polars appeared a pink colour with a low refractive index and low birefringence. This indicates barium sulphate (Feller 1986, p. 55), which is often used as a filler in commercial paints. It is very unlikely Nolan himself would have added this material (Feller 1986, p. 47). The analysis suggests then, that Nolan used both commercial and home-made black media.

SUMMARY OF ANALYSIS

The *Pebbles* works contain a crude carbon black pigment mixed with madder lake for the purple hues, and a finer carbon black mixed with ultramarine blue and an unidentified yellow for the green. The yellow media in *Pebbles 3* was confirmed to be an organic lake pigment under 400 x magnification. It is likely that all the transparent colours contain dyes, which explains why they were able to be pushed through the paper fibres when applied. The fading on the recto of these colours further suggests the use of organic dyestuffs.

The results of the examination and analysis are consistent with what was reported in the literature. For example, it is known that Nolan used dyes and that he had experience with layering colours when he worked at Fayrefield Hats. It is worth recalling just how experimental Nolan's art practice was, especially in the years leading up to the production of the *Pebbles* works. There remain many possibilities for how he created these works, perhaps he added some of the house-paint he was using at the time or made use of the stencil techniques. Avenues for further research include

- Characterising the binder in these works i.e. if it is oil, is it printing ink or oil paint?
- Identifying the type of dyes used i.e. are they aniline dyes as indicated by the literature?
- Looking for ways to identify shoe polish. This was mentioned in the literature however no further evidence was found during the analysis.
- Examination of other pebbles works to corroborate what has been found and perhaps provide further information.

In terms of conservation implications, the major point of note is the sensitivity of the dyes to light, and the influence this might have for displaying other Nolan works with similar colours to the *Pebbles* monotypes. A second point is the potential for his works to contain mixtures of unconventional media and therefore the extra caution required when undertaking treatments.

CONCLUSIONS

Sidney Nolan's background in commercial art gave him the confidence to experiment with a wide range of materials and techniques such as monotype printing. Through examination and collaboration this research has identified a number of materials components within the case study works. Questions still remain unanswered and there are numerous avenues for future investigation.

Detailed examination of these under researched Nolan works contributes to our understanding of the artist, his processes, materials and techniques. This research initially developed from treatment work of the Heide collection at CCMC and with the support of Heide became a student minor thesis research project. Minor thesis research such as this pulls together knowledge from many sources and enables collaborations between small and large organisations; with and without conservation staff (such as NGA and Heide).

It is hoped that publication of this research may enable other *Pebbles* examples to come to light for comparison. Research and visual examination suggests there is still much to uncover about the Nolan monotypes, this article provides a starting point for future investigations at Heide and other Australian collections.

ENDNOTES

1. The works were examined under a Fisher Biotec VL-6.LC 6W ultra-violet light at both 365 nm and 254 nm.
2. Infrared reflectography was carried out using a Hamamatsu C2741-03 infrared vidicon camera and a pair of Hamamatsu C1385-02 infrared light sources.
3. Micro-samples of each of the pigments were removed from *Pebbles 3* according to the different media colours. These were placed on microscope slides, dispersed in water and set in Melt Mount (refractive index = 1.66). Each slide was viewed under both an Olympus BX60 with polarising and UV fluorescence (capability) microscope and Leica DMLP with polarising and UV fluorescence (capability).

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AUTHOR BIOGRAPHIES

Katie Wood is a recent graduate of the Master of Cultural Material Conservation program at the University of Melbourne and has previously completed a BA in Art History and PGCert in Heritage Materials Science at Victoria University of Wellington. This research formed part of her minor thesis topic, which investigated a collection of monotypes at Heide Museum. Whilst studying Katie gained experience at a number of institutions including the Museum of New Zealand Te Papa Tongarewa, Australian War Memorial and National Gallery of Australia. Katie is currently working as a Graduate Paper Conservator at International Conservation Services.

k.wood@icssydney.com

Briony Pemberton is a paper conservator at the Centre for Cultural Materials Conservation in Melbourne. She has a BA in Fine Arts and History from the University of Melbourne (1995), and a MA in Conservation, specializing in works on paper, from Camberwell College of Arts, London (1999). Following on from her studies in London, Briony was employed as a paper conservator at the Tate Gallery for two years where her main focus was British watercolours from the 17th - 19th century. Since returning to Australia in

2002, Briony has been employed as a paper conservator at the State Library of Victoria, the State Library of New South Wales, and the National Gallery of Victoria. In 2007 she joined the Centre where she is currently involved in the conservation of works on paper from the Heide Museum of Modern Art collection. Her current research areas include stain reduction techniques and the investigation of artists' materials in the Heide collection.

brionyp@unimelb.edu.au

Sophie Lewincamp is part of the teaching and research team at the Centre for Cultural Material Conservation, University of Melbourne. She coordinates the Masters hands-on treatment subjects, internship placements and supervises minor thesis research. Sophie has worked at some of Australia's leading cultural institutions such as the National Library of Australia and Australian War Memorial. Sophie is a graduate of the University of Canberra conservation course and in 2005-06 was awarded the Harper-Inglis Paper Conservation Fellowship at the Library of Congress, Washington DC. Sophie is currently a PhD candidate at the University of Melbourne researching Community Memory and Community Collections.

lews@unimelb.edu.au