Welcome to the fifth Newsletter of TAAMPP!

Welcome to the penultimate newsletter of the TAAMPP; providing an update on TAAMPP activities from October 2008 to May 2009.

- Tate team update
- Case study 4 – John Hoyland’s 25.4.69
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Tate team update

The four members of the TAAMPP team have been keeping very busy since the last newsletter! Bronwyn and Patricia have carried out the treatment and evaluation of the Hoyland painting 25.4.69 (with help from painting conservator Elisabeth Reissner), as well as preliminary testing on the final case study announced later in this newsletter. Bronwyn and Elina have continued to disseminate TAAMPP results, Elina has continued to track and evaluate the TAAMPP varnish and dust studies and has also spent time at the Getty Conservation Institute (GCI) in February with Tom Learner and Alan Phenix carrying out swelling studies on acrylic paints. Mark has continued to make improvements to, and progress with, the DEEMS (Direct Exposure Mass Spectrometry) method for the analysis of organic pigments in acrylic paint films. Each of these activities is discussed in detail below.

Case Study 4 – John Hoyland’s 25.4.69

John Hoyland’s 25.4.69 is a skilful example of an acrylic emulsion painting on canvas with multiple surface qualities. With this painting Hoyland began to explore and test the limits of acrylic emulsion paints. The upper section consists of layered veils of diluted paint with spatters of impasto and the lower section consists of several areas of palette knife applied impasto in a variety of colours. Analysis of the painting carried out by the science team revealed that the paint binder is an ethyl acrylate-methyl methacrylate (EA/MMA) co-polymer which is consistent with the early type of artists’ acrylic emulsion paint. The pigments include: cadmium red, cadmium yellow, Mars red, umber, and the organic pigments PY3, PR3 and PV19, with barium sulphate as the main extender. Analysis with ESI-MS (Electrospray Ionisation-Mass Spectrometry) and portable mid-FTIR spectroscopy confirmed that surfactant was present on the surface of several paints in the lower impasto section; including on the surfaces of the umber, Mars red, PR3 red, and the organic PY3-containing green paints; with trace amounts possibly present on the cadmium passages.

25.4.69 by John Hoyland, 1969 2438 x 914 mm
Image: Tate, 2008. © John Hoyland
The paint surface conductivity was relatively low (0.1 to 0.9 mSiemens/cm) with the impasto areas giving higher values than the upper more dilute section. As can be seen by eye, the gloss values in the lower section were higher than the upper section. The lower section was affected by a light grey hazy surface layer similar to those noted on both the Moon and Liberman paintings – and now known to consist of deposited soiling (surface dirt) as well as exuded surfactant and inorganic material from the paint film. Cleaning tests with a range of aqueous and organic solvent systems revealed once again that the removal of this layer resulted in greater saturation of the paint and more vibrant colours (see images).

As this painting has two distinct textures the surface cleaning treatment was tailored to each section. The upper, dilute section was sponged using an extremely lightly water-wetted Conservators sponge (Preservation Equipment Ltd, UK). The sponge was applied using gentle broad strokes across the surface, taking care to avoid paint spatters and discrete impasto areas. The sponged surface was then dry cleaned with Groom Stick (Preservation Equipment Ltd, UK) using a rocking motion to remove loose dirt remaining on the surface. Each paint colour in the lower section was tested separately and observations made on how efficiently the soiling layer was removed, noting any colour transfer onto the swab, surface swelling and the possible appearance of blanching and gloss changes after treatment.

After extensive testing, the lower section was cleaned with a 1-2% v/v. solution of ethanol in deionised water with the pH adjusted to 6.0. As was the case for the Moon and the Hoyland paintings, this solution offered the efficient removal of surface soiling with a minimal effect on the paint surface. In most cases two swab applications were required and any slight pigment transfer decreased with subsequent swabbing. Nonetheless the green PY3-containing paint was prone to significant pigment transfer, possibly resulting from higher quantities of surfactant and/or other water-soluble materials (during cleaning it also frothed the most). Where necessary, pigment transfer was minimised through adjusting the relative saturation of the swab and by limiting solvent exposure. As was the case for the Moon and Liberman paintings the removal of the light-scattering soiling layer was achieved more efficiently by swabbing with an aqueous system (see image above), resulting in significant increases in colour saturation (see image below).
### Swelling studies at the GCI:

One of the concerns about the wet cleaning of acrylic emulsion paints is the degree of swelling caused by aqueous and other solvent systems. Elina was invited to visit the Getty Conservation Institute in February this year to spend 4 weeks in their laboratories to explore this. Titanium white, azo yellow and phthalocyanine green paints from two different brands were studied. The degree of swelling was evaluated via an increase in the thickness of the paint films during immersion in wet cleaning systems. Interestingly, the two brands showed considerable differences in swelling behaviour and the alkaline aqueous solutions tested caused significant swelling. A scientific paper detailing the results is in currently in production.

### Varnishing acrylics:

The titanium white varnished canvas samples have been light aged and evaluated for changes after 6 months exposure. Changes in colour, gloss and conductivity, as well as any chemical change at the surface of each sample have been documented. Varnish removal tests using a range of hydrocarbon solvents and manufacturer recommended alkaline solutions showed a decrease in removeability after light ageing for most varnish types. The phthalocyanine green samples are now being aged to compare the effect of pigment type on the properties of the overlying varnish coatings. The first evaluation of the varnished green samples has just been completed. The second evaluation will be carried out in September, which will be followed by a publication detailing the results.

### Dust accumulation on acrylics:

After ten months exposure in ambient conditions, the dust study canvases were examined using microscopy and UV imaging to assess the level of dust accumulation, alongside optical properties such as colour, gloss and surface chemistry. Initial results show only very slight differences between the exposed and the covered areas of the canvases, and as yet there are no indications of differences in dust accumulation between the various paint and coating types. Some colour change has been noted with the oil and alkyd samples, however this is not unexpected. The next evaluation will be carried out in October.

### DEMS of acrylic paints:

Mark has created an electronic library containing the results of the DEMS (Direct Exposure Mass Spectrometry) analysis of the organic pigments typically encountered in acrylic paints. As a result the organic pigments present in the TAAMPP paintings have been identified with greater confidence. Other libraries have been created to help identify the paint medium, fillers and even inorganic pigments present in these paints such as the range of cadmium colours identified in the Moon, Warhol and Hoyland paintings. In general, DEMS analysis is proving to be a fast and powerful analytical technique that not only complements established techniques such as infra-red spectroscopy (FTIR), but has contributed significantly to the analytical capabilities of the Tate lab.

### LCACE modern and contemporary paint workshop at the Courtauld Institute of Art:

As part of a modern and contemporary art conservation project organised by the Conservation and Technology Department at the Courtauld Institute of Art, London, Bronwyn co-hosted a workshop with Dr. Christina Young of the Courtauld Institute. The workshop explored properties of modern paints such as flexibility, brittleness and swelling through practical exercises and demonstrations; concluding with a session on surface cleaning using TAAMPP paint samples. This provided a valuable opportunity for students to become familiar with the surface cleaning of acrylic emulsion paints within an exploratory environment. “London Centre for Arts and Cultural Exchange is a university initiative promoting the exchange of knowledge and expertise with the capital’s arts and cultural sectors.”
CAPS colloquium at the Getty Conservation Institute (GCI):

Bronwyn has been invited to help organise a colloquium entitled the ‘Cleaning of Acrylic Painted Surfaces: Research into Practice’ that will be held at the GCI in July 2009. The GCI recognised the need to engage practicing conservators of modern paintings more directly in order to improve their understanding of the recent research into the cleaning of acrylic emulsion paints, as well as obtain feedback on matters that still require investigation, and results from the TAAMPP will play a major role in this. More specifically, this 5 day colloquium aims to review and disseminate the results of research carried out to date; to discuss how these results may or may not be affecting current conservation practice; to present new developments in cleaning research; to establish more thoroughly practical techniques and considerations that are currently utilised by practising conservators, and to highlight and prioritise areas requiring further research. The colloquium organisers consist of Bronwyn as well as Tom Learner and Alan Phenix of the GCI, Tiarna Doherty from the J Paul Getty Museum, Richard Wolbers from the University of Delaware and private painting conservator Chris Stavroudis. Workshop participants will include experienced conservators and scientists who have contributed to acrylic paint research.

Collaboration with Dow-GCI-Tate:

The ongoing collaboration between the Getty Conservation Institute, the Dow Chemical Company and Tate has resulted in our first collaborative presentation at the 37th annual meeting of the AIC (American Institute for the Conservation of Historic and Artistic Works) held in Los Angeles in May 2009. The presentation entitled ‘The use of high throughput testing systems for the rapid screening of potentially useful cleaning formulations for the removal of surface dirt from acrylic emulsion paints’ introduced new, highly efficient testing technologies to help determine optimal cleaning solutions; and will be published in the near future. Bronwyn is now in the process of testing some of the new cleaning solutions on her model paint samples.

Presentations – October 2008 to May 2009

• 21 October 2008: University of Turin, Turin, Italy
• 22 November 2008: University of Perugia, Perugia, Italy
• 9 December 2008: Getty Conservation Institute, Los Angeles, USA
• 6 February 2009: Courtauld Institute of Art, London, UK
• 6 March 2009: Courtauld Institute of Art, London, UK
• 13 March 2009: Science and Engineering Week, London, UK
• 23 March 2009: The Aristotle University of Thessaloniki, Thessaloniki, Greece
• 24 March 2009: The Aristotle University of Thessaloniki, Thessaloniki, Greece
• 8 April 2009: Istituto Superiore per la conservazione ed il Restauro, Rome, Italy
• 21 May 2009: AIC Annual Meeting, Los Angeles, USA (presented by DOW/GCI)
Publications and upcoming presentations

Submitted papers/In press:

Upcoming presentations:
- 25 June 2009: SF-IIC Paris, co-authored presentation by Dr. Tom Learner (GCI)
- 7-11 July 2009: CAPS workshop, Getty Conservation Institute, Los Angeles.

Please contact Frances Fogel of AXA Art UK (frances.fogel@axa-art.co.uk) and/or visit the TAAMPP website for further details.

The final case study

"Now, for me, the canvas is a very modest, simple thing and magic can be made on it. And that, for me, is making the most from the least." Interview with Bernard Cohen by Patricia Smithen and Andrew Wilson, Tate, 2007.

The final case study to be conserved as part of the TAAMPP is British artist Bernard Cohen’s (b. 1933) Painting with Three Spots, One Blue and Two Yellow (T01538), painted in 1970 and purchased in 1972. Cohen created his spot paintings by inter-layering sprayed dots of coloured acrylic paint with coats of white acrylic emulsion paint. Throughout this period Cohen used Bocour paints and avoided using priming products, preferring the flexibility and surface quality of artist’s quality titanium white paint instead.

This painting was chosen as the final case study as it is a good example of the large monochrome surfaces typical of acrylic emulsion paintings. It has some light finger marks and scuffs around the edges, as well as an overall fine layer of surface dirt. As a particularly large painting (1524 x 3962 mm), with a great expanse of evenly applied white paint, it may be difficult to devise a system which will allow us to clean the work evenly. The painting also has a wax coating that Cohen applied to protect the paint layer, which directly relates to the TAAMPP varnish study. At this stage it is not expected that the protective coating will be removed, however this will naturally depend on the results of the cleaning tests to be carried out in the near future.

‘Painting with Three Spots, One Blue and Two Yellow’ (T01538), by Bernard Cohen, 1970.

Tate, 2007 © Bernard Cohen.