Tate AXA Art Modern Paints Project (TAAMPP)

Newsletter 6: November 2009

Welcome to the sixth and final Newsletter of the TAAMPP!

Welcome to the sixth and final newsletter of the TAAMPP; providing an update on TAAMPP activities from June to November 2009, offering conclusions and reflections on the research; marking the end of this valuable *AXA Art Research Grant* funded project.

Tate team update

As the TAAMPP has now come to its official end; the team members have been busy finalising several aspects of the research. Bronwyn Ormsby, Patricia Smithen and Paul Gardener - a private London-based conservator - have now conserved and evaluated the last TAAMPP case study painting by Bernard Cohen (discussed in detail later). Mark Underhill has created a comprehensive DEMS (Direct Exposure Mass Spectrometry) pigment library to help identify pigments and media in modern paints, and is currently applying his analytical skills to a non-TAAMPP project at Tate. Bronwyn and the *AXA Art Research Fellow* Elina Kampasakali have continued to disseminate TAAMPP results, including a number of practical oriented workshops and Elina has made her final comprehensive evaluations for the dust, swelling and varnish studies, with important contributions to the varnish study from Maureen Cross from the Courtauld Institute of Art, London. Some general conclusions are presented here, however more detailed accounts will be published in 2010.

The end of the TAAMPP has also sadly meant that Elina (pictured on the left in the image below) has now returned to Greece. We thank her enormously for her dedication and hard work on the TAAMPP and very much hope to keep working with her on a collaborative basis.

The TAAMPP team in front of 3 of the 5 case study paintings – John Hoyland's '25.4.69'; Alexander Liberman's 'Andromeda' and Jeremy Moon's 'Untitled 2-72'. Standing from left to right: Dr. Elina Kampasakali, AXA Art Research Fellow; Patricia Smithen, Head of Paintings Conservation; Dr. Bronwyn Ormsby, Senior Conservation Scientist; and Dr. Mark Underhill, Analyst. Image Tate, 2009 © John Hoyland, The Alexander Liberman Trust and the Estate of Jeremy Moon, courtesy Rocket Gallery, London.

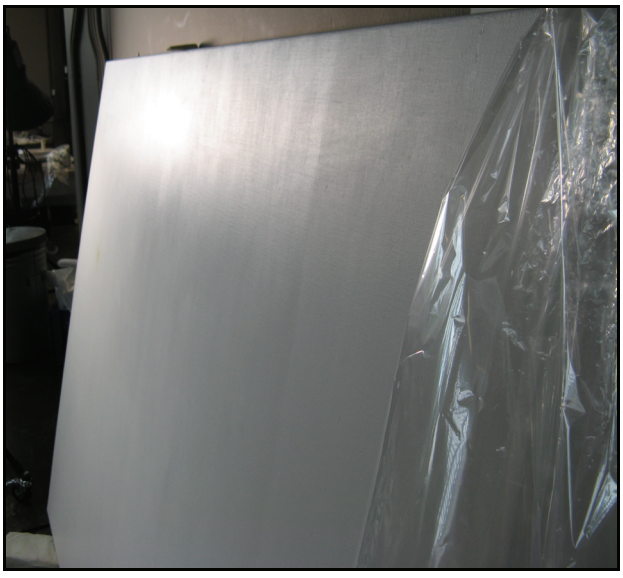
Case Study 5 – Bernard Cohen's *Painting with Three Spots: One Blue and Two Yellow*

The final case study conserved as part of the TAAMPP was British artist Bernard Cohen's (b. 1933) *Painting with Three Spots, One Blue and Two Yellow* (T01538), painted in 1970 and purchased by Tate in 1972. As outlined in TAAMPP Newsletter 5, Cohen created his spot paintings by inter-layering sprayed dots of coloured acrylic paint with brushed 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 professional 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. There were some light finger marks and scuffs around the edges, as well as an overall fine layer of deposited surface dirt. This is a particularly large painting (1524 x 3962 mm), with a large expanse of evenly applied white paint, with a wax-based artist applied (probably by brush) coating to protect the paint layer.

The painting materials used were relatively simple; the paint medium was identified as p(EA/MMA) acrylic emulsion copolymer (in at least two layers) and the pigment was identified as titanium white with no extender pigments present. The coating was tentatively identified as beeswax and the blue and yellow pigments forming the 'three' spots could not be identified (using a number of methods) due to the overwhelming presence of the titanium white pigment. The surface conductivity of this painting was very low, presumably due to the presence of the surface coating; with all values falling below 55µSiemens/cm. Similarly, no surface surfactant was detected on the paint surface, which is relatively matte with gloss values less than 7.0 (measured at 60°). The treatment evaluation revealed that the conductivity had decreased by a small amount; and that the gloss had increased across the surface in a range between 0.1 and 2.3 units; which is a greater variation than observed on the other case studies; in this case reflecting differences in gloss imparted by the brushed wax coating as can be seen in the raking light image, below right, where the cleaning line is also visible.

London-based conservator Paul Gardener cleaning the top edge of Bernard Cohen's 'Painting with Three Spots, One Blue and Two Yellow' (T01538) at Tate.
Image Tate, 2009 © Bernard Cohen.



During treatment image of Bernard Cohen's 'Painting with Three Spots, One Blue and Two Yellow' (T01538). The vertical cleaning line and variations in surface gloss can be seen in raking light (from the left).
Image Tate, 2009 © Bernard Cohen.

Mineral spirits and other hydrocarbon solvents could not be used on this painting surface without risking disturbing/removing the wax coating. Therefore the surface cleaning treatment involved testing a number of aqueous and dry cleaning systems in discrete areas along the edges to assess how both the coating and deposited soiling layer responded. The treatment was commenced with an overall light dry clean with smoke sponge (Preservation Equipment, UK) to remove any loose particulate material; which did not affect the gloss or appearance of the wax layer. The areas of ingrained soiling and fingerprints were then lightly wet-cleaned using deionised water swabs; followed by localised dry cleaning using a Staedtler Mars Plastic® eraser once the wetted areas had dried. Further cleaning of remaining marks was done using cotton swabs dampened with deionised water. Some accretions were removed using a cotton swab and saliva, cleared with deionised water.

Water was also introduced to the paint film using a brushed on gel system consisting of 1% w/v. Pemulen TR2 (Noveon Inc, Ohio) in deionised water (pH 6.0) to assess whether a controlled exposure would aid in the removal of residual fingerprints. The gel was left on the surface for one minute, swabbed off with a dry swab and cleared with a deionised water wetted swab. This worked extremely well in reducing the overall greyness of these areas and did not affect the surface appearance of the coating and paint film. Dry superfine disposable micro brushes (Microbrush® International) were then used to reduce scuffs and marks along the top edge (left photo on previous page) and finally, an overall surface clean was carried out using a lightly wetted Conservators Sponge (Preservation Equipment, UK) to even out the surface.

From the lack of visible change on the painting surface during cleaning (apart from the gloss increase from the removal of deposited soiling), it is possible to conclude that the wax coating may have contributed to the success of the cleaning treatment – i.e. the removal of the more stubborn marks and ingrained soiling may not have been possible were it not present. However, as can be the case with wax coatings, it was also noted during examination that the coating had yellowed slightly and that some of the surface dirt may have become embedded in the wax, preventing it from being easily lifted. Generally – and particularly considering this painting is a vast expanse of matte titanium white paint - the wax coating appears to have protected the paint film from some of the problems associated with embedded soiling. However, as it was not necessary in this case to remove the wax coating, it is possible that the removal of this coating may in time also be required - a procedure which has yet to be fully explored for associated risks with respect to acrylic emulsion paints (see Varnishing acrylics).

Other research – update

Varnishing acrylics:

The varnishes used for this aspect of the TAAMPP included acrylic solution, acrylic emulsion, hydrocarbon and ketone resins as well as a microcrystalline wax coating. Some of the solution (solvent carried) coatings immediately produced uneven films and developed adhesion problems (which may in part reflect problems with application procedures). Surface conductivity values and colour change noted after 6 months of UV-free accelerated light ageing (equivalent to 100-150 years in a museum environment) were small, with colour change generally less than 2.0 E^{94} units. Gloss values tended to decrease with light ageing – with some exceptions. Where surface surfactant was present due to migration through the coating, or as a contribution from any emulsion-based coating; in most cases it had degraded after accelerated light ageing.

Solubility tests with a range of solvents confirmed that, as expected, the emulsion varnishes were either partially removed or could not be removed. The solution-based varnishes were all removed to some extent by the range of aliphatic and aromatic solvents tested, however the highest aromatic content solvent consistently affected the underlying paint layer. The light aged varnishes required increasing numbers of swab rolls for removal, indicating a slight change in solubility after ageing. Many of the solution varnishes were noted as tending to gel prior to removal and proved were difficult to control. The wax coating had attracted surface dirt and the phthalocyanine green painted samples were noted as being more sensitive to colour loss than the white samples. The Regalrez resin remained the most soluble varnish after ageing; however these coatings tended to develop adhesion problems and did not produce satisfactory visual results. This study will be

augmented by more extensive varnish removal treatments on each sample, including an assessment of the paint surface after removal. A detailed account will be published in 2010.

Dust accumulation on acrylics:

The second evaluation of the dust study canvas samples was carried out after the exposure of the panels for a further 6 months in a new location (the science lab). The microscopy and UV imaging assessment of the surfaces showed that dust was now beginning to accumulate and that there were clear differences between the exposed and the covered areas of the canvases. Moreover, differences could also be seen in the size of the dirt particles deposited. For example, for the alkyd and oil samples, larger particles and fibres were visible; and on the acrylic samples, the deposited soiling materials tended to form a uniform layer of smaller particle size. In general there were small decreases in gloss where soiling had accumulated. This study is also ongoing; and it is expected that the small differences noted thus far will become more pronounced as time passes; hence the samples will be evaluated for a third time in 2010.

Cleaning efficacy:

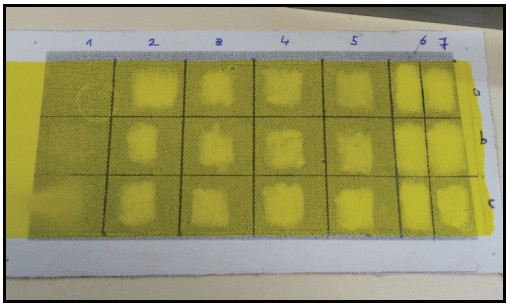
The results of cleaning efficacy studies are being collated and prepared for publication. Results will be augmented by a study to be completed by a Tate Science intern from January to April 2010, where several established and potential cleaning systems will be systematically assessed on a wide range of samples. This will also be disseminated in during 2010.

Collaboration with Dow-Getty Conservation Institute (GCI)-Tate

For the past 6 months, the ongoing Dow Chemical Company-GCI-Tate collaboration has continued with further experiments on potential surface cleaning methods for acrylic emulsion paints based on both aqueous and non-aqueous systems. An abstract has been submitted to the 2010 AIC conference for a progress update on the evaluation of particular solutions as well as the sample assessment methodology developed by the Dow team. Papers are currently in production and are also due to be published in 2010.

CAPS colloquium (GCI)

Bronwyn was one of the team of presenters at the *Cleaning of Acrylic Painted Surfaces: Research into Practice* (CAPS) colloquium held at the GCI from July 7-11, 2009. This involved disseminating current research on the properties of acrylic emulsion paints and introducing new cleaning systems to a group of experienced professional modern and contemporary art conservators. The week was useful to all, and has helped fine-tune further research into cleaning efficacy as well as identifying the need for more treatment-based case studies. It was particularly useful to discuss the relevance of the TAAMPP and other research to conservation practice as well as benefiting from the range of experience and expertise offered by the assembled group of conservators and researchers. This workshop is expected to be offered as an ongoing professional development module by GCI Education.



Test paint sample, partly cleaned using several test solutions. © Tate, 2009

Cologne workshop (CICS)

Bronwyn presented a 2-day workshop to a group of enthusiastic conservation students from the Cologne Institute of Conservation Sciences (CICS), at the Cologne University of Applied Sciences on November 9-10, 2009. The workshop produced very useful information on the cleaning efficacy of established and novel cleaning systems. An appreciation of contributions made by the TAAMPP was recently expressed by Prof. Dr. Gunnar Heydenreich of the CICS, who stated that '…the conservation community has benefited extremely from the results of the AXA Art funded TAAMPP!'

Presentations – June to November 2009

- 25 June 2009: SF-IIC Paris, co-authored presentation by Dr. Tom Learner (GCI)
- 7-11 July 2009: CAPS colloquium, GCI, Los Angeles
- 18 September 2009: Tour for AXA Art, Tate, London
- 28 October 2009: Tate Patrons Breakfast, Tate London
- 30 October 2009: Tate Press Event, Tate, London
- 4 November 2009: Presentation for ICON, London
- 9-10 November 2009: Cleaning workshop, CICS, Cologne

Publications and post-TAAMPP contacts

Published:

- Learner, T. and Ormsby, B. (2009). 'The Cleaning of Acrylic Emulsion Paints' In SFIIC conference Pre-prints, Paris, 24-26th June 2009.
- Ormsby, B. and Phenix, A. (2009) 'Cleaning Acrylic Emulsion Paintings.' *Conservation Perspectives: The GCI Newsletter 24.2* (Fall 2009) http://www.getty.edu/conservation/publications/newsletters/24_2/cleaning.html

Submitted papers/in press:

- Ormsby, B., Kampasakali, E., Miliani, C., and Learner, T. 'An FTIR-based exploration of the effects of wet cleaning artists' acrylic emulsion paints.' 8th International Meeting of the Infra-red and Raman Users Group (IRUG), Vienna, March 2008. *e-Preservation Science*, in press.
- Ormsby, B. and Learner, T. 'The effects of wet surface cleaning treatments on acrylic emulsion artists' paints.' *Reviews in Conservation*, in press.
- Learner, T. and Ormsby, B. 'Cleaning concerns for acrylic emulsion paints.' *The Conservation of Easel Paintings*, Butterworths, in press.
- Kampasakali, E., Ormsby, B., Cosentino, A., Miliani, C., and Learner. T. 'An evaluation of the surfaces of acrylic emulsion paint films and the effects of wet-cleaning treatment by Atomic Force Microscopy (AFM)'. Submitted to *Studies in Conservation*, August 2009.

End of TAAMPP press coverage:

- Culture 24: November 2009. http://www.culture24.org.uk/spliced/objects/art73179
- The Art Newspaper – pending
- Art of England - pending
- Museum Practice - pending
- The Picture Restorer - pending
- The Visual Artists News Sheet - pending

Contacts:

For future events and information regarding Tate modern paint research please contact Bronwyn Ormsby (bronwyn.ormsby@tate.org.uk); or visit the Tate TAAMPP and Modern Paints websites:
http://www.tate.org.uk/research/tateresearch/majorprojects/conservation_modernpaints.htm
http://www.tate.org.uk/research/tateresearch/majorprojects/conservation.htm

For information on the AXA Art Research Grant and AXA Art in general, please contact Frances Fogel at AXA Art UK (frances.fogel@axa-art.co.uk); or www.axa-art.co.uk.

Project wrap-up and thanks!

The TAAMPP has provided important information about the properties of acrylic paints to a number of stakeholders including conservators, collectors, artists and heritage scientists; helping to ensure that the preservation and conservation of acrylic emulsion-based works of art is appropriate to this paint type. Up to date preventive conservation advice, summarised in the *Caring for Acrylics: Modern and Contemporary Paintings* Tate and AXA Art produced booklet, will help minimise the risks associated with soiling accumulation, as well as providing guidance on best practice for the display, storage and transportation of acrylic emulsion works of art. An enhanced understanding of the surface character of acrylic emulsion paints - including how time and conservation treatment may alter paint surfaces - has also contributed much original information that is now beginning to influence conservation practice. This was aided in part by the evaluation of the surface cleaning treatment of 5 acrylic emulsion paintings in Tate's collection. Here the research applied to works of art has provided vital information on the surface and general response of naturally aged paints. Exploring the effects of cleaning treatments has also resulted in the development of an assessment methodology involving the first applications of portable non-destructive analytical instrumentation (mid IR reflectance spectroscopy and AFM) to acrylic emulsion paintings (accessed through MOLAB).

The pioneering TAAMPP varnish study has revealed that none of the varnishes tested proved ideal for acrylic emulsion paintings; problems such as adhesion, solubility and pigment removal were encountered and hence, further research is required (despite the fact that the surface cleaning treatment of the Cohen painting appeared to benefit from the presence of the artist-applied wax coating). Equally, the dust study samples require further exposure before reliable conclusions can be drawn. Significant contributions towards the development of appropriate cleaning methods for acrylic emulsion paint films have also been made, including the evaluation of common and potential cleaning systems through workshops (Courtauld Institute of Art, London; CICS, Cologne; and Cleaning Acrylic Painted Surfaces at the GCI, Los Angeles) as well as the ongoing collaboration between The Dow Chemical Company, the GCI and Tate; involving the use of high-throughput technology to systematically assess the efficacy of wet-cleaning systems.

Over the course of the project the TAAMPP team have delivered over 30 presentations and will have published over 25 publications by the end of 2010, including the 6 monthly newsletters; websites; as well as public and academic papers in international conservation and scientific journals. The TAAMPP Newsletters have been distributed to over 600 individuals in 25 countries; which we celebrate as a great dissemination success!! Keen interest has also been demonstrated by paint manufacturers on the TAAMPP research findings, and regular requests for information and advice continue to be received from conservators and conservation training schools – where modern and contemporary paint conservation issues are often being considered for the first time.

The TAAMPP has benefited from the input of many individuals and collaborating institutions; therefore an enormous thank you goes out to: Maureen Cross, Courtauld Institute of Art, London; Tom Learner, Alan Phenix and Michael Schilling, Getty Conservation Institute, Los Angeles; Joyce Townsend, Christopher Lewis and Marcella Leith, Tate, London; Jacob Thomas, Eric Hagan and Nicky White, formerly Tate, London; Bamber Blackman, Imperial College, London; Paul Gardener and Elizabeth Reissner, London; Mindy Keefe, The Dow Chemical Company, Midland; Costanza Miliani and MOLAB (now Charisma), Perugia; Simone Musso, formerly Politechnico di Torino, Turin; Stefan Zumbühl, University of Applied Sciences, Bern, Switzerland; Gunnar Heydenreich and Petra Demuth, CICS, Cologne; Frank Hoogland and Jaap Boon, AMOLF, Amsterdam; Richard Wolbers, University of Delaware, Delaware; Golden Artists Colours, New York; Ian Garret and Peter Waldron, Winsor and Newton, UK; Talens, The Netherlands; Stuart Croll, North Dakota State University, Fargo; Jonathan Stephenson, London; Crosby Coughlin, New York; John Hoyland and Bernard Cohen, London.

Thanks also to AXA Art, Tate and the GCI for funding this research; as well as Dr. Ulrich Guntram, Frances Fogel and Tom Wessel of AXA Art for their sustained interest and support throughout the TAAMPP. As an extremely important final note(!) - Bronwyn would particularly like to thank the brilliant, hard-working members of the TAAMPP team for a very stimulating and rewarding 3 years!