Institution: University College London

Unit of Assessment: 34A – Art and Design: History, Practice and Theory: History of Art

Title of case study: The benefits of Painting Analysis for conservation and our cultural heritage

1. Summary of the impact (indicative maximum 100 words)

Research by Libby Sheldon into the history and technology of paints and pigments has benefited conservation specialists and art professionals based in both museums and the art trade. Using specialist scientific techniques to examine artists' paint materials, her research findings have made possible the accurate dating of Old Master and British paintings and have played a crucial role in their authentication and critical re-evaluation. Her analysis of works in important public as well as private collections has contributed to both professional and public understanding of our cultural heritage. Her research has enriched appreciation of technical art history for a large general audience through museum displays and programmes and through high-profile media appearances enhancing the understanding of how art is made from a technical and material perspective.

2. Underpinning research (indicative maximum 500 words)

Libby Sheldon is recognised as the leading paint analyst working in the UK and a pioneer of technical art history in this country, as director of the Painting Analysis Unit housed in UCL History of Art. In 2005 Sheldon made an important research breakthrough by establishing the authenticity of a painting by Vermeer in a private collection, previously thought to be a fake or a 19th-century pastiche [see a and b, co-written with UCL Chemistry, in section 3]. Applying Raman microscopy, a non-destructive technique relatively new to the heritage sector at the time, it was possible to map the presence of prized mineral pigments, such as lapis lazuli, and unusual paint combinations known to have been used by Vermeer, indicating clearly that the work was not in fact a forgery. Taking nine years, the research is a benchmark for the use of scientific means to investigate the authenticity of a painting. The techniques of paint sampling and pigment analysis Sheldon developed have led to insights into a wide range of paintings from the 14th–20th centuries [c–f]. We focus here on three key projects:

1. Sheldon's long-standing research interest in Tudor, Jacobean and Elizabethan portraits underpins analyses of important works in the collection of the National Portrait Gallery (NPG) including a series of portraits after Hans Holbein the Younger [c]. Results from often-complex technical research, such as the discovery of a rare use of the highly prized and expensive purple pigment, fluorite, offer insights into the early 16th century pigment trade across Europe. Her analyses and interpretations of paint samples from specific works e.g. a *Portrait of Baron Berners* by an unknown Flemish artist c.1520–30 and a *Portrait of Queen Elizabeth I* by an unknown artist c. 1575 [d] enabled original paint palettes to be determined, highlighting the vulnerability of certain pigments to colour change with age. Examination of paint sample stratigraphy in cross-section and identification of the components by polarising light microscopy (PLM) and energy dispersive X-ray (EDX) enabled Sheldon to unearth evidence of lost or altered colours and textures. This not only has revealed the sophistication of Tudor and Jacobean painting techniques, but also opened up possibilities for new interpretations of the works [c, d].

2. Working at the interface between art history and heritage science, Sheldon used scientific insights into the material structure of paint to develop new methodologies for analysis and interpretation of the technical history of paintings. Her close investigations and microscopic analyses of the little-known Victorian painter Sir John Gilbert shed new light on why this once famous and popular artist has fallen so dramatically into obscurity. Her analysis of his extraordinary uses of gouache and watercolour mediums on ten paintings at the Guildhall Art Gallery in 2009–10 demonstrated not only an adventurous use of new pigments – cerulean blue and zinc white, but also, significantly, Gilbert's use of aqueous media experimentally, as if it were oil, in unprecedented large-scale formats [e]. Commonly thought of as a conventional, even academic artist, Sheldon's research showed that Gilbert was highly experimental (and modern) in his painting practices.

3. Combining traditional optical microscopy, an extensive knowledge of artistic practices and advanced instrumental analysis, Sheldon's research enabled the authentication and dating of painted works of art and facilitated a deeper understanding of artistic production methods, trade of

mineral pigments, and robust identification of fakes and forgeries. Her exploration of the history and technology of pigments has led her to raise questions about artists' intentions and viewers' perceptual skills. For example, using microscopic techniques and comparing a large sample of Old Master paintings from the Making Art in Tudor Britain project, she investigated whether subtle 16th and 17th century combing and texturing techniques were deliberately practical strategies to manage the oil medium or aesthetic effects [f].

Libby Sheldon was a Lecturer in Art History at UCL from 1978 until her retirement at the end of August 2012, and remains attached to the Department as an Honorary Senior Research Associate.

3. References to the research (indicative maximum of six references)

[a] Sheldon, L., Costaras N., 'Johannes Vermeer's 'Young woman seated at a virginal' *The Burlington Magazine*, February 2006, vol. CXLVIII no. 1235, p.89–97. Available on request.

[b] Burgio, L., Clark, R. J. H., Sheldon, L., Smith, G. D., 'Pigment identification by spectroscopic means: Evidence for the authenticity of the painting 'Young Woman Seated at a Virginal' as the 36th Vermeer painting' *Analytical Chemistry* 77, 1261–1267, 2005. DOI: 10.1021/ac048481i.

[c] Sheldon L. 'Tints, texture and original intent, in four after-Holbein Portraits'. Paper presented at the National Portrait Gallery Research Forum, March 2009. http://bit.ly/17VCBaf.

[d] Sheldon L. 'Colour, texture and original appearance: New discoveries and re-evaluations of Tudor and Jacobean painting practices'. Paper presented at the National Portrait Gallery conference *Tudor and Jacobean painting: Production, influences and patronage,* December 2010. http://bit.ly/1cYgsdv.

[e] Sheldon, L. 'A marriage of methods: Exploring Gilbert's ordinary and extraordinary uses of watercolour and gouache techniques', in ed. Spike Bucklow and Sally Woodcock, *Sir John Gilbert: art and imagination in the Victorian age.* Ashgate 2011. Available on request.

Sheldon's chapter was positively reviewed: 'sheds much light on the opacity and idiosyncrasies of Gilbert's technique... offers much needed and solid scholarship...' *Journal of Pre-Raphaelite Studies* Fall 2012.

[f] Sheldon, L., 'Combing, texturing and other hidden effects in paintings of the 16th and 17th century: purpose and perception' (research poster, published in postprints). Presented at the National Gallery Conference, 30th Anniversary of the National Gallery Technical Bulletin, September 2009. Available on request.

4. Details of the impact (indicative maximum 750 words)

Libby Sheldon's research has had impact in three distinct areas. First, it has contributed to knowledge of the material and technical constituents of painting for specialist, but non-academic, professionals such as those involved in conservation [1, 3, 6], the art trade [9], and auction houses. Second, it has benefited national cultural heritage by establishing authenticity and attribution through the analysis of paint conditions of works in important public and private collections in the UK [3,9]. Third, it has been disseminated, often extremely widely, to a broad public and has advanced the public understanding of how paintings are made and how artists work [4, 5, 7]. Overall, it has enabled the re-evaluation of important works of art that form part of our world cultural heritage [1].

Sheldon's collaboration with the National Portrait Gallery (NPG) has **contributed to the deepening of this major national collection's understanding and interpretation of its holdings**. Her findings were of critical importance to conservators and curators, both at the level of the specifics of paint sampling and larger research questions into the uses of technical evidence in art historical interpretation [1]. Impact on both specialist and large publics has been achieved through her contributions to *Making Art in Tudor Britain* (MATB), a five-year NPG project (2007–12) which included an exhibition and impressive website (in 2012–13 the project pages on the website had 74,044 views [1] and NPG has on average 1.8m visitors per year [2]). Through the NPG exhibition and website, new developments within technical art history were brought to public attention, contributing a unique picture of the material life of paintings. Important ideas about works of art as physical objects made according to the material and technical constraints of a particular

time and place have been disseminated widely, deepening public understanding of Tudor visual culture [1]. Sheldon has further strengthened this engagement through regular public lectures for the project's research forum series. Her technical and historical insights into the original appearance of artworks provided the general public with an improved understanding of the original purpose of the artist. An example was Sheldon's analysis of paint samples from Elizabeth I, Darnley portrait [d] where she identified discoloured blue and red pigments and showed that the orange raised patterning over the costume was originally purple. Such discoveries were used by the NPG to enable viewers to have a fuller sense of what the paintings would have looked like when painted: in this case of a richer, more colourful image of the Virgin Queen than we see today; the painting featured in the *Changing Faces of Elizabeth I* display [10]. The *MATB* project findings using Sheldon's research (e.g. comparing later copies after Holbein of William Warham and on the use of the rare pigment fluorite in two versions of portraits Sir Thomas Gresham) are on show in a series of displays such as 'Double Take: Versions and copies of Tudor Portraits' in the Tudor Galleries at the NPG as well as at Montacute House, Somerset [1].

Her research made a **significant contribution to knowledge of Sir John Gilbert's experimental techniques benefiting specialist professionals** in the Conservation Department at the Guildhall Art Gallery. The discovery that the artist used aqueous media for many of his large-scale works which, in past, were thought to be oil paintings, has led to a review of their increased vulnerability. This had important implications for their care and conservation, enabling preventive conservation strategies to be put in place, reducing rates of degradation, and helping to preserve them today. Working in collaboration with the Guildhall and the Hamilton Kerr Institute, Sheldon's key contribution was her analysis of his watercolours using microscopy together with non-destructive X-ray fluorescence analysis, including an experiment in fading. Her research into his painting techniques was widely disseminated as part of the exhibition (29 Apr–29 Aug 2011) of Gilbert's work at this important public gallery, helping to reassess the importance of the artist as a far less conventional figure than had previously been thought. Her research directly fed into and contributed to the public display of the artist's work (in a display entitled 'In the Studio') and so contributed to its programme of public engagement dedicated to promoting understanding of the materials and techniques of painting: thus a major part of the Guildhall display was devoted to a technical exploration of the way in which Gilbert worked, drawing on his own records and incorporating Sheldon's analysis of his gouaches and watercolours [6].

Sheldon's research has enabled the **critical re-evaluation of artworks to benefit our cultural heritage**. In addition to changes in their economic value [10], her research directly contributed to changes in how specific paintings are publically and professionally perceived and valued. Building on her expertise in 17th-century painting techniques [8], she was able to show through cross-sectional analysis of Van Dyck's unfinished portrait of Queen Henrietta Maria as St Catherine (Private Collection) that it had been over-painted by a later artist (as shown in the display at the Banqueting House, 2012 [9]). Her paint sampling of a neglected, damaged and unattributed painting found in a storeroom of the Bowes Museum, County Durham yielded important findings: crystallographic analysis of pigments and paint additives placed it as from the early 17th century rather than the 19th century as previously thought. By contributing to the complex collaborative process of attribution, her research has helped to differentiate historic works from later copies or fakes. Her research was vital in the attribution of the *Portrait of Olivia Boteler Porter* to Van Dyck, rather than it being a work considered of no great importance. The discovery of the use of lead-tin yellow firmly dated it in the period and was characteristic of the artist's known techniques [3]. It is now considered one of the treasures of the Bowes Museum. Thus her work made a significant contribution to the artistic and cultural heritage of a key national collection; Van Dyck's painting is now displayed in the early picture gallery for the first time, with a large text panel that tells visitors the story of the research project and its discovery eliciting much visitor interest [3, 4, 9].

The 'detective work' that this entails has **given the public a fascinating insight into the history of art and how paintings signify as well as how they are made** as material artefacts. Sheldon's research reached large audiences e.g. through an appearance on a *Culture Show* special on the Bowes portrait partly filmed in Sheldon's UCL workshop and viewed by 1.49m people [4], as well as press coverage in the *Guardian, Telegraph* and the *Daily Mail* [5] which collectively reached a readership of over 10m. She has raised public awareness of the scientific research involved in distinguishing fakes and forgeries from originals, e.g. her appearance with Philip Mould and

Bendor Grosvenor [9] on the BBC 1 programme 'Fake or Fortune' discussing her analysis of Van Dyck's *Portrait of Olivia Boteler Porter* (also filmed in the department and based on analysis conducted before her retirement) in September 2012 (up to 4.8 million viewers; the 20th most watched programme that week, bringing technical art history to a vast public [7]).

The work described above comprises a few representative examples of the wider impacts of Sheldon's research. During her time at UCL Sheldon was one of only two people practising easel painting analysis in the country and the only one doing so in the context of a university's art history department. Through specialist technical bulletins, talks and professional exchanges, her findings were communicated to professionals outside academia, e.g. through the conference 'Tudor and Jacobean Painting: Production, Influences and Patronage' hosted by the NPG and the Courtauld Institute of Art (Dec 2010) and funded by the British Academy and The Paul Mellon Centre for Studies in British Art. Sheldon's research was instrumental in building partnerships with these and a variety of other non-academic specialists e.g. in 2011, she received sponsorship of £30,000 from a Dutch private collector to fund technical research on Cuyp and the Dordrecht School. Between 2008 and 2012, she advised a host of national and international bodies, as well as smaller institutions and private conservators. She received commissions from Europe, Australia, North America and Japan, and worked with a wide variety of UK institutions including the Holburne Museum, Dulwich Picture Gallery, Wallace Collection, National Trust, the art trade and commercial gallery sector (e.g. Philip Mould [9] and Rupert Maas Galleries). She has contributed to both specialist and public understanding of world cultural heritage e.g. by providing analyses of paintings undergoing conservation including by Van Dyck in the Royal Collection [8]. The prestigious institutions with which she has worked are an essential indicator of the respect with which Sheldon's research is held within the field.

5. Sources to corroborate the impact (indicative maximum of 10 references)

[1] Statement from the Project Curator (Making Art in Tudor Britain), NPG, on the contribution of Sheldon's research to deepening public understanding of Tudor visual culture through the examination of works of art as material objects. Available on request.

[2] *Making Art in Tudor Britain:* www.npg.org.uk/research/programmes/making-art-in-tudor-britain/matbsearch.php; http://bit.ly/1aG8UUN; visitor numbers: http://bit.ly/1hIgo3s.

[3] Statement provided by the Keeper of Fine Art at the Bowes Museum, County Durham on how the discovery of the Van Dyck Portrait of Olivia Porter has led it to become a key work in the collection and the subject of public display. Available on request.

[4] Culture Show special: http://bbc.in/HSEN6y. First broadcast: Saturday 9 March 2013 at 18.30 on BBC2 and BBC HD. Viewers: http://bit.ly/1aVhncM.

[5] Guardian coverage (2.2m readers): http://gu.com/p/3ebv3/. Daily Mail (6.1m) http://dailym.ai/17VkPUD. Telegraph: (2.1m) http://bit.ly/1bGqwTq. Online and paper readership figures: National Readership Survey PADD (Adults, daily figures, July 2012–June 2013) http://bit.ly/187pJf5.

[6] Statement provided by the Senior Paintings Conservator Guildhall Art Gallery, London, attesting to the importance of Sheldon's research on Gilbert's innovative techniques for its public programme raising public understanding of conservation. Available on request.

[7] BBC, *Fake or Fortune,* Series 2, Episode 3, "Van Dyck: What Lies Beneath?" 30 Sep 2012, BBC1. Viewing figures (30/9/2012): up to 4.8 million viewers http://bit.ly/17skx1E. Media appearances also include [4].

[8] Statement can be provided on request by the Senior Paintings Conservator (now retired) of the Royal Collection testifying to Sheldon's expertise and previous research on Van Dyck's techniques.

[9] Statement provided by the Director of the Phillip Mould Gallery describing the invaluable contribution of Sheldon's research methods to the authentication of two paintings by Van Dyck, including for the Bowes Museum. Available on request.

[10] NPG page on the Darnley Portrait evoking what the painting would have looked like at the time it was completed: http://bit.ly/1gNJr4d and its display http://bit.ly/1fn6BOq.