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V&A Conservation Journal No 28

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The cover shows
Nick Frayling working on a computer image of *Unknown Woman* by Nicholas Hilliard c.1585-1590,
Museum No: P.2-1974
Photography by Frank Thurston, RCA
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V&A New Staff

Jane Armstrong

Secretary to the Head and Deputy Head of Conservation, Part-time

After graduating from Nottingham University with a BA Honours in Mediaeval and Modern History (with a subsidiary in American Literature), I moved to London and joined the BBC. I initially worked in the World Service at Bush House and subsequently as Secretary to the Deputy Editor of the Listener, BBC Publications.

I worked in publishing for several years, for a firm of literary agents and then as Assistant Editorial Manager in a company producing fine art publications. My next job was a five year stint as secretary to the senior partner and his team at Sheppard Robson, a large architectural practice in Camden Town. One of their major projects was designing a new town just outside Baghdad in Iraq. As a complete change, I then took a job as PA to the Marketing Director of Deinhard, a family company of wine merchants, a very interesting job which involved promoting wine sales and helping to organise wine fairs and tastings. I left to have children and took a career break to look after them.

When my younger child began at full time school, I felt ready to return to work. To this end I took a refresher course to update my computer skills and revive my shorthand. I was delighted to get a part-time job at the V&A, and it's good to be back at work after my 'time out'. I started at the beginning of the year and am now finding my feet. I hope my varied secretarial experience will prove useful and relevant to museum administration and I am looking forward to further involvement in the Conservation Department's activities.

Amanda Larratt

Paper Conservator (Job Exchange), Paper Conservation

In January 1998 I started a 10 month job exchange in the Paper Conservation section at the V&A. This is an incredibly exciting opportunity to work, learn and experience life in a large Conservation Department that services an amazing Collection.

I have exchanged jobs with paper conservator Victoria Button. So, she is currently in Melbourne, Australia in my usual rôle of Exhibitions Conservator at the State Library of Victoria. The main responsibility of this position is to coordinate the Conservation Department's involvement in the State Library's exhibitions and loans program. This involves coordinating and carrying out necessary treatments, condition reporting and liaising with curators and exhibition designers about appropriate exhibition environment and design.

My fascination for paper-based items developed while studying a BA in Art History at the University of Melbourne. I went onto complete a B.App.Sc in Paper Conservation from the University of Canberra in 1994, and in 1995 I joined the Preservation and Storage Division at the State Library of Victoria.

From the moment I arrived in the studio it has been non-stop, with items as diverse as enormous twentieth century posters, seventeenth century mezzotints and nineteenth century watercolours, all being treated for four different exhibitions opening within a three week period.

While working at the V&A I plan to work on a wide variety of paper items, to learn new skills and broaden my understanding of conservation in general. I have already benefited much from the expertise of the other paper conservators as I watch and participate in these projects.

Review of "Care and Preservation of Modern Materials in Costume Collections"- New York 2-3 February 1998

Silvia Valussi
RCA/V&A Conservation Course, MPhil Student, Conservation Science

During the first months of my research on synthetic fibres made of polyurethanes (elastane), I had the opportunity to attend this symposium, which was held in the fabulous Metropolitan Museum of Art (Met) in New York. I will always remember this experience as one of the most exciting and valuable events in my life, as I found the two day conference very interesting and useful for my studies, and also because it was my first visit to New York.

In the first day, two sessions of presentations were organised in the Uris Auditorium of the Met. After the opening remarks given by the Director of the Costume Institute, a number of designers and conservators (including a free-lance tailor who has recently worked for Versace) filled the whole day with relevant contributions about the wide range of problems encountered by conservators when dealing with modern materials in the dress collections. The large number of conservators in the audience testifies to both the significant presence of plastics - mostly polyurethane, polyester and polyamide - in twentieth century fashion design and fabrics, and the need for conservators to have an appropriate background. Such a background should consist of information, explanations and guidelines, in order to identify, preserve and care for all the different forms of plastics (fibres, films, adhesives, sheets, etc.) within museum costume collections.

The second day consisted of an all-day seminar on "Plastics in Conservation Materials & Museum Objects", which was held at the Costume Institute and led by Scott Williams, Conservation Scientist from the Canadian Conservation Institute. Only a limited number of people were entitled to attend this seminar, comprising several conservators and a group of students from the Winterthur Conservation Program in Delaware. After an exhaustive description of the different types of plastics and their properties, the discussion went deeper into the physical, biological and chemical agents that cause deterioration of plastics in museums, as well as the use of polymeric materials in conservation. In a practical session, a selection of degraded synthetic museum objects - garments, decorations, shoes, combs and bags - as well as polymeric materials normally used in conservation (for example, foams) were analysed, and the evidence of degradation was discussed. The easy determination of the chemical composition of the plastic components of the objects was identified as a critical requirement for their proper preservation and treatment. The use of a portable Fourier Transform-Infrared Radiation (FTIR) spectrometer with a fibre optic sampling probe permitted a fast and precise identification of the components in the objects considered, and some hypotheses on the causes of degradation were formulated. The instrument consists of separate modules: the Infrared Radiation (IR) source is a MIDAC illuminator FTIR Spectrometer, but the critical part of the instrument is the REMSPEC Mid Infrared Fibre-Optic Immersion Probe System which delivers the IR radiation from the illuminator to the sample, and collects the reflected radiation from the sample for delivery to the detector. This instrument is light weight, compact and mobile. It can be lifted by one person and mounted on a laboratory cart for moving around museums, galleries and storage areas.[1]

Photography by Silvia Valussi

Figure 1. Scott Williams at work using the portable FTIR spectrometer in one of the studios of the Costume Institute.

I feel that this experience at the Met has given me a significant return, fulfilling the great expectations I had before my departure to New York. I made useful contacts, I experienced first-hand the problems of degradation in the dress collections, and I also learned more about communicating with people who do not have a scientific background, but do need and request scientific explanations. I have also realized how twentieth century textile technology has been bringing together fashion, design, engineering and science. Synthetics are now much more than cheap substitutes for natural fibres: they feel good, perform well and look 'out of-this-world' - literally.

Reference

1. Further information about this portable FTIR spectrometer can be obtained by contacting R. Scott Williams by e-mail at scott Williams@pch.gc.ca.

Editorial – Education and Training

Alan Cummings
Course Director, RCA/V&A Conservation Course
Deputy Head, School of Humanities, Royal College of Art

We do not aim to give every issue of this Journal a coherent theme, but that is definitely the intention this time. The theme is education and training, but the articles are diverse in character and content. Some reflect on an educational experience - *How does it feel to be a student on placement, an intern at the V&A or an external examiner? How easy is the transition from education to employment?* Others describe research or practice which has formed part of an educational experience. The message which runs through this whole issue, however, is simple and consistent. The V&A Conservation Department takes its rôle in education and training very seriously.

The most obvious and dramatic evidence for this is easy to see in the list of students and interns which appears with the staff list on the back of every issue. The RCA/V&A Conservation Course took its first postgraduate students in 1989. In fact there were only two of them. They certainly made an impact, but could hardly be said to have threatened the Department on a numerical basis. Nine years later, we are contemplating a new academic year (1998/99) with possibly twenty six students. About half of these will be registered for MA degrees and will aim to graduate as competent, educated, specialist, practising conservators. About half will be involved in research for MPhil or PhD.

The students are no longer all based at the V&A. The Course is now at the hub of a small but exciting educational and research network. Current and imminent collaborations involve the Museum of London, the Horniman Museum, the Tate Gallery, Holden Conservation, Imperial College, the Natural History Museum and the RCA Foundry, as well as most of the studios in the V&A Conservation Department. And there are more developments in the pipeline. Despite the spread of locations, disciplines and research areas, all the students spend time in the V&A. The partnership with the College is vital but it is the Museum which most 'feels like home' for the whole Course, as well providing the practical environment for the majority of our students. Twenty six students is not a lot by current educational standards, but it makes for a very substantial presence in a working department where the priority of staff must be to meet the conservation needs of the Museum, rather than the learning needs of the students.

Alongside the students, the Department offers internships and placements. These are taken up by mid-course students, recent graduates and staff from other institutions in the UK and abroad. Alongside the students and interns, there are junior staff who have substantial training and educational needs. Indeed, as with any occupation seeking to become a profession, there is a need for continuous skill and knowledge development for all staff . The educational picture does not stop there. The Department has a responsibility to educate and train Museum staff from other areas of the Museum and a broader responsibility to the public. The Course regularly offers elements of its teaching to students and staff from elsewhere.

The alarm bells are ringing. In a climate of financial restraint, decreasing staffing levels, limited opportunity for advancement, increasing emphasis on major museum projects, access rather than preservation, deadlines and more deadlines, how can this investment in education, training and research be justified? Some would say it can't, and occasionally say it forcefully. Of course, I am not one of them, and I am happy and grateful that the Department remains largely populated by staff who believe that, on balance, all this teaching and learning and thinking and experimenting and discovering nourishes rather than depletes. Education, training, research and practice have a symbiotic relationship in a working environment. They all contribute to a healthy organism.

Of course, there is a pragmatic side to this too. Has anyone counted the objects treated by students and interns in the last nine years?

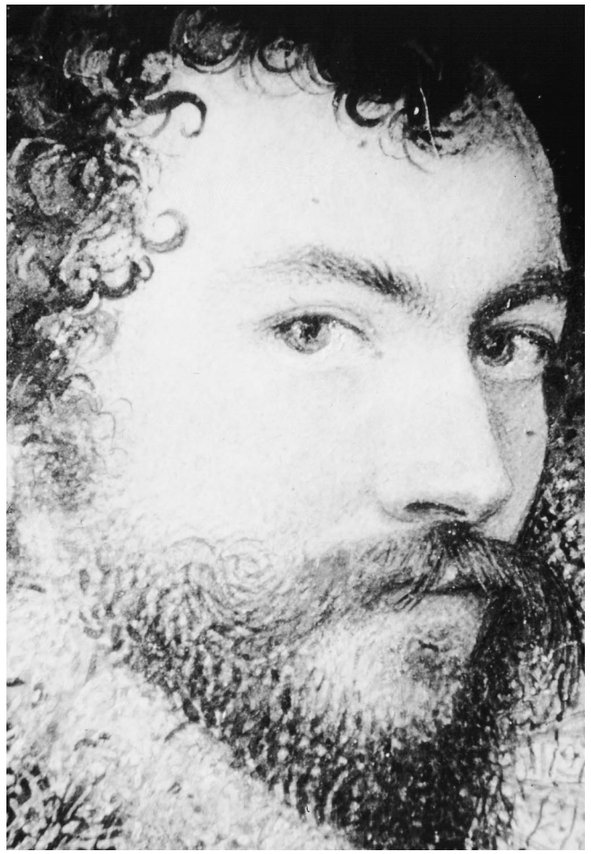
"....but of all things, the perfection is to imitate the face of man kind..."
Nicholas Hilliard, *A Treatise Concerning the Arte of Limning* c. 1600[1]

An exploration of the original appearance of Nicholas Hilliard's portrait miniatures using computer image manipulation

Nick Frayling
RCA/V&A Conservation Course, MPhil student

The goal of this research project has been to simulate both the original appearance of selected Hilliard portrait miniatures, and the evolution of a painting from the preparation of the ground to the finished work, using computer image manipulation techniques.

My research involves the use of computer image manipulation to explore the original appearance of works of art. Clearly, there are many potential applications in this field and, after a survey of other ongoing research, I chose to focus on Hilliard's miniatures. This allowed me to investigate broadly applicable issues, whilst enabling me to indulge my irrepressible interests in portraiture. Access to a comprehensive collection of the works within the V&A Museum, and strong support from the Paper Conservation Section responsible for their well-being, also influenced my decision. Practically speaking, the size of the miniatures allows digitisation at an acceptable level of detail via the medium of film, and subsequent digital image manipulation and display using Apple Macintosh systems and a variety of software available at the College. The flexibility of using film to capture images has proved essential. When photographing the works I have been able to adjust the strength and direction of the lighting to bring out the desired qualities of individual paintings. In some cases, this may be at microscopic level under raking light to emphasize the application sequence. Where necessary I have taken a series of photographs, varying the lighting progressively in order to produce animated sequences to show effects which rely on movement of the painting under illumination.



Self-Portrait aged 30, dated 1577 P.155-1910 Salting Bequest (magnification: x8 approx)

Photography by Nick Frayling

Computer 'retouching' of paintings, although free from the hazards of working with real objects, requires much research and evidence gathering, both historical and technical. I have therefore set out to acquire as much intimacy with the artist's style, and fluency with his practical methods, as possible in the available time. This has been a daunting task as Hilliard's work is characterised by astonishing virtuosity, ranging from his free draughtsmanship from life, to an

Ikuo Hirayama of the Art Restoration Foundation in Tokyo. The conservator, Tanya Tomoko Uyeda, was a very helpful and able translator, making up for my regrettable lack of Japanese language. Her own comments, as an American/Japanese student training in Japan, were also invaluable.

Photography by Sandra Grantham

Figure 3. *Hone* made by Mr Takada of Kyoto

In Kyoto, I was invited to the studio of Mr. Michio Miyamoto, my *Nihonga Mosha Sensei* (Professor of Japanese Copy Painting), from my term at Kyoto Geidai in 1996, to see his work in progress for seven painted fusuma for a new University building in Osaka. This gave me the opportunity to improve my understanding of the many techniques used by classical Japanese painters, of which Miyamoto Sensei has a great knowledge. Together we visited Mr Saburo Nakagawa of the Nakagawa Gofun Enogu Company Ltd, who gave us a tour of his pigment factory in Uji, south-east of Kyoto. I was able to see first hand the whole process of *gofun* (ground oyster shell pigment) production, a white used exclusively in Japanese classical painting. I also watched the four stage water levigation method for producing mineral pigments such as green *rokushō* (malachite) and blue *gunjō* (azurite).

I spent one week at the Usami Shokakudo Company Ltd In Kyoto, also a member of The Association of Master Mounters & Restorers of National Treasures. I visited both the studio in the Kyoto National Museum Conservation Centre and the studio on Horikawa Dori. Being a 'fly on the wall' observer proved to be most useful. I was able to watch many different processes in action, receiving full and careful explanations from the American Master Mounter Apprentice of seven years standing, Mr Andrew Hare, who was extremely patient with my many questions. I also spoke (through Mr Hare's translation) to Mr Naito who takes on most of the initial training of apprentices. It was an illuminating conversation, uncovering attitudes which I had not entirely foreseen.

During my time at the Studio, a paper dealer brought samples for me of the *sekishu* papers used traditionally to line *hone* (wooden lattice frames) for *karibari* drying boards and screen panels. *Karibari* boards are used both in the East and the West to flatten and dry conserved works of art. I also went to the Kitano Shrine monthly antique market to find *dai fuku cho* (old account books). The seasoned paper from these was used for inner *hone* linings in the conservation of *byōbu* (folding screen) panels. Mr Usami took me to Nijo Castle, also in Kyoto, to the studio of Professor Toshiaki Ohno, who is in charge of a project involving the copying of all the endangered painted screens in the castle. Over one thousand wall panels will eventually be replaced by the copies being produced, so that the originals can be preserved in safe storage. We discussed the pigments and binders used and I was able to photograph many of the original screens.

This was followed by a visit to Mr Takada's carpenters workshop, where *hone* were made to replace those which had degraded in *byōbu* being conserved. I was shown the various woods used at the workshop, the great array of planes and saws, and discussed methods used. I also visited Mr Nishimura, a brush maker in Kyoto, to obtain hand-made *shigoki bake* (badger hair pasting brushes) made specially for several members of the V&A Paper Conservation Department. These invaluable brushes are not easily obtainable in England and Mr Nishimura's are particularly fine.

Mr Usami was a gracious and generous host, as was everyone I encountered during my stay. I am indebted to the Great Britain Sawakawa Foundation and Mr Rupert Faulkner of the V&A for making this trip possible, through which I have gained valuable insight and a little more understanding.

Sandra Grantham is funded by The Wingate Foundation, The Rio Tinto Company and The Great Britain Sasakawa Foundation.

Reference

1. Grantham, S., Painting in Japan, *V&A Conservation Journal 24,* July 1997, p22-23.

Photography by Sandra Grantham

Figure 4. A view of the Usami Shokakudo scroll mounting studio at Horikawa Dori, Knoto. In the foreground is Mr Naito and on the back are several *karibari* drying boards.

Report of a Research Trip to Tokyo and Kyoto in January 1998 funded by the Great Britain Sasakawa Foundation

Sandra Grantham
RCA/V&A Conservation Course, PhD Student, Paper Conservation

Photography by Sandra Grantham

Figure 1. Oyster shells at Uki are left to weather for 10-20 years to remove extraneous matter and to weaken the calcium carbonate for grinding the *gofun*.

The title of my thesis to be submitted to the Royal College of Art for a PhD later this year is *Byōbu & Fusuma: Developing an Approach to the Conservation of Japanese Screens Through Technical Study and an Investigation of Current Practices.* I have been looking at traditional and contemporary treatments for the fragile paint on these paper screens and attempting to develop a suitable consolidation procedure. In the process I have investigated the construction methods, the painting materials, techniques and styles (for which I spent a term studying at Kyoto Gedai City University of Arts in 1996)[1] and the screen's historical evolution within Japanese architecture. By combining the above with an understanding of the use and status of the screen in the society of its time and as a present-day collected art object, I have endeavoured to form a holistic survey, so that some fundamental conservation questions may be reviewed.

The research trip was made - in part - to help identify attitudes to, and methods of, conservation training in Japan. This was part of a process to enable me to make an analogy and comparison of eastern and western approaches to the conservation of Far Eastern Cultural Properties.

I began by visiting the Tokyo Geijutsu Daigaku Nihonga Mosha (Tokyo National University of Fine Arts and Music, Copy Painting and Conservation Department) and the Tokyo National Research Institute for Cultural Properties. I was taken on a comprehensive tour of the departments by Dr Inaba, Conservation Scientist, where many works were seen in progress.

Also in Tokyo, a visit was made to the Handa Kyuseido Company Ltd, Oriental Painting Restoration Studio, sited in the Tokyo National Museum. The Handa studio is a member of Kokuho Soko Shi Remei (The Association of Master Mounters and Restorers of National Treasures), and so is one of the seven scroll mounting studios in Japan officially designated to work on National Treasures. Mr Masahiro Handa explained a number of the projects currently being undertaken, which included objects returned from museums in the United States, to be conserved under the scheme set up by

Photography by Sandra Grantham

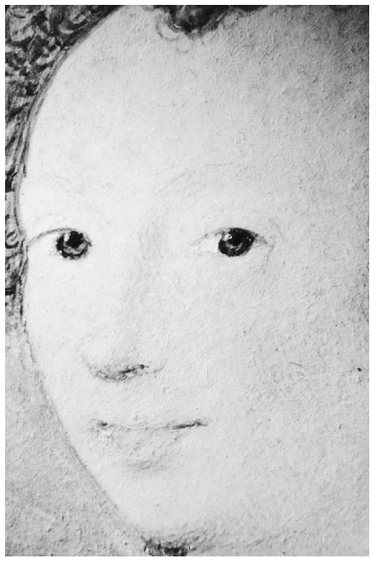
Figure 2. Cherry blossom on an original *fusuma* at Nijo Castle in Kyoto, painted with *gofun* and showing signs of degradation.

immaculate precision of technique. His treatise on miniature painting is beautifully written, concise and addresses difficult concepts. The first-hand access to the works has produced many surprises: the quality of the brushwork at microscopic level is remarkable, and Hilliard is extraordinarily sensitive to the effects of light and movement on his work. The removal of the protective glass to permit study and documentation also produces significant differences in appearance. It is hoped that multimedia presentation of the images will bring the opportunity to share these pleasures with a wider audience.

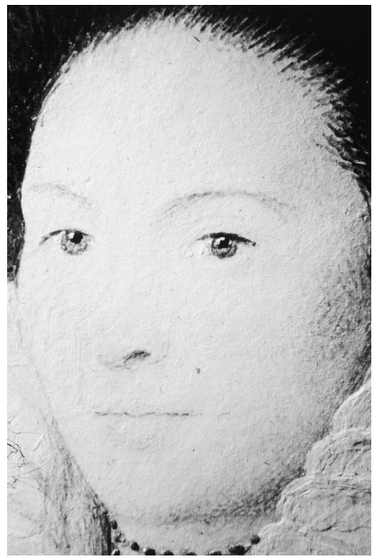
The access to the resources, expertise and training opportunities within both the V&A and the Royal College of Art has been invaluable to my research. The V&A has provided the privilege of access to the original paintings for my own technical examination and photography, and also to existing conservation and curatorial expertise. Of great assistance has been access to the research findings of the late Jim Murrell, the pre-eminent authority in the field. The College has provided me with wider computing resources, as well as courses extending from anatomy to lithography and etching. The anatomy course, provided by the Centre for Drawing Research, involved study visits to the dissecting room of University College Hospital and has been particularly valuable, adding a new dimension to the way I view both painted portraits and life models. Attending the twice weekly life drawing classes at the RCA has given me regular opportunities to improve my technique. I also attend themed daytime drawing workshops, if they are portraiture orientated. A recent intensive two day workshop tutored by Maggie Hambling was particularly productive. The Research Methods Course has provided the stimulus for discussion and occasional collaboration with research students from a wide range of college disciplines.

Multimedia presentation of the results in a broader historical context, enabling conservation issues to be brought to a wider audience, was integral to my original objectives. The opportunity to achieve this much more effectively has been realised by a collaboration with Kenny Stocker, who is currently studying Informational Illustration at the RCA. Kenny's design skills, combined with his specialised computing and communication skills, have enabled me to aim for a more ambitious result.

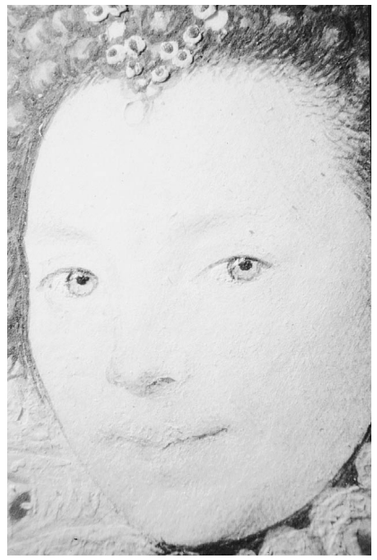
In the course of my research I have taken a large number of microscopic detail photographs directly from the work of Hilliard and his near contemporaries - Holbein, Teerlinc and Oliver. These images, selectively lit to identify and record stylistic and technical features, offer a unique resource for attribution research; an area which I feel could benefit from a more cross-disciplinary approach. The comparison of characteristic compositional devices - calligraphy, brushwork, use of pigments and techniques - coupled with comparisons of sheer dexterity of the artists working at such a challenging scale is revealing. Hilliard's treatise, though (perhaps for professional reasons) not revealing all his secrets, nevertheless gives



Unknown Woman, c.1590-93
P9-1947
Given by E.PJones (magnification: x5 approx)



Unknown Woman aged 26, dated 1593
P.134-1910
Salting Bequest (magnification: x5 approx)



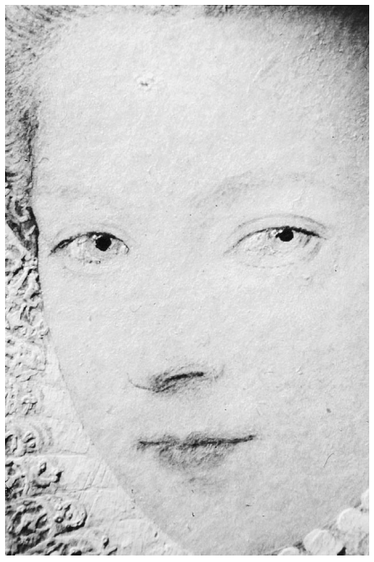
Unknown Woman, c.1585-90
P.2-1974
(magnification: x5 approx)

invaluable indications of his systematic approaches and broader intentions. One of my own special interests, somewhat heightened by attendance on the college anatomy course, is the individual artists' knowledge and application of anatomical matters in relation to portraiture. Certain aspects are sought and recorded, while others are overlooked, on occasion consistently misrepresented, or even perhaps suppressed by the dictates of prevailing portraiture conventions.

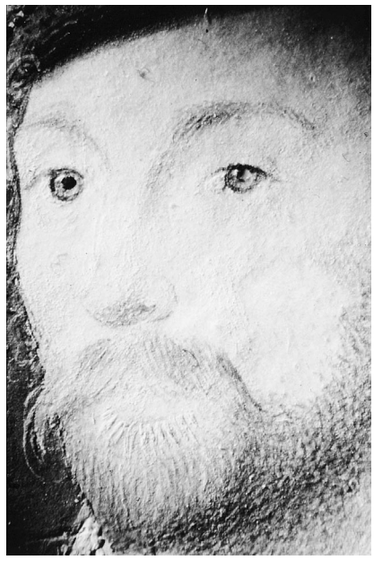
A broadly based approach to the interpretation of the artist's treatise and the subsequent 'virtual restoration' process has been very interesting and fruitful. With my background and objectives I could not have comfortably approached the project in any other way. The research has increased my awareness that the interpretation of painting techniques and the process of retouching (digital or real) are unavoidably subjective in character. One is of course always aware that, though offering many exciting opportunities, computer screen display must necessarily differ markedly from the experience of viewing the actual painting. The use of computer image manipulation is relatively new in conservation and many practical and ethical challenges peculiar to the new medium are presenting themselves. The potential advantages of a body of research students working together in this fast changing field are obvious. The arrival this year of Angela Geary, who is carrying out a research project within the course on computer visualisation of polychrome sculpture, has proved this, and led to some mutually constructive sharing of our differing skills. Next academic year, when I hope to be pursuing a PhD, a third 'computing' student will join the course and our digital collaboration should prove still more fruitful.

Reference

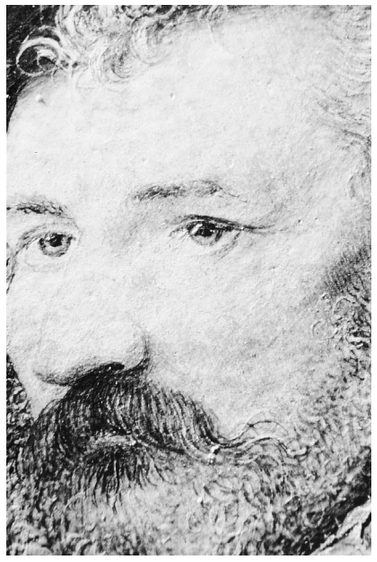
1.Thornton, R.K.R., Cain, T.G.S., (eds.), *A Treatise Concerning the Arte of Limning by Nicholas Hilliard together with A More Compendious Discourse Concerning Ye Art of Liming by Edward Norgate,* Mid Northumberland Arts Group in association with Carcenet Press, Manchester, 1981, p.74.



Alice Hilliard wife of the artist, dated 1578
P.2-1942
Given by the N.A.C.F. (magnification: x5 approx)



Man clasping a Hand from the Clouds, dated 1588
P.21-1942
(magnification: x5 approx)



Richard Hilliard father of the artist, dated 1577
P.154-1910
Salting Bequest (magnification: x5 approx)

Photography by Pauline Webber
Figure 3 - Lining the poster

time, especially financially, when you can find yourself undertaking internships or voluntary work with little or no funding. I am increasingly realising that the money issue permeates the whole conservation arena. In an era in which the arts (among other things) have been severely underfunded for many years, the crisis in funding cannot be ignored. Most people are well aware of funding problems, and monetary issues were not irrelevant at college, yet the necessity of budgeting has still come as something of shock when it translates into very real issues in your working life.

Coming from a training course not based in an institution (unlike the RCA/V&A Conservation Course), one of the other immediate issues is how conservation fits into the wider scheme of museology. In contrast to training, conservation is no longer the focus of everyone, and learning to work successfully alongside colleagues with different priorities has been interesting, invigorating and at times definitely challenging. Preparing for the exhibition has necessitated liaising with curators, designers and object handlers amongst others. As well as this of course there has been the adjustment needed to settle into a working studio. Training courses make a real effort in paralleling working practices, yet the pressures cannot be simulated. Combined with the 'pressure of perfection' is the 'pressure of time'. The course at Camberwell included an element on the conservation of 'oversize paper objects' and four posters were researched, documented and conserved by a group of ten students in over two weeks - a luxury now almost unimaginable. Deadlines are tighter and without the elasticity offered to students, the expected output is much higher, and has to be produced in a shorter time. Although the highest standards are maintained, reports are necessarily more succinct - for example producing the fullest detailed documentation of the 300+ posters would have been an unnecessary impossibility. Decision-making is one of the most important skills taught during training and should be stressed. Deadlines and workloads mean that a continual reassessment of priorities is necessary as conservation work progresses, and to some degree treatments can be limited by the time available.

One final point is that as the end of studying grows nearer, you feel that in some way you should 'know it all' and have cracked the secrets of conservation. However, learning doesn't end by any means; if anything you realise how much more there is yet to learn but with less time for research and further study. The Conservation Department aims to provide time and resources for continuing development, yet this is not easy to fit into a full schedule in departments that have high workloads and may be understaffed.

Hopefully this has been a positive comment - the last year and a half has been a largely enjoyable 'first real job' in which I have learnt a great deal from working in a supportive and challenging team environment.

An article detailing the organisation and procedures of the conservation undertaken for the Poster exhibition will be published shortly by Pauline Webber and Alison Norton.

Acknowledgements
I am grateful to Pauline Webber, Mike Wheeler and the rest of the Paper Conservation studio.

Photography by Pauline Webber
Figure 4 - Taking it easy...Retouching the poster

Out of the Frying Pan...

Alison Norton
Paper Conservator, Paper Conservation

Although no longer a student in a formal sense I am writing in this 'education and training issue' as a recent graduate of conservation training. It will highlight a few of the changes experienced on beginning work in the conservation field after training. I will also discuss if and how these changes can be prepared for, and the (dis)advantages of completing study and entering the 'real world'. Although based primarily and subjectively on my own experiences, and in particular on working for a major exhibition, it will, I hope, also illustrate other more general experiences. It aims to show that there is light at the end of the studying tunnel, even if at times it seems like a train hurtling towards you.

Photography by Pauline Webber

Figure 1 - Overall view of *Rowntrees Elect Cocoa* in studio (Museum No. E.1209-1927)

After graduating from the MA Paper Conservation course at Camberwell College of Arts in November 1996, I began working in the Paper Conservation studio at the Victoria and Albert Museum. Employed on a contract basis, mainly to prepare for the present Power of the Poster exhibition, the past eighteen months have been an illuminating, hectic, but ideal insight into working in the conservation world. After studying for a number of years, albeit combined with work experience, the 'real thing' is in many ways a shock that can only be partially prepared for, although I hope that my lack of experience in some areas has not been a hindrance.

By the time this article is printed, the poster exhibition should have been successfully open for a couple of months, yet at the time of writing final preparations are continuing at a frenetic

Photography by Pauline Webber

Figure 2 - Flattening preparations for lining

pace. The exhibition explores the strengths that have made posters such a powerful medium, focusing on those produced for performance, entertainment, art, propaganda, social issues and commerce in the last 100 years. Over 350 posters are included, all of which have passed through Conservation in the past few months. Full treatment involving surface cleaning, removal of old backings, relining, infilling losses and retouching have been necessary for many, and all have been mounted. The scale of the exhibition was much larger than anything I had previously been involved with, and due to the size and number of posters, was a major undertaking for the studio. Some are massive paper objects (*Rowntrees Elect Cocoa* for instance measuring 4x3 metres), which has necessitated a good deal of planning and organisation. The majority of the posters are mounted on fairly substantial supports, the simple handling of which has meant I have had to become a lot fitter and more muscular.

Every aspect of the poster exhibition and its installation have been subject to financial approval. Stressing the importance of gaining a real understanding of costs, both materials and time, would be a valuable element of all conservation training courses. Therefore, although I hate to begin with it, the most obvious issue on beginning work is money. On a self-interested note it is very nice now to get paid, even if it doesn't always feel like enough. My gratitude at being in paid employment however masks an important issue in conservation. The reliance on volunteers, combined with the expectation that new employees will have *x* years experience can make graduation a very tough

OUTER LIMITS: The Ups and Downs of Being a Student on a Collaborative MA Course

Laura Davies
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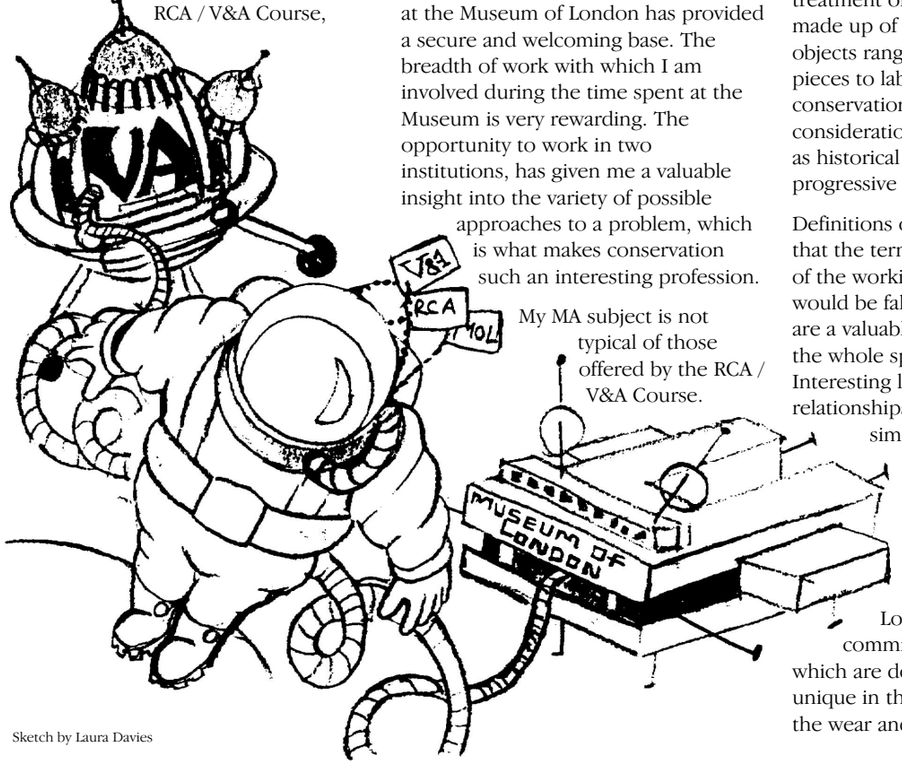
The RCA/V&A Conservation Course is based upon the partnership between different institutions. As well as the two named participants, Imperial College is formally involved, and increasingly there is collaboration with other institutions such as the Horniman Museum and the Tate Gallery. This article describes the conservation challenges posed by a social history collection, based on my experiences as an RCA/V&A student based at the Museum of London.

In October 1996, I began an MA in Applied Art and Social History Object Conservation with the RCA / V&A Course, which was made possible by the co-operation of the Museum of London. The contribution of museums supervising students outside the V&A (where the majority of students are based), extends the range of training and research in which the Course is involved.

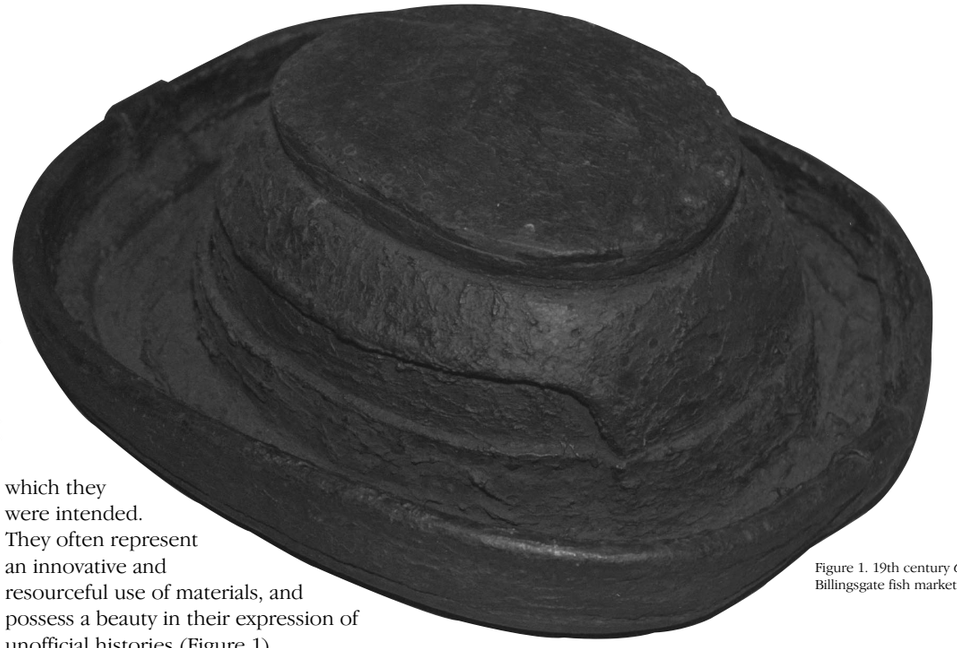


Sketch by Laura Davies

Being on a 'satellite' course is a challenging experience. The intense pace of the course is highly demanding, and being a lone student in a professional working environment away from the course centre can feel isolating. However, the intimate and industrious Conservation Department at the Museum of London has provided a secure and welcoming base. The breadth of work with which I am involved during the time spent at the Museum is very rewarding. The opportunity to work in two institutions, has given me a valuable insight into the variety of possible approaches to a problem, which is what makes conservation such an interesting profession.

My MA subject is not typical of those offered by the RCA / V&A Course. Most students specialise in one material or type of object, and are based in the relevant section of the V&A Conservation Department. The title of my MA describes the diverse collection of objects that I am learning to conserve under the supervision of Robert Payton, Deputy Head of the Conservation Department, and Head of Applied Arts Section. The field of social history object conservation is a relatively young one and can be difficult to define. It involves the application of a broad knowledge of both organic and inorganic materials, along with an intuitive approach to the treatment of composite objects, often made up of unusual materials. These objects range from decorative arts pieces to labourers' tools. Their conservation has to take into consideration the demands for display as historical materials in a very progressive museum.

Definitions of social history can imply that the term is exclusive to the history of the working classes.[1] Clearly this would be false. Social History objects are a valuable source of information on the whole spectrum of society.[2] Interesting light can be shed on the relationships of different social classes simply by the juxtaposition of chosen objects. Some objects are the products of highly skilled makers. They are testimony to the influence of the Fine Arts and to the wealth of the Londoners who commissioned them. Others, which are domestically crafted, are unique in the way they have survived the wear and tear of the work for



Photography by Laura Davis.
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Figure 1. 19th century *Cuir Bouilli* dockworkers hat. Billingsgate fish market, Museum No. MOL.. 80.431

which they were intended. They often represent an innovative and resourceful use of materials, and possess a beauty in their expression of unofficial histories (Figure 1).

An ethical approach to social history conservation involves respect for the 'inherent nature' of these objects, and seldom involves restoration to some subjectively chosen former state. Evidence such as 'original dirt' and the signs of wear and tear are important, interpretable features, and can often place an object directly into its past context, adding to its value. These objects, and their historical presence, give the viewer an empathy with the society and period of their origin.

The Collection at the Museum of London is socially all-embracing, and presents the long and complex story of the development of a major world city from prehistory to the present day. The success of the displays derives from the diversity of objects which are used visually to represent the character of London. Contextual displays are intended to convey a specific historical message, and these contextual displays often demand that artifacts of different materials are housed together in one showcase. Many objects are also shown in open room installations; and selected objects have to be prepared for handling purposes. The museum has a driving mission to increase the accessibility of all of the Collection. This has resulted in the creation of an open storage facility which also acts as a resource centre. This progressive approach to display can be in conflict with the conservation needs of the Collection, and creates interesting challenges for the conservation team.

The Conservation Department at the Museum of London is a very rewarding place to be a student. In a climate where the role of a museum is constantly changing and expanding, so must the role of the conservator. Being involved in effective collaboration between staff in different departments and institutions is an important aspect of conservation training. I feel that the rounded education I receive from the conservation team at the Museum of London, the Course and the staff at the V&A is providing me with flexible, broad-based skills, which will be valuable to me in a changing conservation profession.

References

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2. Davies, S., Social History in Museums: The Academic Context, in Fleming, D.,(ed.), *A Handbook for Professionals,* HMSO in association with National Museums and Galleries on Merseyside and Museums Association, London, 1993,p5

The subjects presented for the final year projects were diverse, ranging from an experimental scientific balloon to peepshows and jigsaws, and from fire-damaged paper and plastic to Islamic manuscripts. Each final year project had to contain elements of history, conservation, science etc, but with a lot of latitude as to where the accent was placed. One consequent difficulty for the examiners was in the comparison of a dissertation weighted towards scientific research with one which laid greater emphasis on ethical discussion of treatments, or with one which centred around a lengthy piece of practical work. In my fourth year as examiner the MA changed, so that the elements of history, research, management and conservation were presented as separate essays, either on one object or each on different objects, with the conservation project carrying the highest mark. So, 35 essays thumped through the post two weeks before the examinations last November. To read everything was untenable, nor is it the role of the external examiner to re-mark everything. Ensuring fairness can be accomplished with sampling.

The *viva voce,* although nerve-wracking for the student, reinforced the assessment of the written work and decided the conferral of a distinction at one end of the scale and the (always reluctant) recommendation of failure at the other end. With the new structure, it was suggested last year that we only '*viva* the borderlines' for distinctions and failures, as is the case with many other degrees. Interestingly enough, this was not well received by the students, due to *vivas* being seen as a rite of passage and as an opportunity for feedback from outsiders.

I found the most engaging and interesting *vivas* were those which developed into an exchange and discussion rather than those characterised by formal questions and answers. Every year I emerged from the two days with a clutch of ideas. This year, for example, I was intrigued by the repair of pith paintings using a pulp infill which contained amongst other things, silicone micro balloons. This is not a one-way process. When making their interim visits in April to discuss the embryonic essays, the external examiners suggest directions for the students; for example, with the pith paper, there was clear overlap both with parchment pulp infilling carried out in Budapest, Baltimore and Brussels, and with paper pulp repair methods.

After the *vivas,* the external examiners attend a formal Board with all the tutors, Head of College etc, and the degrees and classifications are recommended. The examiners write individual reports on subjects such as: the quality of the overall performance of the students in relation to their peers on similar courses; the pass rates; distribution of results and level of internal marking; the form and content of the assessment process and the implications for the content, teaching methods and resourcing of the course. These comments form part of the academic quality monitoring process, and are passed on to current students.

Some final observations as an ex-external examiner. I was always impressed with the overall output of the MA students in under two years, given less than ideal accommodation, given the changes in teaching, and given the growing financial imperative for many students to work part-time. Some useful original work has been published, and easier access to the projects would be useful, perhaps by publication of abstracts.

I was always concerned, and continue to be, about the amount of practical work that the students do, given that the entrance requirement, a first degree, need not necessarily be in conservation. This is a profession-wide concern, not confined to this course, as graphically illustrated by Alan Cummings in a talk to the ICOM-CC Working Group on Training in Maastricht in 1996[1].

I found fascinating the influence that the students' backgrounds had on their approach and development. One year, there was a large intake of Fine Art students who were manifestly creative and dextrous; however they spoke in the first year of experiencing difficulty with the discipline of trimming against a straight edge, and of cutting and measuring very accurately to produce enclosures. As a potential employer, it has been useful to get to know so many students. As supervisor to the MA in Book Conservation on the RCA/V&A Conservation Course, it proved valuable during *viva* discussions for comparing standards of work.

Reference

1. Cummings, A.,The eternal triangle: Professionalism, Standards and Standardisation in Conservation Training, in *A Qualified Community: Towards Internationally Agreed Standards of Qualification for Conservation; Proceedings of the Interim Meeting of the Working Group on Training in Conservation and Restoration of the ICOM Committee for Conservation, Maastricht, 6-8 April 1995;* Cronyn, J., and Foley, K., (eds.), ICOM-CC Working Group on Training in Conservation and Restoration, Distributed by English Heritage Postal Sales; ISBN 85074 640 0

The External Examiner

Graham Martin Head of Science and Information Section
Helen Shenton Deputy Head, Conservation.

An internal perspective

Graham Martin

The rôle of an external examiner is one under debate at present. The majority view is that external examiners are now clearly defined as moderators rather than second or third markers. This moderation is achieved through assistance to the university or college in:

- maintaining academic standards
- verifying that the standards are appropriate to the awards
- ensuring that the assessment process is consistent and fair.

This implies a broad knowledge of the educational processes and procedures, a good knowledge of the workings of other courses and programmes, and the ability to provide a reasoned and fair judgement on difficult matters.

It is vitally important to the process that the external examiner is free to recommend or comment on any and all aspects of programmes of study. The external examiner does NOT represent any one group from either the staff or students.

I am fortunate that I currently hold two positions as external examiner. The first is on the De Montfort University MSc Conservation Science course, and the other is on the newly established undergraduate module in Heritage Conservation at Derby University. Both of the course teams involved actively encourage me to participate in the full workings of the programmes by confidential sessions with students and staff. Only by being involved at such a depth can I offer my full skills as moderator.

The reality of the issue is paperwork. Very often external examiners will see and be asked to comment on examination papers and practices, review marking, and to feed back comments on the structure and content of programmes. It is not uncommon for a 70cm package to arrive on my desk (with prior warning) that will contain exam scripts for rapid review.

I constantly remind myself that I am dealing with people's lives and future job prospects. Occasionally, some hard decisions must be made about the future of individuals on courses. Fortunately such hard decisions are not solely reliant on the external examiner but on the whole educational team.

So why undertake this rôle? It certainly is not for the money, although there are fees and expenses for the task. The other external examiners I know all undertake the task out of an altruistic sense of duty. Since one has taken and absorbed knowledge and skills from the broad profession, it is only fit and proper that something is put back into the system. Being an external examiner is one means of doing it.

A personal view

Helen Shenton

The principles behind the external examiners' rôle are to ensure fairness in marking, to moderate the assessment of the internal examiners, to see that justice is done for the individual student and ensure parity with comparable post-graduate degree courses. The reality of being an external examiner for the MA in Conservation at Camberwell is that between twelve and sixteen 20,000 word dissertations would thump through the post two weeks before the final examinations in November. The examiners can see any course work carried out over the two years, but in practice the emphasis until 1996 was on the final dissertation, examined at a *viva voce (viva)* which took place in the students' exhibition, amongst the conserved objects.

The MA course is offered in Paper Conservation, within which the student can specialise in art on paper or library and archives, or further specialise in photographic materials. There are two external examiners, one drawn from the 'conservation profession' the other 'representing the field of conservation research'. I shared the task firstly with Dr Derek Priest of the Paper Science Department of UMIST and then David Watkinson, Course Leader in Conservation at the University of Wales. Being an external examiner is, to quote Spenser, both a 'painful pleasure and a pleasing pain'. It is very gratifying to realise what you do know; it is very humbling to realise what you do not know.

Archaeopteryx – a wing and a prayer

William Lindsay
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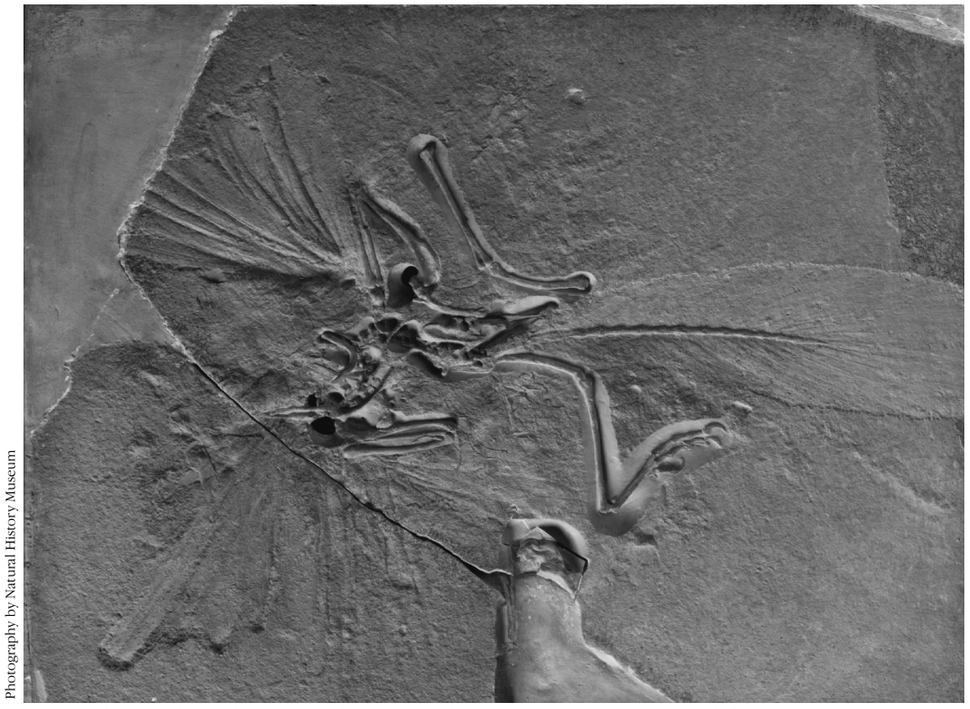


Photography by Natural History Museum

Figure 1. *Archaeopteryx lithographica,* the Natural History Museum (London) specimen Museum number BMNH 37001

Risk analysis or risk assessment can be described as "the study of decisions subject to uncertain consequences"[1] and is applicable to any system, product or equipment where risks lurk, including the care of museum collections. In this context, risk assessment has been developed particularly in natural history collections, probably because these collections tend to be very large - nature is a large and complex entity - and in comparison with collections of cultural objects they are vastly under-resourced. While the V&A may boast a conservator-to-object ratio in the region of 1:70,000, the Natural History Museum could still claim a ratio of only about 1:700,000 if it deemed all its curatorial staff to be conservators. And natural history objects do not deteriorate less than paintings, sculpture or furniture. Indeed, given their organic nature and the routinely invasive study methods employed, natural history collections are arguably at a constantly high risk of destruction.

Decisions about risks are greatly determined by perceptions of what there is to lose. In his "Wager"[2], the 17th century mathematician and theologian, Pascal, considered what decision we should make on belief in the existence of God. His assessment of the risks involved ran, more or less, thus: God is such a big thing that he is beyond reason and therefore, when it comes to belief or disbelief in God, existence and non-existence are like the faces of a coin when tossed - equally likely to turn up. Pascal reasoned that it is better to bet on belief than disbelief since, if you get it right, you are on your way to heavenly happiness and if you get it wrong, you have lost nothing. If on the other hand you opted for disbelief and you are correct, you gain nothing but "noxious pleasures, glory and good living"[3]. However, if you are wrong you have risked - and will meet - infinite damnation.

In the theological world of risk assessment there was no scope for hedging your bets, but how do we fare in the real world? Take *Archaeopteryx lithographica* (Figure 1) for example. This, the earliest bird known - the 'ancient wing from the lithographic stone'- lived about 150 million years ago and is now known from only seven fossil examples. The best specimens display almost undisturbed and perfectly preserved skeletal remains and delicate feather impressions in stone long prized for printing, but still mud when this animal was alive. Since only birds have feathers, *Archaeopteryx* is classified as a bird, but it has some skeletal features which are indistinguishable from those of reptiles. *Archaeopteryx* has an importance beyond most relics of past life:

> "Possibly no other zoological specimens, fossil or Recent, are considered so important as are those of *Archaeopteryx lithographica*... Certainly few other specimens have generated such widespread interest or provoked as much speculation and controversy... *Archaeopteryx* may well be the most impressive fossil evidence of the fact of organic evolution."[4]

The London Natural History Museum's specimen of *Archaeopteryx* was found in 1861 and purchased a year later as part of a larger collection after much negotiation by its Trustees. *Archaeopteryx* was insured during transit for approximately £200. At the time Ruskin lamented the Trustees' inability to recognise a bargain when they saw one:

> "This collection of which the mere market worth, among private buyers, would probably have been some thousand or twelve hundred pounds, was offered to the English nation for seven hundred."[5]

Controversy has been a feature of *Archaeopteryx* since its acquisition.

Risk	Example	Risk Magnitude
Physical Forces - Type 1	earthquake, building collapse, explosion	0.00000073
Physical Forces - Type 2	dropping, damage from falling objects and covers, transport, lifting and placing	0.466
Physical Forces - Type 3	distortion from poor support, vibration, abrasion	0.0000000006
Fire	fire	0.00216
Water - Type 1	flood	
Water - Type 2	roof leaks, plumbing leaks	
Water - type 3	rising damp, seepage	
Criminals - Type 1	major theft	0.0033
Criminals - Type 2	opportunist theft and vandalism	0.0000144
Criminals - Type 3	embezzlement by staff or frequent users	0.0000144
Pests - Type 2	pest infestation	
Contaminants - Type 1	fallout from industrial accident, major chemical release	
Contaminants - Type 2	dust and other materials on surface	not estimated
Contaminants - Type 3	gases and vapours from storage materials	not estimated
Light and UV radiation	fading colours, structural damage, deterioration of glues and adhesives	0.0000022
Incorrect Temperature - Type 1	freezing and thawing	
Incorrect Temperature - Type 2	thermal shock to specimen, softening adhesives	0.0000056
Incorrect Temperature - Type 3	higher than ideal, higher rate of deterioration reactions	not estimated
Incorrect Relative Humidity - Type 2	high enough to cause mould	
Incorrect Relative Humidity - Type 3	splitting of matrix and fossil, splitting of support materials, higher rate of deterioration reactions	not estimated
Custodial Neglect - Type 1	collection abandonment	
Custodial Neglect - Type 2	loss of objects, loss of data	0.000000019
Custodial Neglect - Type 3	ongoing failure to ensure ownership, loss of access	

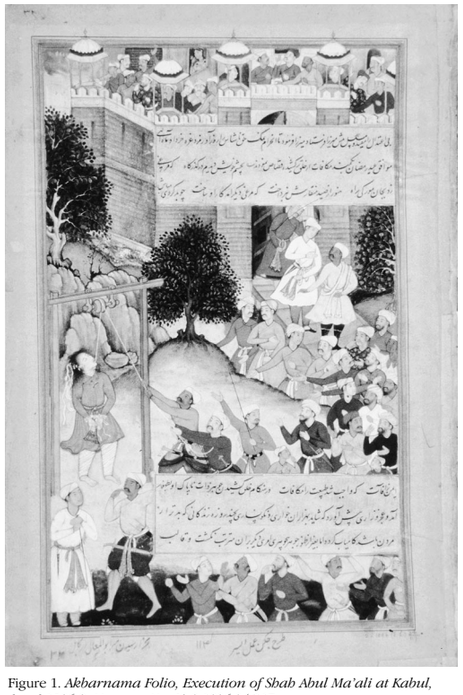
Table 1 Risk Categories (after Waller[6]) and calculated risk magnitudes for *Archaeopteryx*.

Life as an Intern

Radhika Sahgal
Intern, Paper Conservation

In January, I started a three-month internship in the Paper Conservation Section at the Victoria and Albert Museum, thanks to a generous grant from the Nehru Trust Fellowship. I have previously completed two internships: one at the Indian Council of Conservation Institutes (ICCI) at Lucknow in India, and one at Camberwell College of Arts in London.

I work at the Art Conservation Centre, Indian National Trust for Art and Cultural Heritage, New Delhi, India, as a paintings conservator. The studio was set up for conservation of 19th and 20th century oil paintings, but clients also bring us works on paper, textiles, ceramics, wooden material, metals and glass. I entered the profession as an on the-job trainee in 1990. As a fresh recruit straight from art school, for the first three months I was only allowed to *observe* conservation procedures. I did the menial jobs - cleaning the studio before the conservator arrived and washing up when he had finished. It certainly taught me a lot about looking after my equipment and the advantages of being organised before starting to work!



Photography by Radhika Sahgal

Figure 1. *Akbarnama Folio, Execution of Shah Abul Ma'ali at Kabul,* dated 1586-9, Museum No. IS 2-1896-34/117

My conservation education began in the traditional Indian manner. Knowledge was imparted through dialogue and from each object treatment. After two years I recognised that I needed to attend an organised course, and decided to do a certificate course in paper conservation. Here practical work was replaced by lectures and written work. (A Masters degree course in conservation is now available in India.)

I had wanted to work on Indian miniatures and at the V&A I was given two folios from the *Akbarnama.* As a conservator it is far beyond my wildest dreams to be handling objects as important as these. The approach towards the problems of losses, flaking and previous repairs has been one of minimum intervention.The areas of flaking were consolidated locally and the previous repairs removed. The object was slowly humidified to relax and flatten it, ready for mounting. The Indian approach would have included extensive in-painting.

I also participated in the treatment of some of the posters for the major exhibition 'The Power of the Poster'. This was something new for me in several ways. First, the size of some of the objects was larger than anything I had ever worked on before. Second, it taught me how to work alone. I had to overcome my fear of handling large objects by myself. I also learned to use tools which were new to me (japanese brushes and paper), and new treatment techniques.

The experience of working in the Paper Conservation Studio has been a very rewarding one. It has given me the opportunity to be involved with the conservation process, and also a little insight into the planning and thought that goes into mounting a large exhibition. Observing people at work and being a part of the team has boosted my morale and built my confidence. In return, I have given my very best.

Six-month Internship in Decorative Surfaces

Jeanette Ida Moller
Intern, Furniture and Woodwork Conservation

I have been asked by the Editor to give my view of being an intern at the Victoria and Albert Museum and what follows is written in the spirit of constructive criticism.

Before coming to the V&A, I had obtained a Higher National Diploma in Furniture Restoration (1994) , attended a part-time course in Furniture Finishing (1994), and received a BSc(Hons.) in Restoration and Conservation of Decorative Surfaces on Wood and Metal (1996) from London Guildhall University. I had also undertaken two previous three month internships: the first at the Society for the Preservation of New England's Antiquities in Boston (1995) and the second with The Corporation of European Cabinetmakers and Restorers in Brussels (1997). These experiences allowed me to compare approaches and practices in the different countries.

I applied for an internship at the Victoria and Albert Museum for many reasons: the V&A is the world's largest museum of decorative arts; the Conservation Department has an international reputation for conservation practice and research; and lectures and seminars offered by the RCA/V&A Course in Conservation are open to interns.

I am now three months into my internship and I have just completed my second project, a French cabinet c. 1780. The many different materials present in the cabinet offered a real challenge. The carcass is oak, the veneer ebony and the top marble. The cabinet is decorated with Japanese lacquer panels and ormolu mounts.

The process of conservation involved the following: I was briefed by the curator, made a photographic record, carried out research, prepared a condition report and treatment proposal to be discussed with my supervisor. Scientific analysis of the cabinet included examination using handheld ultraviolet light, cross-section samples taken for UV fluorescence and visible light analysis, and solvent tests. Treatment included consolidation, cleaning, infilling and inpainting. Treatment was recorded in a written report and with photographs.

Both research and treatment involved rewarding collaboration. Curators in the Far Eastern Collection were consulted about the origins of the motifs on the lacquer panels. It turned out that the cabinet had a story to tell as, at some point, Europeans had made a few additions to the Japanese motifs on the panels. The cross-sections were examined and explained by staff in the Science Group. My treatment of the ormolu mounts was carried out under supervison in Metalwork Section.

My work here has also involved environmental monitoring of galleries, examination of the condition of gilded chairs, and carrying out 'first aid' on gilded surfaces.

Being an intern in such a large institution has given me, in the main, a privileged feeling. This is partly due to the competition for places and partly due to the overabundance of information which is available - in the Conservation Department's library, the National Art Library, and from staff in the Museum. This feeling of privilege contrasts with the feeling of powerlessness which I have from time to time because of the temporary state of an internship and the sometimes varying levels of supervision, engendered by the busyness of staff and the many ongoing projects.

Working here has made me think a lot more about ethics in conservation. The first point of reference is always the Conservation Department's 'Ethics Checklist', which is a list of questions conservators can ask themselves when approaching a range of conservation tasks. However, being a lot simpler and perhaps more versatile than conventional codes like for example the AIC list in its comprehension, the result is a slight difference in treatment policies between sections. It is also true to say that in conservation generally there is usually more than one solution to a treatment procedure, and individuals often have their preferred methods or skills. Certainly, the overall advantage of the Checklist is that it allows for investigation and experimentation, thereby making the Victoria and Albert Museum an interesting place to work and study.

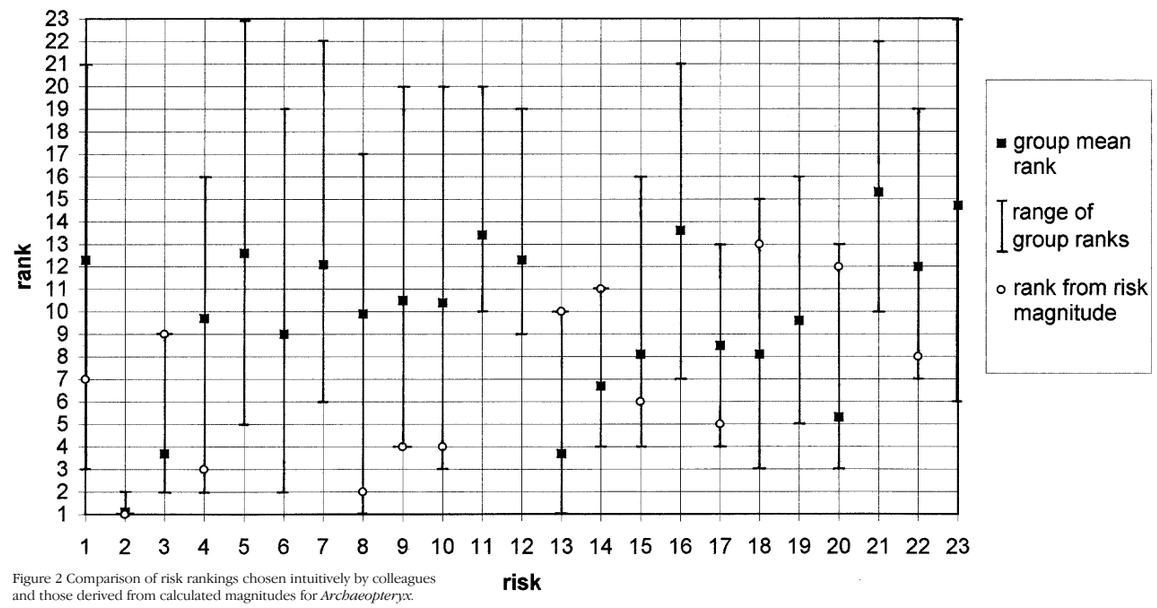


Figure 2 Comparison of risk rankings chosen intuitively by colleagues and those derived from calculated magnitudes for *Archaeopteryx.*

From *Which way up is it?* to *Did it take to the air as a ground-running flapper or a tree-climbing jumper, and was it capable of flight at all?* to *How does it relate to other animal groups, and how far removed is this bird, with reptilian features, from being a reptile?* In our understanding of the history of life these are major issues but, when scientific conflict is not interesting enough, there is always some mileage to be gained from alleging that *Archaeopteryx* is a hoax because it flies in the face of biblical creation[7].

Until recently, the Natural History Museum's understandably reluctant estimate of a financial value of the London *Archaeopteryx* was £2 million - understandable because there is nothing with which to compare it in the fossil world other than the other six examples, none of which have been market-tested. However the astonishing, and some would say inflated, price of $8.3 million paid for a dinosaur last year suggests that *Archaeopteryx* might be revalued upwards towards the £10 million mark[8], the top of a wide range of estimates made ten years ago[9].

Archaeopteryx, therefore has an accumulated value in scientific, cultural and financial terms. So what about the risks to this national and international treasure?

A semi-quantitative methodology for assessments of risks to collections has been in use at the Canadian Museum of Nature for some years, based on the recognition of ten agents of deterioration considered to be comprehensive, and their characterisation as rare and catastrophic, sporadic and severe, and constant and mild (Table 1)[10,11]. A numerical magnitude of risk for defined collections is calculated as a product of the loss in value, fraction susceptible, extent and probability. The value of this assessment lies in the comparison of the numbers, allowing decisions to be made on priorities and resource commitment.

In this case, although *Archaeopteryx* is a rather small and specific sample when viewed as a 'collection', the calculation of risk magnitudes provides some insight into the significance of the various risks. The values of risk magnitude shown in Table 1 were calculated as an illustration of the approach and cannot be considered as absolute values. Their purpose is to offer some means of comparison.

While the results in Table 1 seem to give a clear message, and this may be correct, there are problems with this method which need to be acknowledged. Firstly, there is a lack of data, both on probability and frequency of occurrences. There is therefore a dependency on estimates, expert or otherwise, based on personal experience, knowledge and - ultimately - judgement. In four cases confidence, and knowledge of deterioration processes, were considered to be so weak that numerical values were not assigned, although the risks were considered to be relevant. And, for ten of the risks, deterioration was considered not to result.

The results outlined in the paragraph above are full of value judgements, as is the methodology used to produce them. This is not surprising. Personal knowledge and perceptions draw attention to one area while avoiding another. Equally, the energy required to make a judgement is as relevant a factor as the judgement itself. The more difficult the information is to

acquire, such as the probability of an aeroplane crash on the Palaeontology Building of the Natural History Museum, the more likely it is that a lower level of rigour will be acceptable in judgements in that area. In the professional world of safety analyses, the quality of the results obtained are recognised to be dependent on the analysts, methods and models employed, and comparative studies have shown the extent to which the same situation is open to a variety of results.[12]

As a measure of confidence in, and consensus on the results in Table 1, ten colleagues were asked to rank in order the risks in Table 1 on the basis of their knowledge and experience, and to exclude those which they considered to be irrelevant. These colleagues all have direct knowledge of *Archaeopteryx* and, at some time, have direct - though varying - responsibilities for its storage and use. Figure 2 illustrates the lack of consensus within the group and a lack of agreement with the ranked results of Table 1. (The four risks for which values were not calculated in Table 1 were secondarily ranked tenth to thirteenth.). While nine of the group agreed that Physical Forces Type 2 was the most significant risk (the other ranked it in second place), only five agreed on the second most significant, five on the third and only two on the fourth. The level of consensus was equally low for the risks considered to be irrelevant. Only seven of the twenty three risks were not considered irrelevant by someone, and the greatest number who agreed on what was irrelevant was seven for Custodial Neglect - Type 3.

There are obvious reasons for this poor level of agreement. The ten colleagues who participated in this exercise have a variety of specialist knowledge but their specialisms do not overlap much. So, most people identified the risks of sporadic and severe physical forces because these are characteristic of the use of *Archaeopteryx* through its removal, transport and access for study, and this is the risky area in which most people are involved. More specialist knowledge is required to understand the risks from incorrect relative humidity or contaminants and, since fewer people have this knowledge, more people are likely to score this as a lower risk. The high level of consensus in selecting Physical Forces - Type 2 as the most significant risk for *Archaeopteryx* might be a measure of the likely accuracy of this decision, but the lack of consensus both within and between the group's rankings and those obtained by the semi-quantitative methodology, indicate the attention which needs to be given to choosing a source and measure of comparative analysis. Comparisons may introduce more uncertainty than they resolve if they are not of equal or greater accuracy.

The absence of reliable data is not an obstruction to risk assessment although it is an obstruction to more objective assessment. In these situations we should opt for a rational approach and determine the level of consensus which is achievable - or even desirable - and, where there is agreement on the relevant risks, assume the worst until such time as a better consensus can be achieved. Similarly, where there is a lack of consensus on the magnitude or rankings of risks, consensus may be more readily achieved not by drawing on varied areas of expertise, but by focussing on the more personally valued issue of consequence[13].

It may be difficult to appreciate the height from which *Archaeopteryx* needs to be dropped in order to damage 50 or 60 or 70% of the specimen, and from there to determine what fraction of its value has been lost, and to measure the significance of the risk of dropping, but the consequences of such an event occurring are likely to be more readily appreciated. In the case of *Archaeopteryx,* the consequences of doing otherwise will bring a damnation beyond that wagered by Pascal.

Acknowledgements
Thanks to the staff of the Palaeontology Conservation Unit, Dr. Angela Milner, Head of Vertebrates and Anthropology Division, and her curatorial colleagues.

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Internships at the V&A

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The nature of conservation training is such that qualifications gained from validated conservation courses both in the UK and abroad cannot satisfy all the requirements of the conservation professional. A further period of work experience and training in an institution such as the V&A is considered vital in the development of a well-rounded conservator. It is also important for mid-career conservators and conservation scientists to have the opportunity to refresh and update their knowledge. Many countries have no opportunities of this kind to offer the future caretakers of their country's heritage. The responsibility for the education and training of conservation professionals belongs to the international conservation community as a whole.

The benefits of an internship at the V&A are many. The relatively large size of the Department, the wide range of specialist conservators and scientists, the Course with its formal programme, and links to other academic and cultural institutions all combine to make the Conservation Department of the V&A a unique place to work and study. It can offer a very different perspective on professional life, balancing the diverse activities in which staff are involved. The Museum's extensive collections also present exciting opportunities for discussion with specialist curators and for work on objects of the highest quality.

The Conservation Department offers internships and placements to people from the UK and abroad, both students currently enrolled on conservation courses and qualified conservation professionals at various stages of their careers. Interns are normally here for three to six months, but in exceptional cases they may stay for up to a year. Placements are for shorter periods, usually around four to six weeks. Selection is from a competitive field, on the basis of written application, portfolio, and an interview, either by telephone or in person. This takes place four times a year and we have, on average, 20 interns and placements each year. Internships are not funded by the Museum. While there are no charges for tuition or materials, successful applicants have to find money for their maintenance and travel.

Interns are appointed a supervisor and are attached to a particular specialist Section, e.g. Ceramics & Glass. The work can consist of research, condition assessment, technical examination, treatment, preventive conservation, documentation and liaison with curatorial staff. Each internship will have different emphases, depending on the interests and needs of the individual. An internship begins with a plan of action, a compromise between what the intern wants to achieve and the pre-existing work programme of the conservation section. Interns are assessed on the basis of this plan and are asked to evaluate their internship themselves. Constructive criticism can help us improve what we offer.

Interns are encouraged to participate in Departmental meetings and seminars, and welcomed at events organised by the RCA/V&A Conservation Course. The equivalent of one day a week is reserved for private study. They also have a contribution to make to the development of conservation in the Museum. They bring information about current practice and expertise in areas of special interest from abroad. In addition, they contribute significantly to the output of the Department, both in terms of research and of practical conservation work on objects.

Interns will use the experience gained here in many different ways, depending on their rôle in their own institutions or businesses. However, it will often be a condition of their funding that they share their experience with others, either through teaching, writing or presentation. We endeavour to make their experience here a thoroughly rewarding one.

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