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V&A Conservation Journal No 21

All enquires to:
Conservation Department,
Victoria & Albert Museum,
London SW7 2RL, UK
Telephone 0171-938 8624
Fax 0171-938 8661

The cover shows
Polyurethane foam puppet 'Larry the Lamb'
(Museum No. Misc. 97(1)-1978)
Photography V&A Photographic Studio.

Anna Hillcoat
Paper Conservation: Indian and South East Asian Art

(2 year MA)

Aged 23, British/German

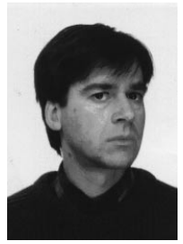
BA (Hons) Paper Conservation, Camberwell College of Arts (1996)

After attending school in Germany, Anna's choice of Abitur subjects coincidentally led her to choose conservation as the field for her further studies. Before coming to Camberwell, she spent eight months assisting a paper conservator in private practice. Here she learnt the first rudiments of paper conservation and confirmed her choice of career. The experience also made her aware of the many possibilities and approaches in conservation and the wide variety of materials a paper conservator can encounter in her or his work. During her time at Camberwell, this became a particular interest following work on Far Eastern materials and three dimensional paper objects. Consequently, Anna spent her college work experience at the Pitt Rivers Museum in Oxford with Birgitte Speake and her team. She worked on paper objects of Japanese origin including a kite in the shape of a crane, a small festival flag and a collapsible lantern.

At Camberwell, Anna's BA project was the conservation of an Oriental parasol. This involved her in research and presented new challenges in both the treatment and the construction of suitable housing for the object. She was also awarded the Worshipful Company of Stationer's Prize for Conservation.

Anna's interest in challenging and unorthodox materials has brought her to the Course and this important area of specialisation. She looks forward to learning from the experienced staff at the V&A and to developing conservation solutions for the unusual problems presented by many of the objects in the Indian and South East Asian collection.

Anna's supervisor will be Pauline Webber of the V&A's Paper Conservation Studio.



Nicholas Frayling
Computer visualisation of the original appearance of works of art and craft.

(2 year MPhil by Project)

Age 39, British

BSc (Hons) Physics, Bath University (1978)

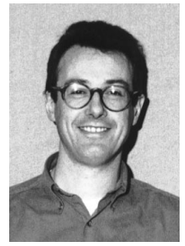
Drawing, Painting and Theoretical Studies units of part-time BA in Visual Studies, University of Humberside (1994/95)

Nicholas has sought to maintain a broad range of scientific, computing and artistic interests. Following graduation, he joined Rolls-Royce (Aero) of Bristol to work in a research and development environment, progressing from an engineering position, through a lengthy spell as a physicist in the materials laboratory, and finally to a systems programming rôle in the computer aided design field.

Keen to broaden his outlook, he chose to move away from the industrial workplace, and devote more time to the visual arts. Taking advantage of adult education opportunities where necessary, he has strengthened his drawing, painting and sculpting skills, and studied the history of art more formally.

Nicholas is looking forward to consolidating his diverse skills in the conservation field, and can foresee many exciting possibilities for the application of the rapidly improving computer image manipulation and multimedia technologies, though he is acutely aware of their inherent limitations. The project specifically involves the use of image manipulation techniques to investigate the original appearance of selected works of art, drawing on historical knowledge of techniques and pigments, reference to undamaged areas and cross-referencing to related works. Interactive multimedia techniques may be used to optimally present the resultant images and elucidate the processes involved in their creation.

Alan Cummings will be the principal supervisor of the project.



William Lindsay
Conservation strategies for developing collections of fossil material

(4 year part-time MPhil by Thesis)

Age 41, British

BSc (Hons) Geology, University of Glasgow (1977)

William is the Head of Conservation in the Palaeontology Department of the Natural History Museum where he began work in 1979. In between building dinosaurs, writing popular books on fossils and managing and applying conservation techniques, he has specialised in the preparation of unique and complex vertebrate fossils for taxonomic research and classification.

Unlike some areas of conservation, the development and application of rigorous approaches to conservation decisions appears to have been poorly developed in the natural sciences. For William, this defect is illustrated annually when he tries to plan and prioritise prevention and remedial conservation in a collection of some 9 million specimens which form an actively changing database for research on biodiversity and life history. So, when the RCA/V&A Conservation Course offered research topics on conservation risk analysis, William saw this as an opportunity to kill lots of birds with lots of stones. He hopes that as a result of his research he will be able to produce strategic conservation approaches applicable beyond his own field of palaeontology.

William's principal supervisor will be Jonathan Ashley-Smith, Head of the V&A Conservation Department.

New Students for the Academic Year 1996/97

Alan Cummings
Course Director, RCA/V&A Conservation Course

As I have pointed out before, the situation for the Conservation Course can change dramatically from year to year. While this seldom makes for an easy life, there is never a dull moment. Last year we were able to offer five MA places in our "core" disciplines as well as one more specialised option within Book Conservation and a research place in Paper Conservation. For this year, we could find space for only one student in a core discipline, Textile Conservation, but the diversity of the Course continues to be illustrated in the five new studentships which begin in October 1996.

We have previously been the first to offer dedicated postgraduate training towards a higher degree in a number of disciplines. These have included Photographic Materials, Historic Wallpapers (with the National Trust), Upholstery, Architectural Paint, Conservation Science (Identification of Materials) and Musical Instruments (with the Horniman Museum). Two of the students beginning this year will also be training in areas never offered before, as far as we are aware, one in collaboration with the Museum of London. These new practical disciplines, as well as the new research projects which begin in October 1996, further illustrate our aim to innovate and to meet perceived needs for expertise in the profession. We have more new areas for training and research under consideration for 1997. Please contact us if you would like information or, indeed, have a suggestion for training or research. We are particularly keen to initiate collaborations along the lines of those with the National Trust, Horniman Museum and Museum of London.

Laura Bennett
Conservation of Applied Arts and Social History Objects (Collaboration with the Museum of London)

(3 year MA)

Aged 23, British

BA (Hons) Fine Art, Staffordshire University (1995)

During her degree course, Laura worked in a wide variety of media but also pursued a personal interest in the skills of traditional craft workers, including those of the goldsmith, weaver and potter. This helped to develop a broad knowledge of materials and strongly influenced her own sculpture. Her work explored the narratives and personalities inherent in domestic and social objects and furniture.

Her interest in traditional crafts also stimulated her interest in museums, particularly in collections of social history and applied arts. It is the directness and expressiveness of such objects that she finds appealing and the influence social history has over cultural identity which fascinates her.

After graduation, Laura found work as a paper conservation technician at the National Library of Wales for six months. She enjoyed the work and became interested in conservation as a possible career. She found out about the Conservation of Applied Arts and Social History Objects option, based at the Museum of London, and sees this as a way of combining and focussing her interests. Before starting the Course, Laura acquired more experience working in the Social History Object Conservation Department of St. Fagan's Museum. Laura's supervisor will be Robert Payton of the Applied Arts section of the Museum of London's Conservation Department.

Elizabeth-Anne Haldane
Textile Conservation

(3 year MA)

Aged 26, British

BA (Hons) in Industrial Design (Textiles), The Scottish College of Textiles, Herriot-Watt University (1992)

After a general course in her first year at the Scottish College of Textiles, which included knitted and woven textile design, Elizabeth-Anne went on to specialise in printed textiles. In her first year she produced a collection of paperwork designs and printed textiles inspired by the study of 18th century costumes and sample books from several museums including the V&A.

After spending some time as a freelance designer, Elizabeth-Anne had the opportunity to spend a year in Boston (USA) and was introduced to textile conservation as a volunteer at the Isabella Stewart Gardner Museum. Having enjoyed this experience, she applied to the Metropolitan Museum of Art and was accepted as an intern on the Antonio Ratti Textile Centre Storage Preparation Project. She spent ten months there learning about conservation storage and enjoying the chance to see so many wonderful textiles. She looks forward to the Course as a means of studying textile conservation formally and also learning about the variety of work carried out in the Museum as a whole.

Elizabeth-Anne's principal supervisor will be Lynda Hillyer, Head of Textile Conservation at the V&A. All the Textile staff will, however, contribute to her training in the many aspects of the discipline, including Marion Kite and Val Blyth.

Editorial

Jonathan Ashley-Smith
Head of Conservation Department

What have leather, rubber and PVC got in common? One answer is that, despite the claim that "Conservators make it last longer", the profession fails dismally with polymeric materials. The mechanisms of decay of these natural and synthetic polymers have been well studied but there are few successful interventive techniques to delay deterioration. Passive conservation by control of storage and environment needs committed collaboration between conservator, curator and buildings management. This can be difficult to achieve, especially since love of these materials is not widespread.

Another thing these types of materials have in common is that they are not in the mainstream of what curators collect, they merely happen to be present in the collections. Similarly they are not in the mainstream of what conservators are asked to treat, yet conservators from a number of different specialist disciplines may find them associated with objects they are faced with. The material may be there as overt decoration as in the Mackintosh cabinet described in this Journal or deliberately hidden as with elastic in a dress.

However, things are not always as bad as they seem. There are signs of a growing interest that may turn into something more passionate. The Museum's collection of gilded leather hangings, largely ignored since it was acquired last century, has been catalogued and rehoused in a curator/conservator collaboration funded by the Getty Grant Program. A number of articles in this issue show that plastics are not totally unloved and the Museum has organised a display of historic plastic tableware, containers and vessels ranging from a Lalique box of 1935 to some recently acquired Tupperware (30 September-16 December).

On the subject of growing appreciation and affection, the responses to the questionnaire about the future of this Journal were extremely positive. Nearly 95% of respondents were quite or very satisfied. More than 70% read most of every edition. Nearly 70% said they would be willing to pay. A substantial number, 45%, said that they would be able to access the information via the internet and it is reasonable to suppose that this number would increase rapidly. We will need some time to consider all the comments made in response to the questionnaire. It will not be easy to balance our professional wish to spread information as widely, cheaply and rapidly as possible against our desire to continue to produce a high quality, permanent hard copy in an affordable manner.

Plastics? – Not in my collection

Brenda Keneghan
Plastics Conservator, Conservation Science

The Victoria & Albert Museum appointed its first plastics conservator in 1992 with the brief of surveying all the plastic objects within the collections. This mammoth task was started by Dr Edward Then and he reported his progress in an earlier edition of this journal[1]. For the last two and a half years I have been continuing the project and as the person actually undertaking the survey I have come across very many interesting and unusual objects ranging from *Cross-eyed Critters* in the Renier Collection at Bethnal Green Museum of Childhood to chairs made from recycled plastic detergent bottles in the Furniture & Woodwork Collection, not forgetting such exotica as the stage fans of Beatrice Lillie and the sunglasses of Elton John at the Theatre Museum.

I have also come across interesting and unusual attitudes to the survey, the most common of which I have christened "plastics denial syndrome", where those in charge will swear blind that there are no plastic objects in their collection and are absolutely astonished when a hidden câche is uncovered. I have attributed this syndrome to the probability that most people mistakenly associate plastics solely with modern living, bearing little relation to the past. Museum collections reflect society throughout history, however, and are influenced by both the fashion and materials technology of the day. As material culture has developed over the last two centuries, a much wider range of objects has been collected and synthetic materials have featured prominently. If we begin with the semi-synthetics, such as cellulose nitrate, we can say that plastics have been around for approximately a century and a half. On this basis it would be unusual if any collection contained no plastics.

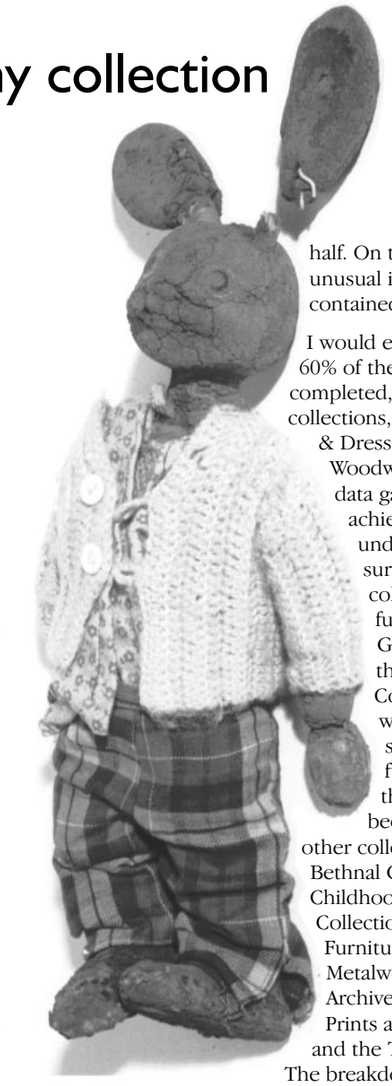


Figure 2. Bendy Bunny Bengy (Museum No. Misc.120-1988)- oxidised natural rubber. Photography by V&A Photographic Studio.

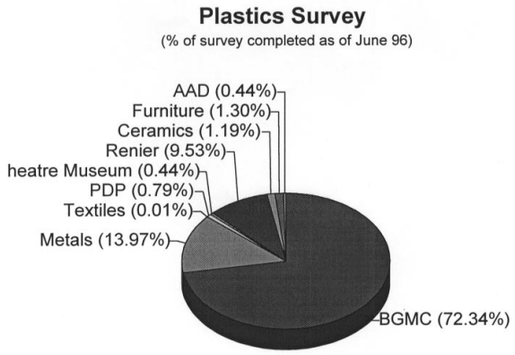


Figure 1. Breakdown by collection of plastics surveyed to date.

I would estimate that about 60% of the survey has been completed, but in some collections, including Textiles & Dress and Furniture & Woodwork, only preliminary data gathering has been achieved. It is intended to undertake in-depth surveys of both these collections in the near future and Roger Griffith, a student on the RCA/V&A Conservation Course, will collaborate on the survey of plastic furniture. Over eight thousand objects have been surveyed from other collections including Bethnal Green Museum of Childhood, the Renier Collection (at BGMC), Furniture & Woodwork, Metalwork, Ceramics, the Archive of Art & Design, Prints and Drawings (PDP) and the Theatre Museum.

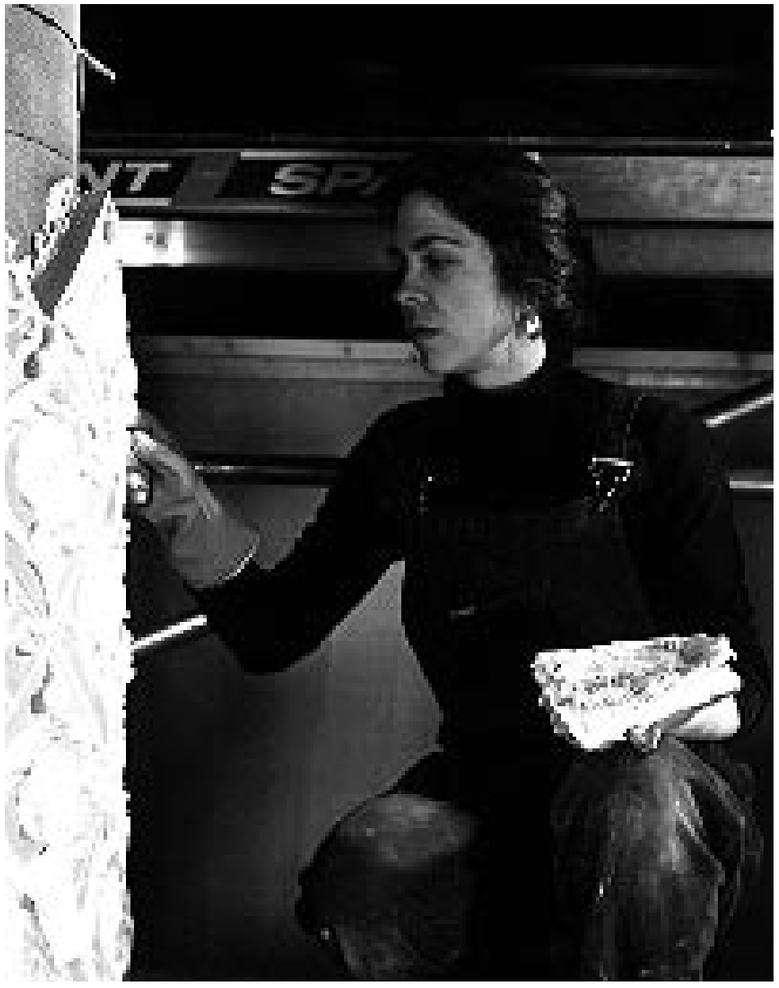
The breakdown of this data is illustrated in figure 1. It can be seen that BGMC, with its vast toy collection, accounts for almost 70% of the objects surveyed up to now.

A separate collection at BGMC, comprising of children's books, has an associated collection of objects relating to children, many of which are plastic. The figure of 13.5% for the Metalwork Collection, which makes it the second largest component of the survey, needs some explanation. The figure which represents over one thousand objects is entirely due to a collection of plastic jewellery donated in the mid 1970s. The Prints and Drawings Collection encompasses quite a wide variety of objects from Bridget Reilly screen prints on polymethyl methacrylate (PMMA) to carrier bags from Harrods™. Also included in PDP's figure is a large collection of packaging

driven into the cores. A small amount of Primal WS24, acrylic dispersion, was added to the mortar to strengthen it since the weight of the collar-pieces was considerable. 16mm stainless steel dowels were set into the volutes using plaster and then set into the cores using polyester resin. The positioning of the volutes meant that the majority of their weight extended beyond the circumference of the collar, and so the force of this weight had to be securely transferred deep into the core.

Since the pier-spanning caps were missing, they were reproduced *in situ* using plaster and mortar, then painted and glazed with acrylic to fit in with the colour scheme. Finally, after the central flowers were added, the capitals were gilded. The remaining original collar-piece appeared to have been painted with gold, certainly it was not a glaze. Oil gilding was chosen for the reproduction pieces as it linked in well with the regilding on the ceiling mouldings close by.

Certainly a sneer such as that made by *Building News* in 1870 belittled the range of considerations to be taken into account and the skills involved in producing such decoration. The sneer in one respect has become true – the columns are now only decorative and in that sense have become sham. However, crockery producers would not have had the problems of design that go with the construction of large, multi-element pieces such as the columns. Each element had to be designed to allow for shrinkage in proportion to the curved surface and for the fact that the pieces would be fitted tightly together to build what was in effect a tube around the core. At each step of this challenging project there were complexities to be appreciated, and whatever the merits of the columns as a decorative feature, the balance of design and material has to be admired.



Photography by V&A Photographic Studio.

Figure 3. Charlotte Hubbard working on the columns.

1. *Building News,* 20 July 1870, p.55
2. Further discussion can be found in Physick, John, *The Victoria and Albert Museum, The history of its building,* The Oregon Press Limited, 1982.
3. Conservation and report carried out by Judith Larney, 1996, report held in Conservation Department, V&A.
4. Firing carried out by Chelsea Pottery, London SW1.

So for a while, with only one example of each element to copy, I worked in the Stained Glass Conservation Studio.

None of the pieces below the lettering band needed to be remade. 84 lozenges and half-lozenges were missing from the shafts; seven of the eight collar-pieces and six of the eight volutes were also missing. Of the 20 rows of lozenges, 13 rows had tiles missing. Each row is characterised by a different flower with its stem spiralling round in a similar manner on each row. This gives the appearance from a distance of the same pattern throughout, and only on closer inspection is the difference noticeable. Measuring the remaining tiles from each row established that the dimensions within each size ranged by 75mm in both height and width throughout. This could be due to uneven shrinkage, or else they may have been made for specific columns within the Gallery although the original positioning of each tile is unknown. A few of the tiles had identifying marks on the back, but by no means all, and their relationship was not established. Whatever the reason, I based the size of each row on average dimensions.

Because the loss of water content on drying means that clay shrinks, it was not possible simply to make moulds from the original tiles. Each tile had to be remodelled on a larger scale. The amount of shrinkage is determined by the type of clay used. Since the clay used in the originals ranged from a pale grey to a dark cream in colour, a fine-grained, white-bodied clay was chosen, with a smoothness and plasticity that would carry the detail of the floral relief. This clay was known to shrink by 6%. A life-size drawing of each tile was enlarged by that amount and used as the basis for the modelling, bearing in mind the curvature along the horizontal plane necessary to allow the pieces to fit round the core.

From the models, plaster moulds were made, to be used for repeated pressings. The pieces were turned out of the moulds and trimmed back, so that the back edges of the tiles would not throw the circle out when building. They were laid out and supported and left to dry slowly before firing.[4]

The reproduction of the collar-pieces and volutes was more complex. There were four collar-pieces to each capital with a span of 40cm on each quadrant. As well as choosing a method that would allow such an arc to dry without distortion, the undercuts of the egg and dart and acanthus leaf had to be accommodated. Trial and error showed that the best way to deal with the combination of elements was to create a piece mould and hollow out the undercuts after the mould was removed. The method used to recreate the volutes involved making four separate moulds and adding the pieces together at the leather-hard stage.

The colour of the background on the original pieces varied enormously from a blue grey to a yellowish green, the colour of the white being fairly uniform although affected by the variable colour of the clay beneath. Again, "average" colour glazes were produced to mix in with the harmony of the various colours.

I am extremely grateful for the help of Alexandra Kosinova (Senior Sculpture Conservator) who worked with me on the construction of the columns. Although we had been aware of the irregularity of the sizes of the lozenge tiles, at the beginning we spent a considerable time building and rebuilding the plinth and column base only to realise that their elements, as with the lozenges, were not perfectly uniform. With this adjustment made to our expectations of the originals, we built the tiles up around the core that had been erected for us previously. Fortunately, during the refurbishment of the Gallery, the original cores of some of the columns had been uncovered and so a good profile of the internal dimensions of the tiles was established.

The tiles were attached to the cores using a traditional mortar of lime putty and sand, with a quartz aggregate added for bulking out the large cavities in the lower pieces. Above the dado, a row of stainless steel plates was driven into the core to divert the weight of the lettering bands. Building each row on the shaft was a little like solving a puzzle. The trick was to place any slightly larger tiles of the row above over the slightly undersized ones of the row below to compensate for the irregularities in size. We had previously noted that many of the lozenge tiles had been "nibbled" at the edges, to fit them into the original columns. I was relieved to discover that I was following the original construction method when it was necessary to trim the edges of some of the reproduction tiles.

Above the lozenges, and below the level of the top return on the collar pieces, two further support rows of stainless steel plates were

Photography by V&A Photographic Studio.

Figure 3. Cellulose Nitrate and ostrich feather fan belonging to Beatrice Lillie showing degradation (Museum No. S327-1979).

ranging from 'eco-friendly' shampoo bottles to the enclosures for vinyl records, audio cassettes and compact discs.

The results of the survey indicate that although the majority of the objects are in a stable condition, the greatest problem being surface dirt and minor abrasions, there are serious problems with individual plastic materials and these recur regardless of what form the object takes. The polymeric materials giving most cause for concern are:

1. Natural rubber.
2. The early semi-synthetics e.g. cellulose nitrate and cellulose acetate.
3. Polyvinyl chloride (PVC).
4. Polyurethane.

1. Natural rubber.

Figure 2 shows *"Bendy Bunny Bengy"*, (Museum No. Misc.120-1988), a flexible toy made from natural rubber by Bendy Toys in 1951. The rubber has become dry and brittle and crumbles on touch due to oxidation. Natural rubber such as cushioning and textiles in other areas of the collections has undergone similar deterioration.

2. Cellulose nitrate and cellulose acetate.

These semi-synthetic materials have been used in a diverse range of applications from mock silk and imitation tortoiseshell haberdashery, to cinema and photographic film. They are inherently unstable and degrade with the subsequent formation of acidic vapours which can cause the disintegration of neighbouring objects. Cellulose nitrate, also known as Celluloid™(Celluloid Co.), was first produced in the middle of the last century by the nitration of the natural polymer cellulose in the form of cotton. The spontaneous ignition of the material proved to be a problem and stories abound of billiard balls exploding on impact, not to mention the music hall suggestion of eliminating mothers-in-law by lighting up cigars near their *Chardonnet* silk evening dresses. The problem of flammability was only overcome by replacement with the related material cellulose acetate, which had a low combustibility. Cellulose acetate was not produced on an industrial scale until the mid-1920s. Deteriorating cellulose acetate can generally be distinguished from nitrate by the distinctive aroma of vinegar surrounding the object, as acetic acid is emitted as degradation proceeds. Figures 3 and 4 illustrate the degradation of cellulose nitrate objects in the Theatre Museum collection. The handle of the Beatrice Lillie fan (Museum No. S327-1979) (figure 3) shows behaviour typical of cellulose nitrate degradation with the material becoming crystalline and opaque. The object illustrated in figure 4, also from the Theatre Museum collection, is a badly degraded cellulose nitrate necklace from the 1922 stage production of Chu Chin Chow. In this case the acidic vapour formed on degradation has caused the textile thread holding the beads to disintegrate completely. A metal component of the necklace

Photography by V&A Photographic Studio.

Figure 4. Badly degraded cellulose nitrate and metal necklace from 1922 stage production of Chu Chin Chow.

has also been attacked, resulting in a bright blue corrosion product.

3. Polyvinyl chloride.

Polyvinyl chloride (PVC) was commercially introduced around 1935 and is probably the most adaptable of the synthetic polymers. More than any other polymer it has benefited from the use of additives especially plasticisers and stabilisers, which has given it light and heat stability, and enabled it to be produced with various degrees of flexibility. Loss of plasticiser and darkening in colour are two indications of PVC deterioration and both are visible in figure 5. This doll from BGMC (Museum No. Misc. 98-1987) is extremely sticky where the plasticiser has migrated to the surface and has attracted dust and dirt. Darkening has occurred to the head and limbs where the object was uncovered. This darkening is the result of conjugated double bonds produced either thermally or photochemically and is accompanied by the evolution of hydrogen chloride.

Photography by V&A Photographic Studio.

Figure 5. PVC doll (Museum No. Misc.98-1987) showing tackiness and darkening associated with degradation.

4. Polyurethane foams.

The major applications of polyurethane foams are furniture cushioning, mattresses, textiles, carpets, packaging, insulation, toys and sporting goods. Among museum collections they feature predominantly as toys, cushioning and textiles. Figure 6 shows a foam figure of the children's storybook character *Larry the Lamb* (Museum No. Misc. 97(1)-1978). This figure is one of a set of thirty three polyurethane foam puppets which are in the BGMC collection. These puppets were the stars of the Thames Television series *"Larry the Lamb in Toytown",* broadcast in the early 1970s. Several of the puppets are on display in their own case at BGMC and, as figure 6 demonstrates, the foam is literally falling apart. When the case is opened there is an unidentifiable pungent odour[2]. More figures are in storage and any handling produces detachment of the exterior foam as a powder. Oxidation has been confirmed as the cause of this severe deterioration of the polyurethane by analysis of the air in the case. This type of degradation has also been encountered in cushions, toys and other objects made from expanded polyurethane

Andy Warhol is reported to have said in the 60s 'It's not fake anything, it's real plastic', thus resolving the imitation/reality argument[3]. Glamorised by the space programme, synthetics took on an air of enchantment, with fashions for foam houses and beanbag chairs made of vinyl. Plastic is now a material in its own right, very popular with contemporary artists and designers. Since the Museum's current collections policy dictates that 50% of all new acquisitions be contemporary, a conservative estimate would indicate that at least half of these objects will contain a substantial plastic component of some kind[4] . The collection will, therefore, contain more and more objects with shorter life expectancies. It is not all doom and gloom, however, as by the implementation of preventive conservation measures, the lifetimes of these materials may be extended significantly, but not indefinitely.

References

1. Then, E. and Oakley, V., A Survey of Plastic Objects at the Victoria & Albert Museum, *V&A Conservation Journal,* No.6, 1993, pp.11-14.
2. Blades, N., *V&A Conservation Science Group Report,* No. 95/23/NB.
3. Bockris, V., *The Life and Death of Andy Warhol,* Bantam, New York, 1989.
4. *V&A Strategic Plan 1992-1997,* p14.

Suggested reading

"Saving the Twentieth Century: The Conservation of Modern Materials", Conference Proceedings, Ottawa, 1991.

"From Marble to Chocolate – The Conservation of Modern Sculpture", Tate Gallery, London, 1995.

Photography by V&A Photographic Studio.

Figure 6. Larry the Lamb badly degraded polyurethane foam puppet (Museum No. Misc.97(1)-1978).

The remaining pieces were laid out, and for many elements of the design no reproduction was necessary. For each of the elements that did need reproducing, at least one example existed from which copies could be made. There was one exception – the pier-spanning cap.

There were 591 tiles to be cleaned and repaired. This work was undertaken by a private conservator. The majority of the tiles were in good structural condition although virtually every tile had suffered chipping to the raised decoration and to the outer edges. The most damaged were the dado and lozenge tiles. All of the tiles had mortar round the sides and the back, of varying hardness and depth. This all had to be carefully removed, ensuring that the internal support bridge, or strap, did not get damaged during the process. The glazed surface and break edges were cleaned, and the chips and breaks repaired.[3]

When choosing which approach to take in the reconstruction of the missing pieces, a variety of factors were considered. The original pieces were examined visually. This inspection indicated that they had been made from press moulds. A clay model of each element would have been made, from which a reusable plaster mould would have been taken. Clay would have been pressed into the plaster to produce multiples of each design. The plaster draws water from the clay, causing the latter to shrink slightly and thus allowing its removal from the mould. Great care would have needed to be taken at the drying stage to produce an even drying out, as an uneven evaporation rate would result in warping.

Analyses of the clay body and glazes were not undertaken as it was decided to reflect the nature of the original materials and techniques. Modern synthetic replicas were not wanted, nor were copies that were indistinguishable from the originals. Besides, the likely presence of lead and copper in the glazes would have complicated the firing, as these minerals are now *non grata* in glaze manufacture.

The reproduction to be carried out required an understanding of the nature of terracotta and glazes. The reconstruction of the whole required sympathy for the project's aim of recreating the original design of the Gallery and also the ability to fix historic material in an appropriate and secure manner.

At each step of the reconstruction there were complexities to be overcome. The first to be encountered was the question of space. Sculpture Conservation was in a temporary location whilst a new studio was being built.

Gallery 65 image

Figure 2. Engraving by John Watkins showing The Ceramic Galleries, circa 1875.

"Sham Columns in a Casing of Crockery"

Charlotte Hubbard
Senior Sculpture Conservator, Sculpture Conservation

The refurbishment of the Silver Gallery, due to reopen in November this year, occasioned the conservation and restoration of two of the ceramic columns which had originally lined rooms 65-69. These rooms had formally been the Ceramic Galleries. Since the Gallery's inception the decorative scheme has undergone changes and the present refurbishment project aimed to restore many of the original features of the interior design. This article describes some of the complexities I encountered in the reconstruction of the columns.

"Sham columns in a casing of crockery built up around a brick core". This description sums up the opinion expressed by *"Building News"*[1] in 1870 of the columns that stand in the Gamble Room, once the Centre Refreshment Room of the Museum, which are the same design as those that were to be restored. They were designed and modelled by James Gamble from an idea by Godfrey Sykes and made by Minton Hollins & Co. in the late 1860s. The lettering bands were taken from Sykes' pictorial alphabet which was designed for the frieze in the Gamble Room.

Shortly before World War I, Sir Cecil Harcourt-Smith, the Director of the Museum, had the columns removed. This caused an outcry which led to some pieces being stored. In 1994 it was established that enough whole or near-whole pieces remained to enable the rebuilding of two columns, if missing pieces could be reproduced.[2]

The casing of each column consisted of an octagonal plinth, column base tiles, four rows of rosettes alternating with three of dado tiles, a band of lettering with the name of a ceramic artist or producer, followed by 20 rows of lozenge-shaped tiles with a floral relief. To accommodate the tapering shaft, each row of lozenges diminished in size towards the top. The capital consists of a collar decorated with acanthus leaves and egg and dart mouldings, with volutes, flowers and a pier-spanning cap above. The glazes were a bluish white, a warm brown and what has been variously described as grey, blue or green.

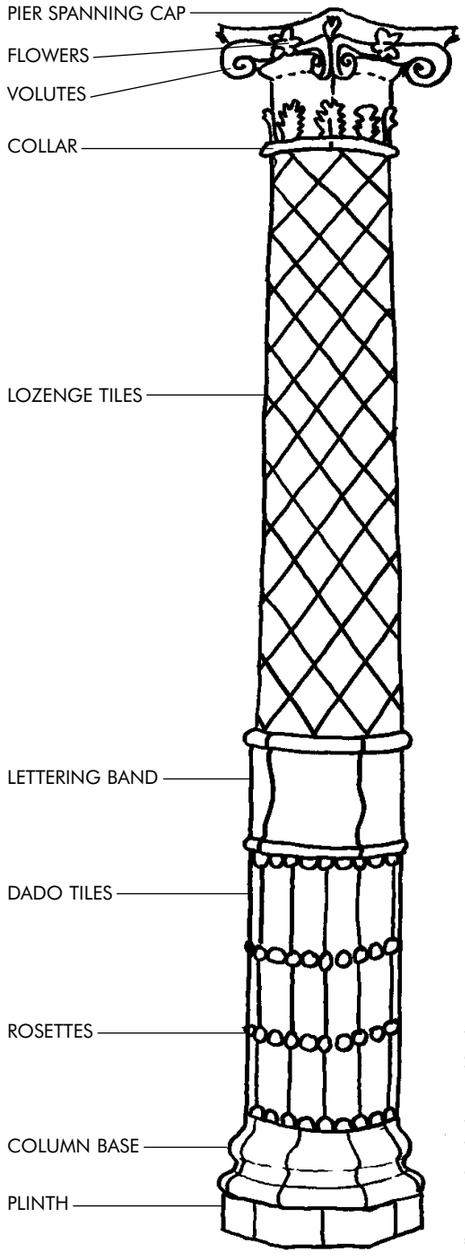


Illustration by Charlotte Hubbard

Figure 1. Illustration showing column elements.

Plastic, Pop and Mass-produced Design in the V&A's Collections

Gareth Williams
Assistant Curator, Care and Access, Department of Furniture and Woodwork

Objects made of plastic are everywhere in the Museum. Vessels, lighting, boxes and accessories are spread between the Ceramics and Glass, Metalwork, Furniture and Woodwork, and Textile and Dress Collections. The Bethnal Green Museum of Childhood has strong collections of plastic toys and the developing collection of product design is focused on the one hundred or so radios, many made of plastic which are, by historical peculiarity, administered by the Department of Furniture and Woodwork. The origins of this unplanned diversity date from 1909 when the Museum's collections were divided into materials based groups, in general wood, metal, ceramics and glass, textiles, stone and paper. Possibly because the Museum has never had an official and specific Plastics Collection, it has failed to fully integrate the material most associated with twentieth century design into its collecting policy. With so many groups of objects from which to choose, the principal intention of this article will be to indicate the scope of plastics in the Furniture and Woodwork collection.

The earliest use of 'plastic' in furniture represented in the collection would appear to be the decorative inlay of a small smoker's cabinet by C.R. Mackintosh (1868-1928) from 1917 (Museum No. Circ.856-1956), recently conserved by conservation student Shayne Lang. Previously, plastic had been a purely utilitarian material used to imitate expensive ivory for cutlery handles or toilet sets. The translucent yellow material is Erinoid™(Erinoid), an early plastic sheet, which Mackintosh used for its decorative rather than structural qualities. The yellow triangles are inlaid into a wooden carcase in a way not dissimilar to conventional wooden veneers.

The inherent qualities of plastic as a structural material were recognised in the 1930s when Bakelite™(Bakeland), (phenol formaldehyde) became a popular material for such objects as radio cases and cigarette boxes. The AD-65 wireless (Museum No. W.23-1981), a circular form moulded entirely from Bakelite, designed by Wells Coates (1895-1958) in 1932 for Ekco Radio, was amongst the first to be made of plastic not disguised as another material. Moreover, because of its curvilinear profile, the case of this wireless could not have been made in any other material, least of all wood, which plastic rapidly replaced in this particular area of design. From this date, the use of plastic and the design of audio equipment became the preserve of the Modernists. Today, as the Museum collection attests, it is almost impossible to buy a radio which is not plastic.

What were the special characteristics of plastic which appealed to designers and manufacturers? It is amongst the most versatile group of materials known, with different varieties notable for their relative strengths, ranging from total rigidity to complete flexibility, not to mention inertness and stability. Plastics enabled the development of an infinite number of novel shapes and colours which were impossible to achieve using natural materials. The moulding of plastic requires expensive tooling and a high degree of industrialisation, yet the resulting products can be mass-produced cheaply and in great quantity. Versatility, novelty and the potential for replication were the perfect qualities of any material for the manufacturers of new consumer goods. Mr Bulmer's collection of fifty nine boxes, clocks, desk sets, smoking ephemera and souvenirs typifies the cheap, fashionable and eye

catching plastic products of the 1930s. Several of the objects were promotional gifts distributed by manufacturers, confirming the ephemeral and commercial nature of much plastic design. The acquisition of the collection in 1983 demonstrates the Museum's confused attitude towards plastics, as the objects were shared arbitrarily between the Metalwork, Ceramics and Furniture and Woodwork collections (Museum Nos. M.49 to 66-1983, C.41 to 54-1983, W.50 to 75-1983).

Furniture designers, often obsessed with producing one-piece moulded chairs, have explored the structural characteristics of plastics. Experiments with moulded plywood in the 1950s led to the development of fibreglass chairs in organic forms by Charles and Ray Eames and others, several examples of which are in the collection. In Britain, Robin Day (born 1915) designed one of the most successful one-piece moulded chairs ever produced, the 'Polyprop' (Museum No. Circ.15, a&b 1966). Polypropylene was invented in 1954 and its strength and malleability were perfectly exploited in Day's design.

Synthetic foam rubbers, developed after 1945 for upholstery, now present us with grave conservation problems as they decay and calcify. Several chairs in the collection have suffered complete breakdown of the foam upholstery, including Michael Inchbald's 'Mambo Chair', 1955, (Museum No. W.13-1981). The integrity of the object is compromised by collapsed upholstery, as the lines of the original chair disappear and the texture is radically altered. We are presented with the ethical dilemma of replacing an original component of the object in an attempt to preserve it.

A seminal exhibition of *Modern Chairs* was staged by the Circulation Department and the Whitechapel Art Gallery in 1970 and many of the collection's best examples of plastic Pop furniture were acquired at this time (see footnote). These include futuristic and fantastic creations by leading Italian and Danish designers of the 1960s. Much Pop design, not only of furniture but also clothing and accessories, was essentially ephemeral: it was not intended to last but to be the disposable product of consumer fashion. Plastic was the preferred material because of its cheapness, versatility and the wider cultural connotations of a bright future unhindered by past traditions. The future has proved to be less bright for some objects, including the 'Blow Chair' (Musuem No. Circ.100-1970), an inflatable, clear plastic Italian armchair, which has hardened and discoloured with age (see article by Roger Griffith). The anticipated life expectancy of the object has been far exceeded, resulting in the Museum's paradoxical attempts to preserve an essentially ephemeral and transitory object. As materials inexorably degrade and chemical structures alter through environmental conditions, the Museum is presented with a long term display and conservation problem.

Figure 1. 'Bookworm' Bookshelf. ©Arad/Kartell, designed by Ron Arad (born 1951), made by Kartell, Italy, 1995, batch-dyed thermoplastic technopolymer. Museum No. W.2-1996 Photography by V&A Photographic Studio.

Experimental furniture in the 1990s has further explored the structural possibilities of plastic and attempted to extend the life of the material, demonstrated by two recent acquisitions. Ron Arad's 'Bookworm' bookshelf (Museum No. W.2-1996), made by the leading Italian plastics manufacturer Kartell, exploits the flexibility and strength of

This laminate was substituted for the five earlier replacements as well as the four losses. Leaving the old restorations would have resulted in one face of one leg having three differing shades of yellow inlay – the top two triangles being original, with a new replacement sandwiched between two old restorations below. The new replacements achieved a closer and far more unobtrusive colour match with the original casein inlay than had been achieved in the past.

Excess poly(vinyl acetate) adhesive (PVAc) around the diamond inlay on the proper left flap attests to a previous, unsuccessful, attempt to flatten and secure the buckling inlay. The alignment of the diamonds has suffered with an unsightly PVAc filled gap between diamonds and veneer down one side. Simply cramping and gluing the inlay down in this way introduces stress into the body of the material and the adhesive and, if the adhesive is stronger than the cohesive strength of the inlay, it will cause the already brittle casein to crack. An alternative, and potentially less damaging, solution was required.

The casein inlay on the smoker's cabinet had buckled and curled due, in part, to unequal moisture loss from upper and lower surfaces. This would suggest that humidifying the casein might be an option. Research on similar samples of casein would be necessary before such treatment could be undertaken since the central aesthetic role of the original inlay on the cabinet would rule out its use in preliminary testing.

Since the priority for this treatment was to prevent damage to unattached and exposed corners, it was decided that the inlay should be secured and supported in its curled state. Only the diamonds on the proper right top of the cabinet were loose enough to require lifting. Balsa thin enough to follow the curved profile of the diamonds was glued to the underside and planed to provide a flat surface for securing them to the cabinet. Balsa was used as it has comparatively small dimensional movement in response to fluctuations in relative humidity due to its low density. This imperfect solution to the problem can be easily reversed in the future should a better treatment be found.

For a furniture conservator whose past experience has focused on problems of construction and traditional surface decoration and finishes, the inlay of the cabinet presented an interesting opportunity for research and a conservation challenge. Since a stock of Erinoid was not available, nor easily made, replacement with a stable modern plastic presented a reasonable alternative. Although direct substitution using Perspex was not possible, the laminated structure of the inlay replacements solved the problems of translucence and colour matching.

Casein plastic is a very unusual material to find incorporated into a piece of furniture – similarly, in the wider context of literature about plastics, casein usually merits only a passing reference. The growing interest in the technical and historical development of plastics may yet produce a more detailed picture of the structure and degradation of casein to provide information about the future conservation of this material.

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extreme cases the casein curls and buckles, as is the case on the Mackintosh cabinet.

Casein Inlay on the Smoker's Cabinet

There were three main problems with the casein inlay on the smoker's cabinet - one quarter of the triangular shaped inlays on the legs were loose and four pieces missing, previous replacements of inlay on the legs were visually obtrusive, and the diamond shaped inlay on the top of the cabinet had buckled, raising the corners above the level of the surrounding veneer and making them vulnerable to damage.

All loose inlay on the legs was lifted, the old animal glue removed and the surface cleaned with a slightly damp cotton bud before being relaid. Because producing a sheet of colour-matched casein to replace the losses would be both time consuming and impractical, a substitute was needed. After consulting the materials library at the Royal College of Art, four shades of yellow Perspex™ (ICI) and one of Plexiglass™(Rohm), both trade names for PMMA, were selected to replace the casein inlay lost from the legs. The Plexiglass turned out to have a textured surface and was therefore abandoned as a substitute. As the minimum thickness of the available Perspex was 3mm and the original inlay was 1-1.2mm thick, the Perspex was hand sawn to the required thickness and then scraped smooth to remove the saw marks which were visible through the plastic.

Thinning the Perspex made this previously opaque material translucent. It therefore required a second layer of colour to be added to achieve a closer match to the original inlay. A laminated structure of Perspex, adhesive (Beva 371 impregnated film), acrylic paint on hand made paper and adhesive (fish glue) on the substrate wood was used to achieve this.

Photography by V&A Photographic Studio.

Figure 2: The smoker's cabinet before conservation, with the flaps closed.

extruded plastic strip (thermoplastic technopolymer) to create a versatile and individual wall-mounted shelf which can be articulated by each user to suit any wall space (figure 1). Although the product is a best seller for Kartell, it is not cheap; plastic furniture is no longer perceived as a disposable gimmick or the poor relation of natural materials. Kartell uses virgin materials to produce plastics but there is increasing interest in recycling post-consumer waste to create new products.

Jane Atfield's chair (Museum No. W.4-1996) is made from board comprised entirely of recycled, high-density polyethylene (figure 2). Bottles used for everything from shampoo to milk, detergent and sun oil are collected in community recycling schemes, washed, chipped and pressed into various thicknesses of board using redundant plywood presses. Bearing witness to its origins, it is possible to find traces of printing and labels amongst the coloured flecks of the self-decorated board. Recycling represents a way forward for the plastics industry and for the consumer in an increasingly environmentally-conscious age. The long term durability of recycled plastic remains untested and it could be that the combination of various forms of plastic in one composite proves fugitive and ultimately self-destructive. Yet, for the time being the plastic itself is enjoying a second use. It can be anticipated that our increased understanding of the chemical structures of plastics, combined with the advanced technology of the materials themselves, will mean that in future the Museum will be able to assess and treat plastic products.

Plastics are now used in all areas of design, from consumer electronics to kitchenware, jewellery to cars. As a material it has revolutionised the shape and even the function of objects we use. Its use in furniture and product design, as collected by the Museum, is only a small indicator of the full scope of objects designed for this material, a substance which has significantly defined twentieth century design.

Footnote

It is interesting to note that contempoary collecting was a speciality of the Circulation Department while the Furniture Department did not focus, at that time, on objects of the present day.

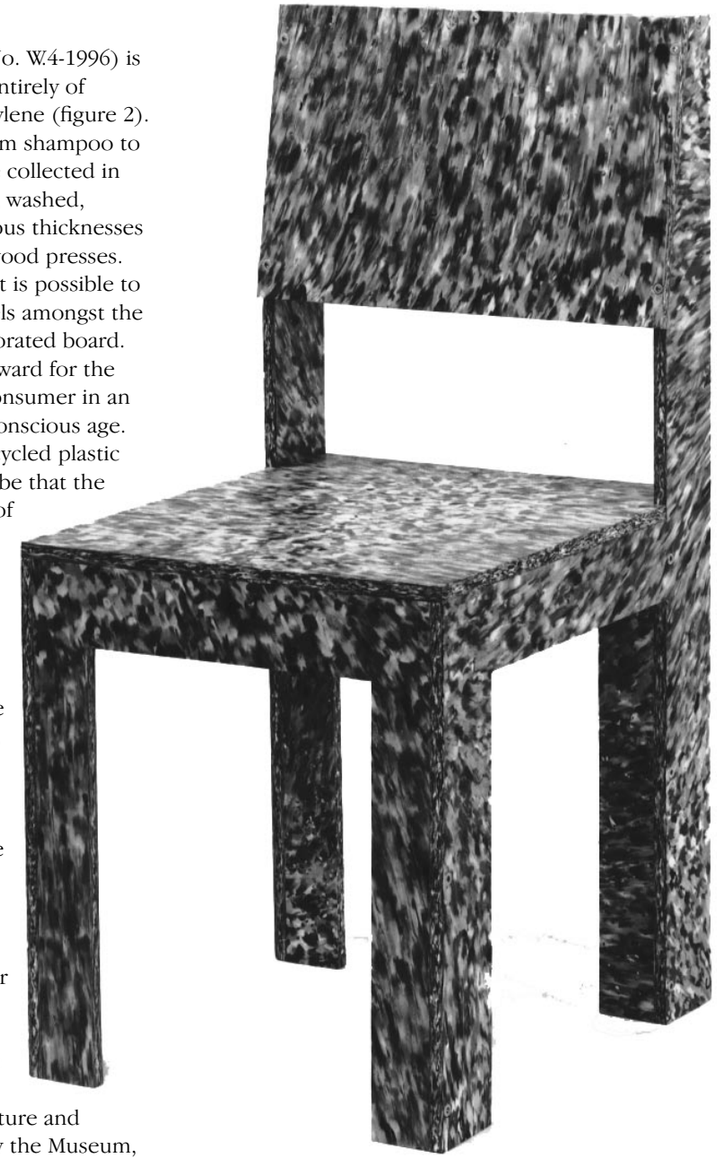


Figure 2, 'RCP2' Chair, ©Jane Atfield, designed by Jane Atfield (born 1964) 1994, made by Made of Waste, 1996, recycled, high-density polyethylene. Museum No. W.4-1996
Photography by V&A Photographic Studio.

Two Pooped-Out Pop Chairs: What is the Future for our Plastic Collections?

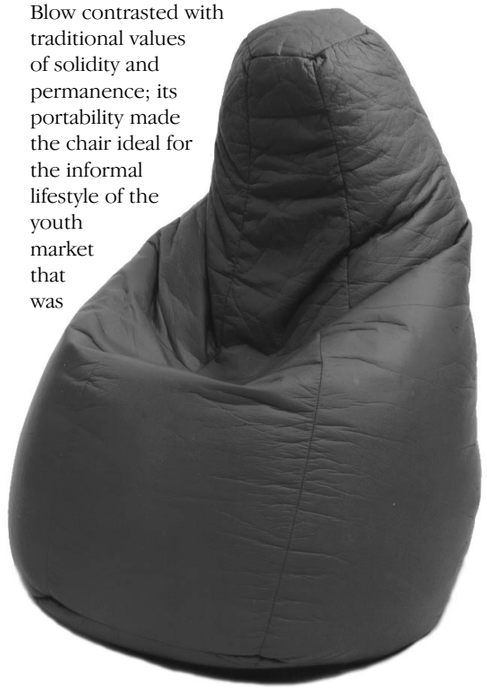
Roger Griffith
Furniture Conservation Student, RCA/V&A Conservation Course

One of the greatest challenges facing the conservator today is how to deal with modern materials. Modern materials have become increasingly important in museum collections and the Victoria and Albert Museum is no exception. The composition of these artefacts is becoming increasingly diverse; although often unknown, they include such materials as rubber, plastics, lacquers and varnishes, metals and numerous composites. These complex materials present new challenges to conservators. Research is urgently required to address the ethical and physical problems of display, storage and treatment.

While conducting a pilot survey of the Twentieth Century Furniture Collection at the V&A, I was presented with two chairs which were good examples of the extreme degradation modern materials undergo in a relatively short span of time. The chairs, made of different materials, had degraded in less than thirty years. They were purchased by the museum in 1970 for an exhibition, "Modern Chairs: 1918-1970", held at the Whitechapel Art Gallery. At the close of the exhibition the chairs were then added to the Furniture & Woodwork Collection, and displayed in the Twentieth Century Galleries. Since the mid-1980s, however, the chairs have not been exhibited due to their state of deterioration.

Sacco (circ. 73-1970) (figure 1) – variously known as the Bean Bag Chair, the Chair of 1001 Nights (1000 positions by day, one position by night), or the anatomic chair - was designed in 1968 by the team of Italian designers Piero Gatti, Cesare Paolini, and Franco Teodoro. Sacco has no fixed form. Its loose filling allows it to take on any shape, including a stool, an easy chair, or even a chaise longue. It is lightweight and therefore extremely mobile. The Sacco is constructed of 'skinflex', a faux-leather cover made of polyurethane and filled with tiny spherical white particles of expanded polystyrene. The design of this chair helped to establish the Italians as leading designers of modern furniture during the sixties and seventies.

Also designed by a team of Italian designers, Gionatan de Pas, Donato D'Urbino, Paolo Lomazzi and Carla Scolari in 1967, was Blow (circ. 100-1970) (figure 2). Blow was the first piece of inflatable living room furniture to be successfully mass-produced. Blow adopted the construction principle of the inflatable raft. This armchair was constructed of PVC (polyvinyl chloride) which required the development of high frequency welding technology. The chair is inflated through a valve at the centre of the back; the separate seat cushion has it own valve and fits into the chair on a membrane to form the seat. Another membrane lies across the underneath of the seat, for additional stability. The quality of transparency and transience of Blow contrasted with traditional values of solidity and permanence; its portability made the chair ideal for the informal lifestyle of the youth market that was



Photography by V&A photographic Studio

Figure 1. *Sacco,* designed by Piero Gatti, Casare Paolini and Franco Teodoro (1968), manufactured by Zanotta s.p.a., Nova Milanese. circ. 73-1970.

Paraloid B72™(Rohm & Haas Co.). The surface finish was blistered and disfigured on the proper left hand side, possibly as a result of exposure to heat. No treatment was undertaken on this because it would have involved the removal of about 20% of the original and although the blistering is particularly noticeable in raking light, it is unlikely to be obtrusive under gallery conditions.

Identification of materials
When undertaking conservation of plastics it is essential to identify at least the base polymer of which they are composed as this will determine the nature and extent of any treatment. This is comparatively easy with early plastics but becomes progressively more difficult as more sophisticated blending of polymers occurred in the last quarter of this century. A range of analytical techniques may be required to identify other components such as plasticisers, stabilisers, fillers and colorants should this be necessary.

Although the yellow inlay on the smoker's cabinet is described as Erinoid™(Erinoid) in the curatorial records, the nature of this material was initially unclear. Brenda Keneghan, Plastics Conservator at the V&A, took samples of the original inlay, the replacement inlay and the original adhesive for analysis using Fourier Transform Infrared Spectroscopy (FTIR). Samples were obtained by removing loose inlay. The edge of the inlay was gently rubbed with a silicone carbide disc to collect a small amount of fine powder. The spectra resulting from the analysis of this powder were matched with spectra from known samples to give the following results: the original inlay proved to be casein; the replacement inlay poly(methyl methacrylate) – PMMA or Perspex™(ICI); and the original adhesive was animal glue.

Casein
Casein is most commonly found as an adhesive and has been utilised in this way for centuries. Casein, derived from goat's milk, was used as an adhesive by the ancient Egyptians and casein adhesives are still manufactured today.[2] It was not until 1899 that a patent was registered in Germany for the production of casein plastic (an apocryphal tale of its discovery involves a cat, a dish of milk and a spilt bottle of formaldehyde) and it was originally manufactured there under the trade name Galalith.[3]

Mackintosh first used casein-based plastic in the Chinese Room at the Ingram Street Tea Rooms in Glasgow in 1911.[4] Although importation of Galalith ceased with the outbreak of war in 1914, the establishment of the Erinoid company in Gloucestershire the same year ensured that casein plastics, widely known as Erinoid, remained available in Britain.

Casein is a phosphoprotein complex precipitated from skimmed milk by acidification. The precipitate produced in this way is insoluble in water, alcohol and other organic solvents, but a colloidal suspension can be created in alkaline conditions. Traditionally this was done using slaked lime, although ammonia is generally used in modern production.[5] The casein film produced, either as adhesive layer or plastic, is neither thermosetting nor thermoplastic and is hard, brittle, and insoluble. It is hygroscopic, a characteristic which prevented exterior use, though wartime research was reported to have produced a casein adhesive which was 'waterproof, uniform and reliable'.[6]

The main use of casein plastic was in the manufacture of buttons and small decorative objects such as boxes and combs. It could be produced in delicate pastel shades and, owing to its capacity to absorb acid dyes easily and uniformly, could be produced in an almost infinite range of colours and tones, including pearly effects.

Flat sheets – such as those used by Mackintosh on the smokers cabinet – were manufactured by first extruding rods, cutting them into strips or nibs and placing them in large presses for compression-moulding into sheets. The sheets were then immersed in a 5% formaldehyde solution making them hard and insoluble in acid and water. They were then dried to reduce the moisture content to about 10%. The long soaking in formaldehyde followed by a long drying process meant that the sheets were often distorted at the end of this procedure so they were re-flattened by hot pressing, then machined and polished by dipping them in hypochlorite.[7] Machining marks are sometimes visible through the resultant glaze, as is the case with the inlay on the smoker's cabinet.

Water in the casein polymer acts as a plasticiser and its gradual loss causes shrinkage and embrittlement of the plastic. Absorption and desorption of water through cycles of changing relative humidity can cause crazing of the surface which can propagate through the material, particularly where the surface has been scratched or has aged and oxidised.[8] In less

Milk and Modernism: Conservation of a Smoker's Cabinet designed by Charles Rennie Mackintosh

Shayne Lang
Furniture Conservation Student, RCA/V&A Conservation Course

The cabinet (Museum No. Circ. 856 1956), (Figure 1) was designed by Mackintosh for 78 Derngate, Northampton, Bassett-Lowke's commission of 1916. It measures 590cm high, 584cm wide with the flaps open and 330cm deep. The aesthetic impact of the piece relies on the use of startling yellow geometric inlay on a black background, a result of Basset-Lowke being colour-blind to all but yellow. The only disharmony is the incorporation of decorative curves on the leading edge of the door on a cabinet which is otherwise characterised by simple mouldings and straight lines. Such quirks are not unusual in Mackintosh's designs, and the cabinet testifies to the quest in the early twentieth century for designers to find a furniture style which would express the essence of the new century rather than referring to the old.

The smoker's cabinet, along with other objects by the same designer, was to be conserved prior to loan for an exhibition which commenced in April 1996 in Glasgow before travelling to the USA.

Treatment records for the cabinet consisted of a comprehensive condition report prepared in 1986 when the cabinet was cleaned and the inlay reattached. Although there are no other records of treatment at the Museum since its acquisition in 1956, evidence of intervention which predates 1986 can be found in Billcliffe's monograph of 1979[1] where replacement inlay on the legs is clearly visible in a large colour photograph of the cabinet.

Although the primary challenge was the conservation of the decorative inlay there were some other minor problems with the construction of the cabinet. Splits in the butted mitre-joints at the rear of the cabinet were secured with balsa fillets which were coloured out with black shellac, isolated from the original by

Photography by V&A Photographic Studio

Figure 1: The smoker's cabinet before conservation.

developing in the 1960s.[1]

Sacco and Blow represent a shift in style, public taste, and popular culture. The 'enjoy-it-today-sling-it-tomorrow-philosophy'[2] of the 1960s created a youth market anxious for a new and exciting approach to home furnishings. Designers were encouraged to develop unpretentious low-cost furniture that would reflect a liberal-minded and classless society. The Italian designers flourished with this new ethos and a number of new companies were founded in the 1950s and 1960s. Their furniture met the ever changing lifestyle of the 1960s. "The 1960s gave way to a new idea or 'meaning' of plastic furniture. Plastic was, in a way, both form and content. It had now become 'true to its material'".[3]

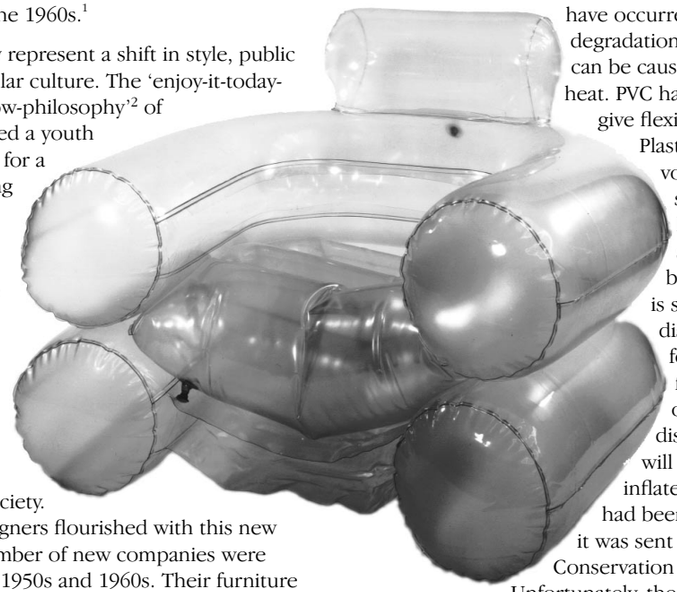
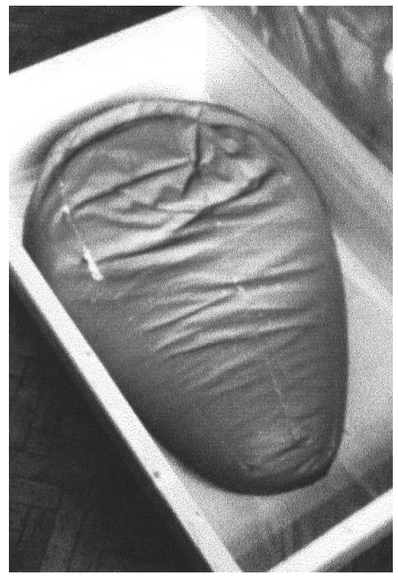


Figure 2. *Blow*, designed by Gionatan de Pas, Donato D'Urbino, Paolo Lomazzi, and Carla Scolari (1967), manufactured by Zanotta s.p.a., Nova Milanese. circ. 100-1970. Photography by V&A Photographic Studio

Examination & Condition

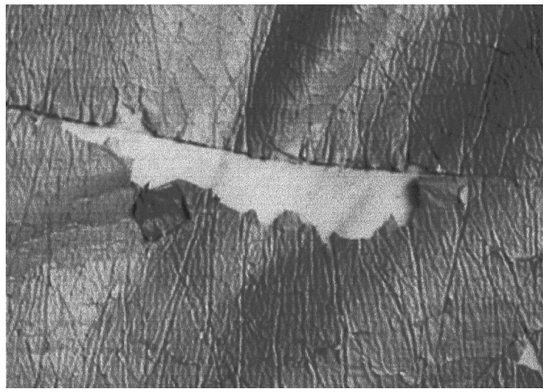
It is unclear from the location records when and why these two chairs were put into storage. Sacco is stored at Blythe House (one of the V&A's off-site storage facilities) in what I call a 'plastic coffin' (figure 3). The Plastazote™ (Polyformes Ltd.) lined plywood coffin was constructed to house the object since it can no longer be displayed. The polyurethane faux-leather cover has degraded and is separating from its base fabric. The cover is so fragile that even the slightest puff of air can cause delamination (figure 4). The cover was analysed by Fourier Transform Infrared Spectroscopy (FTIR) to confirm that indeed it was polyurethane.[4] Polyurethanes degrade when exposed to light or heat. Oxygen and moisture within the environment cause oxidation and hydrolysis.[5] It is unfortunate that an object less than thirty years old cannot be displayed. We are not sure if the degradation of this material was caused by improper storage or if it is inherent in the nature of the material.

Blow's condition is quite dramatic since there is overall yellowing of the PVC that is very common in this type of material. The yellowing is an indication that cross-linking and conjugation have occurred.[6] This type of degradation is not reversible and can be caused by ultraviolet light or heat. PVC has plasticisers added to give flexibility to the material. Plasticisers are rather volatile and are easily lost, so the material gradually hardens and becomes stiffer. Deterioration can be retarded if the object is stored properly or displayed in low light, following the approach for textiles. The cushion of the chair was in disastrous condition and will probably never be inflated again. Apparently it had been punctured and in 1980 it was sent to the Furniture Conservation Studio to be repaired. Unfortunately, the chair was repaired with a product called Loctite™(Marshall Industries) which is a cyanoacrylate. This type of adhesive is not reversible and we probably would not use it today. The repair must have failed at some stage and the cushion was folded and put into storage. When I found this part of the object there appeared to be ink and paper stuck to the object (figure 5). After some detective investigation I discovered that the ink was from a photocopy of the curatorial record of the object. It was



Photography by Roger Griffith

Figure 3. *Sacco* in its *'plastic coffin'* at Blythe Road Store.



Photography by Roger Griffith

Figure 4. *Sacco* (Detail) Delaminated polyurethane cover.

probably placed there so that this part of the object would not be lost, since it had been separated from the rest of the chair.

The Future: Looking Ahead

Aside from the question of whether these objects were ever intended to last, we need to assess the conservation problems they present. We can begin by setting up guidelines – to retard the degradation or at least understand the ageing process of these materials.

In my final year as a student on the RCA/V&A Conservation Course, I will concentrate on modern materials used in the construction and design of Twentieth Century Furniture. I plan to conduct a survey of objects from the Furniture & Woodwork Collection at the V&A. This methodical survey coupled with scientific analysis will help to identify materials and structures that are particularly prone to deterioration. Gathering archival information on manufacturing techniques and the environmental history of the objects will lead to an understanding of the deterioration mechanisms involved. The aims of the survey will be to provide details on the materials in the collection; ascertain the present condition of the objects; determine the atmospheric conditions under which the artefacts are stored and displayed and give information about preventive and remedial measures. My study will be an important step in solving the problems of deterioration such as those which have affected Sacco and Blow, and the other modern materials used in contemporary furniture. The sooner we assess the problems, the sooner we can find solutions.

Acknowledgements

I would like to thank the RTZ Corporation PLC and the Committee of Vice-Chancellors and Principals of the Universities of the United Kingdom (Overseas Research Award) for their interest in, and financial support of my studies.

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Photography by Roger Griffith

Figure 5. *Blow* (Detail) Unfolded seat cushion as found in storage with creases and ink offset onto PVC.

An Object Media Enigma

Jane Rutherston
Albums and Sketchbooks Student, RCA/V&A Conservation Course

One of the most interesting aspects of working with albums, and by this I refer to any blank book with objects adhered to the leaves, is the diversity of material to be found within them. However, nothing was to prepare me for the extraordinary prints I came across in an album from the National Art Library collection – engravings printed in gold on coloured gelatine.

The prints belong to a collection of material relating to the Great Exhibition of 1851, including tickets, songsheets, cards, invitations, notepaper and other ephemera, given to the V&A in 1867 by Charles Wentworth Dilke, one of the six Executive Committee Members of the Great Exhibition.

There were originally seven prints, each measuring approximately 75mm x 115mm, but only six now remain – three blue, two red and one turquoise. When they came to Book Conservation they had all been adhered at the corners to the same page, causing extensive cockling to the paper leaf. The brittleness and inflexibility of the gelatine was hindering the flow of the page, resulting in the prints being vulnerable to further damage. It was therefore decided, in consultation between Book Conservation and two NAL curators, to remove them and mount them out of the album (they are to be housed together in the same conservation box). Further conservation requirements to re-attach and repair damaged, detached corners are still being investigated and will not be dealt with in this article.

The prints are most unusual objects and despite extensive enquiry I have been unable to find out any information on such media from either a curatorial or conservation aspect, and no one I have spoken to has seen or heard of prints of this nature. In researching the official guide of the Great Exhibition I unearthed four entries under France that mention related material:

•**BOUASSES, LEBEL & CO.,** Paris – producers. 'Samples of gelatine pictures'

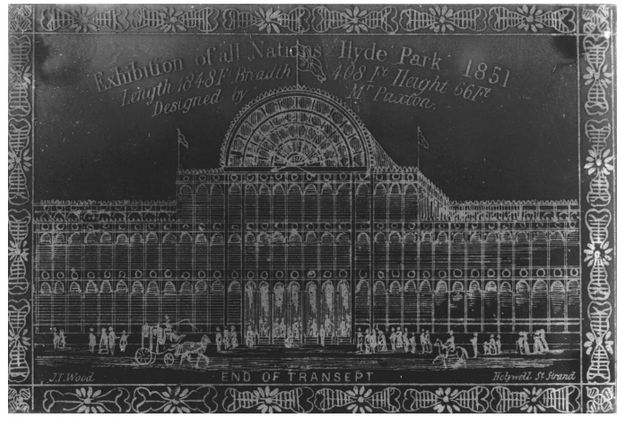
•**CASTELLE, H.,** Paris – Manufacturer. '...printed gelatine. Engraved and knotched gelatine. Gelatine for printing, boardings, drawings, engravings, flowers and decorations for theatres etc. (new invention)'.

•**LECLERCQ, No.,** Paris – manufacturer. 'Specimens of gelatine in white and coloured leaves'.

•**ROYER, JOSEPH CHARLES,** La Tournelle – Manufacturer. 'Specimens of gelatine leaves of all colours'.

But even taking this into account, it does not fully explain their provenance: the engravings are English, published by J.T. Wood of Holywell Street, London. I have been unable to find any copies of these engravings on paper (admittedly this avenue has only been touched on) but I am certain they must be extant in material collected from the Great Exhibition. Is it possible, therefore, that these engravings were printed at the time as a form of souvenir, or even after the event, by a printer who had purchased the French coloured gelatine and wished to experiment with a new substrate? After all this exhibition was all about the works of industry; encompassing manufacture, design and technology.

I presume that they are essentially experimental and are in many respects a precursor to printing on acetate film, but this innovative form of production still remains a mystery. Perhaps someone reading this article can throw light on this conservation and historical dilemma?



Photography by V&A Photographic Studio.

Figure 1. Engraving on gelatine.