

# A new conservation lining for historic wallpapers

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## Abstract

In recent times the appreciation of historic wallpapers has greatly increased. Consequently, the financial commitment to their conservation and preservation has also noticeably developed, particularly for in situ projects. The conservation of the wallpapers themselves is well reported, but the wall preparation undertaken to receive the newly conserved wallpaper is frequently neglected. Here, the historic technique of supporting wallpapers using a stretched textile is analysed and improvements to the system are suggested. As is often the case in conservation, similar problems and their potential solutions can be found in other disciplines, both related and unrelated, and in international co-operation. Using a lining textile used in oil paintings conservation and a selection of linings used in Japanese mounting, an improved support system for historic wallpapers is suggested.

## Zusammenfassung

Seit einiger Zeit hat die Wertschätzung von historischen Tapeten stark zugenommen. Infolgedessen hat sich auch die finanzielle Unterstützung für ihre Restaurierung und Konservierung, besonders für In-situ-Projekte, spürbar entwickelt. Die Restaurierung der Tapeten selbst ist gut dokumentiert, die Vorbereitung der Wände, auf welche die neu restaurierten Tapeten montiert werden, wird jedoch meist vernachlässigt. Hier wird die historische Montierung von Tapeten auf einen aufgespannten, textilen Träger analysiert und Verbesserungen dazu vorgeschlagen. Wie so oft können ähnliche Problematiken und mögliche Lösungen in anderen verwandten und nicht-verwandten Fachbereichen sowie in der internationalen Zusammenarbeit gefunden werden. Ein verbessertes Trägersystem für historische Tapeten unter Verwendung eines Doublertextils aus der Gemälderestaurierung und einer Auswahl von japanischen Kaschiermaterialien wird vorgeschlagen.

## Introduction

Historic linings for wallpapers can be either simple or complex preparations. All lining systems were intended to create an improved surface on to which the wallpaper could be hung, and to protect the wallpaper from the structure that it covered.

The type of wall surface usually dictates the type of lining system; from a simple paper lining on a flat plaster wall, to a textile stretched on battens and lined with paper over a bare brick wall. The large numbers of wallpapers that have survived in situ from the eighteenth century, and a few from even earlier are testimony to the success of these systems.

Often in larger houses, a stretched textile, usually a canvas type, was used to create a flat surface over unplastered walls, (thereby saving the expense of plastering), and was also used occasionally over a plastered wall to create an air gap. The use of a textile as a support for valuable wallpapers also introduced the possibility of removal and re-hanging of the wallpaper, should the owner wish to move house or change decoration. Removal and re-hanging was in fact common practice, not only as a progression from tradition of 'portable' textile wallhangings, but also because good quality wallpapers were expensive to buy.

However, the high survival rate of historic wallpapers does not mean that these historic systems can not and should not be improved upon, particularly the more complex and problematical ones that utilise a stretched textile. As the characteristics of the wallpaper itself change with age, degradation and consequent conservation, the function and specification of the lining system should acknowledge and address these changes. It could be argued that the historic textile lining systems were 'too successful', in that their longevity allowed (and caused) the wallpaper to be extensively damaged both chemically and physically long before their own apparent degradation caused them to be replaced.

## Historic lining system utilising a stretched textile

For the purpose of this paper, we shall concentrate on the more complex system that incorporates a stretched textile. The wall surface to be covered could be bare brick, wooden planking or even a simple wooden framework (known today as studding). Wooden battens were fixed to the perimeters of a brick or plastered wall; however, wooden walls usually did not receive battens and therefore did not create an air gap. In the latter case, the textile was directly against, although not deliberately adhered to the wall surface. Consequent adhesive applications during lining frequently adhered random areas of the textile to the wall causing severe problems as the textile progressively lost tension.

The textile was first thoroughly washed to release the weaving tension and allowed to dry. It would then be stretched taught with the warp running vertically and attached to the battens with upholsterer's tacks. These were usually of

iron which would corrode quickly although the use of copper tacks has been known. Once stretched taught the canvas would be coated with warm animal glue size. This performed three functions: to further tighten the canvas as it shrinks when wet; to fix the new tension on cooling and drying; and to provide extra adhesive qualities when applying the subsequent lining paper. This gave an extremely solid surface under high tension on to which a lining paper could be easily applied.

Prior to the availability of continuous, machine made paper the canvas was covered with a single layer of hand-made sheets applied individually and at considerable expense. It is only therefore, with the adoption of machine made paper with its strong grain direction, that cross lining of the canvas was introduced. This consisted of two linings, one applied vertically and a second horizontally to equalise the tension created by the first lining. The high survival rate of early wallpapers is also partly due to the superior quality of the hand-made linings over machine-made papers.

The application of the lining paper, whilst drying also increases the tension of the lining system, as it is applied wet and expanded with paste. The resulting surface is *drum like*, and the wallpaper would be applied to this surface giving two or three layers of paper applied to the originally taught and sized textile.

## Historic system in action

In the natural household environment, the system is repeatedly expanding and contracting as moisture is absorbed and desorbed. If the source of moisture is from within the room the upper paper layers will initially control the movement of the system, but if the moisture is from the wall substrate the canvas and size will initially control the movement of the system.

This expansion and contraction of the laminate with an initial differential rate within the laminate exerts considerable stress on the adhesive layers between the laminate. This stress is compounded by the differing directional responses of the paper and canvas. The canvas reacts in a predominantly vertical direction as the warp holds most of the tension. The lining paper, if hand-made, generally has a bi-directional reaction. If the lining paper is machine-made and hung vertically the paper will respond in a horizontal direction. A cross lining would give a balanced reaction. A single horizontal lining of machine-made paper would have a reaction direction similar to that of the canvas but not necessarily of the same proportions.

As the system ages, both individually and collectively, random areas of adhesive bonding between paper and canvas weaken due to the repeated movement. This consequently releases some of the tension from the canvas that then begins to sag progressively under the weight of the paper. This in turn puts strain on the adjacent fixing points which releases yet more tension and transfers strain to the surrounding areas. Once an area of the wallpaper is delaminated from the canvas, and possibly the other paper layers, degradation of the paper itself is more pronounced giving rise to further areas of differential reaction within the individual layers themselves.

In this way, the historic support system degrades in a progressive manner, eventually causing serious damage to the wallpaper it was intended to support, as little is noticeable until the degradation is quite advanced.

## Development of the system

It is apparent, therefore, that a wall lining dependant on such high tension, yet comprising organic materials whose characteristics change relatively quickly with age and a fluctuating environment does not provide a stable system. In developing a new method for supporting historic wallpapers, the weaknesses of the traditional system need to be identified and improved upon. However, it should be acknowledged that the wallpaper often forms part of an historic room setting and building, and as such a degree of historical correctness within the new system is appropriate. (See below).

The new system has to take into account that the environment in which it functions will rarely be of museum standard. Therefore, the response of the linings to environmental fluctuations has to be sympathetic to the reaction of the wallpaper in order to avoid damage. The new system should also reveal damage should it occur in extreme circumstances, allowing the problem to be noticed and rectified.

## Textile

The central weakness of the old system lies in the choice of textile that forms the foundation on to which the other layers are based. Canvas, including high quality linen canvas always requires high tension in order to provide the initially firm base on which to work. It is also inherently acidic as it contains lignin which, over time, contributes to the degradation of the wallpaper [1].

The stretching of a textile to cover a wall surface has its roots in the hanging of tapestries and textiles and as such is an important technique in the context of a historic interior. The type of finish for many interior walls was partially dictated by the type of decoration intended to cover them. Therefore, this should be viewed as an important characteristic of the room to preserve. The installation of new boards or panels onto which to install the wallpaper would change the context of the room in which the paper is to hang.

An alternative textile that is light, strong, and chemically and physically inert would correct the inherent weaknesses of the canvas. Woven polyester fulfils these criteria and has already been in use in other conservation disciplines for many years now. Because of its construction, air flow is possible through the weave of the textile. It is also possible to obtain polyester in widths up to 5m to reduce the need for seams, and with a napped surface to give an adhesive key for the subsequent layers.

In application, the polyester does not require the extreme tension of a canvas, as it is simply hung hand-tight with no need of a size to heighten and fix the tension. The consequent application of paper provides the further adequate tightening of the polyester. Non-rusting staples with a flat bar are used to avoid cutting when fastening the polyester.

As the synthetic polyester textile does not absorb moisture, the bond formed when adhering the first lining paper using a traditional starch paste is not as strong as that to a natural canvas. This however, is not necessarily problematical [2] and can be countered to a greater extent by careful selection of paper and slight modification of the adhesive. The addition of

5% v/v PVA to the wheat starch improves the bond, but more importantly, the choice of a Japanese paper that fibrillates easily to allow fibres to be worked in to the weave of the textile during application strengthens the bond [3].

## Paper

Having a stable textile foundation successfully lined over all with a base paper, the consequent linings and the linings of the wallpaper itself must create a system sympathetic to the conserved wallpaper and its environment. For this purpose Japanese paper is an invaluable material. Accepted today amongst Western conservators for its strength and longevity, it has been used in Japan for centuries in the protection and preservation of artworks and documents. Its relevance in the treatment of historic wallpapers is described below, with a short history of its use, highlighting parallel problems of mounting large-scale paper objects.

## Traditional Japanese paper supports

The use of Japanese paper as a lining support has evolved over time into a sophisticated system for the mounting of both flexible objects, such as hanging scrolls, hand scrolls, and rigid or flat artworks, such as standing or folding screens, sliding door screens and wall and ceiling paintings.

Linings and paper support systems for these artworks vary according to the format, with quite different papers and pastes being used for the flexible and the rigid systems. The techniques used for wall and ceiling paintings in Japan are of especial interest when considering options for treating large scale Western wallpapers, as there are some areas of common concern. Furthermore, as traditional Japanese architecture and interior decoration developed in response to the forces of the elements, much can be learnt by Western conservators when considering the environmental responses of wallpapers within the Western historic interior.

In Japan, cold, dry winters contrasted with hot, humid summers leading to the development of buildings made of wood, which would withstand earthquakes, could be opened up during the summer to let in light and circulate air, but closed up in winter to provide some insulation and protection. The expansion and contraction rate of such wooden structures would not follow that of paper. Rather than apply artworks directly to the wall they were hung temporarily as hanging scrolls, or in the case of paintings intended as a permanent feature of the interior, supported by an elaborate multi-layered underlining support system, known as *shitabari*.

Portable or movable elements, such as folding screens or sliding doors were given a support core consisting of a light but strong wooden lattice. Over this were pasted eight or more layers of paper in such a way as to provide pockets of air between layers and a network of points of contact from the artwork on the outer surface and the wooden core within. The layers of paper provided a buffer to protect the artwork from the wood and allowed a degree of expansion and contraction of the materials without causing damage.

Another feature of the system was that the last layers were designed not only to support the artwork but also to allow it to be removed without difficulty if repairs or remounting were necessary. This system was, and still is in use today, not just for screens and sliding doors, but also the drying boards, or *karibari*, used by Japanese paper conservators, and more recently, Western paper conservators. Their construction has been documented [4] and adapted in some cases by conservators working in the West.

Wall paintings and ceiling paintings in Japanese interiors were treated similarly, with the exception that the lattice core was seldom used. Instead, the wooden planks of the bare wall or ceiling were first pasted directly with paper and sometimes additional strips over any gaps or joins for extra protection. This was followed by the *mino-kake* lining and the rest of the underlining proceeded in the same way as for the panel-system *shitabari*.

The lattice-work and complete *shitabari* system has been used for wallpaper in the West [5]. This system, however, is not always financially viable, or compatible in all locations or historic interiors, for example where the fixing of a lattice core to the wall would alter the architectural features of the room. Similarly, ethical questions may arise as to the use of a completely Oriental system within the context of a Western historic interior. Nevertheless, the last layers of the *shitabari* system have provided some inspiration for new directions in the treatment of wallpaper, working within the remit of the traditional Western stretched textile support. Of particular interest is the *ukekake* layer, which can be applied directly over the lined polyester described above.

The *ukekake* layer consists of quarter-sheets of Japanese paper, pasted along each edge to a depth of 3 to 5mm. The sheets overlap by about one quarter of the height and width of each sheet, the outermost having its exposed edges water-cut. When two *ukekake* layers are used, the paper is turned ninety degrees for equal distribution of grain direction. The artwork is then pasted directly onto this, except in the case of a very large object, such as wallpaper, when a sealing layer is first applied, again balancing the grain direction, *ukeshibari*. The *ukekake* layers act as a kind of cushion between the surface beneath, whether it is a traditional *shitabari* system or a layer of polyester. The network of pasted edges within the *shitabari* layer or layers distribute the tension of the artwork over the whole surface, keeping it in contact with the support layer beneath, but allowing for some movement, expansion and contraction.

To summarise, the new system comprises:

- Stretched, woven 100% polyester fixed with non-rusting staples.
- First lining of Japanese paper adhered all over using wheat starch/PVA, 10mm overlap.
- *Ukekake* (cushion) layer adhered at perimeters (3-5mm) of quarter sheets, overlapping one quarter of the height and width
- *Ukeshibari* (sealing) layer adhered all over with wheat starch, overlapping 3-5mm.
- Wallpaper lined once or possibly twice with Japanese paper.

The lining treatment described above has already been used successfully in a number of projects in Europe, namely for Chinese wallpaper panels at the Victoria and Albert Museum and on Chinese wallpapers in the historic interior at Oud Amelisweerd, Holland and Woburn Abbey, England.

## Conclusion

Considering the infrequency, high monetary cost and disruption of a full-scale conservation treatment for historic wallpapers, it is essential that the wallpaper be replaced in situ with the best possible, durable support. For conserved historic wallpapers, particularly Chinese wallpapers (which are the most common type to receive full conservation) this new system, or indeed the *shitabari* system, would appear to be the most suitable to date. The polyester and cushion layer/s provide a departure from the reliance on high tension, and also a tolerance within the laminate to accommodate movement within the system in fluctuating environmental conditions.

Furthermore, as many wallpaper conservators prefer Japanese paper for the conservation re-lining of historic wallpapers, the techniques and materials used in the wall linings therefore provide a more compatible laminate. Finally, the cushion layer also allows for reversibility; providing a level at which the wallpaper could be released, removed and replaced without breaking down the whole system.

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## Notes

- 1 Hackney, S. and Hedley, G. 'Measurements of the ageing of linen canvas', *Studies in Conservation*, Vol. 26 (1981), pp. 1-14.
- 2 Under extreme stress it is preferable that the bond between textile and lining paper fails, thereby protecting the wallpaper.
- 3 Vanke, F. The Conservation of an Oversized Cartoon by Ford Maddox Brown, unpublished thesis Camberwell College of Arts (1994), p. 99.
- 4 Webber, P. Huxtable, M. 'Karibari / the Japanese drying-board', *The Paper Conservator*, Vol. 9 (1985), pp. 54-60.
- 5 Woude, Nico van de. 'The Conservation of Historic Chinoiserie Interiors and Chinese Export Wallpapers in the Netherlands', *Paper Conservation News*, no. 85, (March 1998), pp. 6-9.

## Biographies

**Philip Meredith** studied and worked for eleven years in the workshops of the Usami Shokakudo in Kyoto, Japan, and is currently Head Conservator of the Far Eastern Conservation Centre at the National Museum of Ethnology, Leiden, The Netherlands.

**Mark Sandiford:** After serving an apprenticeship and working as a decorator for ten years Mark re-trained as a paper conservator at Camberwell College of Arts on the OND and



1. Chinese export wallpaper, mid. nineteenth century. Before removal during initial mechanical surface cleaning. Showing discolouration around pier glass.



2. Hanging the polyester textile. Showing the wall surface constructed of wooden planking.

HND courses. He then specialised in the conservation of historic wallpapers and large works of art on paper on the RCA/V&A post-graduate course, graduating with Distinction. He has been practising this specialism as a partner of Sandiford and Mapes since 1993. Mark is joint winner of the Museums and Galleries Young Conservator of the Year Award, 1994, awarded for work in historic wallpaper conservation.



3. The first layer of Japanese paper being applied to the polyester textile.



4. The Ukekake ('cushion' or 'pocket') layer being applied to the first layer of Japanese paper in quarter sheets.

**Philippa Mapes:** Philippa gained a BA Hons in History in 1985. Following employment at the Silver Studio Wallpaper Archive, she trained as a paper conservator on the OND course at Camberwell College of Art. After working at Buckinghamshire Record Office, Philippa further specialised in historic wallpaper conservation on the RCA/V&A conservation course, gaining an MA with Distinction on graduating. She is now partner in the firm of Sandiford and Mapes and joint winner of the Museums and Galleries Commission Young Conservator of the Year Award 1994.

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