

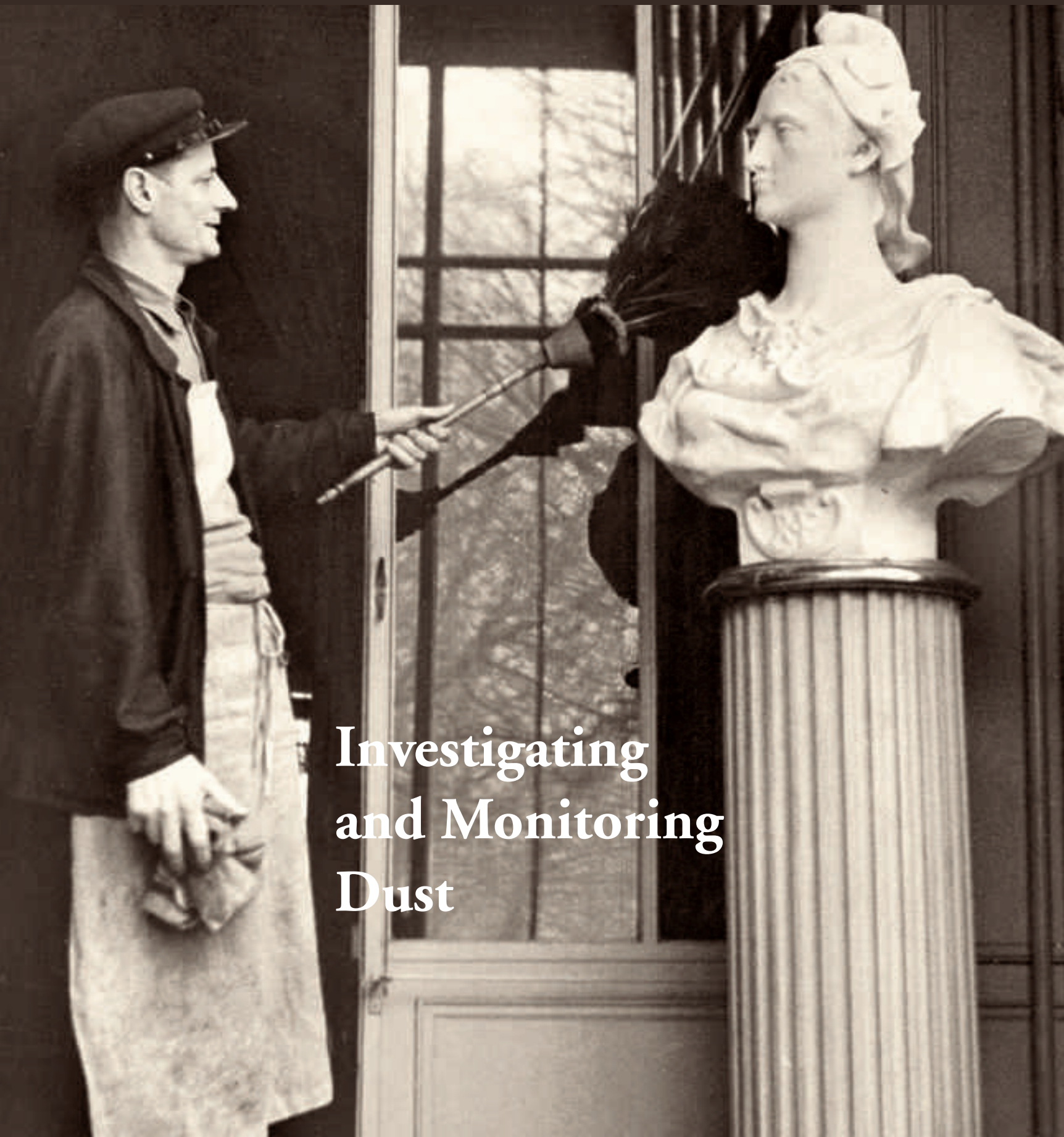
International Preservation News

A Newsletter of the IFLA Core Activity
on Preservation and Conservation



No. 53

May 2011



Investigating and Monitoring Dust

ISSN 0890 - 4960

International Preservation News

is a publication of the International Federation of Library Associations and Institutions (IFLA) Core Activity on Preservation and Conservation (PAC) that reports on the preservation activities and events that support efforts to preserve materials in the world's libraries and archives.

IFLA-PAC

Bibliothèque nationale de France
Quai François-Mauriac
75706 Paris cedex 13
France

Director:

Christiane Baryla

Tel: ++ 33 (0) 1 53 79 59 70

Fax: ++ 33 (0) 1 53 79 59 80

E-mail: christiane.baryla@bnf.fr

Editor / Translator

Flore Izart

Tel: ++ 33 (0) 1 53 79 59 71

E-mail: flore.izart@bnf.fr

Spanish Translator: Solange Hernandez

Layout and printing: STIPA, Montreuil

PAC Newsletter is published free of charge three times a year. Orders, address changes and all other inquiries should be sent to the Regional Centre that covers your area. See map on last page.

IPN is available on line at:

www.ifla.org/en/publications/32

IFLA-PAC Mailing List at:

<http://infoserv.inist.fr/wwwsympa.fcgi/info/pac-list>

Any request for distribution should be addressed to:
flore.izart@bnf.fr

Front cover:

Palais de l'Élysée. Paris, vers 1930.

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Carine Peltier



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We are every day more and more immersed in a digital world: tablets, mobile phones, screens popping up around us make the access to libraries and archives collections easier.

So, why making a special survey on dust since this topic seems out of date now? On August 15-16, 2007, in Durban, Johann Maree, then PAC regional director for South Africa, already tackled the subject by organizing a very relevant workshop on “Mould, Dust and Pest”.

At this occasion, we had discovered that this theme of dust was universally shared by the librarians of all the continents, in very different ways: daily management of dust, sometimes at a large scale depending on the size of stores; dust removal because of collection move or building restoration; dust issue in countries subject to extreme climates, recovering their collections and making them difficult to protect; dust from earthquakes, volcanic eruptions, devastating cyclones; radioactive or asbestos dust contaminating collections. Many recent events, regrettably, have showed us at which point this topic is still relevant today as the cleaning and restoration can be a long, expensive and titanic task.

Because of these extreme cases, and maybe to find better answers, dust has become a subject of research,

either in stores or in exhibition spaces: we measure it, study its structure, the damages it may cause, the methods for controlling it. Dust being described as a “silent attacker”, the question of cleaning becomes central: how to organize it? At which rate? Paradoxically, the Anglo-Saxons have developed the concept of over-cleaning, affirming that too much cleaning can kill the “soul” of a place or a book.

The articles we are proposing you today do not certainly exhaust the subject but they show us at which point dust control is a burning issue. To quote our friend Jeanne Drewes, “to dust or not to dust”, that is the question.

Christiane Barylá
IFLA-PAC Director



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Nous sommes chaque jour davantage immergés dans un monde numérique : des tablettes, des téléphones portables, des écrans de plus en plus nombreux et présents nous permettent d'accéder facilement aux collections des bibliothèques et des archives.

Alors pourquoi nous intéresser à la poussière ? N'est-ce pas un thème démodé et dépassé aujourd'hui ? Déjà les 15 et 16 août 2007, à Durban, Johann Maree, directeur régional du PAC pour l'Afrique du Sud, s'était emparé du sujet en organisant un très pertinent satellite meeting intitulé « Mould, Dust and Pest ».

A cette occasion nous avons découvert à quel point ce thème de la poussière était universellement partagé par les bibliothécaires de tous les continents et de manières extrêmement diverses. Gestion quotidienne de la poussière, parfois à grande échelle en fonction de la taille des magasins. Chantiers de dépoussiérage lors de déménagement ou de restauration de bâtiments. Poussière des pays soumis aux climats extrêmes qui recouvre leurs collections, difficiles à protéger. Poussière des tremblements de terre, des éruptions volcaniques, des cyclones dévastateurs ; poussière radioactive ou poussière d'amiante qui contamine les collections. De nombreux événements récents, hélas, nous ont montré à quel point ce sujet pouvait devenir d'actualité tant le nettoyage et la restauration des fonds peuvent être une tâche longue, coûteuse et titanesque.

Entre ces cas extrêmes, et peut-être pour mieux y répondre, la poussière est devenue sujet d'étude. Sujet d'étude dans les magasins mais aussi dans les espaces d'exposition : on la mesure, on étudie sa structure et les dégâts qu'elle occasionne, les méthodes pour la contrôler. Alors qu'elle est décrite comme un « agresseur silencieux », la question du nettoyage devient centrale : comment l'organiser ? A quel rythme ? Paradoxalement et parallèlement, les anglosaxons ont même développé le concept d'over-cleaning, selon lequel trop de nettoyage peut tuer « l'âme » d'un lieu ou d'un livre.

Les quelques articles que nous proposons aujourd'hui à votre réflexion n'épuisent certes pas le sujet mais ils montrent combien le contrôle de la poussière demeure d'actualité. Pour reprendre une expression de notre amie Jeanne Drewes, « to dust or not to dust », voilà la question.

Christiane Baryla
IFLA-PAC Director

Low Cost Dust Monitoring at The British Library: a Case Study in Progress

by **Jane Pimlott**, Preservation Coordinator, The British Library
and **Caroline Peach**, Head of the British Library Preservation Advisory Centre

Introduction

The British Library is fortunate to occupy a modern, purpose-built building at St Pancras in central London. Approximately 34% of its collection is stored here, and 10 of its 12 reading rooms are to be found here, through which researchers can access the extensive collections of more than 150 million items.

Managing a collection of this size is not without complexity, the challenge of the scale of operations can have a significant impact on seemingly routine collection care tasks such as house-keeping and cleaning.

When the St Pancras site opened in 1997 it had been built to a high specification including filtration systems to ensure the exclusion of particulate pollutants to 85% efficiency and maintaining maximum SO₂ levels at below 100 micrograms per square metre.

As a consequence of this there was less need for systematic, routine cleaning of books and shelves at the St Pancras site than at the library's previous location and an approach of cleaning books and shelves on demand was adopted (though cleaning of floors and non-collection areas continued to be carried out regularly by Estates teams).

In 2009 it became clear that the number of 'on demand' cleaning requests was increasing and reports were being received about high dust levels in both basement storage areas and reading rooms. High dust levels are a concern not just because of the collection care issues, but also because of health and safety issues for staff and in terms of reputation for the British Library. A dust survey of both basement storage areas and reading rooms was proposed in 2009 to establish the extent of the problem and to inform the development of a solution.

Designing the dust survey

Initiating a dust survey was recognised as a large undertaking. Although limited to just the London site, the survey would still cover all four basement areas (22,300 sq m) and 10 reading rooms (12,370 sq m). The Preservation team at the British Library consists of five members of staff, and whilst it would be possible to involve staff from other library departments such as Storage and Estates in the work, it was important that the survey be quick to carry out and low cost.

The first step was to define the purpose of the survey and the locations to be surveyed.

Purpose

- To identify the extent of dust on books and shelves in basements and reading rooms
- To assess any variations in dust levels
- To identify the causes of high dust levels
- To enable cleaning and associated collection care priorities to be identified
- To collect benchmark data quickly and simply
- To be able to relate information on dust levels to type of stock at location

The gradual reduction in systematic cleaning of books and shelves meant that, for this survey, there could be no identification of how long the dust had been building up. The date of the opening of the building (1997) and date of the start of the survey (2010) gave a broad indication of the time over which dust had been building up on shelves and shelf canopies, but the level of dust on books would depend on whether they had been cleaned before moving to the new site in 1996/1997.

One of the desired outcomes of the survey was therefore a benchmark of existing practice which can be used to monitor ongoing rates of dust build up and assess the impact of house-keeping practices.

Planning

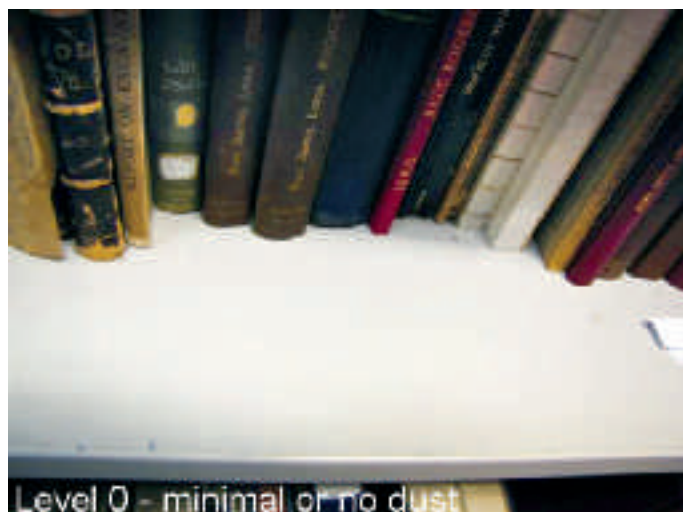
As is common in many institutions, the responsibility for house-keeping activities, such as cleaning, falls across several departments at the British Library. This shared responsibility can be an advantage because it ensures that the activities are embedded across the organisation but it also has the potential to cause problems if there is confusion about who has responsibility for what, or if there are gaps in the coverage of activities. At the British Library the responsibility for collection care issues relating to book and shelf cleaning belongs to the Collection Care and Collection Storage departments. The responsibility for housekeeping and general cleaning, including staff working areas, floors, access areas and corridors, and the high level areas above shelves (the canopies) belongs to the Estates department. It was important to recognise this division of responsibilities early in the planning of the survey so that good communication could be established, the right people could be involved

in both planning and carrying out the survey, and all departments had the opportunity to contribute to both the survey itself and plans for the subsequent housekeeping programme.

Assessing and recording information

The process of carrying out the survey was guided by a need to get a quick, overall assessment of dust levels. The large scale involved meant that the method used had to be simple. The team therefore set up a visual assessment methodology rather than an approach involving complicated and time-consuming weighing or analysis. The visual assessment was based on simple, easy to assess characteristics using only four categories.

The four categories were described by example photographs and minimal text as below.



1-2-3. Scale 0 – Minimal or no dust. © British Library

4-5-6. Scale 1 – Light but noticeable dust. © British Library



Level 2 - moderate dust



Level 3 - heavy dust and/or debris



Level 2 - moderate dust



Level 3 - heavy dust and/or debris



Level 2 - moderate dust



Level 3 - heavy dust and/or debris

7-8-9. Scale 2 – Moderate dust. © British Library

10-11-12. Scale 3 – Heavy dust and/or debris. © British Library

The largest areas to be surveyed were the storage basements, most of which are shelved with high density mobile shelving. A simple method of recording the location of the different dust levels was needed. The project team considered recording information directly onto excel spreadsheets, using the columns and rows of the spreadsheet to mimic the columns, bays and ranges of shelves but this option was thought to be too time-consuming at the point of data collection and so was not used.

An advantage of the new, purpose-built St Pancras site is that up to date floor plans of reading rooms and basements are available. These plans show the layout of the space including, with minimal alteration, the locations and numbering of the ranges of shelving. The plans also show working areas, walkways, doorways and the location of vents. The project team agreed to use the plans to record the identified dust levels.

A colour-coded system was used to record the four dust categories on the floor plans as follows:

- Scale 0: no colour
- Scale 1: yellow
- Scale 2: blue
- Scale 3: pink

The information recorded on the plans would then be transferred onto spreadsheets reflecting the ranges and bays at a later date.

Although the British Library operates at a large scale, the principle of establishing a system of visual assessment and using floor plans to record the location of dust build-up can be applied to organisations of all sizes.

Carrying out the dust survey

The assessment and recording of dust was carried out by teams of two people working together. One person carried out the visual assessment and the other person recorded the information directly onto the plans using the colour-coding system.

Due to the size of the area being surveyed it was not possible to look at every range of shelves. In each basement compartment, every 3rd to 4th range was checked and the results were applied



to the adjacent ranges. In the reading rooms, the smaller areas meant that each range could be checked.

Each team collected information on the level of dust at four different shelf heights: on canopies (the highest level above shelves and books); the top of ranges (the highest book shelf); mid range (a shelf at mid level); and bottom of range (the lowest shelf).

Collecting data in this way allowed the team to compare dust levels in different compartments, see the overall distribution of dust within a compartment, see the distribution of dust by height, and identify the areas of heaviest dust deposit.

The data from the floorplans was then transferred to spreadsheets to enable the information to be analysed and edited. This was best done by the people who had collected the data, and soon after the information had been gathered to avoid misinterpretation. The grid format of the spreadsheet was used to reflect the shelf layout and height of shelves, and to separate out information about the shelf canopies (Estates responsibility) from that relating to books and shelves (Collection Care responsibility).

The pictures below show the relationship between a marked-up floorplan for one of the reading rooms, and the same information transferred to a spreadsheet.

Reading Room	Range	Bay:	1	2	3	4	5	6	7	8	Comments	Cells Height
Science Floor 2	1st	Canopy										20.21.12
		Top										20.21.12
		Mid										20.21.12
		Bottom										20.21.12
Science Floor 2	2nd	Canopy										20.21.12
		Top										20.21.12
		Mid										20.21.12
		Bottom										20.21.12
Science Floor 2	3rd	Canopy										20.21.12
		Top										20.21.12
		Mid										20.21.12
		Bottom										20.21.12
Science Floor 2	4th	Canopy										20.21.12
		Top										20.21.12
		Mid										20.21.12
		Bottom										20.21.12
Science Floor 2	5th	Canopy										20.21.12
		Top										20.21.12
		Mid										20.21.12
		Bottom										20.21.12
Science Floor 2	6th	Canopy										20.21.12
		Top										20.21.12
		Mid										20.21.12
		Bottom										20.21.12
Science Floor 2	7th	Canopy										20.21.12
		Top										20.21.12
		Mid										20.21.12
		Bottom										20.21.12
Science Floor 2	8th	Canopy										20.21.12
		Top										20.21.12
		Mid										20.21.12
		Bottom										20.21.12

From the spreadsheet format, the information could be easily edited to present specific information for particular purposes. For example, the table 1 shows the Estates department the total extent of canopy cleaning required (in metres) for each of the four basements.

Table 1

Basement	Total metres of shelf canopy needing cleaning overall	Level	
		Level 2	Level 3
Basement 1	2251	721	1540
Basement 2	3724	3027	688
Basement 3	4732	2750	1982
Basement 4	4320	3913	407
Totals	15037	10411	4618

Table 2

Priority areas for cleaning (Estates team; all other cleaning priorities)			
Range Priorities - B1, Comp 5			
Ranges	No of ranges	No of Bays	Metres
200-212	11	110	84.6
218-240	21	210	18.30
258-326	30	300	274.34
	41	482	387.32

Whereas the table 2 shows the Collection Care department the extent of cleaning of books and shelves required within one compartment. With limited resources available, it was important to be able to compare data across all areas and establish priorities for cleaning. The use of the visual assessment and transfer of data to spreadsheets meant that the areas of highest dust deposit could easily be identified and these areas could therefore be targeted for cleaning.

Results

The plotting of information on floorplans allows conclusions to be drawn about the causes of dust deposit which will help with its long-term management.

The locations of high dust (scales 2 and 3) identified in the British Library survey can be broadly categorised as follows.

Public areas of reading rooms:

- Shelving adjacent to photocopiers
- Open access collections
- Shelves at the ends of rows next to walkways
- Low level shelves
- Shelving and surfaces close to working areas or areas where people gather (for example queues at issue desks)

Furthermore, it was found that the busiest reading rooms had the highest levels of dust.

- Storage areas
- Open shelving
- Static shelving close to working areas
- Areas adjacent to thoroughfares
- Areas near to doors
- All areas adjacent to staff working locations

Using the results

With a good overview of the extent, variation and causes of dust in the storage areas and reading rooms, the project team could decide cleaning priorities, plan a cleaning programme according to the priorities and establish strategies for minimising future dust build-up or the effects of future dust build-up.

For the British Library the factors influencing priorities for immediate cleaning (within the next 12 months) were the level of dust, the location of the dust and the resources available for cleaning. It was decided that all areas showing scale 2 and 3 dust levels would be cleaned.

Cleaning priorities took into account health and safety considerations, and the value and condition of the book stock. A risk assessment was carried out for the activities associated with book cleaning, and written guidelines were produced to accompany the training sessions that were set up for staff involved in carrying out the cleaning.

For the basement storage areas, all areas with scale 2 and 3 dust levels were prioritised for cleaning. The Estates department carried out cleaning of the high level canopies first, followed by book and shelf cleaning of the same locations by Collection Care staff.

In the reading rooms all the canopies were identified as a priority for cleaning because reading rooms are public areas. The priorities for the cleaning of books and shelves were determined by the areas with the highest dust levels.

For both basement storage areas and reading rooms the survey data is being used to determine longer-term patterns of cleaning. In establishing the longer-term approach to managing dust, the project team considered two approaches.

1. Remove or reduce the causes of the dust, e.g. filtration, reduction in access by and movement of people, sealing gaps around windows and doors.
2. Reduce the effects of dust, e.g. develop a regular cleaning programme, move items away from high traffic areas, change the type of shelving, box items to protect from dust deposition.

The experience of the 2010 dust survey and the analysis of results raised, and helped to answer, a number of questions:

- How does type of stock relate to high dust areas? There are high dust levels from book debris and high traffic in an area storing rare books. This will be prioritised for cleaning and identified as an area for future boxing.
- Can sensitive items be moved from high dust areas and replaced with something else? High value items are often in busy areas due to high reader demand. Moving the item would not affect dust exposure because the same amount of staff movement and book debris would result from these items regardless of where they are stored.
- Can shelving be moved to more suitable locations? Changing the location of shelving in the basements is not possible due to the number of items involved, the density of the storage and shortage of space. In reading rooms there may be greater flexibility to reposition some shelving away from thoroughfares.
- Can different types of shelving be used (e.g. closed shelving)? More suitable storage could possibly be built or purchased to house some materials depending on need, and in consultation with the Collection Storage Department. This is only likely to be feasible for single items or small collections of items with special needs.
- Can the pattern of movement of people within a room be changed? The movement of people in basement areas is dictated by the positions of fixed and mobile shelving. It may be possible to make minor changes in reading rooms if these can be proved to be beneficial.
- What other activities happen at a location that can increase dust levels and can these be moved or screened off? It may be possible to move photocopiers away from open shelving in reading rooms. It may be possible to screen off some thoroughfares in basements to protect adjacent shelving.

The work at the British Library is on-going and of course, any changes implemented would need to bring overall benefit to the collection, location and people (staff and users) and would not just be considered in terms of reducing risks to the collection from dust and dirt. Ease of retrieval, vulnerability to

theft, and air circulation are just a few of the considerations that would be taken into account before making changes to the location of items, storage furniture or thoroughfares and access routes.

The British Library has identified and is implementing the following actions as a result of the dust monitoring exercise.

- Set immediate cleaning priorities using the survey results.
- Identify and clearly define routine work which should be included in cleaning contracts.
- Train an appropriate number of staff for the cleaning of books and shelves.
- Co-ordinate book and shelf cleaning priorities with general housekeeping requirements.
- Use the survey results for further examination of the effects of specific activities in reading rooms and storage locations.
- Implement an on-going dust monitoring programme to assess dust build-up over time using the 2010 results as a benchmark.

For an institution such as the British Library where the scale of the collections and the extent of the storage areas and reading rooms is significant, a linear approach to cleaning – starting at one end and finishing at the other – is not the best use of resources. By establishing and implementing a low-cost and simple dust assessment and monitoring programme, collection care staff have been able to identify high priority areas for cleaning and develop a longer-term strategy for preventing and minimising both dust deposition and the effects of dust deposition.

The collaboration of library staff from different departments has brought significant benefits in terms of communication of collection care and housekeeping issues, and the subsequent training of increased numbers of staff in good handling and cleaning techniques. It has resulted in the targeted and effective use of resources to achieve the multiple aims of reducing the damaging effects of dust to the collection, reducing health and safety issues related to dust, and maintaining publicly visible high standards of collection care.

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Monitoreo del polvo de bajo costo en la British Library: estudio de caso en curso

por Jane Pimlott, Coordinadora de Preservación, British Library, y Caroline Peach, Jefe del British Library Preservation Advisory Centre

Introducción

La British Library tiene la suerte de ocupar un moderno edificio especialmente construido en St. Pancras, en el centro de Londres. Aproximadamente, el 34% de su colección se encuentra allí y 10 de sus 12 salas de lectura también en este edificio, donde los investigadores pueden acceder a las amplias colecciones de más de 150 millones de piezas.

La gestión de una colección de estas dimensiones es compleja, el reto de la escala de las operaciones puede tener un impacto significativo en las tareas aparentemente rutinarias para el cuidado de las colecciones tales como el mantenimiento de las instalaciones y la limpieza.

Cuando se inauguró la sede de St. Pancras en 1997, la construcción se había realizado cumpliendo altas especificaciones que incluían sistemas de filtración para asegurar la exclusión de partículas contaminantes hasta un 85% de eficiencia y el mantenimiento de los niveles máximos de SO₂ por debajo de 100 microgramos por metro cuadrado.

Como consecuencia, hubo menos necesidad de hacer limpieza de rutina a los libros y estanterías en la sede de St. Pancras que en la antigua sede de la biblioteca y se adoptó un sistema de limpieza de libros y estanterías a solicitud (aunque la limpieza de los pisos y las áreas ajenas a las colecciones siguió realizándose regularmente el personal del departamento de los Bienes (Estates)).

En 2009, se hizo evidente que el número de solicitudes de limpieza estaba aumentando y se recibían informes acerca de niveles elevados de polvo, tanto en las áreas de depósito de los sótanos, como en las salas de lectura. Los altos niveles de polvo son una preocupación, no solo por el tema del cuidado de las colecciones, sino también por el aspecto de la salud y la seguridad del personal y para la reputación de la British Library. Se propuso realizar una inspección del polvo en los depósitos de los sótanos y en las salas de lectura en 2009, a fin de determinar el alcance del problema y elaborar una solución.

Diseño de un estudio de inspección del polvo

Se reconoció que comenzar una inspección del polvo es una empresa de grandes proporciones. Aunque se limitaba a la sede de Londres, la inspección abarcaría los cuatro depósitos de los sótanos (22.300 metros cuadrados). El equipo de Preservación de la British Library está formado por cinco personas, y aunque se podía incorporar al personal de otros departamentos de la

biblioteca como los del Almacenamiento y de los Bienes (*Storage and Estates*) a la actividad, era importante que la inspección fuera rápida y de bajo costo.

El primer paso fue definir el objetivo de la inspección y los espacios que serían objeto de la misma.

Objetivo

- Identificar la extensión del polvo en los libros y las estanterías de los sótanos y las salas de lectura
- Evaluar las variaciones de los niveles de polvo
- Identificar las causas de los niveles de polvo elevados
- Permitir identificar las prioridades de limpieza y de cuidado asociado de las colecciones
- Recopilar datos de referencia de manera rápida y sencilla
- Poder relacionar los niveles de polvo con el tipo de material ubicado en el sitio

La reducción sistemática de la limpieza de los libros y las estanterías significó que, para esta inspección, no se pudo identificar por cuánto tiempo se había estado acumulando el polvo. La fecha de la inauguración del edificio (1997) y la fecha de inicio de la inspección (2010) daban una amplia indicación del tiempo durante el cual se había estado acumulando el polvo en los entrepaños y los techos de las estanterías, pero el nivel de polvo en los libros dependería de si se habían limpiado o no antes de su mudanza a la nueva sede en 1996/1997.

Uno de los resultados esperados de la inspección era, por lo tanto, establecer una patrón de referencia de la práctica actual que pueda ser aplicada para monitorear las tasas continuas de acumulación de polvo y evaluar el impacto de las prácticas de mantenimiento de las instalaciones.

Planificación

En la British Library, al igual que en muchas instituciones, la responsabilidad de las actividades de mantenimiento de las instalaciones, como la limpieza, les corresponde a varios departamentos. Esta responsabilidad compartida puede ser una ventaja, porque garantiza que las actividades estén integradas en toda la organización, pero puede ser también una causa potencial de problemas si existe confusión acerca de quién es responsable de qué actividad, o si existen vacíos en la cobertura de las actividades. En la biblioteca, la responsabilidad del cuidado de las colecciones que tiene que ver con la limpieza de los libros y las estanterías recae en los departamentos de Cuidado de Colecciones y Almacenamiento de Colecciones

(Collection Care y Collection Storage). La responsabilidad del mantenimiento y limpieza general, incluidas las áreas de trabajo del personal, las áreas de acceso y los pasillos y las áreas altas encima de las estanterías (los techos) le corresponde al departamento de Bienes (Estates). Es importante reconocer esta división de responsabilidades tempranamente en la planificación de la inspección, a fin de poder establecer una buena comunicación, involucrar a las personas correctas tanto en la planificación como en la ejecución de la inspección y que todos los departamentos tengan la oportunidad de contribuir tanto con la inspección propiamente dicha, como con los planes para el programa de mantenimiento posterior.

Evaluación y registro de la información

El proceso de ejecución de la inspección estuvo determinado por una necesidad de obtener una evaluación general y rápida de los niveles de polvo. La gran escala del proyecto implicaba que el método a usar debía ser sencillo. Por ello, el equipo estableció una metodología de evaluación visual, en lugar de un enfoque que involucrara una inspección o análisis lento y complicado. La evaluación visual se basó en características sencillas y fáciles de evaluar empleando solo cuatro categorías. Las mismas se describieron mediante fotografías de ejemplos y un texto mínimo como aparece a continuación.

- Escala 0 – mínimo polvo o sin polvo (ver fotos 1-2-3 página 7)
- Escala 1 – Polvo ligero pero visible (ver fotos 4-5-6 página 7)
- Escala 2 – Polvo moderado (ver fotos 7-8-9 página 48)
- Escala 3 – Polvo y/o sucio abundante (ver fotos 10-11-12 página 8)

Los espacios más amplios a inspeccionar eran los sótanos de depósito, muchos de los cuales tenían una alta densidad de estanterías móviles. Se requería un método sencillo para registrar la ubicación de los distintos niveles de polvo. El equipo del proyecto consideró registrar la información directamente en hojas de cálculo de Excel, usando las columnas y las filas de la hoja de cálculo para semejar las columnas, entrepaños e hileras de estanterías, pero se consideró que esta opción tomaría mucho tiempo en el punto de la recolección de los datos, por lo que se descartó.

Una ventaja de la sede de la nueva de St. Pancras especialmente construida para la biblioteca es que se dispone de los planos actualizados de las salas de lectura y los sótanos. Los planos muestran la distribución del espacio incluidas, con mínimas alternaciones, las ubicaciones y numeración de las hileras de estanterías. Los planos muestran además las áreas de trabajo, corredores, puertas y la ubicación de las salidas de aire. El equipo del proyecto acordó usar los planos para registrar los niveles de polvo identificados.



1. Información registrada en el plano.

Plan	Nivel	Color	Descripción
García Pto 2	27	Rojo	Alto
	28	Rojo	Alto
	29	Rojo	Alto
	30	Rojo	Alto
García Pto 2 (A Lado 1)	31	Amarillo	Medio
	32	Amarillo	Medio
	33	Amarillo	Medio
	34	Amarillo	Medio
García Pto 2 (B Lado 2)	35	Amarillo	Medio
	36	Amarillo	Medio
	37	Amarillo	Medio
	38	Amarillo	Medio
García Pto 2 (C Lado 1)	39	Azul	Bajo
	40	Azul	Bajo
	41	Azul	Bajo
	42	Azul	Bajo
García Pto 2	43	Rosado	Alto
	44	Rosado	Alto
	45	Rosado	Alto
	46	Rosado	Alto

2. Datos transferidos a las hojas de cálculo.

Se empleó un sistema de codificación de colores para registrar las cuatro categorías de polvo en los planos.

- Escala 0: sin color
- Escala 1: amarillo
- Escala 2: azul
- Escala 3: rosado

La información registrada en los planos se transferiría luego a las hojas de cálculo reflejando, posteriormente, las hileras y entrepaños.

Aunque la British Library funciona a gran escala, el principio de establecer un sistema de evaluación visual y usar los planos para registrar la ubicación de la acumulación del polvo se puede aplicar a organizaciones de cualquier dimensión.

Ejecución de la inspección del polvo

La evaluación y registro del polvo acumulado la llevaron a cabo equipos de dos personas. Una persona llevaba a cabo la evaluación visual, mientras la otra registraba la información directamente sobre el plano usando el sistema de código de colores.

Debido a las dimensiones del área a inspeccionar, no fue posible revisar todas las hileras de estanterías. En cada compartimento del sótano, se revisó cada tres o cuatro hileras y los resultados se aplicaron a las hileras adyacentes. En las salas de lectura, las áreas más pequeñas permitieron revisar cada hilera.

Cada equipo recolectó la información del nivel de polvo de cuatro distintas niveles de la estantería: en los techos (el nivel más alto por encima de los entrepaños y los libros); la parte superior de los estantes (el entrepaño de libros más alto); la mitad de los estantes (un entrepaño en el nivel medio); y la parte inferior de los estantes (el entrepaño más bajo).

Esta forma de recolectar los datos le permitió al equipo comparar los niveles de polvo en los diferentes compartimentos, ver la distribución general del polvo dentro de un compartimento, ver la distribución del polvo según la altura del entrepaño e identificar las áreas con el mayor depósito de polvo.

Luego, se transfirieron los datos de los planos a las hojas de cálculo para permitir el análisis y edición de la información. Esto lo hicieron mejor las personas que recolectaron los datos y poco después del levantamiento de la información para evitar los errores de interpretación. Las celdas de la hoja de cálculo se utilizaron para reflejar la distribución de las estanterías y la altura de los entrepaños, y para separar la información de los techos de las estanterías (responsabilidad del departamento de Bienes) de la relacionada con los libros y los entrepaños (responsabilidad del departamento Cuidado de Colecciones).

Tabla 1

Sótano	Total de metros de techos de estanterías que requiere limpieza general		
		Nivel 1	Nivel 2
Sótano 1	2261	721	1540
Sótano 2	3724	3027	689
Sótano 3	4732	2750	1982
Sótano 4	4320	3913	407
Totales	15037	10411	4618

Tabla 2

Áreas prioritarias de limpieza vinculadas con las prioridades de limpieza de libros y estanterías			
Prioridades de Filera 51, Compartimiento 5			
Filera	No. de hileras	No. de entrepaños	Metros
202-212	11	110	64,6
239-240	2	22	15,92
259-328	50	330	274,34
	41		462

Las ilustraciones 1 y 2 (p. 13) muestran la relación entre el plano ya marcado de una de las salas de lectura y la misma información transferida a la hoja de cálculo.

A partir de la hoja de cálculo, la información se pudo editar fácilmente para presentar información específica para fines particulares. Por ejemplo, la tabla 1 le muestra al departamento de Bienes la limpieza total de techos que se requiere (en metros) para cada uno de los cuatro sótanos.

Mientras que la tabla 2 le muestra al departamento de Cuidado de Colecciones la extensión de la limpieza de libros y estanterías que se requiere dentro de cada compartimiento.

Disponiendo de recursos limitados, era importante poder comparar los datos de todas las áreas y establecer las prioridades de limpieza. El uso de la evaluación visual y la transferencia de los datos a hojas de cálculo permitieron identificar fácilmente las áreas con mayor depósito de polvo y que, por consiguiente, se les diera prioridad de limpieza.

Resultados

El registro de la información en los planos permite sacar conclusiones acerca de las causas de la acumulación del polvo, lo cual permitirá su manejo a largo plazo.

Las ubicaciones con mayor acumulación de polvo (escalas 2 y 3) identificadas en la inspección de la British Library pueden categorizarse de manera general como sigue:

Áreas públicas de las salas de lectura:

- Estanterías adyacentes a las fotocopiadoras
- Colecciones de estantería abierta
- Estantes al final de las filas al lado de los pasillos
- Entrepaños bajos

- Estanterías y superficies cercanas a las áreas de trabajo o áreas donde la gente se reúne (por ejemplo en las filas delante los mostradores donde se retira el material)

Además, se determinó que las salas de lecturas más concurridas tenían los niveles más elevados de polvo.

Áreas de almacenamiento:

- Estanterías abiertas
- Almacenamiento estático en estanterías cercanas a las áreas de trabajo
- Áreas adyacentes al paso de las personas
- Áreas cercanas a las puertas
- Todas las áreas adyacentes a los puestos de trabajo del personal

Uso de los resultados

Con una buena visión general de la extensión, variación y causas de la acumulación del polvo en los depósitos y salas de lectura, el equipo del proyecto pudo definir las prioridades de limpieza, planificar un programa de limpieza de acuerdo con las prioridades y establecer estrategias para minimizar la acumulación de polvo o los efectos de la misma en el futuro.

Para la British Library, los factores determinantes de las prioridades de limpieza inmediata (dentro de los próximos 12 meses) fueron el nivel de polvo, la ubicación del polvo y los recursos disponibles para realizar la limpieza. Se decidió que se limpiarían todas las áreas que mostraban niveles de polvo escalas 2 y 3.

Las prioridades de limpieza tomaron en cuenta las consideraciones de salud y seguridad y el valor y condición del fondo bibliotecario. Se realizó una evaluación de riesgos de las actividades asociadas con la limpieza de libros y se elaboraron lineamientos para acompañar las sesiones de capacitación que se organizaron para el personal involucrado en la ejecución de la limpieza.

Para las áreas de almacenamiento ubicadas en los sótanos, todas con niveles de acumulación de polvo escalas 2 y 3 recibieron prioridad de limpieza. El departamento de Bienes realizó primero la limpieza de los techos de las estanterías, seguida de la limpieza de los libros y entrepaños de las mismas ubicaciones por el personal de Cuidado de Colecciones.

En las salas de lectura todos los techos de las estanterías se identificaron como prioridad de limpieza debido a que las salas de lectura son áreas públicas. Las prioridades para la limpieza de los libros y estantes se establecieron según las áreas con los niveles de polvo más altos.

Los datos del estudio se están utilizando para determinar los patrones de limpieza a largo plazo, tanto para los depósitos de los sótanos como para las salas de lectura. El equipo del proyecto consideró dos enfoques para establecer el abordaje del manejo del polvo a largo plazo.

1. Eliminar o reducir las causas del polvo.

Por ejemplo, filtrar el aire, reducir el acceso del polvo ocasionado por el movimiento de las personas, sellar las ranuras alrededor de puertas y ventanas.

2. Reducir los efectos del polvo.

Por ejemplo, desarrollar un programa de limpieza regular, retirar las piezas de las áreas muy transitadas, cambiar el tipo de estantería, colocar las piezas dentro de cajas para protegerlas de la acumulación de polvo.

La experiencia de la inspección del polvo de 2010 y el análisis de los resultados plantearon, y contribuyeron a responder, varias interrogantes:

- ¿Cómo se relaciona el tipo de material con las áreas con una elevada acumulación de polvo?

Se encontraron niveles de acumulación elevada de polvo producto de los residuos de los libros y a la alta circulación de personas en un depósito de libros raros. A esta área se le dará prioridad de limpieza y se identificará para almacenamiento futuro en cajas.

- ¿Se pueden mover las piezas sensibles de áreas con niveles elevados de polvo y reubicarse en otro lugar?

Generalmente, las piezas de valor se encuentran en áreas concurridas debido a la alta demanda de los usuarios. Trasladar la pieza a otro lugar no afectaría la exposición al polvo, debido a que estas piezas generarán la misma cantidad de movimiento y residuos indistintamente de dónde estén guardados.

- ¿Se pueden mudar las estanterías a ubicaciones más adecuadas?

El cambio de ubicación de las estanterías dentro de los sótanos no es posible debido al número de piezas involucradas, la densidad del almacenamiento y la falta de espacio. En las salas de lectura puede haber una mayor flexibilidad para reubicar algunos estantes lejos de las áreas de circulación.

- ¿Se pueden usar distintos tipos de estanterías (por ejemplo, estanterías cerradas)?

Se podrían construir o comprar mobiliario más adecuado para almacenar algunos materiales según las necesidades, con la asesoría del Departamento de Almacenamiento de Colecciones. Esto es factible solo para las piezas sueltas o las colecciones pequeñas de piezas con necesidades especiales.

- ¿Se puede modificar el patrón de desplazamiento de las personas dentro de una sala?

El desplazamiento de las personas en los sótanos está determinado por las ubicaciones de las estanterías fijas y móviles. Es posible hacer cambios menores en las salas de lectura si se puede demostrar que los mismos aportarán beneficios.

- ¿Qué otras actividades se realizan en el lugar que pudieran incrementar los niveles de polvo y pueden éstas trasladarse o eliminarse?

Es posible mover las fotocopiadoras lejos de las estanterías abiertas de las salas de lectura. Es posible eliminar algunas áreas

de circulación en los sótanos para proteger las estanterías adyacentes.

El trabajo en la British Library es continuo y por supuesto cualquier cambio que se implemente deberá suponer un beneficio global para la colección, la ubicación y las personas (personal y usuarios) y no solo considerarse en términos de reducir los riesgos a las colecciones producidos por el polvo y la suciedad. La facilidad de acceso, la vulnerabilidad a los robos y la circulación del aire son solo algunas de las consideraciones que habría que tomar en cuenta antes de hacer cambios a la ubicación de los materiales, el mobiliario de almacenamiento o las áreas de circulación y rutas de acceso.

La British Library ha identificado y está implementando las siguientes acciones como resultado del ejercicio de monitoreo del polvo.

- Establecimiento inmediato de prioridades de limpieza usando los resultados del monitoreo.
- Identificación y definición clara de la rutina de trabajo que debe incluirse en los contratos de limpieza.
- Capacitación de un número adecuado de trabajadores para la limpieza de los libros y las estanterías.
- Coordinación de las prioridades de limpieza de los libros y las estanterías con las necesidades de mantenimiento general.
- Uso de los resultados del monitoreo para continuar examinando los efectos de las actividades específicas de las salas de lectura y de los depósitos.
- Implementación de un programa continuo de monitoreo del polvo para evaluar la acumulación del mismo en el tiempo, empleando los resultados de 2010 como referencia.

Conclusión

Para una institución como la British Library, donde la escala de las colecciones y las dimensiones de los depósitos y las salas de lectura son significativas, un enfoque lineal de la limpieza –comenzando por un lado y terminando por el otro– no es la mejor forma de emplear los recursos. Al establecer e implementar un programa de evaluación y monitoreo del polvo de bajo costo y sencillo, el personal responsable del cuidado de las colecciones pudo identificar las áreas de alta prioridad para la limpieza y diseñar una estrategia a largo plazo para prevenir y minimizar tanto la acumulación del polvo como los efectos de la misma.

La colaboración del personal de distintos departamentos de la biblioteca aportó beneficios importantes en términos de la comunicación de los problemas del cuidado de las colecciones y el mantenimiento general, así como la posterior capacitación de un mayor número de trabajadores en las técnicas adecuadas de manipulación y limpieza. Esto se tradujo en el uso orientado y efectivo de los recursos para alcanzar los múltiples objetivos de reducir los efectos nocivos del polvo para las colecciones, reducir los problemas de salud y seguridad relacionados con el polvo y mantener estándares elevados, públicamente visibles, de cuidado de las colecciones.

Dust Deposition and Measurement in Libraries

by Barry Knight,

Head of Conservation Research, The British Library

Introduction

“Dusty” is the adjective most commonly associated in people’s minds with libraries and museums, however unfairly. There is no doubt that dust is unsightly and can be damaging to collections, but it is omnipresent both in the home and in cultural institutions, so in order to devise an effective strategy for controlling dust, it is important for collections managers, conservators and curators to understand the nature of dust, its sources, and how to quantify it.

The nature of dust and its sources

Dust covers a very wide range of particle sizes. It can range from 1mm or more in diameter (sand grains) down to nanometer sizes for diesel engine emissions. Generally, the smallest particles (less than 2.5µm diameter) are considered the greatest threat to human health, while the larger particles are less of a threat to health, but contribute more to the soiling of surfaces. This is because particles larger than about 10µm diameter are trapped in the nose and throat and those between 2.5 and 10µm are trapped in the bronchi, from where they are removed in the mucus. Particles smaller than about 2.5µm can penetrate deep into the lungs, where they may cause harm.

Also, larger particles settle out rapidly from the air, in other words, they are deposited on surfaces, while smaller ones remain suspended, so they are more likely to be inhaled, but are less likely to settle on surfaces. Dust is generally considered to be material that is visible to the naked eye, although very fine particles that are invisible can be a more insidious threat because they accumulate slowly and imperceptibly.

Thus, for the purposes of cultural heritage protection, dust can be defined as unwanted particulate or fibrous material (“fluff”) that is deposited on surfaces. Clearly this is of greatest concern when it is deposited on the surfaces of heritage material, such as books on open shelves or museum objects on open display. Books in enclosures such as phase boxes and objects in display cases are effectively protected from most dust.

Airborne dust from external sources may penetrate a library or museum, and larger particles may be brought in by people on their clothes or shoes. Dust may also originate from the fabric of the building, or from the collection itself. Fibres are almost exclusively derived from clothing, while the very finest particles come from diesel emissions. The largest particles (1mm or more) are transported on people’s shoes; because of their size they are not transported by the air and are only ever found at ground level or very close to it. These particles typically comprise sand and gravel from paths, etc. Smaller particles such

as clay minerals may also be transported on people’s shoes. Because of their smaller size they are capable of being transported through the air and may therefore spread further both horizontally and vertically.

Fibres behave rather differently: although they may be several millimetres in length and are typically 20-40µm diameter they are easily transported by the air and can travel long distances inside buildings.

Other external sources of dust include road dust (principally fragments of rubber from tyres and mineral dust from abrasion of the road surface), soil dust from agricultural operations, sea salt particles (mainly in coastal areas, though they may be transported far inland by the wind), and inorganic salts such as ammonium sulphate and ammonium nitrate, which also result from combustion processes. More unusual sources can sometimes be significant for short periods, such as the volcanic ash from Iceland that was deposited over much of Western Europe in 2010, or red dust from the Sahara Desert that is occasionally blown into Europe.

Internal sources of dust can include small flakes of paint and plaster from walls and ceilings and fibres from carpets, while books themselves can contribute leather fibres and fragments (eg from red rot) and paper fibres and fragments. Finally, people – staff and visitors alike – shed textile fibres from their clothes, and also hair and skin flakes. By their movements they are one of the greatest contributors to the transport of particles through the building. Different kinds of textile fibre can be distinguished under the microscope, and their colours may give a clue as to their origins. For example, blue cotton fibres are often derived from denim.

Particle source	Typical size
Vehicle emissions	0.01 – 0.1µm
Salt particles	0.2 – 5µm
Pollen	> 3µm
Volcanic ash	< 5µm
Soil	5 – 10µm
Fungal spores	> 10µm

The deposition of dust in libraries

There are several reasons for objecting to the presence of dust in a library: firstly, it is unaesthetic – it makes books look uncared for. More seriously, a layer of dust can cause staining to the

head of the text block, and in older library collections one may find soot and tar from coal fires causing black staining which is almost impossible to remove. Apart from causing staining, dust can carry pollutants such as sulphur dioxide, which causes degradation of paper and leads to yellowing and loss of strength. Dust stains can also penetrate further into the book if the pages are distorted, for instance if the book has been exposed to high relative humidity. Dust is also hygroscopic: if the relative humidity is high the dust can become physically cemented to the paper and is very difficult to remove. If the edges of the text block have not been trimmed, this makes the removal of dust even more difficult. Abrasive dusts are likely to damage the surface of the paper in the course of being removed.

An extensive study carried out by the National Trust and the University of East Anglia (UEA) in 2000-05 revealed much about the deposition of dust in historic buildings, including historic libraries [1]. It was found that where the visitor route through a room is constrained by a rope barrier, for example, the rate of dust deposition on horizontal surfaces falls off rapidly away from the visitor route, so that 1m away from the visitors the rate is one quarter of that next to the route. It was also found that more dust was deposited where visitors turn or change direction. The vertical distribution of dust was also interesting. As might be expected, the rate of deposition decreased with height, with the largest particles being deposited near floor level, and smaller particles at greater heights. However, there was a sharp increase in deposition between about 50 and 120cm above floor level, which is believed to be caused by the friction of visitors' arms and legs detaching fibres from their clothes.

A further study was carried out by the National Trust, English Heritage and UEA specifically on dust in historic libraries [2]. This confirmed the previous findings regarding the effect of proximity of visitors to book shelves and the influence of the amount of movement on dust deposition. It also showed that the gap between the head of a book and the shelf above has a strong influence on the amount of dust deposited, and that the amount of dust deposited decreases from the spine to the

fore-edge. The effectiveness of "dust falls" – flaps of cloth or leather that cover the gap between a book shelf and the volumes below, and which are found in some historic libraries – in reducing the rate of deposition of dust was demonstrated. Clearly dust falls will be most effective where all the books on a shelf are the same height.

Similar effects are found in modern libraries such as the British Library. More fibres are deposited where there is greater staff activity; the amount of dust deposited is greater on lower shelves than on higher ones; and more dust is deposited towards the spines than the fore-edges of shelved books.

Measurement of dust deposition

For environmental studies regarding the effect of particulates on human health, it is important to measure the amount and size distribution of dust suspended in the air. For libraries and historic buildings, this is less important than measuring the rate at which dust is deposited on surfaces. Fortunately this means that comparatively simple and inexpensive equipment can be used for monitoring dust.

There are two main ways of collecting dust: either by trapping it on an adhesive surface (such as a white sticky label) or by collecting it on a glass slide (such as a microscope slide). The National Trust developed a very simple method of holding sticky labels by mounting them in a 35mm slide mount: this exposes a standard area of the adhesive surface and protects it from being touched by the fingers, and also provides a surface on which the location of the sampler can be recorded. Alternatively a glass microscope slide can be used; electrostatic attraction holds even large dust particles to the surface quite firmly. Glass slides can be very inconspicuous, but have the slight disadvantages that it is difficult to avoid finger marks round the edges and they are quite fragile.

There are also two main ways in which the amount of dust deposited can be measured. If glass slides are used, it is possible to measure the decrease in specular reflection that occurs as the surface is progressively covered with dust. This can be done with a simple apparatus consisting of a lamp and a photodetector arranged so that the beam of light from the lamp is reflected from the glass slide at 45° into the photodetector. A simple circuit then enables the decrease in intensity of the reflected light, or "loss of gloss", to be calculated, compared to a clean slide. The advantage of this technique is that it measures the effect of all the particles on the reflectance of the slide, including the very fine particles that cannot be seen with a microscope. The disadvantage is that it does not give us any information about the nature of the particles, their size or shape.

The other method of measuring the amount of dust deposited, which can be used with sticky samplers and glass slides, is to use a microscope attached to a digital camera, together with software that can count the number of dust particles per square millimetre and the fraction of the surface area that they cover. Clearly, this gives much more information about the nature of the dust, but it requires more expensive specialist equipment.



1. Dust samplers. © National Trust/Caroline Bendix

The earliest dust surveys were done using the “loss of gloss” meter developed by Stuart Adams [3]. A convenient unit for measuring the rate of deposition of dust was found to be a 1% decrease in reflectance after one week’s exposure – this was referred to as 1 Soiling Unit (SU). Later work was mostly done using the microscope and camera method, and again a 1% coverage of the surface of the slide in 1 week was found to be a convenient unit. Knight found that a 1% decrease in reflectance was not the same as 1% coverage of the surface: instead 1% coverage was equivalent to 2% loss of gloss. The reason for this was not clear but may be related to the geometry of the particles [4].

The results of the work carried out by the National Trust were mostly reported in units of reciprocal gigaseconds (Gs-1), this being the reciprocal of the theoretical time to obtain 100% coverage of the surface. 1Gs-1 corresponds approximately to 1% coverage in 4 months, so 1% coverage in 1 week is approximately 16Gs-1.

A dust survey can be a simple and inexpensive tool to determine the sources of dust in a library and which areas collect most dust. This enables resources to be targeted on those areas that require the most frequent cleaning and may enable mitigation measures to be put in place that will reduce the rate of dust accumulation.

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Monitoring Deposited Dust in The Old Library, Trinity College Dublin

by **Allyson Smith**¹, **Robbie Goodhue**, Geology Department, Trinity College Dublin
and **Susan Bioletti**, Library, Trinity College Dublin

Abstract

A study is currently being undertaken to characterise the accumulation rate, distribution, particle size, type and source of dust in the Old Library, Trinity College Dublin, in order to investigate its impact on the collection of more than 300,000 books and manuscripts held there. The majority (approximately 200,000 books, dating from 15th – 19th century) are held on open shelves in the Long Room and Gallery. As well as being a research facility, the Old Library is an exhibition space, and a major tourist attraction as home to a renowned medieval manuscript (the Book of Kells, c.800). It is open to the public seven days a week, almost year-round.

1. Site context

The campus of Trinity College Dublin is an island of over 40 acres, situated in the heart of the city (*fig. 1*). As such, it is surrounded by heavily trafficked roads and neighbours busy building sites as the urban landscape is continuously revised. The Old Library (c. 1712-1732) is the repository for the university library's treasures, one of the landmark buildings on campus, and a protected structure. The principal space is a double height room (Long Room and Gallery), located on the first and second floors of the three-storey purpose built structure. This space is approximately 65m in length with an estimated volume of 9000m³. Bookstacks in the Long Room and Gallery are arranged along the north and south side of the space, perpendicular to the external walls (*fig. 2*).

Almost half a million visitors pass through the Old Library annually, following a defined route. Visitors enter at ground floor level on the south side of the building (colonnades enclosed c.1890), visit the exhibition and gift shop on that level, arrive at the Long Room via the staircase in east pavilion (remodelled mid-1960's), walk around the Long Room (no public access to the Gallery), and return to the ground floor by descending the centrally located staircase (enlarged c.1990).

¹. Corresponding author.

Only a very small proportion of the collection is housed in environmentally controlled conditions, the majority rely on the 'passive' micro-environment within the building. Windows are single glazed timber framed, and are habitually opened during the warm summer months when visitor numbers peak. A double row of ropes separates visitors from bookstacks in the Long Room by at least 1.2m. The Long Room and Gallery are the daily workplaces for several people including preservation assistants, security guards and library staff.

2. Why study dust?

Apart from being visually undesirable [1. Lithgow *et al.*, 2005], dust is hazardous to cultural heritage as it can accelerate and complicate degradation [2. Brimblecombe *et al.*, 2009], and is a potential health hazard [3. Morawska & Salthammer, 2004]. Dust is a heterogeneous mixture of organic and inorganic matter. Its constituents are not necessarily separate or friable, and may have adhesive qualities. Particles

can be large or tiny, inert or reactive, benign or harmful. The mechanisms by which particulate matter accumulates mean that it can vary from sample to sample, and even from season to season within the same environment. Consequently, dust is challenging to characterise.

Due to the nature of the Old Library it would be impossible to eradicate all dust and create a 'clean room'. Therefore we must try to understand the dust:

Accumulation rate – can we establish how much dust is deposited during a certain period of time?

Distribution – is the same amount of dust deposited everywhere in the Old Library, or are there areas where there is less or more dust?

Particle size – are most of the deposited particles sub-micron, micron, or millimetre sized in diameter?

Particle type & source – can we assess where most of the particles come from i.e. the collection, visitors, the building, wider environment?



1. Trinity College Dublin, campus map (Old Library marked with a star).



2. Long Room and Gallery looking east.



3-4. Dusty books.

Particle deposition is the result of a complex interaction of physical and chemical processes, influenced by environmental variables. With regard to the Old Library, location within Long Room, Gallery, Attic or Colonnades, proximity to window or aisle, or gap between book head and overlying shelf may all be factors which influence dust accumulation. Surface texture and the presence of water (as vapour) may also play a part. Particle size has a considerable effect on particle deposition rates, and there is a relationship between increasing deposition velocity and increasing particle diameter [4. Christoforou *et al.*, 1993]. Air velocity adjacent to surfaces and the temperature difference between a surface and the adjacent air are important factors governing the deposition rate of fine particles [5. Nazaroff *et al.*, 1990]. Coarse particles (>10µm) settle onto horizontal surfaces under the influence of gravity, while fine particles (such as elemental carbon produced in combustion systems) are capable of depositing onto vertical surfaces by diffusion and thermophoresis [6. Salmon *et al.*, 2004].

In 2003 the Department of Preservation and Conservation initiated investigations into the high levels of dust on the collections in the Old Library to determine whether it constituted a risk to the preservation of the collection or to staff handling the collection, and if the source of the dust could be readily identified. As the entire collection was affected and the soiling impacted anyone handling or using the collection, a complete clean of the books was overdue and essential (*fig. 3-4*). After a 12 month trial preservation project, fundraising under the banner 'Save the treasures of the Old Library' was launched in 2005. This project aims to remove the dust from books and shelves, to provide minor repairs to bindings, and to record the condition, structure and treatment of each volume in a database. The work is carried out by teams of preservation assistants, who are trained and supervised by a conservator. With the estimated cost of the project

at 2 million, a thorough investigation of the particulate pollution levels in the Old Library was required.

Existing dust samples were analyzed using XRD (x-ray diffraction) by the Geology Department, TCD. Macroscopic particles were also separated visually. The results indicated that:

- sources of the dust on the collection come from both inside and outside the structure;
- there was a significant amount of coarse inorganic particles on the collection;
- a significant portion of the dust was products of the collection such as leather, resin, wax and paper – this suggested that the collection was decaying;
- some constituents of the dust are hazardous to library collections.

These findings heightened interest in the college community about preserving the collection for the future. At this point it was considered important to bring the issues of the collection to a wider audience, and to participate on the international platform of the Cost D42 initiative as a way of benefitting from and participating in a wider dialogue on a little studied area of heritage preservation. Cost D42 was a European initiative (2007-2010) with the main objective of studying chemical interactions between cultural artefacts and the indoor environmental conditions, through field studies and laboratory experiments and to translate the results into preventive conservation practice. Local support from the Library and the Geology Department made it possible to create a PhD project (commenced Spring 2009) focussed on particulate pollution in the Old Library in order to address issues of soiling, damage and monitoring in depth. This project is concerned primarily with contemporary dust, as the existing dust is being removed through the 'Save the Treasures of the Old Library' programme. Through characterisation, assessments may be made as to how Old Library dust might age, and historic damage patterns seen in the collection may be better understood.

3. Monitoring dust accumulation

3.1 Method: 'Loss of gloss' technique

There is no widely recognized or standard method for dust monitoring in museums or historic properties. Ease of use, cost effectiveness and portability were among our requirements. These were fulfilled by the 'loss of gloss' technique, which uses a standard glass microscope slide as a dust collector. The concept of dust soiling a glossy surface and its subsequent measurement using a standard 45° angle dust meter was published by Brooks & Schwar [7. Brooks & Schwar, 1987]. Schwar went on to develop the technique [8. Schwar, 1994], and Adams later published a modification of the technique [9. Adams, 1997]. The dustiness of the slide after exposure for the desired period is quantified by measuring the reduction in surface reflectance relative to a clean unexposed slide. The instrument for measuring the reduction in reflectance has a light source, one or more detectors, and digital display of gloss level. The device is calibrated using a base-plate of known reflectivity and 'zero-reflectance' standard. A Novo-Gloss Trio by Rhopoint Instruments – with detectors at 20°, 60° and 85° angles – was used. The 60° angle was regarded as the reference angle, and the reflectance measurements generated by the instrument as 'gloss units' (GU) have been used here (*fig. 5*).

All glass slides are cleaned with acetone, and the clean measurements recorded at the beginning of the sampling period. At the 60° angle, the Novo-Gloss Trio measures an elliptical area of approximately 157mm² on a glass slide. A template was made to facilitate the measurement of the same ellipse when the slide is clean and dirty, thereby reducing operator error and allowing clean and dirty measurements for each slide to be directly comparable. These 'differences' were used to assess and compare soiling in our experiments. Prior to use, a study was carried out to assess instrument precision. Results were within the specifications outlined by the manufacturer.

The use of glass microscope slides has several advantages. They are widely available, inexpensive, well characterised, easy to handle and inconspicuous when in situ. However, glass slides are not directly comparable to the objects in the Old Library, therefore measurements obtained may only be suitable for qualitative interpretation unless relationships to real surfaces can be demonstrated. There are significant unknown factors in



5. Novo-Gloss Trio by Rhopoint Instruments.

passive sampling. Dust deposition is not necessarily linear and it is easy to imagine how losses from a glass slide dust collector could occur. Furthermore, the relationship between water vapour (humidity) and particle attraction/repulsion/retention is complex and little understood, as is the thermal discrepancy between the glass slide and object studied. Comparison of acquired data with other similar studies is not straightforward as local conditions and materials will vary, as might sampling period and instrument used for measuring reflectance.

3.2 Experiment 1: general soiling patterns

Preliminary studies indicated that particulate deposition appeared to be greater at Gallery level than at Long Room level, and that there tended to be greater deposition levels in the area of the centrally located staircase. Based on this, an experiment was designed to:

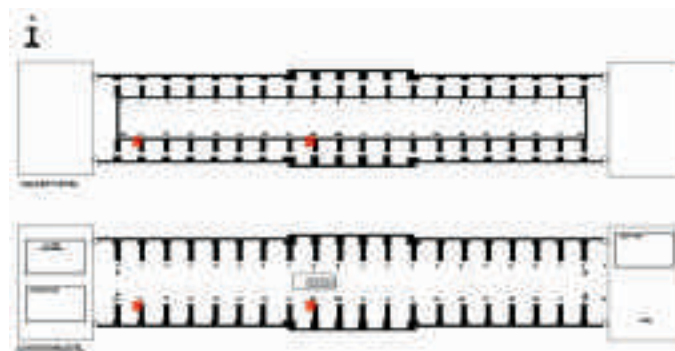
1. compare soiling between the centre and west sides of the Long Room and Gallery;
2. examine if there were seasonal differences in soiling;
3. assess if there was a difference in dust distribution over a defined vertical range.

Four dust collection sites were selected: two in the Long Room (LRI, LRII) and two in the Gallery (GI, GII). All sites were on the south side of the room, and those in the Gallery were directly overhead those in the Long Room (*fig. 6*). A purpose built stand with shelves at 10cm intervals was made for each collection site and all stands were attached to existing bookstacks (*fig. 11*).

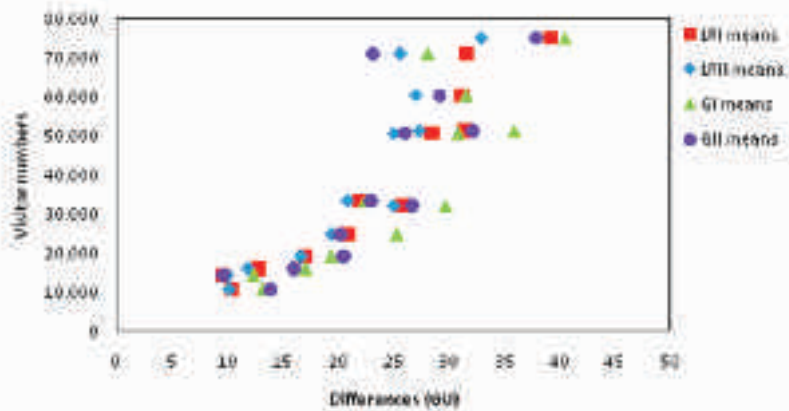
In the Long Room, stands had a vertical range of 0m (floor level) to 2m, and were located approximately 1.2m from the visitor route and 3m from the nearest window. Due to the Gallery balustrade, stands in these upper locations had a vertical range of 1.2m above floor level to 2.1m, and were approximately 2.4m from the nearest window. Each shelf held one glass slide which was measured every 31 days (monthly), and one glass slide which was measured at the end of the sampling period (duration). Other dust collectors were trialled but will not be discussed here. The sampling period was from 03 August 2009 to 10 August 2010.

Results:

1. In general terms, soiling was greater in the centre of the room than in the west, and soiling in the Gallery locations was greater than Long Room locations. The centre Gallery location (GI) had the highest overall average deposition in 8 out



6. Location of dust collectors (Experiment 1).



7. Visitor numbers plotted against mean differences (Experiment 1).

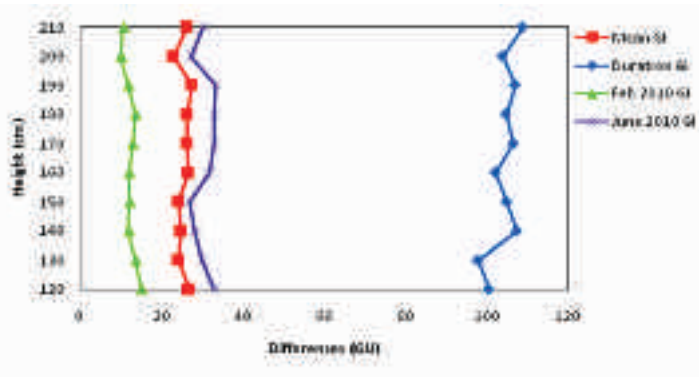
of 12 months. With regard to the slides exposed for the duration of the sampling period, the centre Gallery location was the most soiled of the four, and west Long Room (LR11) was the least soiled. 'Loss of gloss' measurements were not linear. It appears that the instrument measurement is not linear, and soiling is not linear, and we have not yet been able to dissociate the two. The sum of twelve monthly measurements was not equal to the single measurement of the duration slide. In fact, the sum of monthly averages was approximately three times the duration average for each location.

- When average deposition for each location was plotted against the months, all are highest during Aug/Sept and drop down to the lowest recording in Dec/Jan, then pick back up in Feb. When average deposition for each location was then plotted against visitor numbers the strong relationship suggested that this variable was highly influential (fig. 7). Large visitor numbers, the summer months, and increased ventilation are all closely connected in the Old Library. It is impossible to single out one as the main cause of increased soiling.
- In order to examine vertical distribution of dust deposition, the data for all months was averaged by height. Vertical distribution may display some interesting local trends, but averaged vertical distribution for 12 months shows none (fig. 8).

3.3 Experiment 2: a closer look at soiling patterns

A follow up experiment broadened the area examined and was designed to:

- compare soiling between locked storage areas and public areas;



8. Differences over a vertical range (Experiment 1).

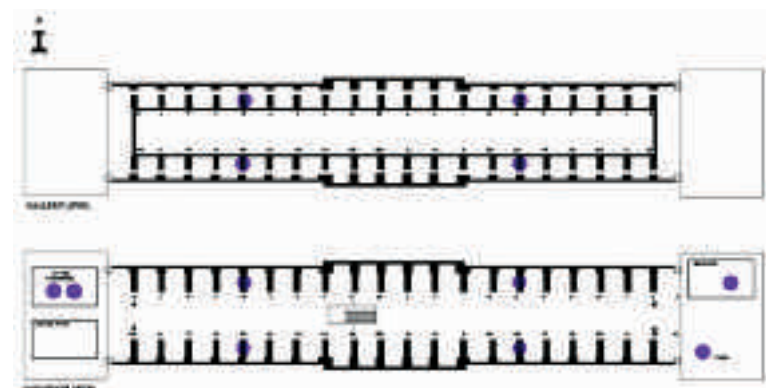
- assess if there is a difference in soiling between either end of the same shelf;
- assess if there is a difference in soiling from front to back of shelf;
- identify soiling 'hot spots'.

Sampling locations included the East Attic, Upper Colonnades, Lower Colonnades (locked bookstacks with limited staff access); the Fagel cage (locked bookstack and workspace of preservation assistants), four sites in the Gallery (limited staff access); and four sites in Long Room (public space) (fig. 9).

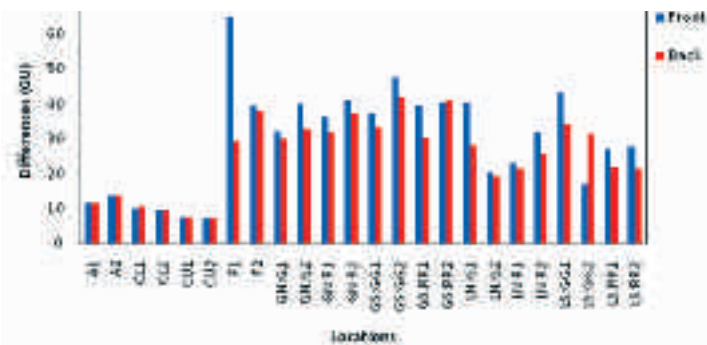
Book shaped boxes (book blocks) were fabricated to imitate the dimensions of the volumes temporarily removed from shelves to accommodate the experiment (fig. 12). The heights and depths of all shelves were considered. A pair of book blocks was placed at each sampling location, at either end of the shelf. At the front and back of each book block were a glass slide which was measured every 31 days (monthly), and a glass slide which was measured at the end of the sampling period (duration). Other dust collectors were trialled but will not be discussed here. A data logger measuring ambient temperature and relative humidity was also placed at each location. The sampling period was from 10 June to 13 December 2010.

Results:

- As may be expected, the locked bookstacks with limited staff access (i.e. enclosed areas with the least human activity) had the lowest soiling. Soiling from highest to lowest was: Fagel cage, Gallery, Long Room, Attic, Lower Colonnades and Upper Colonnades. In areas where there is day to day human activity, there appears to be a drop off in soiling from July to December. When monthly and six monthly averages are compared, the pattern is almost identical. Therefore it is reasonable to conclude that monthly averages provide a good indication of a longer term average for the same locations.
- Where there was little soiling, location on shelf made no difference. In areas where soiling was high, the end of a shelf closest to human activity was consistently more soiled than a more sheltered end, even if that end was in proximity to a (closed) window.
- In general terms, over a six month period the front of a shelf was more soiled than the back. However where there was little soiling no significant difference was observed (fig. 10). The gap to overlying shelf and how the shelf is packed appears to be influential. A large gap and a loosely packed



9. Location of dust collectors (Experiment 2).



10. Differences after 6 month period (Experiment 2).



11. Shelves (Experiment 1).



12. Book block (Experiment 2).

shelf provide more available surfaces for deposition than a small gap and a tightly packed shelf.

4. Over the longer period of 6 months, it seems that the east end of the Long Room close to the walkway is a dust hot spot, as considerable differences have been recorded here. The passageway area of the Gallery, both north and south sides also seem to be soiling hot spots. All of these locations are associated with regular staff or visitor activity, however it cannot be assumed that the same deposition patterns are at play in all locations.

4. Conclusions

An understanding of dust in the Old Library will inform the preservation requirements of the collection, and allow a reasonable prediction of the useful lifespan of books stored on open shelving in a working library that is almost 300 years old. It is both expensive and damaging to the collection to maintain a continuous programme of cleaning.

For the foreseeable future, the 'passive' microclimate which exists in the Old Library will remain unchanged. Based on our research to date, we can be confident that dust would continue to accumulate even if the building were to be closed to visitors, as it would penetrate through leaky windows and be generated from the inevitable degradation of interior finishes and the collection itself.

While there are inherent limitations to the 'Loss of gloss' technique and the use of glass slides, there are valid and persuasive advantages. One of which is its portability, allowing many measurements to be made at many sampling locations. The data presented in this paper is based on 2718 individual measurements at sixteen locations within the building.

Our research has demonstrated that soiling from dust deposition varies throughout the year and varies greatly within the building. This has allowed us to identify dust hot spots. Analysis of data from the experiments described above is ongoing as characterisation of dust with instrumental analysis is carried out. The existence of different types of dust in different areas is being studied. Data from dust collectors other than glass slides is also being assessed and possible correlations are being tested.

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When the Dust Settles: Dust Monitoring in Exhibitions at the Victoria and Albert Museum

by **Bhaves Shah**, Assistant Scientist, V&A,
Susana Hunter, Textiles Conservator, V&A
Stuart Adams, Adams Dust Monitoring Service
Anne Bancroft ACR, Senior Book and Paper Conservator, V&A
and **Val Blyth ACR**, Senior Preventive Conservator, V&A

The Victoria and Albert Museum (V&A) has a history of monitoring the deposition of dust in locations throughout the Museum since 1996, starting with a monitoring exercise conducted at the former Theatre Museum at Covent Garden (1996, Ford 1997) and followed up by a year long study throughout the main South Kensington site during 1996-1997. Several other dust monitoring exercises have since been completed, including monitoring the 2003 'blockbuster' Versace exhibition in the main exhibition courts

of the V&A (Galleries 38, 39 and the North Court). The "Diaghilev and the Golden Age of the Ballets Russes, 1909-1929" exhibition (Diaghilev, 29 September 2010 – 9 January 2011) showcased over 150 objects from the unrivalled V&A Theatre & Performance collection of Ballets Russes material. Costumes, two large theatre curtains, paintings, designs, 3D models, film footage, musical

scores aimed to portray the unique artistic leadership of Serge Diaghilev, and the legacy and influence of the Ballets Russes to the world performance art. The exhibition design was to maintain a character of 'performance', a sense of 'immediacy' beyond the regular constraints of display cases. The curatorial brief to place 37 costumes on open display (including some loaned costumes) challenged conservation practice. There was a real need to influence the exhibition design, as concerns were raised over the lasting damage of dust particulate deposition, and the risks of cleaning treatments. Dust deposition needed to be managed, primarily for the safe keeping of the collection, and secondly to enhance the visitors experience allowing them to be duly inspired.

The method employed for measuring dust deposition, developed by Schwar (1994) and modified by Adams (1997), measures a reduction in gloss of a shiny surface and is given the term 'soiling'. Clean, labelled glass microscope slides are ex-

posed for one week. The slides are measured for loss of surface gloss and the results are then expressed as "soiling units per week", i.e. a 1% reduction in gloss is equivalent to 1 soiling unit per week. Error is given to 1 soiling unit per week.

For museum collections the accumulation of dust can cause collection care concerns as dust can provide nutrients for fungal and pest/insect activity. When dust is left to settle it can accelerate biological, chemical and physical deterioration of objects

(Brimblecombe, 2010). The rate at which the dust 'cements' onto objects depends on the amount of ambient humidity as well as how hygroscopic the dust and the object are. Depending on how long dust is left on an object as well as the type of dust, dust may remain imbedded between fibres and/or bonded to surfaces. In addition to a loss of gloss the object surfaces covered by dust can become corroded

and discoloured. It is not possible to totally remove all dust from an object. For conservation staff, the risk of 'imbedded' dust particulates on the objects constitutes a special challenge, as these can be abrasive on the surface of an object, as well as being very time-consuming and difficult to reduce or remove. The cleaning routines and prolonged mechanical actions required to reduce dust put objects at risk and can cause irreversible damage and loss of original material. The time and cost on Museum staff and resources can add up to many person-hours of work per year. The object's characteristics are paramount in determining whether an Open display situation may be viable. *The V&A Environmental Guideline 2006* points out "airborne dust and dirt may cause damage to some objects either because they are inherently fragile or because of the inability to remove dirt without causing damage during the cleaning process" and recognises some of the following objects that are particularly at risk:



1. The Diaghilev exhibition, Gallery 39. Photography by P. Kelleher. © V&A images

Inherently fragile material	Fragile /original decorative surfaces
Textiles particularly costume, silk carpets. Original and early upholstered furniture. Animal derivatives; fur, feathers, hide. Waxes.	Painted furniture. Sculpture. Painted textiles. Manuscripts. Decorated leather. Friable media on paper, e.g. charcoal, pastel.

Table 1. V&A Guidelines for the Environmental Control of Objects on Display in FuturePlan, 2006.

Dust particulates deposited on museum objects typically consist of two kinds; fibrous particulates (from the visitors and their clothing and from the objects themselves) and non-fibrous airborne particulates (skin, soil, building dust, grit, salt, insect fragments, pollen, pollutants). Size of the dust particle will determine the rate at which it settles, smaller particles generally take longer to settle and further away from the source. Dust will be organic or inorganic, acidic, neutral or alkaline and might react with an object depending on the object material. As visitors' comments have shown, the public paying for popular temporary exhibitions find unsightly levels of dust detracting to their experience. High levels of dust can change the perception of an exhibition, and of the institution. For the appreciation of an object, assuming dust deposition is cumulative without any cleaning, the reduction of gloss will be in the order of 10% in a typical 15 week exhibition at 1 soiling units per week. At 5 soiling units per weeks the loss of gloss will be in the order of 50%. Dust is also potentially a health hazard. Whilst the best way to preserve museum objects on display is to place them inside well-built and well-sealed display cases, this can be unsustainable on many exhibition budgets and casing objects could also have an impact on the curatorial aims of the display.

Strategy to reduce dust deposition rates

In order to reduce dust deposition it is important to know the factors that increase its rate. The following (non-comprehensive) list has an impact on dust deposition rates:

- Seasonal: The number of visitors. Fibres from visitors, the skin and hair. The clothing of visitors (heavy, fibrous and woollen clothes worn in winter). Environmental factors such as humidity and temperature. The deposition of salt, insect debris and pollen are seasonal effects which may be observed.
- Design: Overall exhibition layout, visitors 'flow', display height of object, barriers and distance between visitors and displays. Distance from entrance and exits. Time visitors spend in front of a display (due to film screens, benches, route layout). Volume of space overhead and the ceiling height.
- Building management: There are three types of gallery environment; open to the atmosphere, air handled (10% air change) and air conditioned. Air flow of the gallery space. Air movement systems can generate their own positive air pressure, creating a barrier of blown air. The air filtration system employed and its efficiency over a range of particle sizes. Effects of building activities in the museum. Cleaning programmes.

Dust deposition rates as grouped by Adams and Ford (1999) have served as parameters to gauge the efficiency of these strategies:

Less than 1 soiling unit per week in cases.
Typically 2-3 soiling units per week in the galleries.
Typically 3-5 soiling units per week in locations up to 4 meters away from entrances and exits.

Table 2. Typical dust deposition rates measured by Adams and Ford, 1999.

In a wider museum context the planned refurbishment of galleries throughout the Museum, known as FuturePlan, has been a challenge to manage the dust generated from the wide ranging building activities being carried out. Areas where building activities are to be carried out are hoarded off and kept, as much as possible, separate from the general museum environment. Subsequent improvements to hoardings over the last few years have saved resources and the containment of dust during refurbishment programmes. The surface cleaning of dust has historically fallen to trained Museum staff. This has been offset by a recent initiative where gallery assistants have volunteered for training, and in their own time begun a programme of helping to clean sculptures. This will be reviewed this year and may extend to some work on reproduction textiles. The British Galleries at the V&A have a high number of textiles on open display and again there is little time for either assistant curators in charge of the galleries to perform surface cleaning tasks or for textile conservators. Over the last three years, the V&A Preventive Conservator has been training interns and students to carry out summer placements where selected textiles are inspected for insect activity and surface cleaned. The build-up of dust in floor voids is thought to harbour insects which are a threat to woollen textiles; the British Galleries have a high number woollen tapestries and carpets. The Preventive Conservator works with the Word and Image Department (WID) and Book conservation (BKC) where other book cleaning projects have been organised in direct response to the spread of dust from FuturePlan projects. BKC and WID run annual cleaning programme which works with conservation students from Camberwell College of Arts.



2. Staff cleaning a tapestry object. Photography by V. Blyth. © V&A images



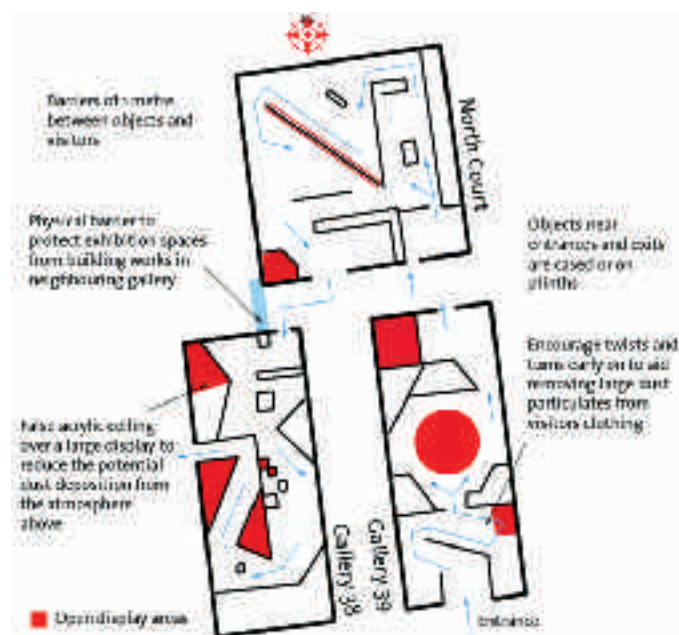
3. Example of dust protection to manage the effects of building activities. Photography by V. Blyth. © V&A images

Exhibition courts at the V&A

The Diaghilev exhibition offered the opportunity to re-access existing strategies for the management of dust deposition on objects on open display in temporary exhibitions. With 37 costumes out of a total of 70 costumes on open display, it was important to establish a combination of practical measures which would protect the costumes, be well integrated into the design and not be obtrusive or disrupt the visitor enjoyment of the exhibits. The exhibition had successfully to convey a very so-

phisticated curatorial brief. A dust monitoring exercise during the Maharaja exhibition (“Maharajah – The Splendour of India’s Royal Court”, 10th October 2009 to 17th January 2010) provided us with initial recommendations which were developed further for the Diaghilev exhibition. From the early stages of exhibition planning conservation worked together with the design team, curatorial staff and the exhibitions department. This was to influence the exhibition design and to implement strategies that would aid the reduction of dust deposition. Weekly monitoring was carried out throughout the exhibition period in order to survey the effectiveness of the measures implemented, but also identify unforeseen ‘problem areas’. The design layout needed to allow for easy access to carry out surface cleaning sessions before Museum opening hours. All the galleries have an air conditioning system installed, to control the gallery temperature and relative humidity. An air filtration system consisting of primary and secondary filters (known as ‘box and bag’) is also installed. These filter an approximately 95% efficiency at 1micron and are changed every three to six months. The strategies implemented in the Diaghilev exhibition are summarised below:

- Objects near entrances and exits are cased or on plinths.
- Twists and turns are encouraged early on to aid the removal of large dust particles from visitors clothing.
- A minimum one metre distance between objects and visitors was maintained.
- One metre high solid barriers are used to shield some vulnerable objects from dust and people.
- A false ceiling (approx 3m high) reduces the height above a display with the aim to minimize the potential dust deposition from the atmosphere above.
- Access to adjacent area of building activity is blocked.
- A continued communication between conservation and object handling staff, event’s organisers and contracted cleaning staff.



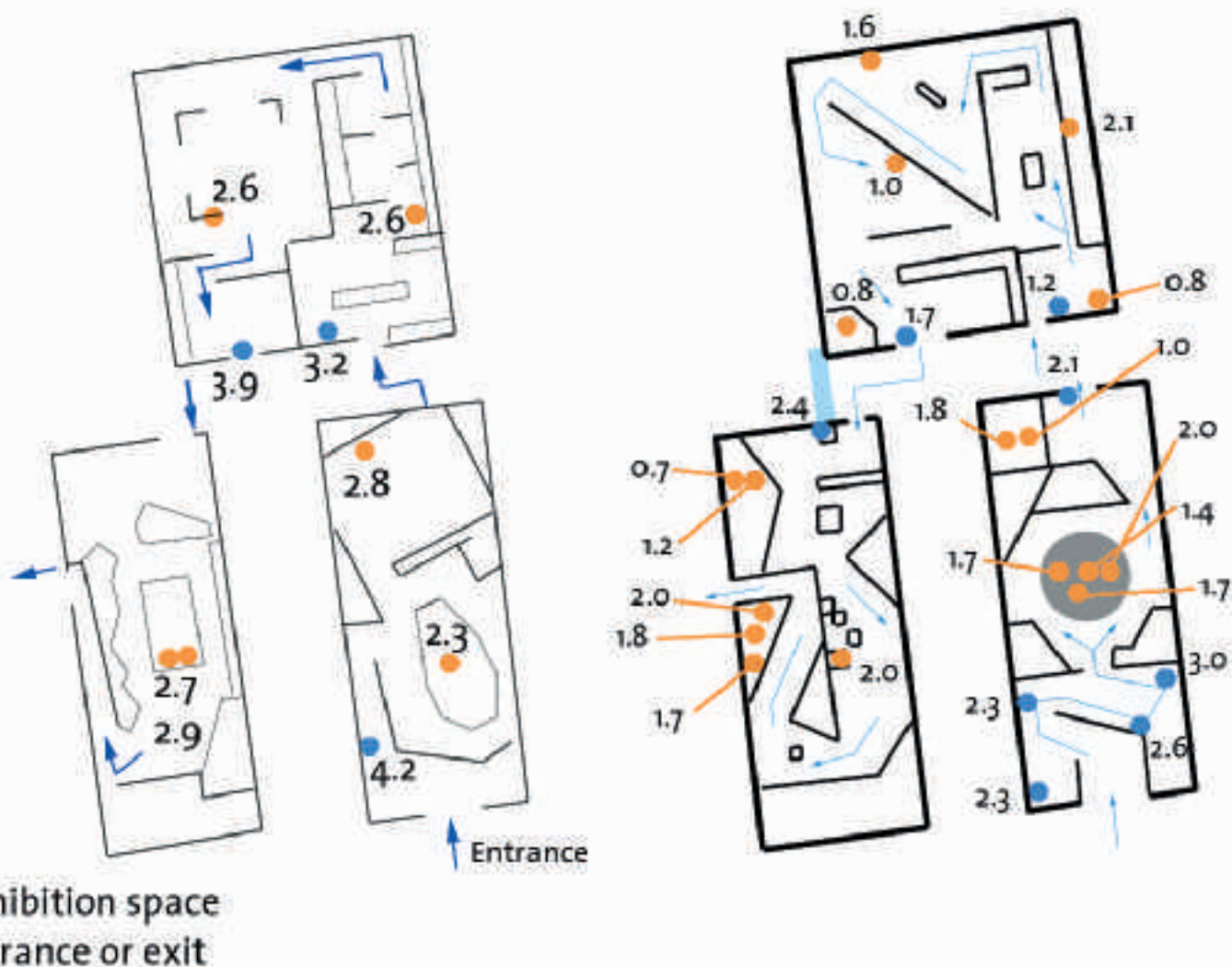
4. Measures implemented in Diaghilev to reduce dust deposition. The areas marked red correspond to the objects on open display.



5. Gallery 39, Rite of Spring tiered display. Objects are on open display. Photography by B. Shah. © V&A images



6. Gallery 39, Rite of Spring. Surface cleaning sessions 5 and 10 weeks into the exhibition period. Photography by B. Shah. © V&A images



7. Maharaja and Diaghilev gallery plans; indicating average weekly soiling units (su wk.) per location.

Results

Figure 7 shows that the dust deposition values recorded between the two exhibitions have been reduced. From visitor responses to Diaghilev, there had not been a mention of any visual obstruction due to the practical measures to reduce dust deposition; such as distance from displays, barriers and false ceilings. In general, the values obtained from the dust monitoring exercises in the exhibition courts have been within the expected values for the V&A, see Table 2. Although the values may not always correlate to the observations made by conservators who have the opportunity to examine objects and gallery voids more closely, they nevertheless lead a course of action to manage dust deposition within Museum temporary exhibitions. Budgetary constraints or design specifications may limit the number of cased objects. Despite the implementation of successful strategic measures to reduce dust deposition for objects on open display, surface cleaning sessions during the course of an exhibition will still need to be scheduled. Conservator's and technical services resources need to be evaluated (i.e. time and cost for weekly monitoring, time and cost

surface cleaning sessions during and after exhibition periods, time and cost for additional conservation work). Conservation treatments may be put at risk if the object is not protected, e.g. inside a case. The monitoring and reduction of dust particulates deposition will always have an element of unpredictability. The visitor figures are a significant factor. Diaghilev was not considered a potential 'blockbuster' and with 37 costumes on open display, this was a clear advantage (in comparison 168,000 people came to see the V&A Versace exhibition in 1999 and exhibits were surface cleaned every two weeks). The Diaghilev dust averages obtained could have been different had the exhibition received a higher visitor attendance (115,000 visitors were received over a 16 week period and 197,000 visits were recorded during the 15 week Maharaja exhibition). Where and how the exhibits are placed is important. The object's condition and vulnerability are the first considerations when planning for an open display situation. The repeated action of cleaning, and the detrimental effects of such treatment forbids very vulnerable objects being placed on open display.

Summary

We have shown how a number of strategies can be used in combination to protect objects. Exhibition entrances and exits are generally areas that are the main concern, particularly when an active programme of building activities is being carried out (e.g. V&A FuturePlan). Measures should be taken to shield entrances and exits from particulates generated during building activities, even when the activities are taking place quite far away from the exhibition. Where visitors congregate, such as in front of audio visual equipment (AV's), such as large screens and monitors, is an area for further research.

General trends were observed:

- The communication between all parties and input from conservation at the planning stages provided a successful result.
- Distance from public – increasing the distance, decreases the dust deposition.
- Distance from entrances and exits – increasing the distance, decreases dust deposition.
- When maintaining distance is problematic solid barriers can assist decrease dust deposition.
- False ceilings in combination with distance and/or the use of barriers between visitor and exhibits assist decreasing deposition.
- Raising objects from the floor level and not to place objects on the floor. "Dust mobilized by people's feet rarely rises above 0.3 m above the ground" (Rendell, 2010). Dust deposition

was noted not to be significantly different at different heights but past studies have shown deposition peaks at a person's waist height (0.8 to 1m high).

- Even with all the measures considered and implemented, unexpected dust deposition can still occur. It is recommended to be vigilant, and to survey the exhibition after the opening date to identify local 'problem' areas.

Further measures and actions which can be investigated and applied for a better management of dust deposition:

- To plan for a 1m to 1.5m distance between exhibits and visitors, especially where visitors can congregate around AV's.
- To use 'sticky dust mats' at entrances, currently used in storage and select exhibitions.
- If carpet is to be used leading to or in an exhibition space it should be a synthetic and cleaned daily.
- To continue to improve the cleaning programme for objects on open display.
- To encourage visitors to remove their outer clothing prior entry to the exhibitions spaces.
- The use of air movement systems to create positive air pressure inside a gallery space as a barrier.
- To re-evaluate the filtering capability of the air filtration system.

The results have shown the strategies implemented can contribute to lower levels of dust deposition. These strategies will now be presented for assimilation into care of collections and in response to the V&A mandate of accessibility. Visitor comments to Diaghilev have shown that these can be incorporated without affecting the visitor's enjoyment of the exhibition.

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Preservation in an Italian Library: Mantova, Biblioteca Teresiana

by **Carlo Federici**, Professor of conservation of library and documentary materials, Università Ca' Foscari, Venezia, and **Cesare Guerra**, Director, Teresiana Library, Mantova

Abstract

During the renovation works of the Teresiana Library of Mantua - started on March 2008 and ended with the reopening to the public in 2011 - we wanted to give special emphasis to issues of preservation of book materials. In this article, these aspects are briefly given account of.

A. The Library and its history

The Teresiana Library of Mantua is the historic library of the city. It was built by Maria Theresa of Austria (1717-1780) and was part of a broader program for schools and university reforms in Mantua and Lombardo-Veneto. The library opened to the public on the 30th March of 1780.

The library was developed originally in the two large rooms of the Jesuit College - now called "Sale Teresiane", Teresian Rooms - in the Society of Jesus Palace.

From an administrative point of view, the library became State Library in 1866 when Mantua became part of the Kingdom of Italy. A few years later, in 1881, thanks to a Central Government proposal, it was acquired by the Municipality thus becoming the city's public library.

Upon the main rooms shelves, since their creation, came together many private religious and monastic libraries of great historical, bibliographical, literary and scientific value. The printed volumes dating from the sixteenth to the nineteenth century were placed in the two Teresian Rooms and organized by format, while the manuscripts and incunabula were put in order in other separate rooms: today they are preserved in a manuscripts and rare books repository

B. The renovation

In the late seventies and early eighties of last century, many reasons led the City Council to seek new solutions: the sudden and exponential growth of the library's users number; structural problems of the building including a lack of new reading rooms and space to store books and, finally, the need for structural upgrading of the building in order to provide the new services that computer technology implied.

Two actions were essentially undertaken, although at different times. The first led to the opening, in December 1998, of a new modern multimedia library, the "Cultural Centre Gino Baratta".



1. First Teresian Room after restoration.



2. System of air treatment.

The second action was the beginning of the restoration of the Teresiana Library as the Mantova Conservation and Research Library.

C. Work schedule

The following main lines of action were developed around:

- 1) The restoration of the eighteenth-century wooden shelves of the two "Teresian Rooms";
- 2) The installation of new technological systems in the public rooms and in the stores such as air conditioning and air treatment. The system achieves the air filtering and renewing with an injection of air according to the standard values of temperature and relative humidity. These values are controlled by the central station. The system supplies the study room of the central gallery and the storehouse on the first floor.
- 3) The upgrading of the air conditioning system from the basement storehouse in order to re-establish the relative humidity values within the parameters of acceptable standard;
- 4) The installation of a lighting system and a fire-fighting service with safety system in the library's storehouse. In the two Teresian Rooms and in the rare books repository, the system only works to monitor the alarm because the too important capacity of the room does not allow an automatic switching off.
- 5) The anti-theft system uses RFID (Radio Frequency Identification) and is integrated into the management of books in SBN (National Library Service);
- 6) The users' identification through the recognition of CRS card (Regional Services Card);
- 7) The implementation of a wireless access;
- 8) The introduction of compact shelves in order to increase the capacity of the library. The library will be able to store new collections needed for the reading rooms;
- 9) The library furniture and the books display in the reading rooms.

D. The restoration of the wooden shelves

The historical value of the monumental Teresian Rooms relies on their being designed for the original library in Mantua.

The recent restoration work of the rooms' wooden shelves was preceded by preliminary survey about the state of conservation of the scaffolding. Different points were studied: the surface degradation due to the multiple coats of paint over the time, the surface oxydation due to infiltration of water and exposure to sunlight; the deterioration of the structure due to the waste and the settling action of scaffolding and balustrades. These surveys revealed several mistakes in the shelves strips, a slight deformation of shelves and uprights; several galleries have to be reinforced and there is a need for further interventions on the doors ironworks.

Several general factors, preservation considerations, practical aspects of restoration and consolidation of the wooden shelves, drove to the necessity of taking out all the books from both the Rooms. The immediate availability of the adjoining



3-4. Second Teresian Room during and after restoration.

Gallery - clear of any furnishings - encouraged this choice and allowed to reposition the 44 thousand antique volumes of the two Rooms inside four metal shelves, meeting the topographic order. The restoration and consolidation of the wooden shelves then continued for a year. In this period some maintenance was carried out on the old books.

The restoration of the wooden components involved several activities: the removal of dust and fragments deposit with a vacuum cleaner, the cleaning of surfaces with surface-active mixtures, the woodworm treatments with non-toxic insecticides. The balustrades were consolidated by the application of metal brackets bonded at the base of the balustrades and the floor.

E. Preservation interventions on ancient books

As mentioned before, maintenance works on the 44 thousand volumes located in the two Teresian Rooms were scheduled to be done during the restoration of the shelves.

In the light of subsequent considerations and thanks to the opportunity offered by the collaboration with the Villa Manin School for Paper Restorers, in Friuli Venezia Giulia Region, the whole operation was more important than foreseen and was connected to the preservation mission of the library. In Mantua, then, we had been able to apply perfectly the Ar-

ticle 29 of the Italian Cultural Heritage Code which states that “[t]he preservation of cultural heritage is ensured by coherent, coordinated and planned activities of study, prevention, maintenance and restoration”.

E.1 The study in the first place

The environmental survey carried out by installing a monitoring system of the microclimate conditions in the library is definitely part of the study.

Thermo-hygrometres were disseminated in different rooms of the library. Besides a display that allows the reading of temperature (T) and relative humidity (RH) in real time, they have a memory able to store about 4000 data. They were programmed to record hourly values of T and RH.

This, besides allowing the control of the situation in all the old books storage rooms, permitted us to check that the environmental parameters showed no significant problems and that the answer was reasonably good, despite the Mantuan climate (not ideal for the preservation of archives and library materials: it is not unusual to record, for weeks, a relative humidity between 70 and 95%). We should keep in mind that the environmental measures occurred in absence of air conditioning and so that the thermohygrometric inertia of the library is due mainly to the eighteenth century architectural structure of the building.

E.2 Maintenance

The most relevant interventions in maintenance were disinfection and dusting. As mentioned above, the 44 thousand volumes were transferred and displayed in four metal shelves located inside the Central Gallery, which are 70 meters long and 6 meters wide.

Disinfestation

For the disinfestation, the shelves containing the books were wrapped in polyethylene sheeting and appropriate measures

were taken to reduce the risk of accidental holes in the sheets. The sheets were then sealed through thermofusion. To kill the insects, it was decided to disinfest by modifying the atmosphere, the method allowing total elimination of the bugs without ambient risk (the same air of the premises in which the oxygen level is brought from 20 to 0.1 - 0.2% is used) or chemical risk for the books and documents.

Basically, the pest control was carried out by placing taps at the two ends of the big sacks wrapping the bookshelves. The first tap was used for the entrance of air at a low oxygen level (i.e., nitrogen 99.9%), the second tap, once the plastic sac full, was used to expel the gas whose composition was analyzed by an oxymeter. When the level of oxygen was less than 0.2%, the taps were closed leaving the books in that condition for at least five weeks; this is enough to obtain the elimination of the bugs at their various stages of life (eggs, larvae, pupae, adult insects).

To add security, all along the treatment, it was decided to maintain the oximetry monitoring in adding nitrogen in the bags because of their large volume.

Dusting

The dusting of the volumes was carried out together with their repositioning in Teresian Rooms with a soft brush connected to vacuum cleaners equipped with HEPA filters able to block the particles that make up the atmosphere. The dusting was applied to the outside of the plates bindings and the three edges with particular care to the top one on which most dust is deposited such as hinges, headcaps and headbands.

E.3 The conservation survey

Finally, an identification was made of all the damages which occurred to each of the 44 thousand volumes, following two phases. In the first phase, the volumes with altered binding and structure were identified.

The “binding survey” was subdivided in two sections, the cover and the structure (cords and sewing), evaluating any damage on three levels: from 1 (little damage) to 3 (significant damage). Then, the paper survey was articulated according to the origin of the damage: chemical or mechanical. And in this case too, the seriousness of the damage was evaluated from 1 to 3.

This first phase of the survey gives us the opportunity to see that less than one third of the Teresian Rooms volumes presented conservation problems. The possibility of some subsisting more severe damages is very rare. On the other hand, there are many cases of chemical degradation on the paper sheets, associated with serious problems in the whole binding.

Among the 44 thousand volumes considered, 22% present minor damages, while 5% show serious alteration (only one level 3 parameter). In the other hand, 1% of the collection present severe damages (i.e. two or more indicators of level 3).

The second phase of the survey relies on the cooperation between the Library and the Villa Manin School for Book Conservators. Two students from the School are currently writing their thesis about the storage conditions and the state of deterioration of the books in the Teresiana Library. The results of these researches, still ongoing, are scheduled for the 2011 summer. They will be disseminated in a large way.



5. Treatment by anoxia.

Le chantier de l'icôneothèque du musée du quai Branly 2004-2005

par **Carine Peltier**, Responsable de l'icôneothèque, Département Patrimoine et Collections, *musée du quai Branly

Le musée national du quai Branly est né du projet présidentiel de « donner aux arts d'Afrique, des Amériques, d'Océanie et d'Asie leur juste place dans les institutions muséographiques de la France »¹ en rassemblant ces collections dans un lieu unique à Paris. En 2000, le Pavillon des Sessions ouvre de manière symbolique au musée du Louvre. Quai Branly, le bâtiment conçu par Jean Nouvel, est ouvert au public lors de l'inauguration le 20 juin 2006, neuf ans après l'initiation du projet.

Cet établissement public administratif dépend de deux tutelles, le Ministère de la Culture et de la Communication et le Ministère de l'Enseignement et de la Recherche. Il bénéficie d'un soutien extraordinaire et conduit ainsi un chantier remarquable dit « des collections »² de 2001 à 2004. Les 300 000 objets du musée national des arts d'Afrique et d'Océanie, et du laboratoire d'ethnologie du musée de l'Homme, sont dépoussiérés, mesurés, photographiés, anoxiés³, identifiés, répertoriés, restaurés, numérisés. Début 2006, les collections sont déménagées vers les réserves du nouveau musée du quai Branly.

Parallèlement, l'établissement souhaite également constituer une médiathèque rassemblant les bibliothèques des deux musées, le musée de l'Homme (MH) et le Musée national des Arts d'Afrique et d'Océanie (MNAAO), ainsi que la documentation et les collections iconographiques. Parallèlement aux chantiers en cours (construction du bâtiment, collections d'objets, collections documentaires, etc.), un large programme de conservation préventive a également été entrepris entre mars 2004 et 2006 pour les collections de photographies. Cet article se propose d'en retracer les grandes lignes.

Présentation de l'icôneothèque

L'icôneothèque est le service de gestion et de conservation des collections de photographies et d'arts graphiques, attaché à la Médiathèque⁴, et au sein du Département patrimoine & collections du musée du quai Branly. Les collections conservées sont estimées aujourd'hui à 700 000 pièces. Elles comprennent aussi bien des estampes, des dessins, des affiches, des cartes postales, que des photographies. La photographie représente plus de 90% de la collection et couvre une large gamme de

1. Rapport de la commission « Arts Premiers », août 1996, Archives du musée du quai Branly (D006227).

2. Voir à ce sujet Christiane Naffah (ss la dir.). 2004. *Le chantier des collections du musée du quai Branly : conservation préventive à l'échelle d'une collection nationale : organisation, fonctionnement et protocoles de traitement des ateliers*. Paris : Musée du quai Branly.

3. Les objets sont privés d'oxygène pendant plusieurs semaines afin d'éliminer des nuisibles éventuels.

4. CADIST en ethnologie.

procédés techniques, du daguerréotype aux procédés contemporains.

L'icôneothèque s'est constituée, comme la collection des objets du musée, de l'union des fonds conservés à la photothèque du MH et au MNAAO, respectivement estimés à 580 000 pièces et 66 000 pièces, auxquels s'ajoutent les nouvelles acquisitions du musée du quai Branly depuis 2000, et qui représentent, à ce jour, plus de 50 000 pièces.

Quelques collections et domaines phares :

-> Les collections du Laboratoire d'anthropologie du Muséum.

-> Les voyages et missions autour du monde du XIX^e siècle à nos jours :

- avec un fonds rare pour le XIX^e siècle (1840-1870) surtout pour l'Amérique - plus particulièrement le Mexique, le Pérou, le Brésil - l'Afrique équatoriale et l'Afrique de l'Ouest, la Polynésie, la Mélanésie, l'Indonésie et le Vietnam.

- les missions ethnologiques des années 1920 et 1930 dont la mission Dakar-Djibouti (1931-1933) avec Marcel Griaule notamment, ou bien celle de Lévi-Strauss en Amazonie (1935-36) et les raids automobiles des Croisières Noire et Jaune André Citroën.

-> La photographie coloniale.

-> Des photographies d'auteurs comme Brassai, Walker Evans, Henri Cartier-Bresson, Pierre Verger, etc.

-> Des fonds témoignant de l'histoire du MH et du MNAAO : leurs évolutions institutionnelles (le musée d'ethnographie du Trocadéro devenu musée de l'Homme, le musée permanent des colonies devenu quant à lui musée de la France d'Outre-mer, puis musée national des arts d'Afrique et d'Océanie) et l'évolution de la muséographie (prises de vues des expositions, des salles, des cartels, affiches des événements de la programmation, etc.).

Ces collections⁵ constituent un témoignage patrimonial et scientifique majeur, couvrant les 4 aires géographiques - l'Asie, l'Amérique, l'Afrique et l'Océanie. A travers l'étude de ces collections, les chercheurs peuvent ainsi appréhender aussi bien l'histoire des collections et des institutions, que l'histoire des sciences de l'Homme (ethnologie et anthropologie physique), et l'histoire de la photographie.

Une politique d'acquisition continue aujourd'hui d'enrichir ces collections du XIX^e siècle au XXI^e siècle. Le musée du quai Branly s'ouvre également à la création contemporaine par l'acquisition de photographies d'artistes contemporains, ou encore en organisant la biennale *Photoquai*, dont la troisième édition ouvre ses portes en septembre 2011.

5. Pour une histoire succincte des collections, voir Carine Peltier. 2007. « L'icôneothèque du musée du quai Branly ». In *Bulletin des Bibliothèques de France*, n° 04, p. 10-11.

Le chantier des collections

Entre mars 2004 et fin 2005, un véritable chantier des collections a permis de mener d'importantes campagnes sur des lots homogènes dans une chaîne de traitement de masse.

Avant le déménagement des collections, une expertise menée par un restaurateur sur deux ensembles du MH et du MNAAO a permis de déterminer, dès la fin de l'année 2003, le nombre approximatif de pièces, leurs différents types de support, et leur état général. Lorsque le musée du quai Branly hérite de ces collections, elles sont alors estimées à 350 000 pièces. Elles se sont révélées riches de plus de 580 000 pièces pour le MH. Le musée fait également réaliser une cartographie des deux collections, avant enlèvement, par une société prestataire. Un plan y indique la localisation précise des lots, pièce par pièce, armoire par armoire, étagère par étagère. Toutes les informations disponibles sur les lieux d'origine sont sauvegardées : feuilles volantes, inscriptions diverses, étiquettes anciennes, etc.

L'ampleur de la tâche est telle qu'il est alors convenu de dégager trois ensembles prioritaires parmi les autres, suivant différents critères tant scientifiques que relatifs à la conservation tels qu'ils sont apparus lors de l'expertise générale : des tirages sur papier montés sur carton des ^{xix}^e et ^{xx}^e siècles, des négatifs au collodion et au gélatino-bromure d'argent sur plaques de verre, et enfin des négatifs sur support souple en nitrate de cellulose. En avril 2004, après plusieurs semaines d'emballage et de préparation, le déménagement d'une centaine de palettes – dont 9,5 tonnes de verre – est réalisé, à partir des éléments de la cartographie, vers deux directions : un lieu de stockage, pour les lots non retenus dans ce chantier, et un atelier de travail, pour les ensembles choisis, le bâtiment de Jean Nouvel quai Branly étant encore en construction.

Les trois lots sont homogènes par leur technique et organisés par formats, ce qui permet un traitement de masse, c'est-à-dire de mettre en œuvre une chaîne d'opérations rationalisées. Il s'agit pour le musée de rehausser le niveau de connaissance et le niveau de conservation de chaque pièce.

La chaîne comprend les opérations suivantes :

- Déballage, dépoussiérage (au pinceau en poils de chèvre) ;
- Conditionnement suivant les normes de conservation dans des pochettes individuelles et boîtes ;
- Traçabilité⁶ (ainsi que saisie d'un minimum de données documentaires pour identification de chaque pièce, et évaluation succincte de l'état) ;
- Campagne de restauration pour certains supports ;
- Numérisation (préparation de sous-lots, emballage, transport, retour et contrôles divers tant physiques que numériques) ;

6. Comme les objets, les livres ou même la documentation du musée du quai Branly, les pièces de l'icénothèque portent toutes un code à barres qui est appliqué sur les pochettes individuelles et qui permet d'en assurer la traçabilité. Ce code est composé de deux lettres, qui informe de la nature du support, et sept chiffres : PP0000001 pour Photothèque Papier, PF0000001 pour Photothèque Film, PV0000001 pour Photothèque Verre, PM0000001 pour Photothèque Métal, et PA0000001 pour Photothèque Autre comme albums, objets de techniques mixtes, divers... Chaque pièce est ensuite localisée dans une boîte qui porte aussi un code à barre, le PB0000001 pour Photothèque Boîte et qui peut être déplacé dans une PBPRET0001 pour tous les mouvements extérieurs aux réserves.

- Référencement complet à partir des fichiers numériques importés dans le logiciel⁷ inventaire et de gestion des collections (récolement de notices préexistantes ou inventaire complet) ;
- Mise en stockage temporaire, dans l'attente de la livraison des réserves du nouveau bâtiment quai Branly.

Toutes les pièces présentant une dégradation importante sont écartées de la chaîne de traitement. Si aucun traitement n'est prévu, un conditionnement spécifique est étudié, afin de stabiliser la pièce dans l'attente d'une restauration.

Le chantier est réalisé, comme ceux de la médiathèque, à 80% par des sociétés prestataires, ce qui nécessite un suivi très important. La rédaction de cahiers techniques et de cahiers de procédures très précis, ainsi qu'un encadrement permanent des opérateurs sont absolument requis pour la maîtrise et l'efficacité du chantier. Cinq sociétés sont nécessaires pour assurer l'ensemble des étapes de traitement jusqu'au rangement : une société d'ingénierie culturelle, un groupe de restaurateurs, une société de numérisation patrimoniale, des transporteurs spécialisés et une société de gestion de documentation.

1- Le premier ensemble se compose de quelque 170 000 tirages sur papier, tous procédés confondus du ^{xix}^e et ^{xx}^e siècle, dont 138 000 sont collés sur des cartons et portent des inscriptions correspondant à un système d'indexation géographique et de classification thématique⁸, élaboré dans les années 1930. Ces photographies, rangées dans des meubles à tiroirs en bois, étaient en accès libre pour les chercheurs à la Photothèque du musée de l'Homme, et ce jusqu'en 2003 pour la plupart. Il s'agit alors d'améliorer les conditions de conservation en remplaçant les meubles en bois par des boîtes en carton neutre et des pochettes individuelles et de diminuer les dégradations mécaniques, dues aux multiples manipulations autorisées aux chercheurs.

Ce premier lot est retenu pour lancer le chantier pour différentes raisons, d'une part sa très grande homogénéité de technique et de format, (les cartons de montages sont quasiment tous de mêmes dimensions), et d'autre part, la moindre fragilité du support pour la mise en place de la chaîne avec tous les opérateurs et l'affinement des procédures. Enfin, le musée souhaite que ce fonds, librement consultable et très fréquemment utilisé depuis la fin des années 1930, soit restitué à son public rapidement grâce à la numérisation.

L'ensemble est totalement dépoussiéré, conditionné, tracé et numérisé. De manière générale, le choix est fait de numériser la pièce dans son ensemble, avec son support et son verso si

7. Le choix du logiciel inventaire s'est porté sur un outil de type gestion de collection muséale, le même que les objets du musée du quai Branly, The Museum System (The Gallery Systems®), et non pas sur un outil de bibliothéconomie. Ce système a permis d'absorber les systèmes et strates d'inventaires des systèmes antérieurs. En effet, les institutions précédentes avaient commencé un travail important d'inventaire. La photothèque du MH travaillait sous le système Micromusée (©Mobydoc), avec 100 000 notices non homogènes et donc considérées comme à recoler. Au MNAAO, un inventaire par lots et fonds de 450 pages existe sous format Word, accompagné de 7 petites bases Access pour de petites collections inventoriées, quant à elles, pièces à pièces. Le nouveau système devrait pouvoir prendre en charge ces différents types d'inventaires, supporter des imports de nature différente et garder en mémoire ces différences tout en créant une mise à plat de ceux-ci pour uniformiser l'information et l'homogénéiser.

8. Christine Barthe. 2000. « De l'échantillon à la personne, du type au corpus ». In *Journal des Anthropologues*. Paris.



1. PP0024013 : Anonyme, *Femmes cafres*, tirage sur papier albuminé monté sur carton, 1890-1899.

nécessaire (présence d'inscriptions ou d'un autre tirage), sans recadrage, afin de restituer les objets tels qu'ils sont conservés. Les tirages montés sur carton sont ainsi numérisés dans leur ensemble : le carton est entièrement visible et toutes les inscriptions sont lisibles.

2- Le deuxième lot est un ensemble de 25 000 négatifs au collodion et au gélatino-bromure d'argent sur plaques de verre, de format 9x12 cm au 50x60 cm, encore conservés dans leur conditionnement d'origine du XIX^e siècle en bois, et du début du XX^e siècle en fer blanc. Constitués pour une partie des négatifs du Laboratoire d'anthropologie du muséum et pour partie du haut-commissariat de France pour l'Indochine, ces fonds comptent parmi les collections phares, dont une grande part est inédite.

3 sous-lots sont différenciés : les plaques en bon état, les plaques dégradées (émulsion décollée et plaques cassées), et les plaques de grands formats à la manipulation délicate (à partir de 21x27 et jusqu'au 50x60 cm).

Outre un ensemble de plaques cassées et de dégradations physiques plus particulièrement le long des râteliers, les deux collections présentent des dégradations caractéristiques. Pour celle du Laboratoire d'anthropologie du muséum conservée dans des boîtes en bois depuis le XIX^e siècle, même si certaines plaques sont coincées (le bois a joué) ou d'autres présentent des réticulations des collodions, l'ensemble est plutôt en bon état. La deuxième collection, provenant du haut-commissariat de France pour l'Indochine et rapportée dans des boîtes en fer blanc, présente de très nombreux décollements d'émulsions parfois totalement enroulées sur elles-mêmes, certainement liés aux différences climatiques subies depuis 1929. Elle est également touchée par une dégradation du verre inéluctable due à sa mauvaise qualité (des grains de silice remontent en surface, altérant au passage définitivement la couche image),

et d'importants miroirs d'argent⁹. En 2005, dans le cadre d'un marché de restauration, le traitement d'un ensemble de négatifs non prévu initialement dans le chantier est organisé : 730 d'entre eux, cassés ou bien présentant les plus importants décollements d'émulsion, sont alors restaurés.

Une étude de conditionnement¹⁰ extrêmement spécifique en fonction des formats et de l'état des plaques de verre est engagée avec le fabricant de conditionnements de conservation. Le choix est fait d'écartier les matériaux de conditionnement tels que le polypropylène, en raison de l'électrostatique et de l'instabilité pour les grands formats, et l'aluminium anodisé en raison du poids, au profit de conditionnement de papier et de carton uniquement.

Des boîtes cubiques aux dimensions extérieures toutes semblables, sont dessinées, pour un rangement à la verticale de plaques en bon état de petit format du 9x12 au 13 x18 cm, avec un aménagement intérieur variant grâce à un système de cales. Ensuite, les plaques de format supérieur ou présentant des décollements (dans l'attente d'un traitement), sont conditionnées à l'horizontal, dans des lits « graphiques » de carton, plus ou moins profonds en fonction de l'épaisseur du verre ou de l'enroulement de l'émulsion sur plusieurs millimètres voire centimètres dans certains cas. Des encoches permettent la manipulation éventuelle, mais le fond blanc des lits permet une lecture de la pièce sans aucune préhension directe. Des boîtes, plus spécifiques, sont dessinées à partir de ce principe pour la trentaine de plaques de format 50x60 cm.

Cette étude se fait en parallèle de la définition de l'aménagement des matériaux de stockage des réserves du futur bâtiment - compactus, étagères, profondeur, hauteur, sens de stockage - ce qui permet une optimisation de l'espace.

11 500 négatifs sur plaques de verre de petit format et en bon état sont numérisés en 2005. Pour les négatifs, il est convenu de numériser brut en négatif pour inventaire, et d'obtenir également une version positive pour étude. De manière générale, les fichiers ne sont pas retouchés, l'objet est reproduit avec ses « dégradations » et « défauts » éventuels, comme le miroir d'argent.

3- Le troisième ensemble comprend quelque 50 000 négatifs sur support souple en nitrate de cellulose. La photothèque du MH comprend un fonds de 230 000 négatifs sur supports souples, parmi lequel 70 000 posent un problème d'identification. Les négatifs datent de la fin du XIX^e siècle jusqu'aux années 1960 environ. Les formats sont variés. Il est nécessaire de connaître la nature des supports (nitrate de cellulose ou acétate) afin de leur appliquer des conditions de conservation appropriées et d'éviter ainsi les risques qui leur sont liés. Il s'agit d'un support qui pose d'immenses problèmes de conservation, car sa dégradation est inéluctable, le seul moyen de la stopper réellement étant la congélation. Au niveau 4 de dégradation, alors même que l'image est devenue illisible, le nitrate de cellulose peut s'enflammer spontanément à partir

9. Il s'agit d'une métallisation due à une migration d'atomes d'argent en surface.

10. Voir Elodie Texier, Marie Beutter, Irma Laubenthal, Carine Peltier. 2006. "Photographic conservation activities at musée du quai Branly, Paris, France". In *Newsletter of the ICOM-CC Working Group on Photographic Materials*, Octobre 2006.



2-3. PV0003987 en négatif et en positif : Louis Rousseau, *Thang-vaï*, 47 ans, chinois de Shang-hai, négatif au collodion sur plaque de verre, 1850-1859.

d'une température de 40°C. L'urgence de la situation est rapidement apparue : certaines pièces avaient d'ores et déjà atteint le niveau 4. A ce stade, la destruction est l'unique solution.

En raison de la dangerosité du support, un véritable chantier est indispensable, pour améliorer les conditions de conservation (meuble en bois et pochette cristal), pour les stabiliser par un climat froid et peu humide, pour les numériser afin d'éviter leur sortie pour consultation, et pour compléter la connaissance de chaque pièce par son niveau de dégradation et la saisie de toutes les informations documentaires afférentes.

Dans le cadre d'un important marché de conservation/restauration des fonds photographiques du musée du quai Branly, l'étude de ce fonds est menée courant 2005, par 8 restaurateurs pendant 5 mois dans un nouvel atelier dédié. L'identification des supports en nitrate de cellulose est réalisée en deux temps. Tout d'abord, l'étude visuelle des systèmes d'encoches rencontrés, des marques et types de négatifs, des dégradations caractéristiques rencontrées, des dates de production des négatifs, des inscriptions ou de la documentation accompagnant les négatifs, permet d'identifier la nature du support. Elle a permis de recenser de nombreuses marques de fabricants et d'encoches, des supports aussi bien en nitrate qu'en acétate, encore peu connus¹¹. Puis, pour les supports ne pouvant être identifiés visuellement (bords découpés par exemple), des tests ponctuels à la Diphénylamine¹² sont réalisés sur des échantillons représentatifs.

A l'issue de cette étude, quelque 50 000 négatifs (de formats 24x36mm, 6x6, 9x12, 13x18, 18x24 cm, 20x20 cm) sont identifiés comme supports composés avec certitude de nitrate de cellulose. Ils sont isolés, conditionnés dans des pochettes individuelles en papier et des boîtes en carton de conservation, et numérisés dans la même chaîne que les deux lots précédents. Ils sont conservés aujourd'hui dans une chambre froide¹³. Cette collection a fait l'objet d'une déclaration à la préfecture de police auprès du Service technique d'inspection des installations classées (STIIC). Le service de déminage de la préfecture de Po-

11. Gwénola Furic, Aurélia Garnier-Liessart, Agnès Vallet, Alice Mohen, Claire Duverger, Elodie Texier, Marie Beutter, Sabrina Esmeraldo. 2006. « Identification des supports souples en nitrate et acétate de cellulose d'après le fonds de négatifs photographiques du musée du quai Branly ».

12. Une solution de diphénylamine diluée à 0,5% dans de l'acide sulfurique est appliquée sur un prélèvement de négatif à l'aide d'une pipette. Il s'agit d'un test réactif colorant. Voir la synthèse de la Note de l'I.C.C. 17/2 : « Test ponctuel à la Diphénylamine pour déceler la présence de nitrate de cellulose dans les objets de musée. »

13. Le climat retenu est de 12 ° (+/- 2 °C) à de 20 à 30% HR (+/- 5%).

lice de Paris a, quant à lui, procédé à la destruction des 600 négatifs de niveau 4.

En début d'année 2006, ce chantier de conservation préventive a permis de reconditionner et d'assurer la traçabilité de quelque 220 000 pièces ; 200 000 sont numérisées. Les trois ensembles, bien que de nature différente, ont pu intégrer cette chaîne de traitement, avec des ajustements de procédures, en fonction du type de support, pour chacun des prestataires (manipulation, transport, numérisation, conditions de travail, etc.).

A la livraison des bâtiments du musée du quai Branly, le déploiement des collections a pu être effectué dans les différentes réserves aux climats appropriés aux divers matériaux.

Conclusion

Depuis l'ouverture au public du musée en juin 2006, le travail continue : surveillance des collections, analyse et étude des fonds non traités, conditionnement, inventaire et documentation des collections. Cependant, le spectre des activités s'étant élargi avec le passage pour l'établissement d'une phase de chantier à une phase de fonctionnement (organisation de plus d'une centaine de consultations par an de pièces originales au cabinet des fonds précieux, préparation des pièces pour des expositions et des prêts, etc.), le rythme s'est bien évidemment ralenti. Toutes ces opérations sont réalisées aujourd'hui par l'équipe de l'iconothèque, à l'exception de la numérisation toujours assurée par une société extérieure. La chaîne de travail actuelle varie peu de celle du chantier, seul l'inventaire est réalisé en amont. La numérisation des collections se poursuit également à un rythme plus faible passant à 15 000 pièces en moyenne par an. A ce jour, 293 299 pièces sont numérisées¹⁴. Le musée cherche aujourd'hui à organiser un nouveau chantier des collections pour le traitement de 250 000 autres pièces afin de pouvoir diffuser et valoriser cette riche collection.

Consultation des collections :

- Le catalogue de l'iconothèque sur le site du musée : <http://www.quaibrany.fr/fr/documentation/le-catalogue-de-l-iconotheque.html>

- Les pièces originales de la collection sont consultables au cabinet des fonds précieux sur rendez-vous : mediatheque@quaibrany.fr

14. Correspondant à quelque 392 163 fichiers numériques (recto-verso des pièces sur papier, des multiples pages d'albums, les négatifs et leurs versions positives, etc.).

Announcements



Photograph by C. Moorby © British Library

British Library Boston Spa Storage Facility

We visited on December 2010 the British Library storage facility in Boston Spa, Yorkshire, opened in 2009. The building houses storage compartments which are temperature and humidity controlled with a low oxygen environment planned to preserve 7 million items. The collection moves are underway: the types of material moved are serials, monographs, newspapers, patents, CDs and LPs. The low use material is going to Boston Spa and the high use to St Pancras, at a rate of 400m of material loaded a day. Since December, 142km of British Library collections are stored there now. The collection moves is due to finish in the summer.

Items are stocked in bar-coded containers each holding two meters of material, stored on racks 21 meters high, organized in seven aisles. The racking system is one of the most complex and dense in Europe. The facility offers 262 km of environmental controlled storage. Low-oxygen environment permits to reduce any fire risk. It is fully automated: robots operate within the storage void to retrieve individual containers and convey them to a retrieval area where library staff can take out the required item and send it to the St Pancras site within 48 hours.

Aside this Additional Storage Building, a Newspapers Storage Building is planned too: the construction should start this summer.

IFLA Satellite Meeting "Libraries in Islands. Setting-up Collections, Promoting Cultural Heritage and Networking.", 11-12 August 2011, San Juan, Puerto Rico

Organized by:

IFLA-PAC (Preservation and Conservation) Core Activity

Sponsored by:

IFLA Rare Books and Manuscripts Section
ACURIL (Association of Caribbean University, Research and Institutional Libraries & National Committee)
Museum of Art of Puerto Rico

Subscription: free of charge

Conference venue:

Museum of Art of Puerto Rico
Avenida De Diego 299 Santurce,
Puerto Rico 00909

Conference languages: English/Spanish

Theme:

Creating and funding a cultural heritage collection in the islands is confronted to specific issues that differ according to the Island history and geographical environment: was it part of a colonial empire? Is it an independent country or region? Is the Island located in an archipelago with historical and cultural consistency? How difficult are the climatic conditions? Where does the audience come from: locally or at a distance?

The comparison of different situations, the presentation of ongoing innovative projects will be the occasion for librarians to think about their own plans, as well as to identify the stages, the political and strategic issues, human and financial resources needed to launch and conduct collection enrichment and promotion.

The general theme is divided into three sessions:

- Preservation and Conservation issues
- Collections constitution and enrichment in and/or outside a network of libraries
- Specific strategies and solutions for services and valorisation

Find more information about registration on IFLA-PAC webpage:

<http://www.ifla.org/en/events/ifla-pac-and-rare-books-and-manuscripts-section-satellite-meeting>

A Spanish version of this announcement is also available on line.

Contact:

PAC: christiane.baryla@bnf.fr

IFLA-PAC Session:

"Cultural Heritage Preservation Planning: Confronting Economic and Environmental New Challenges", 18 August 2011, San Juan, Puerto Rico

Recently, cultural heritage has experienced consequences of both economic slowdown and climate change. Indeed, in times of crisis, preservation appears to be especially subject to budget cuts and does have to adapt to these new economic and environmental conditions. The IFLA-PAC session will aim at presenting some recent strategic approaches and methods to address changing priorities and requirements in the field of preservation management.

The session will focus on:

- **Buildings:** Which adaptations to improve library and archives buildings in terms of cost management and energy efficiency? (New constructions or renovation)
- **Collections:** What do we need to preserve and/or give access to?
- **Preservation strategic and business models:** Basic elements for preservation planning and low-cost methods likely to be applied in developing countries.

The programme will be soon on line on IFLA website.

Contact:

Christiane Baryla, IFLA-PAC Director:
christiane.baryla@bnf.fr

IADA XIIth Congress, 28 August-2 September, Berne, Switzerland

The IADA (International Association of Books and Paper Conservators) congresses have been providing a quadrennial platform for the presentation of research and development in the field of paper and book conservation since 1967. IADA's XIIth Congress covers the full range of topics in the conservation and preservation of the World's Paper Heritage and related disciplines. It provides an ideal forum for international professional exchange between colleagues and students from Europe and the rest of the world.

Conference language: English and German with simultaneous translation

Programme:

The programme is available at: <http://www.iada-online.org/berne.pdf>

Registration:

www.iada-berne2011.com

ICOM-CC 16th Triennial Conference on "Cultural Heritage/ Cultural Identity - The Role of Conservation", 19-23 September 2011, Lisbon, Portugal

The conference theme aims to capture the recognition by communities or nations of the importance of affirming their cultural heritage in this era of globalisation, as they evolve through contact and exchange with other cultures. Considering this trend, the conference will explore and compare different approaches regarding conservation policies and methods, as well as scientific methods for studying materials and technologies, in order to improve our understanding of the role of conservation in valuing heritage and its relationship to other areas such as sociology, economy, and politics, which are vital in ensuring the sustainability of communities.

The ICOM-CC Triennial Conference in Lisbon will be an opportunity to share methods, studies and strategies to value individual cultural identities through heritage conservation by addressing topics such as:

- The relationships between cultural heritage and cultural identity
- National and international conservation policies

- The importance of interdisciplinarity in the preservation of cultural heritage
- The development of research and education in heritage conservation
- Standards, practices, and methodologies for heritage conservation.

More information about registration and conference fees are available on the conference webpage at: www.icom-cc2011.org

Contact: info@icom-cc2011.org

Reports

Seminar "France-Russia : Achievements in the field of conservation and restoration of documents", Paris, 4-8 April 2011, Bibliothèque nationale de France, Paris

The IFLA-PAC program and the BnF Department of Preservation welcomed on April 2011 a group of 20 Russian restorers from different institutions (such as the Library for Foreign Literature, the State Historical Museum, the Pushkin Museum of Fine Arts in Moscow and the Historical Museum in Saint Petersburg, etc.). The PAC also organ-

ized a series of visits in Paris on the topic of conservation and restoration.

The group, headed by Olga Smirnova, from the Library for Foreign Literature, and Rosa Salnikova, Director of the PAC Regional Centre in Russia, scheduled to visit the most important centres for graphic material restoration and preservation in Paris this year. They took the opportunity of the annual "Journée interateliers", a conference day held on April 4 at the BnF and intended for French restorers, to meet Parisian colleagues and present their own works and researches in Russia.

Several topics were studied: the restoration by the BnF of scenery models from the Opera Theatre in Paris; the issue of cardboard used in conservation; the restoration of the *Sacre de Napoléon* book; French training in restoration. The proceedings of the conference will be online on BnF website next June.

See: http://www.bnf.fr/fr/professionnels/actualites_de_la_conservation/s.actualites_conservation_dernier_numero.html

During their French week, the group visited the restoration workshops of two major BnF departments: Maps and Plans Department and then Prints and Photographs Department, both located in the historical Richelieu site.



The Russian restorers group in visit in Paris.

At this occasion, they could look at old photographs restoration (BnF preserves the world's biggest picture collection, unique for its wealth of material on past centuries). Patrick Lamotte, expert in that field, showed many examples of the department works. In the Maps and Plans department, a special presentation was made about the restoration of the Coronelli globes and of some drawings by Prissé d'Avennes on display in the BnF until next July.

On Wednesday 6, our Russian colleagues were greeted by Madame Jacqueline Sanson, General Director of the BnF, and then had a general presentation of the Bibliothèque nationale de France, in Russian, by Valentine Besson (librarian in charge of the Russian collections at the BnF), followed by a complete visit of the Conservation department workshop in the Tolbiac site.

Later in the week, they visited the Louvre Museum Cabinet des Dessins, exceptional workshop excellently presented by Mr André Le Prat, in charge of restoration. Versailles and Chambord were other beautiful destinations for the group to end their week of visits.

Christiane Baryla would like to thank all the participants and the different experts who contributed to make this one-week seminar possible and of great interest for our Russian colleagues.

Report on the British Library Conservation Research Conference "The Science of Objects and Collections", April 11, 2011, London, UK

This conference, organized by Barry Knight, Head of Conservation Research at the British Library, was aimed at exploring two linked themes: understanding the nature of objects and understanding the nature of collections.

Barry Knight introduced the conference by reminding the three priorities of the strategy for conservation research in libraries and archives in the UK and Ireland: collections life-cycle prediction, effects of the storage environment and non-destructive methods for assessing damage to materials. These three topics were then illustrated by the different presentations, giving a general overview of the conservation science field in the UK. It was particularly interesting to learn more about the newly launched projects within the Science and Heritage programme, such as:

– Heritage Smells, a project between the University of Strathclyde and the British Library. It compares air sampling results in national libraries and archives in UK and Ireland to develop portable non-in-

vasive tools based on the sense of smell, which may provide information on the condition of paper. It would help characterization of materials and identification of objects liable to deterioration.

– the Collections Demography project (2010-2013): Matija Strlic, from the Centre for Sustainable Heritage, presented this project which aims at building a general model of interactions between archival and library collections, the environment and the users to explore various scenarios of collections care and management, taking into account the climate change and new strategies of access/use which will affect the lifetime of paper-based collections.

One of the key topics of the conference was the research for energy efficiency, in a context of rising energy costs. How to reduce energy consumption without endangering the collections? The strategy of the BL to reduce its carbon footprint and energy use was presented. Moreover, Kostas Ntanos, Head of Conservation Research and Development of the National Archives, presented a survey of environmental conditions led in the TNA repositories. The National Archives have collected environmental data since 2008 and have developed a very interesting computer simulation model of the repositories, which used EnergyPlus software, to find the different scenarios combining both energy savings and appropriate preservation environment in storage.

Nancy Bell (TNA) ended the conference day with a communication about the necessity of redefining environmental standards for libraries, archives and museum collections in the UK. The standards available have been criticized because they rely on the intensive use of heating and air-conditioning systems. A new British standard (PAS 198) will be launched on October 2011. Based on recent scientific works, it will take into account both economic imperatives, the need to reduce energy use and the long-term care of collections.

The proceedings of the conference should be published soon.

IFLA International Newspaper Conference, "Issues and Challenges for National Heritage", 25-27 April 2011, Kuala Lumpur, Malaysia

By Else Delaunay, Consultant, IFLA Newspaper Section

Legal deposit libraries worldwide are facing a difficult task: the dual challenges of preserving hardcopies as part of the national heritage, and managing new technologies coming up for printed as well as online newspapers. Digital technologies are con-

stantly developing and will interfere with various aspects concerning newspapers (ex. acquisition, access, storage, preservation of look and content, etc.). Finally funding is another challenge in a time of financial constraint.

Three keynote addresses, thirteen papers and five trade introductions were presented during the three days conference to about 100 delegates from Australia, India, Malaysia, Singapore, Europe (Finland, France, Germany, Netherlands), and USA. The printed programme included very useful abstracts of all the papers and a USB key donated to each delegate included the complete text of most of the papers given. It was indeed a very well organised conference followed up by a cultural visit to Kuala Lumpur and the new administrative city of Putrajaya.

The Conference covered six subject fields: News in multiple scripts and multiple languages: challenges in access and preservation; Selection of newspapers for digitization and preservation; Library perspectives on library standards, news preservation, access to news, digital libraries and budget; Marketing and promotion of new library services; Library and publishers perspectives on copyright; Intellectual property, legal deposit and preservation news; Software company perspectives on library standards, preservation, access, digital libraries and project management. Indeed a very large overview and updating of all the problems linked to newspaper digitization and preservation. Each session was completed by a Question and Answer session, an enriching exchange between speakers and delegates.

If the digital library, the newspaper digitization from microfilm or from hardcopy and the electronic archiving as well as software developments for other languages and multiple scripts were key-subjects, other aspects of newspaper management such as born digital newspapers, copyright, negotiations with publishers, collaboration between national libraries and private companies, preservation of originals, etc., were also approached. In fact, the Conference gave a large survey of programmes and projects in South East Asia, in North America and in Europe. Each speaker representing generally the national library in his/her country or some private companies (trade presentations) stated on the current situation and policy of electronic or non-electronic access to the newspaper collection, its preservation and the possibility of making it accessible on the Internet.

The National Library of Malaysia did its utmost to make the Conference a professional success and a great souvenir to all the participants.

PAC CORE ACTIVITY

USA and CANADA

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Washington, D. C. 20540-4500 USA

Director: Dianne L. van der REYDEN
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Fax: + 1 202 707 3434
E-mail: dvan@loc.gov
<http://marvel.loc.gov>
<http://www.loc.gov/index.html>

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Quai François-Mauriac
75706 Paris cedex 13 - France

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Fax: + 33 (0) 1 53 79 59 80
E-mail: christiane.baryla@bnf.fr
<http://www.ifla.org/en/pac>

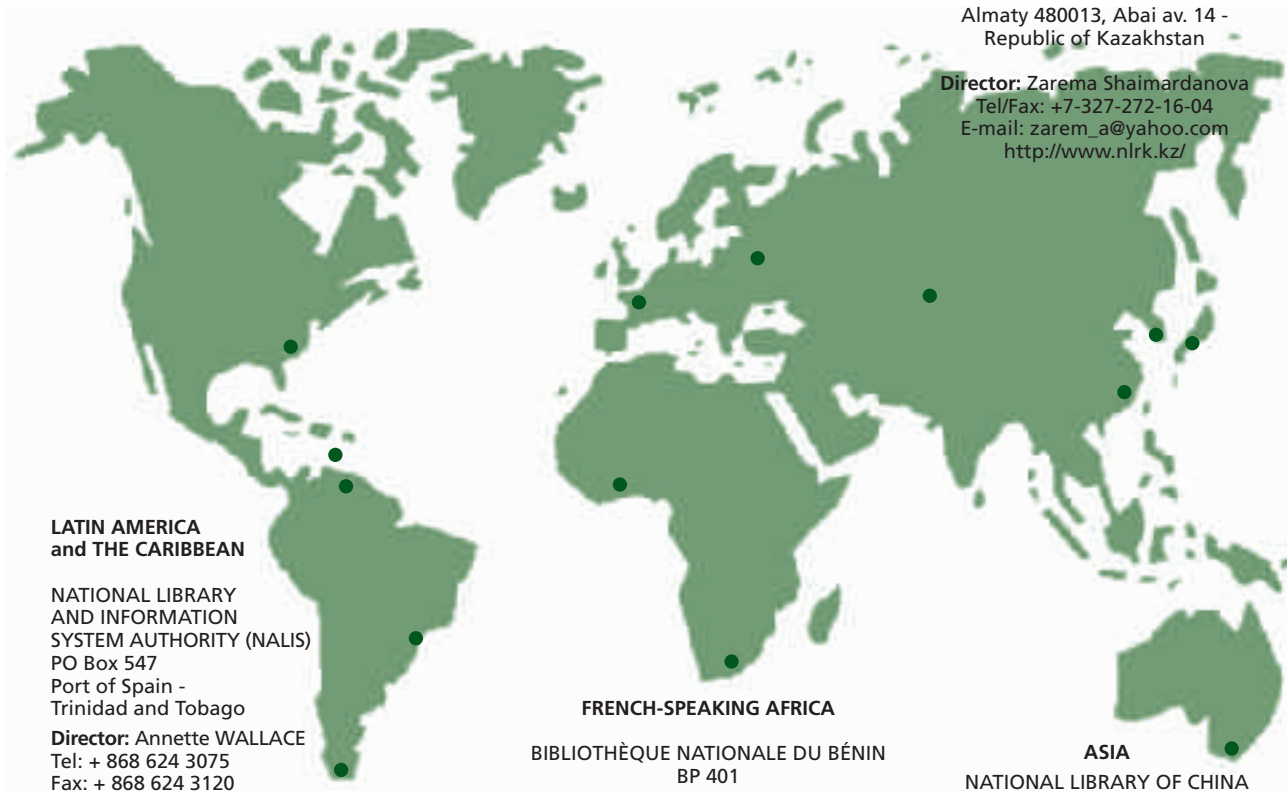
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Fax: + 7 095 915 3637
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E-mail: zarem_a@yahoo.com
<http://www.nlrk.kz/>



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Fax: + 868 624 3120
E-mail: awallace@nalis.gov.tt
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DE VENEZUELA
Apartado Postal 6525
Carmelitas Caracas 1010 - Venezuela

Director: Ramón SIFONTES
Tel: + 58 212 505 90 51
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www.bnv.bib.ve/

FUNDAÇÃO BIBLIOTECA NACIONAL DE BRASIL
Av. Rio Branco 219/39
20040-0008 Rio de Janeiro - RJ - Brasil

Director: Jayme SPINELLI
Tel: + 55 21 2220 1976
Fax: + 55 21 2544 8596
E-mail: jspinelli@bn.br
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UCT LIBRARIES
University of Cape Town
Private Bag
Rondebosch 7701 - South Africa

Director: Johann MAREE
Tel: + 27 21 480 7137
Fax: + 27 21 480 7167
E-mail: jmaree@hiddingh.uct.ac.za
www.lib.uct.ac.za/

OCEANIA and SOUTH EAST ASIA

NATIONAL LIBRARY
OF AUSTRALIA
Preservation Services Branch
Canberra Act 2600 - Australia

Director: Colin WEBB
Tel: + 61 2 6262 1662
Fax: + 61 2 6273 4535
E-mail: cwebb@nla.gov.au
www.nla.gov.au/

ASIA

NATIONAL LIBRARY OF CHINA
33 Zhongguancun Nandajie
Beijing 100081 - China

Director: Zhang Zhiqing
Fax: + 86 10 6841 9271
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NATIONAL DIET LIBRARY
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Director: Noriko NAKAMURA
Tel: + 81 3 3581 2331
Fax: + 81 3 3592 0783
E-mail: pacasia@ndl.go.jp
www.ndl.go.jp/

NATIONAL LIBRARY
OF KOREA
KRILL/Preservation office
Banpo-Ro 664, Seocho-gu
Seoul 137-702 - Korea
Director: Giu-Won LEE
Tel: + 82-02-535-4142
E-mail: leegw@mail.nl.go.kr