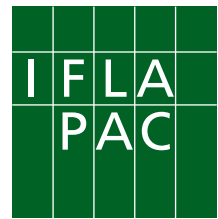


International Preservation News

A Newsletter of the IFLA Core Activity
on Preservation and Conservation



No. 41
July 2007

Contents

- 4** Risk Management: methodological principles
Emmanuelle Bermès
- 8** Risk Management and Digital Repositories:
the case of DRAMBORA
Emmanuelle Bermès



Pest, Dust, Mould and Water

- 9** Preventive Preservation, a day-to-day work
Tony Basset
- 13** Library, Pasture and Sheep
Danielle Mincio
- 14** The National Library of France:
Indoor Air Pollution in the Storage Rooms
as a Consequence of an ill-suited Air Purification System
Thi-Phuong Nguyen and Michel Dubus
- 19** Preservation of Books, Pictures, Fabrics and Others
from Mould Spoilage
Philippe Dantigny
- 22** Hot Water Damage:
A Case Study of the Library of the Culture Palace for Nationalities
Zhang Zhiqing and Zhao Daying



New Centres, New Policies

- 26** The British Library Centre of Conservation
Helen Shenton
- 29** Historical Opportunity for Ancient Book Preservation in China
Zhang Zhiqing
- 33** News
- 35** Publications
- Events and Training
- *Announcements*
 - *Reports*



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 Barylà

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

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

E-mail: christiane.barylà@bnf.fr

Editor / Translator

Flore Izart

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

E-mail: flore.izart@bnf.fr

Spanish Translator: Solange Hernandez

Typewriting: Isabelle Fornoni

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/VI/4/ipn.html

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

ISO 9706

© 2007 by IFLA

editorial

The first issue of 2007 is published late, and first I would like to apologize for this delay. We are not evolving towards a biannual publication but, on the contrary, towards an improvement in the review quality, which implied a change of printer. I hope that you will appreciate the first colour supplement inside this issue. This better visual quality must be also the sign of a better quality of the contents. *IPN* is much more than a newsletter, a goal to which the editorial team devotes itself. Besides, I enjoin all our readers to send us their criticisms and suggestions!

This issue focuses on preventive preservation and, first, on paper collections management. As PAC Director for one year, I have noticed how topical the digital data preservation issue is. Publications, meetings, networks, training workshops everywhere in Europe, America, Asia on that subject: we are almost suffering information overload. Digitization and now its corollary, preservation of digital data, are studied on a worldwide scale. Moreover, PAC organized in Paris a symposium on that issue, whose report is available at the end of the review.

What about collections? No "contents", no digitization. Google has launched its huge enterprise from books preserved in libraries, and it is the case for all the far-reaching digital projects. Preventive preservation and risk management inside our institutions are more topical than ever. As you have probably noticed it, our colleague Johann Maree, PAC Director for South Africa, organizes in Durban a top-level satellite meeting on that subject before IFLA general conference, and I invite you to attend it. Indeed, I would like to give a particular perspective to risk management and new pollution and infection factors in modern buildings. Of course, some papers don't constitute a comprehensive survey of this issue but show how burning it still is. Research and development are highly active in this field, in collaboration with other sectors. For instance, one of our contributors, Philippe Dantigny, is working in the food-processing field. If *IPN* often focuses on disaster planning, it is also important to deal with risk management. That is why the National Library of France has constituted in-house working groups on that subject: in the opening paper, Emmanuelle Bermès introduces the risk management methodological principles.

In the last part of *IPN*, Helen Shenton (Head of Collection Care, British Library) describes the new Centre of Conservation in London she has responsibility for, its creation and missions. I was lucky to assist to its inauguration last May and I must say that I was dazzled by this very beautiful realization, for several reasons to begin with the building quality on the St Pancras site, behind the National Library. What I want to stress is the fact that the book conservation studios are located together with the collections, giving a feeling of great cohesion and satisfaction to see preservation activities at the heart of the library, and not exiled far from books. In addition, the new building intends to involve the public by incorporating tours of the studios and demonstrations about the technical aspects of our profession. At last, it gives a lot of importance to training and research, two key words of our activity. Congratulations to Helen Shenton from PAC: you are all invited to visit it and get inspired.

I remind our readers of the fact that *IPN* and all the PAC publications are available on line at: www.ifla.org/VI/4/pac.htm

I wish you a very good reading.

Christiane Barylà
IFLA-PAC Director

Ce premier numéro de l'année 2007 paraît avec un peu de retard et je souhaiterais d'abord vous présenter toutes mes excuses pour ce délai. Non, nous n'évoluons pas vers une publication biannuelle mais bien au contraire vers une amélioration de la qualité de notre revue, et cela passait par un changement d'imprimeur. J'espère que vous apprécierez pour la première fois l'insertion d'un cahier couleur au sein de ce numéro. Cette meilleure qualité visuelle doit être aussi le reflet d'une qualité accrue des contenus. *IPN* est bien plus qu'une lettre d'information et l'équipe éditoriale s'y emploie. J'en profite à ce propos pour adresser un appel à tous nos lecteurs afin qu'ils nous envoient suggestions et critiques.

Ce numéro 41 est dédié à la conservation préventive et clairement, d'abord, à la gestion des collections papier. Depuis un an maintenant que j'occupe le poste de Directeur du PAC, j'ai pu constater à quel point la question de la conservation des données numériques était à l'ordre du jour. Publications, conférences, réseaux, ateliers de formation, partout, en Europe, en Amérique et en Asie : le sujet fait florès et nous souffrons presque de surinformation. La numérisation et maintenant son corollaire, la conservation des données numériques, sont étudiés à un niveau planétaire. Le PAC a d'ailleurs organisé à Paris un symposium sur le sujet dont vous trouverez plus avant le compte rendu.

Et les collections dans tout ça ? Sans « contenus », pas de numérisation : Google lance son entreprise gigantesque à partir des livres conservés dans les bibliothèques, et c'est le cas pour tous les chantiers numériques de grande envergure. La conservation préventive et la gestion des risques à l'intérieur de nos établissements sont donc plus que jamais à l'ordre du jour. Vous avez sans doute noté que notre collègue Johann Maree, Directeur du Centre PAC d'Afrique du Sud, organise à Durban un pré-séminaire de très haut niveau sur ce même sujet avant la Conférence générale de l'IFLA. Je vous invite tous à y participer. Je souhaiterais en fait que soit donné ici un éclairage particulier à tout ce qui concerne la gestion des risques et aux « nouveaux » facteurs de pollution ou d'infection dans des bâtiments modernes. Il est clair que quelques articles ne constituent pas une somme sur le sujet mais montrent plutôt combien il reste d'actualité : il s'agit d'un domaine où recherche et développement se maintiennent à un niveau élevé, souvent en collaboration avec d'autres secteurs d'activité. Un exemple : Philippe Dantigny, qui contribue à ce numéro, travaille dans le secteur de l'agro-alimentaire. Dans *IPN*, il a souvent été question de désastres et de plans d'urgence : il nous semble tout aussi important de mettre l'accent, en amont, sur la gestion des risques. La Bibliothèque nationale de France a ainsi constitué des groupes de travail en interne en ce sens et l'article introductif d'Emmanuelle Bermès nous en présente les aspects méthodologiques.

Enfin vous trouverez en dernière partie un article de Helen Shenton (Directrice de la Conservation à la British Library) décrivant la création et les fonctions du nouveau Centre pour la Conservation dont elle a la responsabilité à Londres. J'ai eu la chance d'assister à l'inauguration de ce centre en mai dernier et je dois dire que j'ai été éblouie par cette très belle réalisation, et ce pour plusieurs raisons à commencer par la qualité du bâtiment à Saint-Pancras, à l'arrière de la Bibliothèque nationale. Ce que je tiens à souligner d'abord c'est l'unité de lieu : les ateliers de conservation sont situés à côté des collections et cette intégration donne un sentiment de grande cohésion ainsi que la satisfaction de voir les activités de conservation replacées au cœur de la bibliothèque, et non pas exilées loin des livres. Ensuite il y a la volonté d'impliquer le public de la bibliothèque dans tous ces aspects techniques de notre métier par des visites et des démonstrations. Enfin, le centre accorde une place importante à la formation et à la recherche : deux mots-clés de notre activité. Un grand bravo donc à Helen Shenton de la part du PAC et une invitation pour tous à le visiter et à s'en inspirer.

Je rappelle aussi à tous nos lecteurs que vous pouvez trouver ce numéro d'*IPN* ainsi que toutes les publications du PAC en ligne à l'adresse suivante : www.ifla.org/VI/4/pac.htm
Je vous en souhaite donc une excellente lecture.

Christiane Baryla
Directeur d'IFLA-PAC

Risk Management: methodological principles

by **Emmanuelle Bermès**,
functionally in charge
of the Digital Library on the Web,
National Library of France

If nowadays risk management seems to be in fashion, above all in libraries, it is not a recent invention. In business world, particularly in industrial production, risk management has been a part of activities monitoring method for a long time. In computer industry, the risk management methodology, although not always referred to by this designation, permits to assess and treat risks related to information system security. Risk management is also a part of project management. All these experiences have led to a stable and detailed risk management standard: an asset for patrimonial institutions intending to start using this method of managing risks related to the preservation of their documents.

Why adopting a risk management method?

A library with a building, collections (physical or digital) to preserve, an information system and a certain number of projects to implement, has four good reasons to adopt a risk management methodology. Each activity generates risks and the question is not to avoid them all, but to define the acceptable level of risk according to the institution's missions and means. Risk management is a sort of compromise management: between needs and means, immediate activity imperatives and long-term objectives of the preservation mission... To find easily a compromise, risk management appears to be an essential tool since it enables to quantify elements which are usually the most difficult to estimate in the decision-making process.

The six main steps of risk management

The risk management methodology, if well-tried, can vary from one context to another but it is always structured around six main steps.

The first step focuses on the definition of context, needs and objectives. This work is essential to list the risks and then choose the assessment criteria against which the risk will be evaluated. Risks are not the same according to the objective concerned, preservation of documents or staff and information security, for instance.

Then, a list of risks has to be established. It is important to define precisely each risk in terms of vulnerability and threat. On the one hand, vulnerability corresponds to the identification of a fact that makes the risk possible: for instance, only buildings located in areas liable to flooding are likely to suffer flood risk. On the other hand, threat is the potential to exploit this vulnerability, whose source can be internal or external.

There are several methods for identifying risks: brainstorming, observations and experimentations, scenario analysis or reports from prior incidents, internal or external audit... All these methods can be combined.

It can be very useful to classify the list of risks thus obtained to make the process of assessment easier, according to risk categories (operational, financial, organizational, infrastructure, reputation, etc.) and the nature of risks sources, which can be external such as the natural environment, or internal such as the means, etc. Risks are evaluated in order to provide a quantitative analysis. Generally, two main criteria are used: impact and likelihood. The impact analysis implies the evaluation, according to the objectives fixed in the first step, of the gravity of the situation in case a risk occurs. The difficulty here consists in establishing objective criteria to evaluate this level of gravity. Likelihood is easier to analyse in an objective manner by using experience (did risk already occur in the past, at which frequency?). To each criterion corresponds a list of fixed values used as a rating scale, for instance on 5 or 10 points, depending on the intended level of detail.

At this stage, a categorised list of risks run in the exercise of activity is obtained and can be organized by level of risk. This result can help the decision-making process: a matrix which combines impact and likelihood provides an instant view on the most critical risks (those which have a very high likelihood and impact, of course, but also those which have a low likelihood and high impact, or a low impact but a very high likelihood).

Risks considered as top priority are then identified, with their treatment and action plans, according to the institution's missions. The costs and benefits of implementing the operations of treatment have to be evaluated: it might be valuable to address an easy to treat lower-priority risk. In addition, a very expensive operation, but

likely to reduce significantly the level of several main risks, can also be decided.

Risk treatment corresponds to the implementation of actions leading to the reduction in the level of risk.

Treatment concerning internal risks reduces its likelihood. As far as possible, risk source is controlled to prevent the risk from occurring.

On the contrary, when the risk source is out of reach, the only solution is to reduce its impact, in the case of risks related to natural environment, for instance. A disaster preparedness plan is a good example: as we cannot prevent a disaster from occurring, we plan all the measures permitting a rapid intervention and avoiding serious consequences on documents.

Other strategies exist: risk avoidance (as the risk is too high, the activity concerned is foregone) or risk transfer (transferring a part of the risk, for instance by purchasing insurance).

In the end, a residual risk still remains, made of all the risks that we can't or don't want to treat. It corresponds to the risk that we accept to run: it is told the risk tolerance.

The last step is iteration. Indeed, risk management should be an ongoing and evolving process. Some risks still change over time; new ones can appear or even be generated by the implementation of some measures of control. So we must keep on being extremely vigilant. Some risks have a predefined revision period, and the whole process must be regularly repeated.

Conclusion

The outcome of this process can consist in elaborating tools to help monitoring activities. Those tools can be reports, which will make the decision-making process easier, by providing indicators and figures.

From an operational point of view, risk management can lead to the elaboration of a system of reference which will provide measures of control, alerts in case of problem and easily accessible solutions or treatments.

In addition, risk management is a tool of communication: once the process comes to an end, the measures taken can be made public in order to improve the trust in the activities concerned, and trust is a sensitive criterion for activities such as the preservation of digital objects or information system security.

Emmanuelle Bermès contributed to the International Symposium organized by PAC at the BnF in April 2007.

Proceedings are available on line at:

<http://www.ifla.org/l/whatsnew/new.htm>

References

Direction centrale de la sécurité des systèmes d'information (DCSSI), *Précis de gestion des risques SSI*, janvier 2006.

Available at: <http://www.ssi.gouv.fr/fr/confiance/documents/methodes/grssi-precis-2006-01-17.pdf>

Gary Stoneburner, Alice Goguen, Aexis Feringa. *Risk management guide for Information Technology systems. Recommendations of the NISO*. NISO, 2002.

Available at:

<http://csrc.nist.gov/publications/nistpubs/800-30/sp800-30.pdf>

Federation of European Risk Management Association (FERMA), *Risk management standard*, 2002.

Available at: <http://www.ferma.eu/Default.aspx?tabid=195>

Aunque en la actualidad parece estar de moda la gestión de riesgos, sobre todo en las bibliotecas, ésta se ha empleado durante mucho tiempo en el mundo de los negocios y en la industria de la computación, donde permite evaluar y manejar los riesgos relacionados con la seguridad de los sistemas de información. Toda esta experiencia ha llevado a establecer un estándar de la gestión de riesgos: ventaja para las instituciones patrimoniales que pretenden comenzar a aplicar este método para la conservación de sus documentos.

Toda actividad genera riesgos: la cuestión no es eliminarlos, sino determinar el nivel de riesgo aceptable, de acuerdo con la misión y los medios de la institución. La gestión de riesgos se estructura siempre alrededor de seis etapas principales:

- definir el contexto, las necesidades y los objetivos de la institución;
- enumerar todos los riesgos, definidos en términos de vulnerabilidad y amenaza;
- clasificar los riesgos, de acuerdo con categorías (operacionales, financieros, etc.);
- cuantificar los riesgos mediante dos criterios principales, el impacto y la probabilidad, a fin de identificar los riesgos más críticos;
- llevar a cabo acciones que conduzcan a la reducción del nivel de riesgo;
- repetir regularmente el proceso completo (iteración).

El resultado de este proceso es proporcionar las herramientas para facilitar el proceso de toma de decisión.

Gérer les risques : principes méthodologiques

by **Emmanuelle Bermès,**

Responsable fonctionnel de la Bibliothèque numérique sur le Web,
Bibliothèque nationale de France

La gestion des risques, si elle fait aujourd'hui l'objet d'une sorte d'effet de mode, notamment dans le monde des bibliothèques, n'est pas une invention récente. Dans le monde de l'entreprise, et en particulier de la production industrielle, la gestion de risques fait depuis longtemps partie des méthodes de suivi de l'activité. Dans le domaine informatique, la méthodologie de gestion des risques, sans être toujours désignée sous ce nom, permet d'apprécier et de traiter les risques relatifs à la sécurité des systèmes d'information. La gestion des risques fait également partie des éléments de base de la gestion de projet. Toutes ces expériences ont conduit à la formalisation d'une méthodologie de gestion des risques stable et détaillée : un atout pour les institutions patrimoniales qui veulent aujourd'hui se lancer dans l'utilisation de cette méthode pour gérer les risques liés à la conservation de leurs documents.

Pourquoi adopter une méthode de gestion des risques ?

Une bibliothèque qui dispose d'un bâtiment, de collections (physiques ou numériques) à conserver, d'un système d'information, et qui met en œuvre un certain nombre de projets, a d'ores et déjà quatre bonnes raisons de mettre en place une méthode de gestion des risques. En effet, toute activité génère des risques et, en l'occurrence, la question n'est pas de supprimer les risques, mais de déterminer le niveau de risque acceptable en fonction des missions de l'établissement et de ses moyens.

Car la gestion des risques, c'est aussi une gestion du compromis : entre les besoins et les moyens, entre les impératifs immédiats de l'activité et les objectifs à long terme de la mission de conservation... Et pour faciliter ce compromis, la gestion des risques sera un outil essentiel parce qu'elle permet de quantifier, d'exprimer de manière tangible les éléments qui sont d'ordinaire les plus difficiles à estimer lors d'une prise de décision.

Les six étapes de la gestion des risques

La méthodologie de gestion des risques, quoique éprouvée, peut varier d'un contexte à l'autre mais elle s'articule toujours autour de six étapes majeures.

La première étape porte sur la définition du contexte, des besoins et des objectifs. Ce travail est déterminant pour faire la liste des risques et choisir ensuite les critères d'évaluation qui vont permettre de mesurer les risques. Les risques ne sont pas les mêmes suivant que l'on se fixe pour objectif la conservation des documents ou la sécurité des informations et des personnes, par exemple.

Dans un second temps, on établit la liste des risques. Pour cela il est important de bien définir le risque, qui doit obligatoirement se constituer d'une vulnérabilité et d'une menace. La vulnérabilité correspond à l'identification d'un état de fait qui rend le risque possible : ainsi un risque d'inondation ne peut exister que pour un bâtiment construit en zone inondable. La menace est un potentiel d'exploitation de cette vulnérabilité, dont la source peut être interne ou externe à l'établissement.

Il existe différentes méthodes pour identifier les risques : réunions de brainstorming, observations et expérimentations, études de situations réelles par scénario ou par retour d'expérience sur incident, recours à une expertise interne ou externe sous forme d'audit... Toutes ces méthodes peuvent être combinées.

Il peut être utile de classer la liste de risques ainsi obtenue, ce qui facilitera la phase d'évaluation. On utilise à cette fin des grandes catégories de risques (opérationnel, financier, organisationnel, infrastructure, réputation, etc.) et également la nature des sources de risques (les risques externes incluent notamment l'environnement naturel, tandis que les risques internes sont liés aux ressources, aux matériels, etc.).

Les risques sont ensuite évalués de façon à permettre une analyse quantifiée. En général, deux principaux critères sont utilisés pour évaluer les risques : l'impact et la probabilité. L'impact revient à déterminer, en fonction des objectifs fixés lors de la première étape, la gravité de la situation si le risque se produit. La difficulté consiste à déterminer des critères objectifs pour évaluer ce niveau de gravité. La probabilité est plus facile à analyser objectivement, en utilisant l'expérience (le risque s'est-il déjà produit par le passé, et avec quelle fréquence ?).

Pour chaque critère on détermine une liste de valeurs fixes qui vont servir d'échelle de notation, par exemple sur 5 ou 10 points suivant la finesse de l'analyse.

A ce stade, on a obtenu une liste catégorisée des risques encourus dans l'exercice d'une activité, que l'on peut ordonner par niveau de risque. Ce résultat va servir d'aide à la prise de décision : une matrice combinant l'impact et la probabilité permet de faire ressortir les risques les plus critiques (ceux qui ont une probabilité et un impact très forts bien sûr, mais également ceux qui ont une probabilité faible et un impact fort, ou un impact faible mais une probabilité très élevée).

On identifie alors les risques jugés prioritaires, les moyens de traitement et le plan d'action, en fonction des missions de l'établissement. Les coûts et bénéfices des opérations de traitement doivent aussi être évalués : ainsi un risque non prioritaire mais facile à traiter peut être pris en compte. De même une maîtrise très coûteuse mais susceptible de faire baisser significativement le niveau de plusieurs risques majeurs pourra être décidée.

Le traitement ou la maîtrise du risque correspond à la mise en œuvre des actions qui permettent de faire baisser le niveau de risque.

Les maîtrises qui portent sur les risques internes diminuent la probabilité d'un risque. Dans la mesure du possible, on choisit ainsi de juguler la source du risque, afin d'éviter qu'il ne se produise.

Au contraire, on cherche à diminuer l'impact d'un risque quand on n'a pas de prise sur sa source, par exemple dans le cas d'un risque lié à l'environnement naturel. Un plan d'urgence en est un bon exemple : dans l'impossibilité d'empêcher qu'un sinistre ne survienne, on prévoit toutes les mesures qui permettront une intervention rapide et éviteront un impact catastrophique sur les documents.

Il existe d'autres stratégies, comme l'évitement (le risque étant trop élevé, on renonce totalement à l'activité si les missions le permettent) ou le partage (on reporte une partie du risque sur un tiers, par exemple en souscrivant une assurance).

En fin de compte, il existe toujours un risque résiduel, constitué de tous les risques que l'on n'a pas les moyens ou la volonté de traiter. Ce résidu correspond au risque que l'on accepte d'encourir : on parle alors de tolérance au risque.

La dernière étape du processus est l'itération : en effet, une gestion de risque n'est pas un processus fini ou figé. Certains risques peuvent évoluer naturellement avec le temps, de nouveaux risques peuvent apparaître ou même être générés par l'application de certaines maîtrises. La vigilance doit donc être continue dans le temps. Certains risques peuvent avoir une périodicité de révision prédéfinie, et l'ensemble du processus doit être répété à intervalles réguliers.

Conclusion

L'aboutissement de ce processus peut résider dans l'élaboration d'outils qui vont aider à piloter le suivi d'une activité. Ces outils peuvent être des tableaux de bord, qui vont faciliter la prise de décision en proposant aux décideurs des indicateurs chiffrés.

Du point de vue opérationnel, la gestion des risques peut déboucher sur l'élaboration de référentiels de suivi, qui vont permettre de mettre en place des mesures de contrôle, de générer des alertes en cas de problèmes, et de trouver plus facilement les solutions ou les traitements à appliquer.

La gestion des risques est aussi un outil de communication : une fois ce processus achevé, on peut faire connaître les mesures qui ont été prises et ainsi améliorer la confiance dans les activités concernées, confiance qui s'avère être un critère sensible pour des activités comme la préservation de documents numériques ou la sécurité des systèmes d'information.

Emmanuelle Bermès est intervenue lors du symposium international organisé par le PAC à la BnF en avril 2007. Les actes sont consultables en ligne à l'adresse suivante : <http://www.ifla.org/l/whatsnew/new.htm>

Références

Direction centrale de la sécurité des systèmes d'information (DCSSI), *Précis de gestion des risques SSI*, janvier 2006. En ligne : <http://www.ssi.gouv.fr/fr/confiance/documents/methodes/grssi-precis-2006-01-17.pdf>

Gary Stoneburner, Alice Goguen, Aexis Feringa. *Risk management guide for Information Technology systems. Recommendations of the NISO*. NISO, 2002. En ligne : <http://csrc.nist.gov/publications/nistpubs/800-30/sp800-30.pdf>

Federation of European Risk Management Association (FERMA), *Cadre de référence de la gestion des risques*, 2002. En ligne : <http://www.ferma.eu/Default.aspx?tabid=195>

Les références en ligne sont consultées le 6 juin 2007.

Risk Management and Digital Repositories: the case of DRAMBORA

by Emmanuelle Bermès

The long-term preservation of digital objects is still too recent to provide reference tools able to assess the trustworthiness of a patrimonial institution. It is difficult to face preservation needs over 30, 50 or 100 years and more, in a digital world where technologies evolve so quickly that they can modify the whole hardware and software environment in less than five years. However, institutions such as libraries or archives have precisely long-term missions. In those conditions, one of the main difficulties consists in being able to give guarantees and quantifiable elements to sustain their objectives in the long term. Several tools are available: general quality standards or specific ones such as Open Archival Information System (ISO 14721), and risk management method can complete them by proposing a view in time of the activity.

In that context, several initiatives have been taken for the certification of digital repositories: on the international level, one of the most ancient, the Research Libraries Group (RLG) and NARA initiative, called TRAC (Trustworthy Repositories Audit and Certification); on the national level, the NESTOR initiative in Germany and, more recently, the European project proposed by DPE (Digital Preservation Europe) and Digital Curation Centre in UK, using the risk management methodology and called DRAMBORA (Digital Repository Audit Method Based On Risk Assessment).

DRAMBORA provides not only a list of criteria in order to check the compliance of an activity with different standards, but also a real methodology which can be implemented inside one institution as a self-assessment. A tutorial can be downloaded on the project website, with

forms models to be filled in step by step, in order to make the audit easier without requiring a previous training about risk management related to digital objects.

A DRAMBORA audit covers all the activities which are likely to have an impact on digital objects, from the institution's essential missions and objectives to its technical means, strengths and weaknesses on the organizational level, staff, budgets, etc. This methodology is also based on evidence: the risk management and the audit result will rely on the capacity of the institution to provide a well-documented view of its digital preservation activities, thanks to policies, specifications, job profiles, annual reports, completed by staff interviews, direct demonstrations and observations. Evidence is required in order to obtain an objective analysis. This methodology aims at evaluating the vulnerabilities and risks threatening the digital repository activity, with openness, in order to guarantee the trustworthiness necessary to carry this brand-new mission through to a successful conclusion. The goal is not to avoid all the risks but to be able to identify and control them.

DRAMBORA should soon benefit from a Web interface which will make self-audit even easier and bring the risk management methodology in the context of digital repository preservation within everyone's reach.

DRAMBORA on line: <http://www.repositoryaudit.eu/>

NESTOR on line: <http://nestor.sub.uni-goettingen.de/>

TRAC on line:

<http://www.crl.edu/content.asp?l1=13&l2=58&l3=162>

Preventive Preservation, a day-to-day work...



by **Tony Basset**, Microbiologist,
Laboratory of the National Library of France,
Bussy Saint-Georges

Besides internal factors of deterioration, books can suffer from biological contaminations including insects and moulds in most cases. Moulds can damage the material such as paper, leather, parchment, by digesting them. Insects can also feed on books and cause irremediable damages by digging galleries in text blocks or binding leathers, which can lead to the definitive loss of the support.

To avoid such issues, it is highly recommended to control the climatic conditions of the bookstacks, the sanitary state of donations, and to dust regularly the collections. Nevertheless, the fact that collections are installed in a recent building responding to preservation standards doesn't mean that a close watch of the building and collections is not needed. Even recent libraries can be contaminated! This article will present many examples of contamination that the laboratory of microbiology had to manage in French libraries or archives.

I. Example of contamination due to air conditioning system

Climate control is a well-digested notion now. Environmental conditions are proved to influence the development of mould spores and cause damage to collections. Less than 55 per cent of relative humidity is recommended to prevent the spores from germinating. Nevertheless, in some cases, the climate system itself, supposed to control temperature and humidity, can be the cause of a contamination.

For instance, some contamination came from a bad adjustment of humidity sensors due to the recent installation of a climate control system in a new library. When functioning, it caused a fungous contamination which quickly spread in all the stocks (See pictures 1 to 3, p. I.). The sanitary expertise revealed that sensors had regulated relative humidity up to 90 per cent instead of 55 per cent.

Another example: the extra climate control system (dehumidifier/humidifier) consists of two batteries, a cooling battery, in which circulates a refrigerant liquid (which dehumidifies the air), and a heater battery, in

which circulates a hot liquid (which humidifies the air). This technique requires that the cold water pipes are isolated to avoid condensation. But if the material is ill-isolated, humidity appears on pipes, which favours the development of mould spores present in the atmosphere. Therefore, the climate control system supposed to protect collections from a fungous contamination can become a source of contamination itself.

So, climate control system cannot completely meet our needs: a human control of environmental conditions is still required.

II. Example of contamination due to a mismanagement of collections

It is always interesting for libraries to receive a donation or legacy, even if it is a potential source of contamination. Indeed, it can be dramatic to accept a donation without a preliminary sanitary expertise. A mouldy or simply dusty donation can increase the airborne contamination of stocks, not to mention the donations infested with insects.

Our laboratory had to face the case of a library infested with mites (See picture 4, p. I.) because of a donation of moth-eaten costumes. In another case, the installation of moth-eaten blackout curtains in a room led to the general infestation of the library. More exceptional case: a stock infested with booklice (See picture 5, p. I.) coming from a donation conserved in a cellar, and another with fleas. We also had to manage issues of contamination much more serious, due to bibliophagist insects such as wood beetles or furniture beetles (See pictures 8 and 9, p. II.).

Isolating the donations in a place of quarantine seems to be the solution. This quarantine permits then to make a precise diagnosis and recommend some appropriate curative treatments before stocking the donated documents with a collection free from contaminants. Besides, this safety measure should be extended to all the objects integrated into stocks.

III. Example of contamination due to bad maintenance

Building maintenance is essential. Indeed, mismanagement can cause a contamination in the long term. For instance, the laboratory of BnF regularly has to face cases of pipe breaks due to wear or bad sealing, or sprinklers leaks. Those cases, besides the damage caused to collections, can favour, if mismanaged, a microbiological development.

Another example, more exceptional, but as noxious, is the case of gutter obstruction by leaves, which causes an infiltration by walls, an increase of relative humidity and a contamination (See picture 11, p. II.).

A regular maintenance of buildings permits to avoid these troubles which can provoke in the long term sanitary disasters besides the damage suffered by the building itself.

IV. Example of contamination due to a lack of maintenance of places and collections

It is always a satisfaction to put collections in a new library, clean and free from contaminant. But, even if the place is clean at the beginning, it is likely to become dusty with time. Indeed, dust can come from new dirty collections, a lack of airtightness (due to doors, windows, ventilating system, etc.) or human activity. Dust accumulation favours microbiological development, even in the air-conditioned stores (See picture 12, p. II.). Moreover, insects can find an ideal breeding ground in those dusty areas.

For instance, the laboratory had to manage a case of contamination by wood beetles which developed in the bodies of dead insects in a stock and then spread into the binding leathers.

A regular maintenance of collections is required: spores accumulation increases the risk of a microbiological contamination. Indeed, spores which are produced in great quantity can survive several years, waiting for the good conditions, such as an increase of relative humidity, to germinate and generate a mould.

V. Example of contamination due to insects

The environment close to a library is a potential source of contamination. Indeed, the presence of gardens, woods or fields near the building favours the development of pests. Insects represent a very important threat for the documentary material: they need an access to penetrate into stocks and infest them if conditions are favourable. This access can be, besides donations and legacy, windows, doors and all the openings.

The laboratory of BnF is often contacted to identify insects found near collections such as stag beetles (*Dorcus parallelipedus*) (See picture 6, p. I.), living usually near woods: the presence of trees favoured their development and they came into the building by an opened window.

Other insects as cockroaches or pillbugs can also come in by discharge pipes.

Another example: a library invaded by green lacewings (*Chrysopa carnea*) (See picture 7, p. II.), whose larva which eats aphids is more useful in a garden than in a library. In that case again, the contamination was favoured by the closeness of parks.

A more exceptional case: a library infested with several insects (solitary wasps, earwigs, flies, moths, etc.) coming from nearby wheatfields by ill-soldered smoke vents.

Another atypical example: a library overgrown with thousands of cluster flies (*Pollenia sp.*) which came into the building by an interstice. Origin of contamination: the closeness of a cattle farm.

Those insects, even though they are not known to be contaminants for books, can bother the staff and stain books with their excrements.

Those cases of contamination by insects show how important the location of a library is, since its nearby environment can become a source of contamination.

VI. Example of contamination due to human mistakes

The more frequent case is a bottle of water falling on a book or a shelf. The water, if not quickly resorbed, permits mould spores to germinate. Another atypical example: when the cleaning staff washes the stocks floors in water, there is a risk water reaches the lowest shelf by mistake and causes a fungous development on books. Therefore, the slightest mistake of handling can have serious consequences. That is why means of prevention have to be applied to all the operations related to books.

Conclusion

Obviously, a microbiological contamination can have several origins: staff, building or material failures. Moreover, the scale of contamination will be more or less important according to the emergency response time. So it is necessary to keep a close watch on places and collections in order to locate as soon as possible failures (rise of relative humidity, apparition of moulds, insects, etc.). Contamination also raises the issue of immobilization and withdrawal of collections, not to mention the cost of these operations: removal of collections, curative treatments on infested books, works on the building if necessary, disinfection and cleaning of the places, moving in once collections are free from contaminant, etc. So vigilance is highly recommended.

La conservation préventive, un travail au quotidien...

Outre les facteurs de dégradation internes, les ouvrages peuvent subir des dégradations dues à des contaminants biologiques incluant les insectes et les moisissures, dans la majorité des cas. Les moisissures peuvent endommager les matériaux constitutifs des livres comme le papier, le cuir, le parchemin, en les digérant. Quant aux insectes, ils peuvent se servir des livres comme source nutritive, créant ainsi des dégâts irrémédiables en creusant des galeries dans les corps d'ouvrages, les cuirs de reliure et générer ainsi une perte définitive du support.

Néanmoins, ce n'est pas parce que les collections sont installées dans un édifice qui répond aux normes de conservation qu'il faut s'affranchir d'une surveillance étroite du bâtiment et des collections.

Premièrement, il sera toujours nécessaire d'opérer un contrôle humain sur les conditions environnementales, car les systèmes climatiques censés contrôler la température et l'humidité sont parfois eux-mêmes à l'origine d'une contamination. Par exemple, le mauvais réglage des sondes d'humidité reliées à un système climatique nouvellement installé lors de la création d'une bibliothèque a provoqué une contamination fongique dans les magasins.

Bien que toujours enrichissant pour une bibliothèque, un don ou un legs est une source potentielle de contamination. Un legs moisi ou tout simplement empoussiéré peut augmenter la contamination aéroportée des magasins de stockage. Il en est de même pour les dons infestés par des insectes (mites, poux du livre, insectes bibliophages, etc.) qui peuvent contaminer les ouvrages sains.

Le remède serait d'isoler les dons à leur arrivée dans un local de quarantaine afin de faire un diagnostic précis et de préconiser les traitements curatifs adéquats avant de stocker les documents dans un local sain avec des collections saines.

L'attention portée à la maintenance d'un bâtiment est également primordiale. Des cas de ruptures de canalisation, ou encore de fuites de sprinklers, peuvent, s'ils sont mal gérés, provoquer une contamination microbologique. L'entretien des locaux et des collections est tout aussi essentiel pour éviter une accumulation de poussière favorable à un développement microbologique et à la croissance d'insectes.

En effet, l'environnement proche d'une bibliothèque peut être à l'origine d'une infestation des magasins de stockage. Des espaces verts comme un jardin, un bois, un champ, aux abords de la bibliothèque, offrent un terrain propice au développement d'insectes plus ou moins nuisibles. Le laboratoire de microbiologie de la BnF a rencontré le cas exceptionnel d'une bibliothèque contaminée par une multitude d'insectes (guêpe solitaire, perce-oreille, mouche, papillon de nuit, etc.) qui vivaient dans un champ de céréales à proximité et entraient par des trappes de désenfumage mal soudées.

Enfin, l'erreur humaine est une source potentielle de contamination : par exemple, une bouteille d'eau renversée ou une erreur de manipulation lors du nettoyage à grande eau des sols des magasins...

De toute évidence, une contamination microbologique peut avoir plusieurs origines : défaillance humaine, du matériel, du bâtiment. De plus, l'ampleur de la contamination sera plus ou moins importante selon la rapidité d'intervention. Ainsi, il est nécessaire de mettre en place une surveillance des locaux et des collections afin de repérer le plus tôt possible les anomalies (augmentation de l'humidité relative, apparition de moisissures, d'insectes, etc.) et de contrôler régulièrement les interventions se tenant à proximité des collections.

Il ne faut pas oublier que, lors d'une contamination microbologique, se pose aussi le problème de l'immobilisation des collections, de la non-communication des ouvrages et du coût financier engendré par toutes ces opérations : déménagement des collections, traitement curatif des ouvrages infestés, travaux sur le bâtiment si nécessaire, désinfection et nettoyage des locaux, emménagement des collections saines. La vigilance est toujours de mise.

Preservación preventiva, un trabajo del día a día...

Además de los factores internos del deterioro, los libros pueden subir contaminaciones biológicas exteriores que incluyen insectos y moho en la mayoría de los casos. El moho puede dañar los materiales como el papel, cuero y pergamino al digerirlos. Los insectos también pueden considerar los libros como alimento y causar daños al cavar galerías en bloques de textos y encuadernaciones en piel, que pueden conducir a la pérdida definitiva del soporte. Es por ello que deben aplicarse medidas preventivas a todas las operaciones relacionadas con los libros.

Sin embargo, el hecho de que las colecciones estén ubicadas en un edificio nuevo que responda a las normas de preservación no significa que no se requiera vigilar tanto el edificio como las colecciones, ya que incluso las bibliotecas recientes pueden ser contaminadas.

En primer lugar, un control humano de las condiciones ambientales sigue siendo necesario dado que, en algunos casos, el sistema de control del clima, que supuestamente regula la temperatura y la humedad, puede ser causa de contaminación, si no está bien graduado.

Además, las donaciones o legados son una fuente potencial de contaminación. Una donación mohosa o simplemente llena de polvo puede incrementar la contaminación por el aire de los depósitos, ni qué decir de las donaciones infestadas por insectos.

El mantenimiento del edificio también es esencial. Los casos como la ruptura de tuberías pueden favorecer, si no se manejan bien, un desarrollo microbiológico, además del daño causado a las colecciones. También es necesario vigilar a la conservación de las colecciones dado que la acumulación de esporas incrementa el riesgo de una contaminación microbiológica.

Los insectos representan una amenaza muy importante para el material documental, ya que penetran en los depósitos por la más mínima abertura y los infestan si condiciones están favorables. Los casos de contaminación por insectos demuestran cuán importante es la ubicación de la biblioteca, ya que su entorno, tal como un jardín, un bosque o un campo cercano, favorece el desarrollo de insectos dañinos.

Los errores humanos pueden generar contaminación. El caso más frecuente es el de una botella de agua derramada sobre un libro o una estantería. El agua, si no se reabsorbe rápidamente, permite la germinación de las esporas de los hongos.

La contaminación también plantea el problema de la inmovilización y del retiro de las colecciones, además del costo de dichas operaciones: la remoción de las colecciones, los tratamientos curativos de los libros infestados, los trabajos de reparación del edificio que fueren necesarios, las desinfección y limpieza de los espacios, el traslado de las colecciones sanas, etc. Por ello se recomienda altamente mantener la vigilancia.

Library, Pasture and Sheep...

by **Danielle Mincio,**

Head of Preservation and Conservation,
Bibliothèque cantonale et universitaire de Lausanne, Switzerland,
IFLA Preservation and Conservation Section

Open to the general public, the Dorigny Library is located at the heart of the University of Lausanne in a building inaugurated in 1982 (See picture 10, p. II.). Its collections, one of the most important in Europe, are composed of monographs and periodicals covering all the realms of social sciences, which are freely available.

As a part of the University of Lausanne, intentionally installed in a lakeside and bucolic site, the library was built near the oak where Napoleon I is said to have rested, with an unrestricted view on Lake Lemman and French Alps.

Built into the hillside, the library is an arc-shaped building of five floors, including two underground levels: there is no denying that it is a complete architectural success in terms of integration in the landscape and comfort for users. The open-air floors end with grassy terraces and from spring to autumn we have the privilege to see charming sheep graze the grass when it goes to seed. If this environment is magnificent in an esthetical perspective, it is much less favorable to the preservation and consultation of documents.

Until 1990, grass was regularly mowed but, because of budgetary cuts and the rise of ecology, lawn mowers were forbidden and replaced by sheep. When grass goes to seed, the slightest gust of wind scatters the seeds which penetrate into the library by vents whose filters are not thin enough to prevent them from propagating in the air.

If, in most parts of the building, pollens diffusion is limited, it is not the case of the manuscripts and valuable works reading room, since it doesn't benefit from the general air-conditioned system of the building. As installing it *a posteriori* would mean a lot of expense and overhauling the whole system, the room is not yet air-conditioned.

In order to permit readers to breathe, the library staff is often forced to open the windows, above all during summer, which lets seeds and flowers pollen enter. Mosquito screens, also serving as shutters, reduce their propagation but in a less effective way than filters.

Once the germination season has passed, it is the turn of sheep to go into action. As the reading room is situated on the hill side, with only one meter between the windows and the grassy area, sheep are grazing near the users absorbed in the reading of thirteenth century manuscripts.

In sheep fleece live little insects and parasites which would be only too pleased to change their environment to end their days between the pages of the *Encyclopedia* of Diderot and d'Alembert. To that biological pollution, we have to add olfactory and noise pollution. A bleating sheep is one thing; a bleating flock is another...

It is clear that this situation could be improved, first by investing in more efficient vent filters. On the other hand, the stone-paved path along the building should be widened from one meter to five to reduce the pollution related to sheep and grass. The reading room could be air-conditioned too with a stand-alone system to avoid big investments and opened windows.

As the library is not the building owner, all the plans of works have to be submitted to the University which has other priorities as the building of new lecture halls in order to face the increasing number of students.

The conclusion we can draw from this example is that the environmental element has to be taken into account when the building of a new library is planned. If nature provides an ideal setting for study and should not be eliminated, elementary safety measures concerning collections have to be respected to avoid biological contamination.

The National Library of France: Indoor Air Pollution in the Storage Rooms as a Consequence of an ill-suited Air Purification System



by **Thi-Phuong Nguyen**,
Laboratory of the Preservation Department,
BnF, Technical centre of Bussy Saint-Georges
and **Michel Dubus**, C2RMF

The detrimental effects of outdoor atmospheric pollution on archive and library collections have been largely investigated. It has been demonstrated that pollutants emitted by human activity, sulphur dioxide and nitrogen oxides in particular, induce a weakening of cellulose and collagen-based materials, such as paper and leather. Thus, lots of efforts have been done these last years to improve the indoor air quality in these buildings: elaboration of environmental standards, use of high quality filters, installation of air purification systems. The French National Library (BnF), located in Paris, is particularly concerned with these pollution issues. When constructing the new building in 1996, these preservation parameters were taken into account: the construction materials were scrupulously chosen and effective air purification systems, equipped with chemical and particle filters, were installed to clean the air coming from outside.

But, very rapidly, severe corrosion has been detected on the cold copper pipes of the indoor air humidifiers/dehumidifiers placed inside the storage rooms. These extra conditioning units, added to the central air conditioning systems, allow a local regulation of relative humidity. The usual lifetime of such units is 15 to 20 years but those installed at the BnF saw their lifetime shortened to 6 years.

Two types of corrosion were noticed on the hot and cold copper pipes of these units: an acidic corrosion also called "ant nest" or formicary corrosion and a sulphur corrosion, which appears as dark deposits on the hot copper tubes and the silver-containing brazed joints (See picture 13, p. III.).

Because of these corrosion issues, all the extra conditioning units were replaced (188 units), meaning an important additional cost for the BnF.

Several phenomena could have been responsible for this corrosion, including a contamination of indoor air. It was then decided in 2005 to perform an extensive investiga-

tion of the indoor air quality. Four rooms were chosen for this study, in which very different media were stored: acidic documents, audiovisual items, contemporary books and magazines.

This survey revealed an evident indoor air contamination by acidic and sulphur pollutants, which did not come from outside but were definitely emitted by the collections themselves and/or the boxes and folders used for their conditioning. Among the four storage rooms studied, two had pollution levels equivalent to those found in urban environment, thus far higher than the limits admitted in the standards dedicated to the long-term storage of graphic and photographic documents.

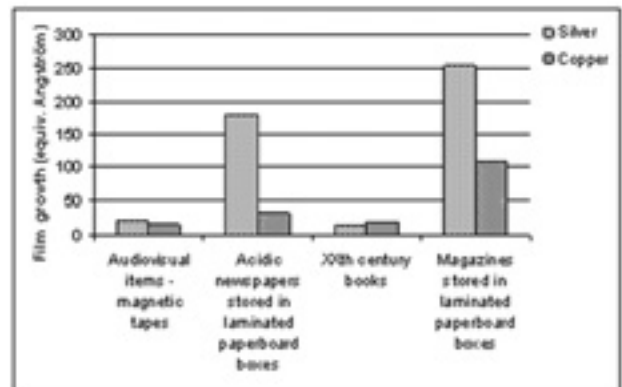
These results are quite worrying and show that, despite the precautions taken to clean the outside air, indoor air cleaning was neglected. Far from suspecting the extent of such a pollution emitted by the collections or the conditioning materials, the teams in charge of the conditioning systems design have concentrated their efforts on energy conservation: 90% of the indoor ventilated air is a non-purified recycled air. Only 10% is taken from the outside, conditioned and cleaned. So, in case of indoor pollution, the concentrations of pollutants increase progressively until equilibrium is reached. For the collections, this situation can be compared with the storage into an airtight box or envelope in which the degradation is highly accelerated.

This study gives a new insight into the conservation strategies of archival and library collections. It shows that the volatiles emitted by the collections or the conditioning materials are important environmental parameters that should be as considered as light, temperature or relative humidity. It also shows that particular attention should be given to the design of air conditioning and filtering systems installed for the long-term preservation of our cultural heritage.

The indoor pollution should not be underestimated: its evident bad effect on some construction materials, as observed at the BnF, foreshadows its potential harmfulness on the documents. How such indoor pollutants can exactly influence the conservation of archival and library collections? Should we take the harmful volatiles into account when we determine the criteria that characterize a "long-term preservation box or envelope"? Is it necessary to standardize the design of libraries and archives purification systems?

To answer these questions, scientists and researchers working in the field of cultural heritage preservation have joined their forces for several years. National or European research programs were born, some of which are funded on national¹ or European² scales. The results of these programs should have key practical consequences: improvement of the cultural heritage conservation, optimization of the costs devoted to them.

Figure 1: Thickness of the corrosion film on silver and copper-plated quartz crystal microbalances³. Results obtained after 1 year exposure in variable storage rooms at the BnF.



Comments

The corrosion film thickness, which reflects the presence of atmospheric aggressive pollutants, varies a lot from one storage room to another. This variability depends on the nature of the collection and/or type of conditioning material used.

It appears that acidic collections induce an acidic corrosion of copper in humid conditions. Some conditioning materials induce, even at a low humidity and temperature, sulphur corrosion on silver and copper.

1. Non-exhaustive list of funded national research programs on VOC's emitted by library collections:

- 2007-2009 three-year plan of the National Library of France, *Volatile organic compounds emitted by the library collections and the conditioning materials, effects on the sound collections*.

Contact: Thi-Phuong Nguyen (BnF), thi-phuong.nguyen@bnf.fr

Project co-funded by the French ministry of Culture and the BnF.

- French National Research Program on Conservation and Knowledge of cultural heritage, *Towards non-destructive diagnostic of paper degradation: a new analytical integrated approach*.

Contact: Anne-Laurence Dupont (CRCC), aldupont@mnhn.fr

Project co-funded by the French ministry of Culture.

- British Library Research Project, *The Volatile Organic Compounds (VOCs) in Books*.

Contact: Barry Knight (British Library), Barry.Knight@bl.uk

Project co-funded by the Andrew W. Mellon Foundation.

2. COST D42 EnviArt: Chemical interactions between cultural artefacts and the indoor environment.

Contact: John B.G.A. Havermans (TNO, The Netherland),

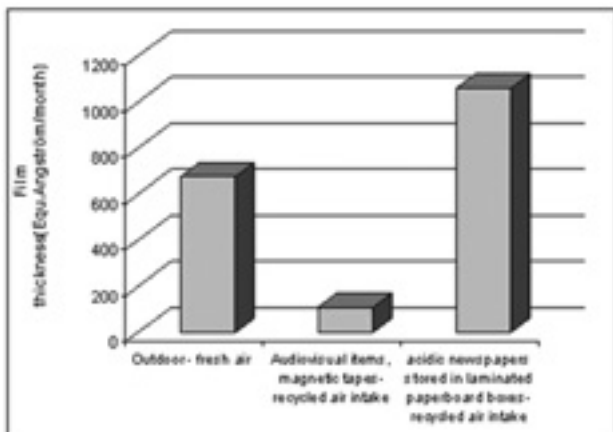
john.havermans@tno.nl

Project co-funded by EC.

3. The Quartz Crystal Microbalance (QCM) is an atmospheric electronic sensor constituted of a piezoelectric device made of a small plate of quartz coated with a thin layer of copper or silver. The coated quartz has a known vibration frequency. When the metallic film is corroded, its mass increases, inducing a modification of the quartz vibration frequency. This monitor is equipped with a data logger and thus can follow on line the air corrosivity.

Figure 2: Thickness of the corrosion film formed on silver coupons⁴.

Results obtained after 1 month exposure in variable storage rooms at the BnF, comparison with outdoors.

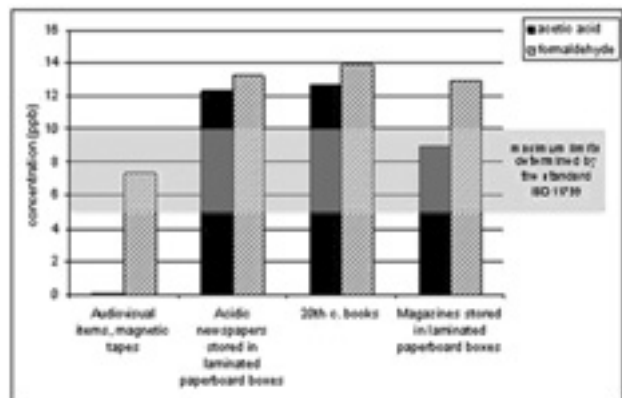


Comments

Silver coupons placed in some storage rooms have, after one month exposure, a higher corrosion film thickness than coupons placed outdoor. This corrosion film, composed of silver sulphide, is probably generated by an interaction between the metal layer and sulphur-containing compounds emitted by some of the conditioning boxes used at the BnF. In the room where acidic newspapers are stored in boxes, the sulphur pollution exceeds this observed in the outdoor urban atmosphere.

4. Environmental reactivity coupons (ERC) are acrylic plates coated with a thin layer of silver, copper or lead. After one month exposure, the corrosion crystals are analysed by cathodic/electrolytic reduction. It is possible by using this method to have information on the chemical composition and the thickness of the corrosion film.

Figure 3: Comparison of acetic and formaldehyde levels measured in some BnF storage rooms with the limits determined by the standard 11799⁵.



Comments

For some atmospheric pollutants, the international standard ISO 11799 suggests maximum limits admitted in the storage areas of archives and libraries. Acetic acid and formaldehyde are two of the pollutants mentioned in this standard, which are found in the storage rooms of the BnF. The graph clearly shows that, among the four rooms studied, two exceed the limits of acetic acid and formaldehyde determined by the standard.

5. ISO 11799, 2003: *Information and documentation*. Document storage requirements for archive and library materials.

Pollution dans les magasins de stockage du site Tolbiac de la BnF : les revers d'une climatisation mal adaptée

Les effets nocifs de la pollution atmosphérique sur les documents d'archives et de bibliothèques ont déjà été très largement étudiés. Les gaz polluants issus de l'activité humaine, dioxyde de soufre et oxyde d'azote, provoquent une fragilisation des matériaux celluloseux (papier notamment) et des matériaux issus du collagène (cuir en particulier). C'est à ce titre que des normes ont été édictées et des efforts fournis pour améliorer les systèmes de purification de l'air entrant. Le nouveau bâtiment de la Bibliothèque nationale de France, installé sur le site de Tolbiac, a été conçu comme un établissement type, prenant en compte ces nouvelles règles de la conservation préventive : les matériaux ont été scrupuleusement choisis, des centrales de climatisation performantes ont été mises en place, équipées de filtres chimiques et de filtres à particules.

Pourtant, malgré ces précautions, des problèmes de corrosion sévères ont été observés sur les batteries froides en cuivre des armoires de climatisation placées à l'intérieur des aires de stockage des collections. Auxquels s'est ajoutée une corrosion de nature très différente sur les batteries chaudes de ces mêmes armoires : les brasures contenant de l'argent étaient très fortement dégradées tandis qu'un dépôt noir de nature soufrée (sulfure de cuivre) était visible sur les tubes en cuivre. Le remplacement de la totalité des batteries froides et chaudes a dû être effectué (188 unités), entraînant un surcoût très important pour l'établissement.

Plusieurs phénomènes peuvent être à l'origine de cette corrosion, tels qu'une contamination de l'air intérieur. Il a donc été décidé en 2005 d'entreprendre une étude exhaustive de la qualité de l'air dans quatre magasins, lesquels ont été choisis en fonction de la nature des collections stockées : documents acides, documents audiovisuels, monographies et périodiques contemporains. Cette étude a révélé la présence de gaz polluants acides et soufrés qui ne proviennent pas de l'air extérieur mais des collections elles-mêmes et/ou des boîtes et pochettes utilisées pour leur conditionnement. Sur les quatre magasins étudiés, deux présentaient des niveaux de pollution équivalents à ceux trouvés en milieu urbain, donc bien supérieurs aux valeurs maximales admises par les normes relatives à la conservation sur le long terme des documents graphiques et photographiques.

Ces résultats montrent que, malgré les précautions qui ont été prises pour assainir l'air issu de l'extérieur, aucune mesure n'a été prévue pour traiter celui qui est à l'intérieur. L'étude menée par le laboratoire du département de la conservation de la BnF renouvelle donc quelque peu la problématique de la conservation préventive des documents d'archives et de bibliothèques. Elle révèle l'importance de facteurs de dégradation autres que la température et l'humidité, à savoir les composés organiques volatils libérés par les collections elles-mêmes et/ou leurs conditionnements, et l'attention toute particulière qui doit être portée à la conception des systèmes de filtration et de climatisation dédiés au stockage à long terme des collections patrimoniales.

Cette pollution interne ne doit pas être sous-estimée : ses effets sur les matériaux du bâtiment, tels que constatés à la BnF, nous font entrevoir sa potentielle nocivité pour les documents patrimoniaux. Quels sont précisément les impacts de ces polluants internes sur la conservation des collections d'archives et de bibliothèques ? Les normes qui définissent actuellement l'aptitude des conditionnements à la conservation des collections doivent-elles être reconsidérées, et tenir compte en particulier des composés organiques volatils potentiellement néfastes qu'ils pourraient émettre ? Doit-il y avoir des normes portant sur la conception des systèmes de traitement de l'air dédiés à ce type d'édifice ?

C'est pour répondre à ces questions que, depuis quelques années, des laboratoires et équipes de recherche impliqués dans la préservation des collections de musées, d'archives ou de bibliothèques ont uni leurs efforts autour de projets communs de recherche, nationaux ou internationaux. Les résultats de ces études devraient avoir des issues pratiques essentielles : amélioration des conditions de conservation du patrimoine écrit, photographique, audiovisuel ou muséologique, optimisation des dépenses qui y sont consacrées.

La Biblioteca nacional de Francia: contaminación del aire de los depósitos como consecuencia de un sistema de purificación de aire inadecuado

Los efectos negativos de la contaminación atmosférica externa sobre las colecciones de las bibliotecas y archivos han sido objeto de amplias investigaciones. Se ha demostrado que los contaminantes que emite la actividad humana, el dióxido sulfúrico y los óxidos de nitrógeno en particular, inducen el debilitamiento de los materiales a base de celulosa y colágeno, tales como el papel y el cuero. Por consiguiente, se han realizado muchos esfuerzos durante los últimos años para mejorar la calidad del aire en el interior de estos edificios, tales como: elaboración de normas ambientales, uso de filtros de alta calidad, instalación de sistemas de purificación. La Biblioteca nacional de Francia (BnF) tiene un interés particular en estos problemas de contaminación. Cuando se construyó el nuevo edificio en 1996, se tomaron en cuenta los siguientes parámetros de preservación: los materiales de construcción se seleccionaron escrupulosamente y se instalaron sistemas de purificación de aire eficaces, equipados con filtros para partículas y químicos, para limpiar el aire proveniente del exterior.

Sin embargo, muy rápidamente, se ha detectado una severa corrosión en las tuberías de cobre para agua caliente y fría de las unidades de acondicionamiento de aire instaladas dentro de los depósitos. Esta corrosión puede ser producto de varios fenómenos, entre los cuales se puede incluir la contaminación del aire interior. Luego, se decidió en 2005 llevar a cabo una amplia investigación de la calidad del aire interior. Se escogieron cuatro depósitos para este estudio, en los cuales se almacenan diversos medios: documentos con soporte ácido, piezas audiovisuales, libros contemporáneos y revistas. Este estudio reveló una evidente contaminación del aire interior por contaminantes ácidos y sulfúricos, que definitivamente no provenían del exterior sino que eran emitidos por las colecciones mismas y/o por las cajas y las carpetas utilizadas para su almacenamiento. Entre los cuatro depósitos estudiados, dos tenían niveles de contaminación equivalentes a los que se encuentran en el ambiente urbano, aunque muy por encima de los límites admitidos en las normas relativas al almacenamiento a largo plazo de documentos gráficos y fotográficos. Estos resultados son muy preocupantes y muestran que, a pesar de las precauciones que se han tomado para limpiar el aire exterior, se ha descuidado la limpieza del aire interior.

Este estudio da una nueva visión a las estrategias de conservación de las colecciones de los archivos y las bibliotecas. El estudio demuestra que las sustancias volátiles emitidas por las colecciones o los equipos de acondicionamiento son parámetros ambientales importantes que deben tomarse en cuenta al igual que la luz, la temperatura o la humedad relativa.

No se debe subestimar la contaminación interior: ¿cómo pueden exactamente esos contaminantes internos influir en la conservación de colecciones bibliotecarias o de archivo? Para responder estos interrogantes, los científicos e investigadores que trabajan en el campo de la preservación del patrimonio cultural han aunado esfuerzos durante varios años en los programas de investigación nacionales y europeos. Los resultados de estos programas tendrán consecuencias prácticas claves, tales como el mejoramiento de la conservación del patrimonio cultural y la optimización de los costos destinados a ella.

Preservation of Books, Pictures, Fabrics and Others from Mould Spoilage



by **Philippe Dantigny**,
Agricultural Engineer,
Laboratory of Food Microbiological Engineering,
ENSBANA, Dijon, France

Introduction

Due to the appearance of visible hyphae, production of unpleasant odours, fungal spoilage of books, pictures, fabrics, etc., causes important losses. In order to preserve historical heritage, there is a need for a tool allowing prediction of fungal development. This paper develops the basis of « predictive mycology » that takes into account moulds specificities. The influence of some environmental factors on mould development is reviewed and the bottleneck of knowledge highlighted. Eventually, readers are provided with some guidelines and possible strategies for avoiding mould spoilage.

Mould specificities

Fungal growth involves germination and hyphal extension, eventually forming mycelium. Spores are widely disseminated in the environment, and they are principally responsible for spoilage. Under favourable conditions, especially the humidity of air, spores swell. Thereafter, when the length of the germ tube is equal to the spore diameter, the spore is considered to have germinated, see Fig.1.

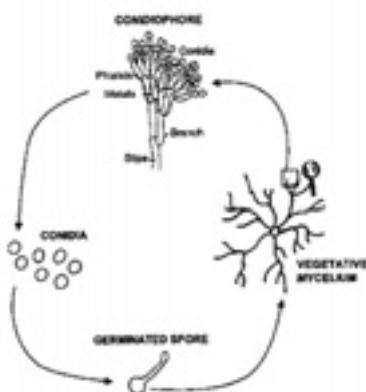


Fig. 1: Life cycle in *Penicillium chrysogenum*.

Germination can be considered as the main step to be focused on, because a product is spoiled as soon as visible hyphae can be observed. However, few studies have concerned germination kinetics. This shortage can be explained by the difficulties of acquiring sufficient, reproducible data. In fact, this kind of study requires microscopic observation for evaluating the length of the germ tube.

Temperature (T) is the main factor for controlling bacterial growth, but the effect of water activity (a_w) on mould growth is more important than T. Oxygen is necessary for the growth of food spoilage fungi. In contrast, light is not necessary for mould development, for fungi are not photosynthetic. Fungi are heterotrophic organisms that should obtain the carbon from their environment.

Bottlenecks of knowledge

Whatever the ecosystem, the bottlenecks of knowledge remain the same as illustrated in Fig. 2.

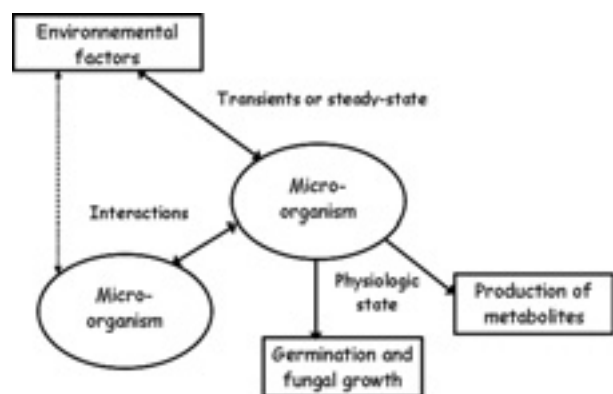


Fig. 2: Factors that affect the metabolism of organisms.

Depending on the environmental factors, moulds are developing at different rates. The highest rate is obtained when all the environmental factors are set to the maximum. There are many factors that can limit fungal development: the medium that may contain inhibitors, intrinsic factors such as the pH and extrinsic factors such as the water activity (relative humidity of the air/100 at equilibrium with the medium in a closed device) or temperature. It should be mentioned here that the latter factors cannot be controlled in an open environment. In these transient conditions they are not constant with time and important variations (either the magnitude or the rate) are responsible for adaptation of the cells (synthesis of stress proteins). More generally, the "physiological state" of the micro-organisms (*i.e.*, the conditions in which they were grown or stored) has a great importance for explaining the kinetics of development. It was shown recently that the germination time of spores that were not produced in optimum conditions was enlarged as compared to spores obtained in optimum ones. The last factor that affects metabolism is the interaction between organisms. Interactions can be antagonistic (*e.g.*, competition for the limiting substrate), but also synergistic. One organism can develop only if another organism is present. For example, a molecule produced by a micro-organism is necessary for the development of the other one. In addition, all the organisms can alter the environmental factors while growing (changes in the pH value).

Models

Models aim at understanding and predicting fungal development and metabolism. Biological phenomena are complex, but they can be modelled by simple laws. In a first step, the most important factors can be determined by means of the experimental design methodology that allows determination of the most significant factors carrying out the lesser experiments as possible. For example, it was shown that pH had no significant effect on the germination of spores. In contrast, water activity had a greater influence on germination than temperature. In addition, a synergistic interaction effects between a_w and T was demonstrated. In a second step, the influence of the most important factors on fungal development should be described by using kinetic models.

We focused on germination of a population of spores. In Fig. 3, the percentage of germinated spores P (%) is drawn as a function of time t (h), for various concentrations of an inhibitor (ethanol). The logistic function that fits the experimental data is:

$$P = P_{\max} / (1 + \exp(k(\tau - t)))$$

P_{\max} , that represented the percentage of viable spores, was equalled to 100% for ethanol concentrations in the

range 0-3%, all spores were viable (capable of germinating). This model also provides the germination time, τ (h), that is the time at which half of the viable spores were germinated. In this example, all the other factors (medium, pH, a_w and T) were set at the optimum.

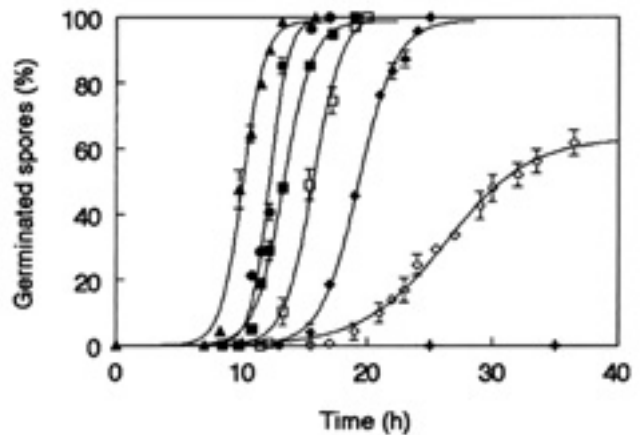


Fig. 3. Germination kinetics of *P. chrysogenum* on YNB-GA medium (0.99 a_w , pH 5.4, 25°C) in presence of ethanol solutions (wt/wt): (▲), 0%; (●), 1%; (■), 2%; (□), 2.5%; (◆), 3%; (◇), 3.5%, (+), 4%, and logistic model (—) fit.

Therefore, the increase of the germination time was due to the increase of the ethanol concentration only. The germination curve is symmetrical with respect to the germination time that represents also the mean germination time of the spore germination. Thus, the use of the logistic model is related to a normal distribution of individual germination times amongst a population of spores. It was experimentally verified that normal distribution was obtained when spores were obtained under optimal conditions, 25°C, 0.99 a_w . But when spores are obtained under sub-optimal conditions (0.95 a_w), the distribution is no longer normal. As a conclusion, it is necessary to monitor the environmental factors during production of spores, because germination kinetics depend also upon the physiological state of the spores.

Strategies for controlling mould spoilage

Some guidelines that are listed below are already in use. The key factor for controlling mould development is the humidity of air. It is also important to monitor temperature because variations of temperature may lead to condensation in some remote place, thus favouring mould development. Similarly, ventilation of dwellings is important to avoid condensation. In order to decrease the risk of contamination it is always desirable to maintain as a level as low as possible the number of spores that are present in the ambiance. It should be kept in mind that spores are also disseminated through dust present in the air. Eventually spores will fall down on the books,

pictures, fabrics, etc., that can be potentially spoiled under favourable conditions. At this stage it is not necessary to identify all the spores present, because only few species (the most adapted to their environment) may develop. Therefore the identification of the moulds responsible for spoilage should be made on visible mycelium. Strategies for avoiding mould spoilage should include the prediction of the germination time because spores are much more sensitive to fungicide products when the germ tubes are initiated. Unfortunately, there is a lack of knowledge on the effect of transient environmental conditions and physiological state of the spores on the germination kinetics. Research should be directed towards these bottlenecks of knowledge. Future application may consist in developing simple tests warning people in charge of heritage preservation from imminent spoilage.

Author:

Philippe Dantigny
Laboratoire de Génie des Procédés Microbiologique et
Alimentaire
ENSBANA
1, Esplanade Erasme
F-21000 Dijon
France
phdant@u-bourgogne.fr

References

- Sautour, M., Rouget, A., Dantigny, P., Divies, C. and Bensoussan, M. (2001a). "Prediction of conidial germination of *Penicillium chrysogenum* as influenced by temperature, water activity and pH", *Lett Appl Microbiol* 32: 131-134.
- Sautour, M., Dantigny, P., Divies, C. and Bensoussan, M. (2001b). "A temperature-type model for describing the relationship between fungal growth and water activity", *Int J Food Microbiol* 67: 63-69.
- Sautour, M., Dantigny, P., Divies, C. and Bensoussan, M. (2001c). "Application of Doehlert design to determine the combined effects of temperature, water activity and pH on conidial germination of *Penicillium chrysogenum*", *J Appl Microbiol* 91: 900-906.
- Sautour, M., Dantigny, P., Divies, C. and Bensoussan, M. (2002). "Comparison of the effects of temperature and water activity on growth rate of food spoilage molds", *J Ind Microbiol Biotechnol* 28: 311-315.
- Dantigny, P., Soares Mansur, C., Sautour, M., Tchobanov, I. and Bensoussan, M. (2002). "Relationship between spore germination kinetics and lag time during growth of *Mucor racemosus*", *Lett Appl Microbiol* 35: 395-398.
- Sautour, M., Dantigny, P., Guilhem, M-C. and Bensoussan, M. (2003). "Influence of inoculum preparation on the growth of *Penicillium chrysogenum*", *J Appl Microbiol* 95: 1034-1038.
- Dantigny, P., Guilmart, A. and Bensoussan, M. (2003). "Predictive mycology: some definitions", *Cryptogamie Mycologie* 24: 377-383
- Dantigny, P. (2004). "Predictive mycology", in McKellar, R.C. and Lu, X (eds), *Modeling microbial responses in food*, CRC Press, Boca Raton, FL, USA, pp 313-320.
- Dantigny, P., Guilmart, A., Radoi, F., Bensoussan, M. and Zwietering, M. (2005a). "Modelling the effect of ethanol on growth rate of food spoilage moulds", *Int J Food Microbiol* 98: 261-269.
- Dantigny, P., Tchobanov, I., Bensoussan, M. and Zwietering, M. H. (2005b). "Modelling the effect of ethanol vapour on the germination time of *Penicillium chrysogenum*", *J Food Prot* 68: 1203-1207.
- Dantigny, P., Guilmart, A. and Bensoussan, M. (2005c). "Basis of predictive mycology", *Int J Food Microbiol* 100: 187-196.
- Dantigny, P., Bensoussan, M., Vasseur, V., Lebrihi, A., Buchet, C., Ismaili-Alaoui, M., Devlieghere, F. and Roussos, S. (2006). "Standardisation of methods for assessing mould germination: a workshop report", *Int J Food Microbiol* 108: 286-291.
- Dantigny, P., Marin, S., Beyer, M. and Magan, N. (2007). "Mould germination: data treatment and modelling", *Int J Food Microbiol* 114: 17-24.

Hot Water Damage: A Case Study of the Library of the Culture Palace for Nationalities

by Zhang Zhiqing and Zhao Daying

Department of Rare Books and Special Collections,
National Library of China

The Library of the Culture Palace for Nationalities of China (LCPN), built in 1959, is a national library which houses important collections of national minorities, 600,000 books and periodicals, including a rich collection of many precious versions and full-text ancient books written in Tibetan, Mongolian and Manchu (See picture 1, p. III.). Its bookstacks are on the first basement of 500 square meters. Unexpectedly, on November 15, 2005, a broken heating pipe led to a minor flood at the bookstacks and seriously damaged more than 20,000 volumes of ancient books and newspapers. As a rare case of hot water disaster, the causes, response action, salvage and recovery should be carefully analyzed and discussed. This event points out that, even in a modern library, the pipes of fire extinguishing installations and drainage system can suffer flood risk. Therefore, more attention should be paid to the increasing proportion of water damage in modern libraries.

1. The water damage causes

On November 15, 2005, a 50cm-diameter heating pipe placed near the basement of the LCPN suddenly burst, releasing 90° water into the drainage system and then into the basement. At 10:00 am, a librarian found water flow effusing out of the drainage system and steam rising up, so he called the policemen immediately. Ten minutes later, hot water had rapidly accumulated, forming a 30cm-deep pool in the bookstacks and inundated the lower bookshelves. Due to the high temperature and the low visibility caused by steam, the librarians and rescuers could not go into the basement at all. When steam rose to the roof, the fire sprinkler abruptly turned on and wetted the newspapers on the upper bookshelves, located on the passageway of the library, damaging the collections a second time.

In the wake of the floods, the library officials immediately called the fire police, the Beijing Armed Police and the Beijing Heating Company. After a slight drop of the temperature, they immediately decided to pump water. However, around 13:00, since water pumps were still on the way, more than eighty armed policemen had to enter the library basement with buckets to carry the water out.

Though the steam in the library made it overshadowed and difficult for breathing, all the hot water was carried out within two hours. More than 200 people had participated in the rescue action, and finished the work at about 23:00. According to the statistics, more than 20,000 newspapers and books were damaged by the hot water, including more than 290 packs of the precious Tibetan Buddhist sutras of the Qing Dynasty and more than 600 traditional-thread-binding Chinese ancient books. The cinnabar on many books was blurred, spread and sank, so the book became unrecognizable. Some modern national minority language newspapers and periodicals were badly wet. The poured hot water also damaged the artifacts and objects kept in the Museum of the Culture Palace for Nationalities, 25 objects were immersed directly and four precious of them were seriously damaged. There were approximately 2,629 pieces (sets) of objects fumigated by the steam. The carpets, gifts from the national minority areas given to the central government in 1950, were badly drenched. The disaster cost hundreds of thousands of China Yuan (CNY) in damage.

This hot water disaster is very rare in libraries. Because of water, the paper became glutinous and groups of pages adhered together, several books were worn down to cotton fibers and some documents were blurred and the characters were unrecognizable. Softener from the hot water degraded the paper fibers and formed red marks on paper. The disaster reduces the lifetime of the collection for at least 100 years.

With the benefit of hindsight, we can summarize the main causes of the disaster as follows:

1.1. The heating pipes go through the adjacent area of the library basement.

The LCPN, surrounded by hotels and skyscrapers, is on the north of Chang'an Street in Beijing and has very little space. The heating pipes go through the adjacent area of the bookstacks, connecting to the drainage system of the library. So once a pipe burst, the bookstacks would be inevitably affected. November 15th was the first

day the heating system started for the citizens in Beijing. The heating pipes had been laid over ten years, so they became frangible when suddenly carrying hot water.

1.2. The automatic fire extinguishing system watered the collections for a second time.

The fire extinguishing system automatically turned on because of the steam, and sprayed water downwards wetting the newspaper on the upper bookshelves.

1.3. Disaster preparedness and emergency facilities are not complete.

The LCPN quickly called the fire police, Beijing Armed Police and Beijing Heating Company when the flood occurred. However, because it was hot water disaster, the fire control facilities could not be used. The library itself didn't have any water-sensing alarms and detailed disaster preparedness plan, so when the water pumps could not be assembled in time, the Beijing Armed Police had to use buckets to carry water out. The Beijing Heating Company came to the library at about 12:20 (two hours later) to examine the pipelines and repaired the broken pipes. The work ended at 20:00 or so. Besides, when the automatic fire extinguishing system started spraying inside the bookstacks, the staff outside could hardly observe it, so they did not shut down the system in time.

1.4. The high temperature of the water delayed the rescue process.

Hot water disaster is very rare: the ordinary rescue measures do not work at all. It took more than three hours, since the water entered the bookstacks, for the temperature to come down. Moreover, the clean-up process lasted seven hours, so the time for treating the books had to be extended.

1.5. Some precious books were without any protective covering cases.

The ancient books were put on the naked bookshelves. Those preserved with protecting covering cases had been slightly damaged, but the others were severely affected and became swollen. Some precious ancient Tibetan sutras with Chinese pothi binding were placed in naked wooden bookshelves (without doors) so they were fumigated by steam (See picture 2, p. IV.).

2. Documents treatment

While calling the police immediately and organizing staff to clean up the site, the library also sought help from the National Library of China, the National Museum of China and other neighboring cultural institutions that have rich experiences and techniques for preservation and conservation.

Chen Li, vice-director of the National Library of China, together with several preservation and conservation experts, suggested the rescue measures. First, they gave priority to the precious books and documents: to loose the leaves that were sticking together and to dry them. The staff used the toothpicks to separate the wet sticking leaves, placed unfolded soft absorbent Xuan paper towels between two leaves and changed twice. Second, to stack nearly dry books and use weight to press them flat. After this, they used drying machine. Third, because of limited time to treat other ones, they put them at a dry and ventilated place for air-drying. Four days later (November 19th), the library vacated a 35 cubic meters room to form a cold-storage warehouse. All books and documents were moved into it to prevent further distortion and mold growth. Later on, they vacated other two rooms for freeze-drying, and cooperated with an institution whose large vacuum freeze-dryer could be able to treat over 300 volumes at one time. In March 2006, the library had completed the drying procedure and started the restoration work (See picture 3 and 4, p. IV.).

In order to avoid the accident again, the library also built a partition at the adjacent area to the heating pipelines, rebuilt the bookstacks and enhanced the emergency response system.

After a year of hard work, all the books and newspapers have been conserved except several books that need to be flattened.

3. Inspiration from the disaster

The main flood risk in modern libraries comes from water pipes, drainage systems and fire extinguishing system. For instance, on November 29, 2005, a water pipe burst in the City Museum of Lanzhou, damaging over one thousand chinaware, ancient painted potteries, paintings and calligraphies of celebrities, and other precious ancient books and documents¹. Flood can also be caused by malfunctioned drainage system. In summer 2006, the rainstorm carrying silt plugged the drainage channels of the National Library of China, and accumulated large-scale standing water on the flat roof. Fortunately, owing to timely clean-up and dredging, the event didn't cause damage to the collections.

A special attention should be given to water damage, even if it appears to be negligible compared with the damage caused by fire. The fire sprinkler system is still considered by librarians as the most effective way of

¹ Lanzhou Bowuguan Dixiashi yin Shuiguan Polie Zao Shuizai Wenwu Sunhui (*Burst Pipe Drenched the Basement of Lanzhou Museum and Damaged its Objects*), Xinwen Chenbao (*Shanghai Morning Post*). Posted by: Lu Yuanzhi at 2005-11-30 02:45. <http://news.qq.com/a/20051130/000321.htm> [2007-3-9].

controlling fire but the lessons from the case of LCPN show us the urgent need of special preparedness to water damage.

3.1. The management of the library surrounding pipelines and drainage systems should be strengthened.

The case of the LCPN is different from other flood cases, because it was not caused by internal ruptured pipes. This reminds us that the outside ruptured pipes can also have fatal effects on library collection. The surrounding environment has to be taken into account as one of the risk factors by libraries, as IFLA's disaster manual² stresses it.

The manual takes the vicinity of the buildings as the primary consideration for risk management, and argues that it is advised to "ensure that the appropriate civic and commercial authorities responsible for the water and electricity supplies, sewage and drainage systems, highway maintenance etc., regularly check their systems"³. The case of the LCPN once again proved the significance of this point.

3.2. Waterproof preparedness should be the primary task of library security.

Underground bookstacks are convenient for security management, temperature and humidity adjustment and air quality control. However, various underground pipelines go through the adjacent area of bookstacks, and sometimes may have even been located above the basement (such as in the National Library of China). So the underground bookstacks are actually threatened by the pipelines and have increasing flood risk.

The cases of LCPN and the City Museum of Lanzhou tell us that it is not appropriate to use underground bookstacks in humid and rainy, low-lying and flood-prone areas. Unfortunately, the new built Zhejiang Library is just near the West Lake where frequently occur typhoon and flood. The rare books were placed in the basement, increasing the risk of disasters. As a result, flood preparedness and precaution at the new library is much more difficult than at the old library located at the foot of Xiaogu Mountain.

The Ministry of Culture of China recently issued five profession standards and one of them is the *Basic Requirements of Book Stacks for Rare Books and Special*

*Collections*⁴. Accordingly, bookstacks for ancient books should not be located on top or upper floor of a building. This aims at fire protection, but shows less concern on water damage or flood. The location of bookstacks should be carefully designed including the waterproof materials and flood control requirements.

3.3. Protective barriers should be created and completed.

Library's protective barriers are mainly composed of baseboards, clapboards, waterproof pipelines, waterproof ceiling above bookshelves, higher propped bookshelves, protective covering cases and bookcases.

According to *Basic Requirements of Book Stacks for Rare Books and Special Collections*, air conditioning system should be used in bookstacks for heating instead of water heater installation. Bookstacks should not have pipes for drainage system, air conditioning or heating system, as well as no connection with the areas which have these equipments⁵.

The international current standard requires a basement to "store all material at least 150mm above floor level to delay the effects of flooding". To avoid the damage caused by a burst sprinkler, the IFLA also advises to "provide water barriers (canopies, hoods, plastic sheeting) over the tops of shelving" and to "prefer 'local response' sprinkler heads to target the specific source of the fire and reduce water damage elsewhere by too many sprinkler heads being turned on unnecessarily"⁶. Attending to carry out this measure, we should not lose sight of fire fighting efficiency of the top waterproof barrier.

The function of protective covering cases and bookcases were highlighted in the LCPN's flood. Many ancient books kept in paper-made protective covering cases with cloth-covers have been able to avoid water damage. IFLA's disaster manual also proposes to "use as many 'barrier systems' as possible and affordable (for example, boxes for documents, drawers for maps, prints and plans, filing cabinets for slides, films, photographs)". In the National Library of China, most of the precious editions have protective covering cases.

2. *IFLA Disaster Preparedness and Planning, A Brief Manual*, John McIlwaine, translated by IFLA-PAC China Center, June 30, 2006.

3. *Ibid.*, p.10.

4. *Tushuguan Guji Tecang Shuku Jiben Yaoqiu (Basic Requirements of Book Stacks for Rare Books and Special Collections)*, Chapter 4.3, Library Profession Standards, the Ministry of Culture issued, Beijing Library Press, 2007-1.

5. *Ibid.*, Chapter 4.13.

6. *IFLA Disaster Preparedness and Planning, A Brief Manual*, p.11, 13.

3.4. Pre-disaster evaluation, disaster response and post-disaster recovery should be highlighted.

Many libraries in China have neglected disaster evaluation and management. The librarians and staff have no preservation training at all; they have no idea about disaster preparedness. In the case of LCPN, the drainage system shouldn't have been connected to heater system, the fire sprinkler system should have been shut off in time when the disaster occurred and the pump equipments should have been transported to the site timely.

IFLA's disaster manual is very important and useful for libraries. In 2006, China IFLA-PAC Centre, located in the National Library of China, translated it into Chinese, and transmitted it to all the national libraries, as a guiding document for disaster management.

IFLA's disaster manual develops a three-phase procedure:

- 1) to evaluate the possibility of disasters;
- 2) to know the existing resources, to set out a disaster management plan within the budget and staffing structure;
- 3) to improve implementation.

The manual especially stresses that every independent institution should make a practical disaster plan in light of its own condition and requirements, prepare a worst-case plan and make sure the warning alarm works well every day⁷.

The manual regards the pre-disaster evaluation as a basic step to be accomplished before making a disaster plan. This includes knowing the external threats from neighboring buildings, risk from conflicts and so on, evaluating the existing disaster preparedness structure and response procedure. It considers the analysis of water damage as important as the fire one.

Conclusion

If we collected and translated internal and international resources on disaster handling experiences and research outcomes of libraries, and integrated the latest techniques, then set out suitable and practical disaster preparedness plan, libraries would be able to raise disaster prevention awareness and improve their protection work. It is still an urgent task for us.

*The paper complete version will be available at:
<http://www.ifla.org/VII/4/ipn.html>*

7. *Ibid.*, p. 6.

The British Library Centre for Conservation



by **Helen Shenton**,
Head of Collection Care,
British Library

1. Introduction

The new purpose-built British Library Centre for Conservation (BLCC) on the St Pancras site in London opens in April 2007. The £13.25 million cost of the BLCC has been raised from a combination of government funding, private and public funds. There have been three main, intertwining elements of the Centre – construction, fund-raising and a change programme. The vision was to:

- create state-of-the-art book conservation studios and sound archive technical studios located for the first time together with the collections;
- incorporate public access and educational opportunities as a fundamental part of the design;
- create training and educational facilities to replenish the profession of book conservation;
- apply scientific research on materials to the conservation of library collections.

The BLCC will focus on being a centre of excellence for book conservation. It brings together oriental and occidental book conservation for the first time as well as preventive book conservation (archival phase boxing) and it allows conservators funded by the 'Adopt a Book' fund-raising scheme to join colleagues in the same studio space'. Up until the beginning of March 2007, 45 conservation staff were still working in very inadequate facilities two kilometres away from the St Pancras site on the British Museum site (it was one of the last British Library (BL) facilities still operating on that site after the BL vacated the British Museum site in 1998). When the BL moved to the St Pancras site in 1998, 35 conservation staff moved into new studios located in the main St Pancras building. The BL currently employs 180 conservation, preservation staff and collection care staff. The centre also houses audio preservation studios, which were several kilometres away in sub-optimal facilities. In

1. More information on 'Adopt a book' can be found on the British Library website.

addition, the new building incorporates professional training, public tours of the studios and demonstrations.

2. Construction

In some ways the new three story construction is an upside-down building. As a key requirement in the main studios was northern light, the majority of the space has been allocated to the top floor. Beneath the glazed top-lights of the zigzag roof, the large studios on this floor accommodate 48 conservators, with groups of 8 benches clustered around shared equipment to delineate the different teams. Aqueous treatments are undertaken in a separate, adjoining area along one wall. There are also separate spaces for finishing and leafcasting on this top floor, together with a flexible studio for book-care processes and demonstrations. The Centre is reached across a new public square, with the entrance across this terrace through a visitor and learning centre, adjoining an education suite. The exterior square is designed to be at a height suitable for a future walkway from the adjoining St Pancras EuroStar Railway Terminus, also opening in 2007. On the middle floor there are specially designed areas for archival box-making adjacent to materials storage, an area for marshalling exhibition items going out of the BL on loan, quiet meeting rooms, a scientific examination facility and a workshop for dusty and dirty work, as well as a quarantine room adjacent to the loading bay. The lower floor comprises mainly floating studios to achieve the very high acoustic specification for audio preservation. The Sound Studios are built using blockwork, thermal and acoustic insulation and sit on reinforced concrete slabs floating on acoustically isolating rubber pads some 600mm thick.

3. Public access

The incorporation of public programmes of visits, demonstrations and the explanation of conservation has been part of the fundamental design of the BLCC. Behind-the-scenes tours have been designed into the layout of the conservation studios from the beginning

and they are built on a known interest of the public to see people doing conservation, gained from the 'Adopt a Book Meet your Book' events. It will include demonstrations and workshops for the public and the visitor display in the entrance will be linked to the main Exhibition Galleries, making conservation a core activity at the BL². The Centre will also form part of the public tours of the BL³.

4. Training and Development

The other new element in the Centre is funded internships and training in book conservation. This is a direct response to the much-talked-about crisis in book conservation training in the United Kingdom. Six out of eight courses have closed over the past five years. It is also a matter of self-interest. When analyzed in 2004, 19% of staff in the BL Conservation Department were due to retire within 5 years, rising to 25% for book conservation staff. Many of these conservators have decades of experience and were trained in a way unavailable today. The first Head of Conservation Training in a UK library or archive was created at the BL in 2005, with a remit not only to address the development of the current 80 conservators at the British Library, but also to address the crisis in book conservation training in the UK and define what part of that training the BL should provide. A piece of fundamental research was undertaken to determine the future need for book conservation. An international questionnaire demonstrated that there is a perceived need for book conservation and therefore for training, at current if not increased levels. An interesting finding was that respondents thought that in the light of digital developments, the value of the book as artefact will increase rather than decrease, with a commensurate increase in the need for skills to conserve books as artefacts. The need to replenish skilled book conservators is considered to be a national and international need. In response to this the BL has, in collaboration with Camberwell College of Art (part of the University of the Arts) and other partners, set up a two-year Foundation Degree in Book Conservation, designed to address the industry-identified practical skills shortage. The BL will contribute towards the practical element of the course, providing designated studio space in the new Centre and national vocational qualifications (nvq) for training the trainers ahead of the move into the new building⁴. In addition, a programme of BL internships with funded bursaries will build on the modest *ad hoc* internships and placements currently accommodated. The first BL intern

funded through the Heritage Lottery Fund (£10K) joined the BL at the beginning of November 2006.

5. Conservation treatment review

The new Conservation Centre is much more than just a building project. It is being used as a catalyst for a wide range of changes and improvements. An internationally validated review of all conservation treatments is being carried out, to ensure consistency and best practice. A skills audit will ensure that there is the right match of skills to care for the changing nature of the collections and to follow through the findings of the 'Conservation Treatment Review'. This is part of an initiative to ensure that conservators are fully prepared with new skills demanded by the BLCC (such as giving public tours) and that existing skills are refreshed.

6. Conservation Research

The BL has also identified the need for applied conservation research applicable to caring for the collections in libraries and archives in UK and internationally. The first Head of Conservation Research in a UK library or archive was appointed in 2003. In 2004 'The British Library Applied Conservation Research Strategy' was produced and the BL attracted funding from the Andrew W. Mellon Foundation for an international roundtable discussion to produce a peer-agreed strategic framework of priorities for conservation research in the library and archive community in the UK over the next five years⁵. The emerging themes are:

- the life cycle of collections, including life-cycle prediction, natural ageing of materials and the evaluation of preservation strategies;
- the effects of the storage environment, including the selection of the optimum environment for different materials;
- the development of non-destructive methods for assessing damage to materials.

The emphasis on applied conservation research and the collaborative, outward-looking approach reinforce many BL corporate strategies, particularly the promotion of the public understanding of science and the importance of science and technology in the Library's collections. On a practical level, examples of the collaborative approach are illustrated by the involvement with the EU-funded 'SurveNIR' project to develop an infrared spectrometer for measuring the deterioration of paper which can be used in future condition surveys⁶, and the EU project 'InkCor' investigating iron-gall ink corrosion on paper textblocks, which is a major problem in library and archive collections⁷. Recently the BL received a grant of

2. More information on exhibitions can be found on the British Library website.

3. More information on public tours can be found on the British Library website.

4. More information can be found on the Camberwell College of Arts website: <http://www.camberwell.arts.ac.uk/>

5. More information can be found on the British Library website.

6. More details can be found on the SurveNIR website: <http://www.science4heritage.org/survenir/index.html>

7. More details can be found on the InkCor website: <http://www.infosrvr.nuk.uni-lj.si/jana/Inkcor/index.Htm>

\$700,000 from the Andrew W. Mellon Foundation for two projects to be run over the next three years:

- The Identical Book project will look at the condition of identical books in different nationally significant libraries⁸. By analyzing the condition of identical books published in the UK since the Copyright Act of 1710 in the six different copyright libraries and by using historic data about the storage environments, the project aims to enable more accurate prediction of the future condition of books.
- The volatile organic compounds books project will analyze VOCs given off by books⁹. Paper emits a complex mixture of organic compounds as it ages, including volatile acids, which account for the characteristic smell of old books. They contribute to the further degradation of paper, and it appears that the mix of compounds is characteristic of different papers, the degree and rate of degradation and the pathway by which the paper is degrading. By sampling the air in book stores and measuring the quantity of acid produced, this project aims to help libraries design storage facilities that minimize the rate of paper degradation and also to give an early warning of when the level of acid in the books is reaching dangerous levels.

Conservation research has become a Government issue demonstrated by the British Library's recent participation in a House of Lords Science and Technology Sub-Committee hearing on Science and Cultural Heritage. The Enquiry is investigating conservation research across all the cultural sectors. The written evidence and the transcripts of the oral evidence given are a very interesting snapshot of scientific research in the conservation field and, specifically, how applied conservation research in libraries and archives is developing¹⁰.

7. Conclusion

This new BLCC is a vote of confidence in the need for conservation, and on reflection, this is not just the case at the BL. In the UK, over the past ten years, new studios have opened at Oxford Conservation Consortium, Cambridge Conservation Consortia, the Victoria and Albert Museum, the Conservation Centre at the National Museums Liverpool and the Tate Collection Centre in London is being planned.

*More information on the British Library website:
www.bl.uk/*

⁸. More details can be found on the British Library website.

⁹. More details can be found on the British Library website.

¹⁰. The Report is published on the Houses of Parliament website: www.parliament.uk/.

Historical Opportunity for Ancient Book Preservation in China

by Zhang Zhiqing,

Director of Rare Book and Special Collection Department,
National Library of China

The article focuses on three points:

- 1) the general condition of Chinese ancient books and the serious situation of ancient book preservation.
- 2) the new situation and new mission for the national ancient book preservation since the *Outline of the Programme of Chinese Cultural Development during the 11th Five-Year Plan* was issued, and the Chinese Ancient Book Preservation Project was carried out.
- 3) the important role that the National Library of China (NLC) will play in this new period, relying on the experiences gained from basic work during these years.

1. China has a huge number of ancient books, which are regarded as a precious heritage of Chinese culture.

China is one of the most famous birthplaces of human culture. The great ideologists such as Laozi and Confucius were born in China 2,000 years ago. Paper was invented in China in 100 BC. Methods of printing had come into use by the 7th century, which was helpful to the development of Chinese culture. To take the official library as an example, there were catalogues edited in each dynasty counting the number of books. In the earliest extant catalogue, which dates from the Han dynasty, there were 13,090 volumes; there were 1,855 books in 20,935 volumes in the 3rd century; there were 33,090 volumes in the 7th century; there were 3,277 books in 79,221 volumes in the 11th century. Since the print technique was popular in the Five dynasties, the amount of books became larger and larger. The Northern Song and Southern Song dynasties had edited 119,972 volumes, while the Liao, Jin and Yuan dynasties had edited 9,149 books including series and individual books. The statistics of book editions and press became harder from the 14th century. During the 14th century, the *Congshu* (a series of books edited together by category e.g. the works of Confucius and later commentaries) and *Leishu* (a series of books edited together by genre or subject) came out. The famous *Leishu* of *Yong Le Da Dian* were edited at the beginning of the 14th century, which had 11,095 books in 22,877 volumes, including

over 7,000 kinds of books. It is still the largest encyclopedia in the world today. The series of *Si Ku Quan Shu*, which was edited in the Qing dynasty, has even 700 million words in 36,304 volumes of one book. So the book and press history scholar, Qian Cunxun, said, "The production of books in China was larger than the total number of the production of all other countries in the world by the end of 15th century. And no other country could compare with the large number of Chinese *Congshu* and *Leishu*". Although after the damage of fire, water, worms and wars, the books left today are no more than one tenth, they can still be treated as cultural treasures. According to the statistics, the libraries in China hold about 27,175,000 volumes of ancient books (edited before 1912). If we add the libraries of universities, cultural relic preservation offices and the temples, the total number of ancient books becomes more than 30,000,000 volumes. Among those ancient books, there are more than 2,500,000 volumes of rare books. All of those books are the precious cultural inheritance of both China and the world.

2. The situation of ancient book preservation is very serious.

To preserve and pass on that cultural inheritance are the main tasks of modern librarians. Many ancient books are damaged and aged, waiting for conservation. Since the PRC has been founded, the government has done a lot on preservation and conservation, such as: organizing the conservation of *Zhaocheng Tripitaka*, *Yong Le Da Dian*, Dunhuang manuscripts, Tangut documents and many rare books; setting up bookstacks in many areas to preserve the ancient books; and buying instruments and equipment for testing and experimentation. However, the situation of ancient book preservation is still very serious. This can be summarized as follows:

a) The quantity and quality of ancient books are still not clear now.

Since 1949 the national government has collected and bought nearly 90% of the ancient books, and distributed them amongst different public libraries and those of universities, museums, and cultural relic preservation offices. But many libraries and institutes have not made detailed catalogues of their ancient books. Moreover, the number of ancient books left in the private sphere is not clear, so we can only make a rough calculation of the damage condition and preservation of the ancient books. The national government hasn't set up principles /policies for archives and management of the rare books.

b) The damage and ageing of ancient books are very serious.

The Dunhuang manuscripts are very precious documents dating from the 4th to the 10th century. Most of them are damaged. The preservation of Song and Yuan rare books dating from the 10th to the 13th century is better because of the attention being paid to them continuously. But some of them also have damage and ageing problems. A large number of ancient books of the Ming and the Qing dynasties are seriously damaged. Many of them need to be conserved urgently, especially the books written on bamboo paper which are acidifying. In the past 20 years, the environmental pollution from industrialization has accelerated the speed of acidification of ancient books. The inspection that NLC launched in recent years proves that the average pH value of paper of ancient books in NLC is 6.1. Only 8% of all the ancient books have a pH value greater than or equal to 7. So the ancient books need to be acid-free as soon as possible. Once the pH value drops to 5, the books will acidify seriously and greatly deteriorate.

c) There are not enough conservators.

Ancient books conservation is a traditional handicraft. However, the condition of the professionals of ancient books conservation is not optimistic at the present. There is a lack of staff: they are too old and they are falling behind with the high quality and speed of current requirements. Apart from the serious condition of the damaged ancient books, the lack of professional conservators is the most pressing problem now.

Ancient books conservation is a constant struggle against time. It is also a great undertaking to preserve and pass down Chinese civilization. Although anything has its own order of nature - birth, growth and death -, preservation and conservation may put off the process at least. Books can exist over ten times longer than human beings. The books will be passed down by our efforts as physical historical remains. Therefore, ancient book preservation is a sacred and historical mission for us.

3. Historical opportunity for ancient book preservation

China has suffered much in the last hundred years. It was caught up in wars with England, France, Japan, Eight Allied Powers, experienced World War and civil wars, and then the Cultural Revolution. Its cultural heritage was greatly destroyed in all this turmoil. However, a new opportunity has come in the peaceful age since 1949, especially in the last 20 years. With the development of economy and more investment in culture, the idea of cultural heritage preservation is deeply rooted among the people. *Outline of the Programme of Chinese Cultural Development during the 11th Five-Year Plan* was issued on Sept 13th 2006. The paper puts emphasis on "education in Chinese traditional culture, the inheritance of classic books and techniques". And as an important measurement and a phase target, the Chinese Ancient Book Preservation Project should be launched, in order to make greater efforts towards the preservation of rare books and other relics.

The preservation project is the center of the preservation work in the 11th Five-year Plan. The aim of the project is to establish scientific and effective regulations, to promote actual work, and to arouse public attention (form a proper attitude to preservation). The preservation work will abide by the following principles: preservation should be the primary aim; conservation should be carried out urgently; conservation shouldn't limit public access to the books; and the management of ancient book collections should be strengthened. The work should follow the idea of: preserving by laws and using scientific methods; making a balance between the preservation and utility of the ancient books; concentrating on crucial points and carrying them out step by step. There are four main points of the preservation project.

1. To survey the existing ancient books in the whole nation, so as to get an overall knowledge and an initial sorting of the collections either in libraries, museums or nongovernmental places. All books will be registered and then managed by a hierarchy of importance. A comprehensive database will be established, which will lead to a unified catalogue of Chinese ancient books.
2. To lay more emphasis on rare books. Appropriate measures will be put in place, including making a catalogue of rare books and ranking holding institutions according to the importance of their collections and the quality of their conservation work. This will be helpful in forming a comparatively good preservation and management system, which will improve the holding condition of ancient books.

3. On the basis of the two aspects mentioned above, special funds will be devoted to rescue the damaged books and to make conservation archives. A National Documents Preservation Library will be established. Basic research and testing will be carried out, including the combination of traditional and modern techniques, and new standards for preservation and conservation.
4. To enhance the utility of ancient books, as well as preservation, new reading methods are needed such as digital, photographic printing and so on.

The four aspects of the preservation project supplement each other. An effective fulfillment of the project requires more investments, more professional staff, and a coordination system. The preservation project is planned to form a cooperation system in the whole libraries profession in five years, which will provide a stable foundation for further work. It is a historical opportunity for all the libraries and will significantly influence future work on ancient book collections. Actually, the preservation project integrates all the operations related to ancient books in the name of "preservation".

First, there won't be many scattered ancient books, since about 90% are already stored in libraries by appropriation, donation and purchase. Electronic catalogues are being compiled. The corresponding data has the advantage of being easily distributed, readily used, bearing images and being easily updated and managed. Libraries can exchange standardized data through the Internet. On this basis, the survey of the existing ancient books in the whole nation will be of great help to catalogue compilation and management in the future. The information collected in the survey can act as a dynamic catalogue of Chinese ancient books. It will fulfill the dreams of bibliographers, as it brings much convenience to the readers as well as the libraries.

Second, the preservation project indubitably has positive influence on the libraries' collections. Once the catalogue of rare books is compiled and the institutional hierarchy has been established, funds will be granted to institutions whose holdings of ancient books are large or very important. The storage conditions will be improved with better equipment and stacks and more conservation. The ancient books will be treated with the same care that is given to cultural relics.

Third, the preservation project will promote conservation work. It is an important point in the plan to establish a national preservation laboratory. It can provide scientific evidence from experiments and tests for the conservation work. Also research on standards of bookstacks and conservation techniques will provide a foundation for

the conservation of ancient books. Professional staff is also required. Especially staff who both have library experience and are trained in academic theory. Nanjing Jinling Technical College set up an Ancient Book Conservation department in 2006: it is the first college to grant bachelor degrees in Ancient Book Conservation in China. The cooperation between colleges and libraries creates a virtuous cycle and also a new era of professional education.

Fourth, the preservation project insists on both the preservation and the utility of ancient books. Public access will be facilitated by modern techniques, such as digitization, photographic printing and microfilm. Chinese Rare Books Reproduction Project provides a good example of the use of photographic printing, and it is an important part of the preservation project. During stage one of the project, 758 of the finest books were carefully selected from libraries all over the nation. Some books with sections held in different place have the chance to be united as a complete whole again. Now, the task of the first stage is coming to end, and the following work on rare books of the Ming and Qing dynasties is about to begin. As a result of the success of the Chinese Rare Books Reproduction Project it has been officially made a part of the Chinese Ancient Book Preservation Project. Recently many other libraries round China have given more time and resources within their digitization projects to ancient books. There are nearly a hundred databases, which provide readers with whole collections in digital form. The preservation project suggests cooperation on digitization work, which means the resources won't be developed separately and repeatedly, but will be shared by all members. Each library creates and holds its own resource. Readers can view basic information from the project's homepage but for more detailed information they must visit the website of the holding library. This can assure the libraries' own privileges of holding and publishing.

The third-generation digital library has already put most emphasis on developing relationships between data and helping the reader to analyze those relationships. Founded on these functions, the new database will not only supply readers with resources, but also help them to gain valuable information like a sponge absorbing water. The database can also learn from users and adapt itself to their needs. This is a good reward for the libraries that take part in the cooperation work. To sum up, the insistence on both preservation and utility will provide readers with a new experience of the "Knowledge Service".

The preservation project takes "preservation" as its guiding principle. This principle has been extended into most of the library's work such as collecting, cataloguing, holding, readers' service and preservation. The project

enhances the work on ancient books and the cooperation between libraries. Following the principle of cooperation and resource sharing, all the libraries, from the national or provincial ones to the civic or county ones, can take part in the preservation project. This will bring vigor and vitality to every member, especially for the libraries whose work on ancient books has been peripheral.

In order to ensure the project is carried out successfully, in 2005 the NLC spent nearly one year cooperating with the nine main libraries to create six basic standards. The standards included *Standards for Ranking Ancient Books*, *Standard for Ranking of Damage*, *Basic Requirements of Book Stacks for Ancient Books and*

Special Collections, Techniques and Quality Standards of Conservation, *The Standards for Surveying Ancient Books*, and *The Professional Requirements for Conservators*. The last one is issued as a recommended standard for the preservation project, and the other five are appointed to be the standards for the library profession by the Ministry of Culture. All of these standards are set out by the experiences arising from long-term working practice. The detailed explanations for these standards can be found in *Journal of National Library of China*. These standards are very useful in preparing the preservation project, and will influence the work of ancient book care in all the libraries in China.

Scientists Develop Technology for Roll-up Laptop Screens

New 'morphing' structures have multiple applications

Scientists at the University of Cambridge have developed a range of unique, shape-changing structures, which can be used as roll-up display screens (such as laptop screens), re-usable packaging, roll-up keyboards and self-erecting, temporary habitats.

These structures, also known as 'morphing' structures, afford multiple configurations without the need of complex parts or sophisticated manufacturing. Dr. Keith Seffen, from the Department of Engineering, has developed the structures and is currently exploring various applications for their ingenious behaviour with co-worker Dr. Simon Guest and graduate student Alex Norman.

Dr. Seffen said: "They offer substantial shape-changing capabilities whilst preserving structural integrity. They are simply made and their operation does not rely upon advanced materials. They afford compact, inexpensive solutions for multifunctional devices, which are required to be lightweight, stiff, but foldable on demand."

By using an ordinary sheet of metal, Dr. Seffen can produce structures with no moving parts but which can be configured between at least two distinct, self-locking and stable forms. For example, an A5-sized flat screen can be snapped into the shape of a tube for compact carriage in a briefcase or pocket.

The operation does not require hinges, latches or locks, and without these extra parts, production times and costs are reduced compared to traditional folding structures.

For further information, please contact:
University of Cambridge
Office of Communications
Tel: + 44 (0) 1223 332300

E-paper will be probably launched on the market in 2008

The French newspaper *Les Echos* has proposed its electronic-ink version since April 2007. A reader and one-year subscription will cost 440 to 650 euros (prices before tax).

The Flemish newspaper *De Tijd* was the first to test its own electronic version from March to May 2006, during which it provided readers with a portable device that held an ultra-thin screen the size of a newspaper page, with a very high resolution. This device, connected to the Internet, downloaded the daily paper and kept on updating it electronically and automatically during the day.

This technology has been developed by E Ink Corporation. In the meanwhile, Plastic Logic announced the creation of the first factory of e-paper at Dresde, in the "Silicon Saxony", which will produce the largest flexible organic active matrix display, whose prototype has been elaborated at the University of Cambridge.

It is not the only company developing e-paper: Polymer Vision, Philips subsidiary company, also presented a new form of electronic paper, in the 3GSM World Congress 2006 at Barcelona, which could bring newspapers to mobile phones in the coming year. It consists in putting a rollable electronic display into mobile devices: it can be rolled out to a greater size than the mobile device itself and rolled back when the user has finished. The main goal of the company is to respond to the consumer demand for larger displays in smaller devices.

E-paper will be probably launched on the market in 2008 and might impact the publishing industry by offering the possibility of printing on thin and flexible plastic substrates, "take anywhere, read anywhere", with a paper-like viewing comfort for the consumer. But its price remains a problem: it should be divided in the years to come thanks to industrial production.

For more details, please consult the papers published in *Livres Hebdo* n°680, March 2007.

L'Ina ouvre une école supérieure de l'audiovisuel et du numérique, Ina'sup

Octobre 2007

Ina'sup, toute nouvelle école supérieure de l'audiovisuel et du numérique, ouvrira ses portes en octobre 2007. L'Ina s'appuie sur ses compétences uniques en France de conservateur des archives de la radio et de la télévision, de producteur audiovisuel et de formateur pour créer deux formations de niveau master qui répondent aux nouveaux défis du monde numérique, de la télévision et du Web. La scolarité, étalée sur deux ans, est organisée selon deux spécialités, « patrimoine » et « production ». Les cours seront dispensés par des universitaires et des professionnels de la communication et de l'industrie aux côtés d'intervenants de l'Ina. A l'issue de cette formation, l'Ina délivrera des diplômes du ministère de la Culture de niveau Bac +5.

Pour plus d'information :
Ina (Institut national de l'audiovisuel)
Formation
4, avenue de l'Europe
94366 Bry-sur-Marne cedex
Tél. : 01 49 83 21 75
Fax : 01 49 83 25 83
Site Internet : www.ina.fr
E-mail : inasup@ina.fr

The Challenge of Recycling: New Prototypes of reusable Paper

Trying to face the issue of waste paper in offices, two competing companies, Xerox and Toshiba, are developing new prototypes of reusable paper.

The Xerox Research Center of Canada is experimenting a new prototype of self-erasing paper: the paper erases itself within 16 hours so that it can be used again and again. The main goal is to reduce waste in modern offices, where paper is used as a medium of display rather than storage. The document will be printed with purple ink on a specially coated paper with a yellow tint. This paper contains elements that when absorbing a certain wavelength of light make the colour of the paper change and then gradually revert to its original appearance. Therefore, the only limit in the process of printing would be paper life. Nevertheless, the project is still in a laboratory phase and Xerox has not yet decided when its technology will be commercialized.

Toshiba has developed a completely different technology: a special ink printing on a thermal-sensitive paper which loses its colour and becomes invisible when exposed to very high temperatures in an erasing machine. This technology reverses the chemical bonding reaction occurring in thermal printing, which uses heat to put text on paper. It would allow companies to reuse paper up to 500 times. The so-called "e-blue" technology has already been commercialized in Japan but it won't be available in Europe before 2008. Recently presented in London, it seems to need some adjustments as sometimes rests of printing ink can still be visible on the documents. Moreover, the main problem is the cost, which is very high, because it includes special toner and ink pen, a photoconductor unit and an erasing machine.

For more information on the paper industry, please consult a special survey published in *Livres Hebdo* N°668, « Le papier, presque cadeau », December 2006.

New President at the BnF

Bruno Racine has succeeded Jean-Noël Jeanneney at the head of the National Library of France since the 2nd of April 2007. He was Director of the Villa Médicis, the French Academy in Rome, from 1997 to 2002, and then President of the Georges Pompidou Centre from 2002 to 2007.



© David Paul Carr/BnF

The new PAC Directors

PAC (Preservation and Conservation), one of the six core activities of IFLA, the International Federation of Library Associations and Institutions, has been implemented as a network with a focal point based at the National Library of France in Paris and regional centres, whose directors are:

- Ximena Cruzat, Chile;
- Chen Li, China;
- Johann Maree, South Africa;
- Rosa Salnikova, Eastern Europe and the CIS;
- Dianne L. van der Reyden, USA and Canada;
- Annette Wallace, Trinidad and Tobago;
- Colin Webb, Australia;
- Francis Zogo, Bénin.

We are pleased to introduce the new PAC Directors.



Hiroshi Sakamoto has replaced Yukiko Saito as the new PAC Director for Japan.



Ramón Sifontes has replaced Orietta Palenzuela Ruiz as the new PAC Director for Venezuela.



Jayme Spinelli is appointed as the new PAC Director for Brasil.

Publication

Newspapers of the World Online: U.S. and International Perspectives Proceedings of conferences in Salt Lake City and Seoul, 2006

Edited by Hartmut Walravens

Digitisation has been a hot topic in newspaper librarianship for some years now; it came as a godsend for many bulky and space-consuming collections. The major part of this volume comprises the papers given at the international conference on newspaper digitisation held at the University of Utah, Salt Lake City (May 2006) and presents the state of the art, including experiences from current British and North American projects. This material is complemented

by presentations at the World Library and Information Congress in Seoul (August 2006), focusing on the East Asian Newspaper situation.

München: K.G. Saur, 2006, 195 p.
IFLA Publications 122
ISBN-13: 978-3-598-21849-1
ISBN-10: 3-598-21849-4
Price: 78.00 €

Order:
K.G. Saur Verlag
P.O. Box 701620
81316 Munich, Germany
Tel: +49 89 76902 300
Fax: +49 89 76902 150/250
E-mail: info@saur.de
Website: www.saur.de

Events and Training

Announcements

SOIMA 2007: "Safeguarding Sound and Image Collections"

August 6-31st, 2007

Rio de Janeiro, Belo Horizonte
and São Paulo, Brasil

Organizers

- AN (National Archives of Brazil)
- ICCROM, (International Centre for the Study of the Preservation and Restoration of Cultural Property)

With the cooperation of

- CECOR (Center for Conservation and Restoration of Cultural Movable Properties), School of Fine Arts, Federal University of Minas Gerais - Belo Horizonte, Brazil
- Cinemateca Brasileira, São Paulo, Brazil

- CRCC (Centre de Recherches sur la Conservation des Collections), France
- CCAAA (Coordinating Council of Audiovisual Archives Associations), United Kingdom
- ECPA (European Commission on Preservation and Access), The Netherlands
- Masters Degree Program in Moving Image Archiving and Preservation, New York University, USA
- Office of Records Services, National Archives and Records Administration, USA

The course

Audiovisual records are an integral part of our contemporary life and culture. Yet, audiovisual materials all around the world, especially those housed in heritage or other institutions with mixed collections, are at risk due to deterioration, technological obsolescence or damage from natural and other disasters. Moreover, preservation and conservation of audiovisual materials are complex, requiring specialized guidance, skills and infrastructure. While digitization offers new possibilities for wider access and preservation, many institutions lack expertise to assess the technological implications and to make informed choices that do not strain institutional resources and, at the same time, respect the authenticity and inherent values of this heritage.

This 4-week course will discuss the meaning, selection and use of audiovisual collections in various contexts, exploring the potential of audiovisual

media in transmitting knowledge and cultural traditions. It will provide an overview of issues related to the preservation and access of audiovisual materials *e.g.*, films, tapes, cassettes, disks. It will especially focus on identification of various formats including the playback equipment, life expectancy of media and ways of detecting deterioration. Course topics will include: current knowledge and practices for documenting, handling and storage, risk assessment of collections, emergency preparedness and response, criteria and technologies for migration and reformatting, planning preservation projects, outsourcing options, mass storage systems and management of metadata. Other issues such as copyright laws, legal deposit, institutional and national preservation policies will be discussed in context with participants' working realities. Adaptation to technological changes and related cost-effective preservation strategies will form a key component of the course.

For more information, please contact:
SOIMA 07-Collections Unit
ICCROM
13, via di San Michele
I-00153 Rome RM
ITALY
Telephone: ++39 06 58 55 31
E-mail: collections@iccrom.org
Website:
http://www.iccrom.org/eng/01train_en/announcement_en/2007_08SoimaBRA_en.shtml

IFLA Satellite Meeting "Mold, Pests and Dust: Preservation Policies and Management"

August 15-16th 2007,
Durban, South Africa

This meeting is being co-organized by IFLA Preservation and Conservation Section, Rare Books and Manuscripts Section, Newspaper Section and IFLA-PAC Core Activity. Mold, pests and dust plague African libraries, but worldwide libraries and archives also fight back against these most unwelcome visitors. Corresponding committee member Johann Maree, Head of Preservation at the University of Cape Town Libraries, organizes a full schedule with several international experts to share the latest research and methods for controlling and/or recovering from outbreaks of these ills. These include Helen Lloyd, Preventive Conservation Adviser at the U.K. National Trust and David Pinniger, DBP Entomology in the U.K.

Contact person: Johann Maree
jmaree@hiddingh.uct.ac.za

"Preserving Aboriginal Heritage: Technical and Traditional Approaches"

September 24-28th, 2007
Ottawa, Canada

This symposium, held in Ottawa at Library and Archives Canada, will provide an opportunity for Aboriginal people and conservation specialists to learn from one another – in an atmosphere of mutual respect – about traditional, technical, ethical, and intangible aspects of the conservation of Aboriginal material culture. It is being organized by the Canadian Conservation Institute (CCI), with input and guidance from an Advisory Committee comprising members of First Nations, Inuit, and Metis communities across Canada.

Themes

- *Mutual Learning, Respect, and Ethics*
 - Aboriginal heritage and conservation needs in Canada;
 - links between the care and conservation of tangible objects and intangible aspects of culture;
 - ethics and conservation of Aboriginal heritage.

– *Working Together*

- ways in which Aboriginal people and conservators can work together;
- effective consultations and collaborative projects between Aboriginal people and museums;
- respectful handling, storage, and exhibition of Aboriginal objects.

– *Technical and Traditional Approaches*

- traditional fabrication techniques of Aboriginal objects in Canada;
- care, conservation, and/or analysis of Aboriginal objects, archival records, archaeological artifacts, rock art, paintings, pesticide-contaminated objects, etc.

– *Long-term Impact*

- enhancing the capacity of Aboriginal communities and conservators to preserve Aboriginal material cultural heritage through diffusion of knowledge, including learning opportunities for Aboriginal youth;
- facilities planning and upgrading, preventive conservation, and risk assessment of collections.

– *Pesticides* (session co-hosted by the ICOM-CC Working Group on Ethnographic Collections)

- research in pesticide identification and removal from contaminated collections;
- developments in the assessment of health risks;
- methods or protocols for handling and use of contaminated objects.

For more information, contact:
Client Services
Canadian Conservation Institute
1030 Innes Road
Ottawa ON K1A 0M5
CANADA
Tel: (613) 998-3721
E-mail: symposium_2007@pch.gc.ca

World Library & Information Congress

74th IFLA General Conference and Council

"Libraries without borders: Navigating towards global understanding"

August 10-15th, 2008
Québec, Canada

Libraries play an extraordinary role in educating and empowering citizens. They help individuals and communities to become more knowledgeable, aware and imaginative. At the heart of the drive towards global sharing, libraries transcend economic and social disparities. They promote the values of democracy, equality and basic freedom and reject discrimination. Libraries are a passport for crossing all borders, the key to opening all gateways to knowledge. A true hub, libraries seamlessly incorporate information technology. Their heritage mission is to promote the value of their documentary resources, from textual to image, sounds and multimedia resources. In so doing, they touch on disciplines such as archives and museum studies. Libraries are the crossroads for intellectual and cultural diversity, the locus of exchange and dissemination. Libraries are also the best defenders of access to information. More than ever, access to knowledge determines the quality of political, economic and social governance. Workers, students, researchers, parents and teachers alike can, through libraries, grow and develop their own vision of a just society, express themselves and act.

This conference will enable librarians and archivists to manage in a more effective way preservation and access to their traditional and contemporary collections. The symposium will provide the opportunity to learn about the national preservation programme led by Library and Archives Canada and the Canadian Conservation Institute and hear about current national-level or larger-scale activities in other countries, in a further international perspective.

More information regarding the 74th IFLA General Conference and Council will be soon available on the IFLANET website, at: <http://www.ifla.org/>.

Reports

Conference of Directors of Asia-Oceania IFLA-PAC Centres & Preservation Meeting between China, Japan and Korea

National Library of China, Beijing
January 16-19th, 2007

The National Library of China held a meeting of PAC Regional Centres Directors in Asia on January 16-19th and a meeting on Preservation between China, Japan and Korea, in presence of Christiane Baryla, Director of the IFLA-PAC Core Activity, and under the direction of Chen Li, Director of the IFLA-PAC Centre of China.

The conference focused first on Conservation Management and Regulations and Process. Then, several conservation cases were presented, explaining the issues and their possible solutions. The meeting goals were to describe the process and the analysis of the cases, set forth new methods and new technologies of conservation, share the experiences and contribute to the development of preservation and conservation in different countries (China, Japan and Korea).

For Japan, Yukiko Saito, former PAC Director in Tokyo, presented a report on the activities of the regional centre in Asia. Her colleague, Naoko Kobayashi, presented a paper on preservation and mass conservation at the National Diet Library.

Management of Newspaper Collections: "Printed and Digital Challenges"

Biblioteca nacional de Chile,
Santiago, 3-5th April 2007

By Else Delaunay

IFLA Newspapers Section

The aim of the Conference was to promote good practice for Newspaper Collection, Management and Preservation. It was co-organised by the National Library of Chile, the IFLA Newspapers Section and IFLA Core Activity on Preservation and Conservation (PAC).

Most of the 29 papers presented to the 117 delegates from 17 countries of which 10 were Latin-American countries such as Argentina, Brazil, Costa Rica, Mexico, Peru, Trinidad, etc., had been translated into English or Spanish



The Director of the National Library of China, Zhan Furui, and his staff gave us a warm welcome. On the picture from left: Yukiko Saito (former PAC Director in Tokyo), Seon Myung Soon (Public Service Division Director, National Library of Korea), Christiane Baryla (Director of IFLA-PAC Core Activity, Paris), Mr Zhan Furui (Director of the National Library of China), Hea Won Hyun (National Library of Korea) and Naoko Kobayashi (National Diet Library).

For Korea, Seon Myung Soon introduced the preservation status and future plan of the National Library of Korea, while Hea Won Hyun proposed a study on the conservation of Moon-Pyoung, Hwang collection in Seoul. Obviously, China was well-represented with several presentations: Zhang Zhiqing and Zao Daying gave an introducing paper to the conference about the historical opportunity for rare book preservation in China; Du Weisheng gave us an introduction to the conservation of Tangut Documents (National Library of China).

and set up in a single volume handed over to them.

If the digital library, the newspaper digitisation from microfilms or from originals and the electronic archiving as well as software developments were key-subjects, other aspects of newspaper management such as preservation, bibliography and the value of newspaper contents were also dealt with. In fact, the 3-days Conference gave a large survey of programmes and projects in Latin America but also in North America and in Europe. Each speaker representing generally the national library in his country stated on the present situation and policy of electronic or non-electronic access to the newspaper collection, its preservation and the possibility of making it accessible on Internet.

Financial resources in the different Latin-American countries for preserva-

tion and access to retrospective newspapers vary a lot from one country to another but as a general rule funding is never sufficient. Some countries have precise projects; items are prepared for digitisation but funding is lacking for the digitisation itself. Other countries have already carried out some digitisation programmes of older newspapers but need means to go on.

A large debate followed the papers so the Conference was indeed a very valuable and enriching moment of professional encounters and exchanges.

The Conference papers will be published as an *IFLA Professional Publication*.

More information at:
<http://www.ifla.org/VII/s39/broch/s39-minutes-2007-Chile.pdf>

http://wwwnlc.gov.cn/en/services/iflapac_chinacenter/conf.htm.

You will find more information and pictures of this event on IFLA-PAC website, at:

International Preservation News • No. 41 July 2007

**"The Challenge:
Long-term Preservation"**

Frankfurt, 20-21st April 2007

By Mathias Jhen

From NESTOR *Newsletter*

11/2007 [27 April 2007].

European experts met in Frankfurt on 20 and 21 April 2007 at the invitation of the Federal Government Commissioner for Culture and the Media, the Deutsche Nationalbibliothek and the NESTOR long-term preservation competence network, to discuss the technical and organisational status of the long-term preservation of digital media in the different countries in Europe.

It was unanimously agreed that the threat posed by rapid technical change to the long-term usability of digital objects cannot be countered by unilateral national efforts. As Kim Veltman, Director of the Virtual Maastricht McLuhan Institute in the Netherlands, said in his opening speech, the national efforts need to be coordinated in a global strategy. Hans Jansen, Director of Research & Development at the Dutch National Library and co-initiator of the Alliance for the permanent access to the records of science, was trenchant in his description of the necessity for a cooperative approach to combating digital data loss: "The data was being lost long before we even realised it could be lost." Neil Beagrie of the British Library also pleaded for redoubled and sustained European efforts and he drew special attention to the trustworthiness of digital archives. Andrea Scotti, from the History of Knowledge Museum in Florence, urged the European experts to make a greater contribution to international standardisation than has been the case to date.

The conference then continued with Marie Waltz from the Center for Research Libraries (CRL) in Chicago who focused on a core area of transatlantic cooperation in long-term digital preservation. In her talk the American identified the criteria for testing and certifying trustworthy repositories (TRAC). Uwe M. Borghoff, Professor of Information Management at the Universität der Bundeswehr in Munich, then presented a paper on the archiving systems currently available in Europe and concluded with a brief presentation of the ongoing DigiTool research project. The fact that precisely defined work procedures are becoming an increasingly important topic for European libraries in the context of long-term digital preservation was demonstrated by Hilde van Wijngarden from the Netherlands in her paper. However, according to van Wijngarden, the necessary workflows are still a rarity in Europe. As a consequence, European projects such as PLANETS have been set up to provide the community with practical, usable tools. According to the speaker, each individual country should now start to create its own workflows for the long-term preservation processes.

The moderator, Norbert Lossau, Director of the Niedersächsischen Staats und Universitätsbibliothek Göttingen (Lower Saxony State and University Library in Göttingen), summarised the points made in the panel discussion in an outlook: "Creating and securing an infrastructure", "Implementation of standards and certification processes" and "Concrete recommendations for daily practice" were crucial aspects for the further development of the practical approaches presented. Pat Manson,

head of the Cultural Heritage and Technology Enhanced Learning department at the European Commission, explained, in a response to the specialists' request for political support, the EU strategy regarding long-term digital preservation. Manson described which partnerships and measures are still required to successfully carry out long-term digital preservation at the European level. In the face of the enormous challenges associated with the subject, the European Union is set to significantly increase its commitment to long-term digital preservation. Financed by the 7th Research Framework Programme, various dedicated projects will be set up focusing *e.g.* on automated metadata generation in the period from 2007 to 2013. Manson stressed that the European Union would be making EUR 25 million available in each of the four years to prevent "black holes appearing in European culture".

The total of 300 conference visitors were able to gain a first hand impression of what tools and visions are available to combat the possibility of total digital loss and of the significance of cross-national cooperation in this battle. The conference gave NESTOR further confirmation of the importance of its cooperative activities in the fields of international networking, national and international standardisation and the establishment of initial and further training courses for the future.

The paper complete version is available at: <http://nestor.sub.uni-goettingen.de/newsletter/>
The proceedings are available at: <http://www.langzeitarchivierung.de/eu2007/>

International Symposium "From the production to the long-term preservation of digital objects: international experiences"

Bibliothèque nationale
de France,
Paris, 25-27th April 2007

Co-organized by IFLA-PAC, the BnF (National Library of France) and the Institut national du Patrimoine (National Institute of Heritage), this symposium focused on long-term preservation of digital resources, proposing a statement of art with the contribution of the best experts in the field and enlightening the issues at stake.

More than 120 professionals coming from 14 countries around the world attended two and a half days of visits and conferences.

Bruno Racine, new President of the BnF, and Geneviève Gallot, Director of the Institut national du Patrimoine, opened the Symposium in the beautiful Belvédère of the BnF. Agnès Saal, Director General of the BnF, emphasized the importance she attaches to the themes broached by the speakers. Arnaud Beaufort, Director of Networks and Services at the BnF, was our keynote speaker.

You will find the proceedings on line at: <http://www.ifla.org/II/whatsnew/new.htm>

The first day focused on **digital data production**.

Catherine Dhérent (Archivist at the BnF) introduced the debates. Electronic document exchanges and data exchange standard for archiving were presented by Directors in charge of modernization from the French minister of Economy, Finance and Industry.

Jean-Baptiste de Vathaire presented CAIRN, a portal of human and social sciences magazines. Then we welcomed Nancy Deromedi and Nancy Bartlett Archivists (University of Michigan) for a presentation of digital initiatives at the University of Michigan.

The afternoon was dedicated to **technical visits**: at the French Institut national de l'Audiovisuel in Bry-sur-Marne, we enjoyed a very interesting and living presentation of how the Institute is harvesting the legal deposit for television and radio diffusers.

The second presentation was at the



© David Paul Carr/BnF

BnF: an introduction to the infrastructure of Preservation and Shared Archiving (S.P.A.R.).

The second day dealt with the **harvesting of digital objects and Web archiving**. Catherine Lupovici, Director of the Department of Digital Library at the BnF, was a brilliant moderator.

The morning session was completely dedicated to Web archiving. First, a round table gathered specialists from several countries: Gildas Illien from France, Marcel Ras from the Netherlands and Igor Ranitovic from USA. Then, Catherine Lupovici introduced IIPC (International Internet Preservation Consortium) which held its general meeting in Paris a week before.

The afternoon, introduced and launched by Sonia Zillhardt in charge of Digitization in the French minister of Culture, concerned the **need for inter-institutional collaboration**.

Ximena Cruzat, Director of the National Library in Chile, presented digital policy for DIBAM, Francis X. Blouin, Director of the Bentley Historical Library (University of Michigan), presented the Google project, Ingeborg Verheul, "Memory of the Netherlands" Program Manager, introduced the co-ordinating initiatives of the National Library of the Netherlands to preserve and give access to its paper and digital heritage. At the end, Hans Petschar, Deputy Librarian in the Austrian National Library, presented the Austrian experience in an European context.

After production and harvesting, the third day was dedicated to **preservation**.

Emmanuelle Bermès (BnF) presented a very dense paper about risk management for digital preservation, Claude Huc (Centre national d'Etudes Spatiales) a very comprehensive report on OAIS. Frank Laloë (CNRS) introduced HAL (open archives) and Daniel Teruggi, composer and Director for Research in INA, concluded the morning session with a paper entitled "Preserving artistic objects, sociological and technical context".

I would like to thank sincerely the directors of regional centres who made the effort to come from very far away. So, many thanks to Ximena Cruzat (Director of the National Library of Chile and PAC Centre for Chile, Argentina, Ecuador, Peru) and Francis Zogo (Director of the National Library in Benin and PAC Center for French-speaking Africa).

In addition, I would like to thank the French National Library which permitted us to organize this symposium, and particularly Catherine Dhérent. For this event, we also benefited from the organization for the first time in Paris of the general assembly of IIPC and from the presence at the National Institute of Heritage of a group of archivists from the University of Michigan who attended this symposium.

PAC CORE ACTIVITY

USA and CANADA

LIBRARY OF CONGRESS
101 Independence Avenue, S. E.
Washington, D. C. 20540-4500 USA

Director: Dianne L. van der REYDEN
Tel: + 1 202 707 7423
Fax: + 1 202 707 3434
E-mail: dvan@loc.gov
<http://marvel.loc.gov>
<http://www.loc.gov/index.html>

PAC INTERNATIONAL FOCAL POINT AND REGIONAL CENTRE FOR WESTERN EUROPE, AFRICA AND MIDDLE EAST

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
<http://www.ifla.org/VI/4/pac.htm>

EASTERN EUROPE and THE CIS

LIBRARY FOR FOREIGN LITERATURE
Nikoloyamskaya str. 1
Moscow 109 189 - Russia

Director: Rosa SALNIKOVA
Tel: + 7 095 915 3621
Fax: + 7 095 915 3637
E-mail: rsalnikova@libfl.ru
<http://www.libfl.ru/index-eng.shtml>



LATIN AMERICA and THE CARIBBEAN

NATIONAL LIBRARY
AND INFORMATION
SYSTEM AUTHORITY (NALIS)
PO Box 547
Port of Spain -
Trinidad and Tobago

Director: Annette WALLACE
Tel: + 868 624 075
Fax: + 868 624 3120
E-mail: awallace@nalis.gov.tt
www.nalis.gov.tt/

BIBLIOTECA NACIONAL
DE VENEZUELA
Apartado Postal 6525
Carmelitas Caracas 1010 - Venezuela

Director: Ramón SIFONTES
Tel: + 58 212 505 90 51
E-mail: dconsev@bnv.bib.ve
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
www.bn.br

BIBLIOTECA NACIONAL DE CHILE
Av. Libertador Bernardo O'higgins N° 651
Santiago - Chile

Director: Ximena CRUZAT A.
Tel: + 56-2 360 52 39
Fax: + 56-2 638 04 61
E-mail: ximena.cruzat@bndechile.cl
www.bibliotecanacional.cl/

FRENCH-SPEAKING AFRICA

BIBLIOTHÈQUE NATIONALE DU BÉNIN
BP 401
Porto Novo - Bénin

Director: Francis Marie-José ZOGO
Tel/Fax: + 229 22 25 85
E-mail: derosfr@yahoo.fr
www.bj.refer.org/benin_ct

SOUTHERN AFRICA

Preservation Unit
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/

CHINA

NATIONAL LIBRARY OF CHINA
33 Zhongguancun Nandajie
Beijing 100081 - China

Director: Chen LI
Fax: + 86 10 6841 9271
E-mail: interco@nlc.gov.cn
http://www.nlc.gov.cn/en/services/iflapac_chinacenter

ASIA

NATIONAL DIET LIBRARY
Acquisitions Department
10-1, Nagatacho 1-chome,
Chiyoda-ku, Tokyo, 100-8924 - Japan

Director: Hiroshi SAKAMOTO
Tel: + 81 3 3581 2331
Fax: + 81 3 3592 0783
E-mail: pacasia@ndl.go.jp
www.ndl.go.jp/

OCEANIA and SOUTH EAST ASIA

NATIONAL LIBRARY
OF AUSTRALIA
Preservation Services Branch
Cberra 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/

The "International Preservation News" used to be published three times a year reporting on the preservation activities and events that support efforts to preserve materials in the world's libraries and archives. Printed on permanent paper. In English with articles or summaries in French and Spanish. The International Internet Preservation Consortium is an international organization of libraries and other organizations established to coordinate efforts to preserve internet content for the future.[2] It was founded in July 2003 by 12 participating institutions,[1] and had grown to 35 members by January 2010.[3] As of October 2017, there are 54 members.Â âœª Saving the Web: Ethics & Challenges of Preserving the Internet (morning). âœª Jonathan Kirshner âœª Political Economy and International Security: The State of the Art. lipc member organisations. Â© Copyright 2019 International Internet Preservation Consortium. Type and Press âœœenterâœ to Search.