Natural History Collections Working Group Newsletter

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Coordinators Column

In just under a year the ICOM CC's 14th triennial meeting will be upon us and already we can tell it will be a huge success. The working groups received more than 450 submissions; unfortunately only 150 could be accepted. Our own working group also received far more than we were allowed to submit.

This enthusiasm is hugely appreciated and hopefully those that could not submit at The Hague will take the opportunity to share their knowledge with us in London at the Society for the Preservation of Natural History Collections (SPNHC) meeting in June.

Once again I should like to thank all authors for submitting their papers. The overall quality was extremely high, with a variety of interesting subjects, making it very difficult for the Peer Review Committee and the Editorial Committee to decide their final selection. It is very encouraging to see that so many more members have regained an active interest in our WG. I hope that this enables us to reach the goals we have set for this triennial period of which now two years have past.

One of these goals was to promote better collaboration between the various national and international natural history societies. For this reason I met with the Board of Directors of the Society for the Preservation of National History Collections (SPNHC) in New York and the Natural Sciences Collections Association (NatSCA) in London to discuss the possibilities of closer associations between the three societies. The WG's aim to set up a web-based expertise network based on a decision model was positively received by the other boards and might become one of the first collaborative projects.

A further achievement gained through these partnerships is that the 20th anniversary

meeting of SPNHC will be organised in conjunction with NatSCA and ICOM-CC-NH-CWG. The conference will be held in London from the 12-19th June , 2005 (for more details: see page 3). The main topic will be "Realising Standards", an interesting subject that will hopefully lead to lively discussion, constructive ideas and of course useful standards. The Decision Model for the Conservation of Fluid Preserved Specimens that I have recently developed could be an important tool in realising such standards. It will be one of the key parts of the conference in London and also at the ICOM-CC meeting in The Hague. To give more weight to the importance of such models and to find more support for our project proposal to build a web-based expertise network around such a model, the WG decided to publish this model in table form. It will be available as a separate attachment to this Newsletter.

I hope this has given you an idea as to where the WG stands in relation to its present commitments. I see the WG as active and flexible; capable of building bridges between our national and international professional societies, and through such association we gain more strength and resources to achieve our mutual goals.

These initiatives of our WG could not have been further developed without the tremendous work done by our newsletter editor and assistant coordinator Vicky Purewal. To make life easier for the both of us, we managed to persuade Babke Aarts not only to become a new member but also assistant coordinator to strengthen our WG. With her experience as project manager of several cultural projects in the Netherlands and abroad we think she can be of great value to the team.
I should like, on behalf of myself and the team to thank you for your continuing interest and support and we look forward to seeing you all in London and later in The Hague.

Dries van Dam

ICOM-CC Triennial Meeting 2005 Our cultural Past- Your Future

The ICOM-CC 14th Triennial Meeting will take place in The Hague, the Netherlands, from 12-16 September 2005.

The easiest way to register is by visiting
http://www.icom-cc2005.org/registration_and_fees/
The website is trilingual (English, Spanish and French). The websites main goal is to inform you about registration, accommodation and the programme of the congress. The information on the website will be updated regularly with press-releases, excursion programmes, working group sessions and events in and around The Hague.

The congress fee covers: congress pre-prints, a two volume set (c. 980 pages) plus CD-ROM, full participation in the ICOM-CC Triennial Meeting and 22 Working Group sessions, access to ICOM-CC poster sessions as well as to the trade fair, a choice of excursions on Wednesday the 14th and social events (such as receptions).

A Change in Membership Status.

Refering to my email of January 28th 2004 on imminent items, I would like to confirm now the creation of a membership status of ICOM-CC, different from the one which is generated through ICOM membership. Indeed, the ICOM-CC Fund is now active and has received more than 100 registrations so far for a membership status called "Friend" or "Student-Friend of ICOM-CC". All relevant information on either ICOM-CC membership may be found at the ICOM-CC website at www.icom-cc.icom.museum .

In the past and up until today, membership lists of individual working groups were composed of ICOM members, who had indicated ICOM-CC as the international committee they were interested in, and of non-members. To this will be added now also "Friends" and "Student-Friends". Important actions that will further change working group membership are listed below.

1. from January 1st 2005 onwards, only working group members, whatever their status, will have access to all levels of information of the ICOM-CC website
2. from October 1st 2005 onwards, only working group members who are either members of ICOM or (Student)Friends of ICOM-CC, will have access to all levels of information of the ICOM-CC website
3. from January 1st 2006 onwards, all working group members who are neither a member of ICOM nor a (Student)Friend of ICOM-CC must be removed from the working group list

It is important to emphasise that ICOM-CC needs members in order to continue rendering services and organising meetings the way it has done in the past and to try to do even better in the future! So, becoming a registered member means giving support to your professional network!
Jan Wouters
On behalf of the Directory Board of ICOM-CC.

20th Anniversary for SPNHC

The Society for the Preservation of Natural History Collections is proud to be recognizing its 20 years of service to the Natural History Community in 2005. SPNHC is an international association of individuals who are interested in the development and preservation of natural history collections. Within SPNHC, natural history encompasses more than biological and geological topics; it also includes the fields of anthropology, e.g. ethnology and archaeology. SPNHC members are collection managers, curators, registrars, conservators, and other specialists and generalists involved with research, educational and exhibit collections; a broad range of associated values to these materials are both acknowledged and protected.

In these 20 years, SPNHC has led the way in providing support to the Natural History Community via:

- Books: Storage of Natural History Collections: A Preventive Conservation Approach, Storage of Natural History Collections: Ideas and Practical Solutions (both of these have quickly become classics, and have import beyond natural history fields), Managing the Modern Herbarium, and our latest Museum Wise: Workplace Words Defined; more are scheduled to come out soon.
- Collection Forum, our internationally respected peer reviewed journal which covers the diverse subject matter relevant to the needs of natural history collection management and preservation; book reviews are regularly included; visit our web-site to view two volumes and the contents of other previous issues.
- The Society's contributions were recognised by the American Institute for Conservation of Historic and Artistic Works (AIC) and Heritage Preservation who presented SPNHC with their 2001 Award for Outstanding Commitment to the Preservation and Care of Collections.

SPNHC is a valuable resource which should not be overlooked by workers in the natural history field. The Society actively encourages the participation of individuals involved with all aspects of natural history collections. Visit our web-site http://www.spnhc.org/ www.spnhc.org and join the listserv NH-COLL-L. We encourage you to become a member and partake of our activities, especially this coming year.

We are pleased to welcome the Natural History Collections Working Group as a participant in our 20th Annual Meeting in London, June 12 -19 2005.

SPNHC
Realising Standards 2005

12–18 June 2005

Celebrating its twentieth anniversary, the Society for the Preservation of Natural History Collections will be holding the 2005 annual conference – Realising Standards – at the Natural History Museum in London, its first venue outside North America.

Aimed at curators, collection managers, conservators and other museum professionals, the conference provides an international forum for all those interested in preserving the world's natural history collections and strengthening global networks.

Experts from around the world will host presentations and workshops to tackle broad collections' issues, including:

- current standards of care
- benchmarking of collection condition
- sharing best practice in collection management

Abstracts for papers and posters focusing on the management and care of natural history collections are invited for presentation at the conference. Submissions must be made by 1 March 2005.

For further information, please write to:

SPNHC Conference 2005,
The Natural History Museum,
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Email: **spnhc2005@nhm.ac.uk**
Please visit **www.nhm.ac.uk/spnhc2005** for updates

NATURAL HISTORY MUSEUM NatSCA GCG SPNHC ICOM

Organised by the Society for the Preservation of Natural History Collections in conjunction with the Natural Sciences Collections Association, the Geological Curators Group, ICOM-CC Natural History Collections Working Group and hosted by the Natural History Museum, London.

Detection methods for arsenic in taxidermy specimens

From the 18th until as recently as the late 20th century, arsenic was commonly used as a preservative in tanning processes for stuffed specimens; it was also used as a pesticide in natural history and ethnographic collections. The history of taxidermy reveals that an important number of stuffed specimens found in museum collections may have been prepared with arsenical soap. This fact is not just limited to "ancient specimens", since arsenic was used until quite recently (Hawks & Williams, 1986; Knapp, 2000). The presence of this compound represents an important health and safety hazard. Even if literature for identification of arsenic is available, not all institutions are yet fully aware of questions such as how to detect and identify this toxic residue, and how to handle these contaminated objects.

Typically, several steps are used to detect arsenic in taxidermy collections. The first step consists of a visual inspection of the specimens looking for white crystalline deposits on the specimen. Some areas are more liable to show this residue than others: the base of feathers or hair, in/or at the base of ears, along incisions, on foot pads, and around the eyes, mouth or bill. However, this type of examination does not lead to a definitive conclusion about whether or not arsenic is present. The absence of white powder does not necessarily mean that arsenic is absent. For that reason it is necessary to have recourse to more reliable methods to determine the presence or absence of this element.

The second step is to use some tests designed to detect arsenic. This research tested and compared three different methods: the Weber's test (Hawks & Williams, 1986; Sirois, 1988), a kit developed by Macherey-Nagel sold commercially (Odegaard N., Carrol S. & Zimmt W.S, 2000) and the use of ICP-MS (Inductively Coupled Plasma-Mass Spectrometry).

The test developed by Dr. Stephen Weber is based upon a series of reactions. Zinc is reacted with hydrochloric acid (HCl) to form hydrogen gas. This released hydrogen then reacts with any arsenic that is present (dissolved by the acid) to produce arsine gas (AsH_3) which reacts with silver nitrate ($AgNO_3$) in impregnated filter paper. A positive result is indicated by the appearance of a brown or grey stain on the paper. The limit of sensitivity commonly accepted for this test is 20µg of sample (Hawks & Williams, 1986 ; Sirois, 1988). This limit is supposed to be the "background" level of arsenic currently in soil and water, as a result of arsenic leaching from natural sources and that retained from two centuries of applying arsenic as an agricultural pesticide. This assumes that when water and soil samples are tested, that each sample will contain 20µg or more of arsenic per drop after dilution. This, then, defines the limit for detection when the test is used to identify arsenic in soil and water. Therefore we can estimate a detection limit of about 400ppm for our purpose.

For Weber's test just a few fragments of skin or feather are required, or hairs from a cotton swab rolled over the specimen surface. The sample is placed in a test tube containing a small amount of zinc powder. To bring the arsenic into solution, 1-2 drops of 1M potassium hydroxyde (KOH) are used. Severals drops of 3M hydrochloric acid (HCl) are added until effervescence begins. A piece of cotton moistened with cuprous chloride (CuCl) is then used as plug for the sample vessel in order to prevent possible reactions with antimony (Sb), hydrogren sulfide (H_2S) and phosphine (PH_3), that might be present. These substances interfere with results for arsenic. A filter paper strip moistened with silver nitrate solution (0.1N) is then placed over the top of the testing vessel (for example a test tube), and covered with laboratory wrapping film (Hawks & Williams, 1986 ; Sirois, 1988).

We also used Arsenic Test Paper, which is based on a modification of Weber's method. It is a kit sold by the Macherey-Nagel

Corporation (USA) and recommended by Odegaard N., Carrol S. & Zimmt W.S. (2000). Any arsenic present in the sample is reduced to arsine, and in the presence of this gas, the white test paper (containing 1.9% mercuric (II) bromide) turns lemon-yellow to brown according to the concentration of arsenic. The limit of detection is 0.1ppm of arsenic in 5ml of sample (20ppm). For taxidermy specimens, the procedure is to remove crystalline or powder residue (by rolling fine cotton swabs dampened with distilled water) over the surface. The cotton is broken off and placed in a flask with distilled water. After an hour, a portion of this solution is put into a test tube containing successive drops of concentrated hydrochloric acid and some zinc powder. The test paper is quickly introduced and the tube sealed with laboratory wrapping film. After 30 minutes the paper test can be read.

We tested the sensitivity and accuracy of these two procedures against Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) at the Smithsonian Center for Materials Research and Education (USA). The instrumentation used was a Perkin Elmer Elan 6000 Inductively Coupled Plasma Mass spectrometer (ICP-MS) connected to a cross flow nebuliser as sample-introduction device. The operating parameters of the ICP-MS were optimised to ensure a stable signal with maximum intensity over the full range of the elements of interest, as well as to minimise the formation of oxides and double ionised species (XO^+/X^+ and $X^{++}/X^+ < 3$ %). For that purpose, nebuliser gas flow, lens voltage, detector analogue stage voltage and detector pulse stage voltage are adjusted. A dual detector calibration, which matches the analogue and pulse detector stages, is required to be able to measure major, minor and trace elements at the same time. We used the ICP-MS to determine the concentration of arsenic in our skin samples, as well as standard solutions, and used these results as a control for the tests. Samples of skin and feathers were taken in different areas from sample obtained from the National Museum of Natural History (Paris), and were prepared using digestion with nitric acid (HNO_3). HNO_3 is used because the chloride ion of HCl reacts with the argon gas used in the ICP-MS. This reaction interferes with the mass spectrometer readings. The details of our procedures and our experimental results are being prepared for publication.

Management of contaminated collections

The presence of arsenic in museum collections requires appropriate management of the contaminated objects themselves, as well as any information associated with them. It is important for any institution to develop a protocol for handling contaminated objects. These procedures should also take into account that contaminated items may be manipulated not just by employees, but also by researchers and visitors. Any specimens known, or suspected, to contain arsenic should never be handled without appropriate protection. Nitrile gloves and a protective smock or apron, as well as a respirator, are necessary in dealing with these objects. These supplies should be disposed of in an appropriate manner and labelled as hazardous materials. Specimens testing positive for arsenic must be clearly labelled with « Arsenic contaminated » (Knapp, 2000). This information should also be added to the item's museum record. We would like to caution that the objects that tested negative may still contain arsenic (Palmer, 2001).

These objects should be inspected and tested every few years, as arsenic may migrate from the interior to the exterior of the specimen. Each test result, whether positive or negative, should be recorded in the specimen's accession or catalogue records. These specimens should also be stored separately whenever possible. Objects that are contaminated with arsenic should not be exhibited without taking appropriate measures to determine the amount of arsenic that is present, and should be handed in a safe manner. A HEPA vacuum should be used in dealing with these objects, and it is important to use trained staff for all these tasks (Knapp, 2000).

Conclusion

Arsenic and its compounds were used as insecticides, rodenticides, herbicides and

fungicides in museums from the 18th century until recently. The properties of arsenic enabled its use in the treatment of skins. Taxidermy collections are not the only ones sharing this hazardous risk. The same treatments were also employed in some museums for ethnographic and anthropologic collections.
At present, we have available a set of affordable techniques that allow us to detect the presence of arsenic, thus helping us to manage this problem. Since arsenic-containing objects are still exhibited and studied, identifying the presence of arsenic in specimens is necessary in order to take preventive measures regarding the health of individuals in contact with collections, such as taxidermists, researchers, and the general public. This research is also intended to alert the museum community to this significant concern.

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References

Hawks, C.A. & Williams, S., Arsenic in natural history collections, Leather Conservation News, 1986, 2(2):1-4.

Knapp, A. M., Arsenic Health and Safety , Conserve O Gram, September, 2000, number 2/3.

Odegaard, N., Carrol S. & Zimmt W.S. Material characterization tests for objects of art and archaeology, London : Archetype publications, 2000.

Palmer, P.T., A review of analytical methods for the determination of Mercury, Arsenic, and Pesticide residues on Museum objects, Collection Forum, 2001, 16(1-2):25-41.

Sirois, J.P. & Taylord, J.,The determination of arsenic and mercury in natural history specimens using radioisotope X-ray energy spectrometry and scanning electron microscopy, in Proceedings of the 14th Annual IIC-CG Conference, May 27-30 1988, Toronto, Ontario, Canada, 1988, 124-136.

Western Australian Museum's Collections on the Move.

The Western Australian Museum's collection is hugely diverse, ranging from rare books, ancient fossils and meteorites to exquisite marine corals, sacred Aboriginal artefacts and mounted animal specimens representing the biodiversity of Western Australia. This collection is invaluable and irreplaceable

The move of over three million objects of this collection will ensure the Western Australian Museum can continue to safeguard the State's social, cultural and natural heritage for present and future generations. It also means that Industry and Government can continue to rely on the knowledge and expertise of the Museum's scientists and staff, based on information about the collections.

The renewal of the collection has been achieved through the development and fit-out of the new Western Australian Museum Collections and Research Centre, Welshpool (Perth). This is the first time in its 113-year history that the Museum can boast such 'state of the art' facilities.

Prior to purchase, the Welshpool site was primarily used for the manufacture of arcade equipment and its temporary storage prior to being dispatched. There was no real need for tight environmental controls of light, temperature and relative humidity or control measures for minimising the effects of dust and pests. Major building works have been undertaken to bring the Collection and Research facility up to appropriate museum storage standards.

The design of the collection storage systems at the Centre, is divided into seven discrete zones and some of these can be further divided internally. This allows for appropriate segregation of the collection on a departmental basis which facilitates record keeping and integrated pest management.

The air-conditioning for the collection storage

areas features a significantly high level of air filtration; its F9 efficiency removes 84% of particles 0.35 to 0.45mm, 95% of particles 0.75 to 1.0mm and 99% of particles 2 to 3mm. The system is designed to capture minute particles as they are drawn into the air-conditioning system as well as those that are created within the collection storage spaces, such as exfoliated skin, hair, paper fibres and lint from clothes. Each of the collection boxes will operate under positive pressure, with the supply air being delivered above the collection storage systems and the return air coming into the corridor zones through a series of operable sealed louvres.

Additionally, the wet storage facility at the new Collections and Research Centre will be cooled by a refrigerated air-conditioning system. The temperature set point will be 22ºC, 50% air recycles and nine air exchanges per hour. This will ensure the continuing preservation of the Museum's wet collection and minimise routine collection management maintenance.

A twenty-four hour controlled environment is essential to ensuring the proper storage of the collections. While the Museum considers the environmental impact of its operations, it has a responsibility to care for the collection on behalf of the people of Western Australia. The Collections and Research Centre is designed to use as little power as possible outside of business hours. For example, site power and lighting are scaled back to a minimum level when the buildings aren't occupied.

A very early smoke detection apparatus (VESDA) within the centre will provide greatly improved fire detection for the entire collection store. The dry holotypes will be stored in a specially constructed and air-conditioned vault that has a FM200 (heptaflouropentane) fire suppression system, associated with the VESDA sensing systems. A wet mist fire suppression system is installed within the wet collection store ensuring a heightened level of fire protection for the wet collection.

The wet holotypes are to be stored in a separate storage room inside the wet collection store. A massive auxiliary power supply unit has been installed adjacent to the wet collections building and air-conditioning plant room. This facility will guarantee power to the compressors that provide air at 100 bar to enable activation of the wet mist system in the event of an alarm. A backup water storage tank also forms part of the fire suppression management strategy.

The auxiliary power unit will also energise the ultra-freezers, which contain all the DNA collections, should there be a power failure. The standby generator also has sufficient capacity to allow the main air-conditioning fans to operate and maintain environmental conditions.

Collections throughout the world are susceptible to pests of all kinds and the Museum's collection is no exception. Through the ingenuity and innovation of Museum staff, the Museum has developed a very creative, workable and ongoing solution – an in-situ fumigation approach using carbon dioxide, dry nitrogen or argon gas.

This method will involve the use of gas-proof membranes being fitted over the collection racking and the fumigants being exhausted through specialised roof vents. The air-conditioning system has been designed to assist with this process, through use of dampers in the supply air and through the louvres being shut.

All these features and many others in the Centre's design provide an environment that is compliant and safe for both staff and collections. Furthermore, the Museum is now able to boast contemporary research laboratories and collection management systems.

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Review of Conference papers on Biodeterioration of Cultural Property, Sydney Australia 2001.

In November 2001 the 5th International Conference on Biodeterioration of Cultural Property took place in Sydney, Australia. Although the papers presented were available afterwards on the web, they are now in printed form as Volume 28, 2003 of Bulletin of the Australian Institute for the Conservation of Cultural Materials (Inc).
The twenty papers are all of equal interest and relevance and so below is a brief review of each paper given with the appropriate contact details.

Contents:
Attractant pheromones of museum insect pests - A list of the pheromones available as lures against many insect pests in museums and an assessment of their relative efficacy.
David B Pinniger, RE Child, J Chambers.
david@pinniger.globalnet.co.uk
robert.child@nmgw.ac.uk

Biological agents in the weathering of sandstone sanctuaries in Thailand.
The effect of algae, lichens, mosses etc., on the biodeterioration of sandstone monuments and some suggestions on how to reduce damage.
Chiraporn Aranyanark.
csing@inet.co.th

Detection of fungi and control of disinfections by ATP-bioluminescence assay.
A better, quicker method of detecting damaging micro-organisms than traditional culturing.
Malalanirina Rakotonirainy, Josef Hanus, Sylvite Bonassies-Termes, Cecile Heraud and Bertrand Lavedrine.
rakotoni@mnhn.fr

Gaseous fumigants - limited choice of molecules.
With the imminent loss of methyl bromide, what else is available that works? This paper assesses the choices.
Robert F Ryan
Robert.ryan@boc.com

Gases for insect control: factors that influence their effectiveness. How fumigants work to kill insects and how to best use them.
A useful resume of the efficacy of various current fumigants.
Peter Annis
Peter.annis@csiro.au

Heat eradication of insect infestations: the development of a low-cost, solar-heated treatment unit.
Building on previous work on the effectiveness of heat to kill insects, this paper looks at the conservation aspects of low and high temperature methods of insect control.
Andrew Pearce.
Andrew.w.pearce@awm.gov.au

Insecticides - what they don't tell you.
An overview of the problems that could be encountered by using certain pesticides when the entire formulation of the pesticide is not disclosed.
Robert Child.
robert.child@nmgw.ac.uk

IPM x 10: pest management on a regional level.
Integrated Pest Management with an emphasis on risk management, assessment and its value, and how to implement it.
Alice Cannon.
acannon@tpg.com.au

Monitoring insect pests within buildings using traps: case studies of the use of traps to monitor activity, spatial distribution and efficacy of pest control.
The use of insect traps - with and without lures to gain a better understanding of insect development and therefore better targeted treatments.
David Rees
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A new oxygen absorber - RP system: mortality and use.
The use of RP oxygen absorbers in Anoxic environments to kill insects.
Makiko Sugiyama, Kimihiko Sato and Vinod Daniel.
vinodd@austmus.gov.au

Novel methods of termite management: application to cultural properties.
A review of termite development and the current effective ways of controlling and eradicating outbreaks.
Theo.Evans@csiro.au

Experimental study of physical effects of the freezing method for insect control on artefact materials.
Fragile Japanese objects were subjected to low temperature pest control methods to assess any damaging effects. These were found to be minimal.
Takeshi Ishizaki.
ishizaki@tobunken.go.jp

Preliminary research into the use of the essential oil of Melaleuca alternifolia (tea tree oil) in museum conservation.
The use of tea tree oil in a pressurised gas to control mould growth in humid environments is tested and evaluated.
Sue Gatenby and Pat Townley.
SueG@PHM.GOV.AU

Preservation of cultural property using a non-flammable ethylene oxide fumigant.
A re-evaluation of ethylene oxide as a fumigant when mixed with other gases to lessen its harmful effects while retaining efficacy.
Steve Conviser
Steve.conviser@honeywell.com
Sampling and estimate of fungal biodeteriogens of Lucknow, India.
Experimental sampling of the air in libraries, archives etc., to collect, analyse and identify the principle biogens present.
Asha Khandelwal.
ashakhandelwal@yahoo.com

The present situation in pest control of cultural properties in Taiwan.
A pragmatic discussion on the state of IPM in Taiwan; with advice on monitoring and the importance of training the in-house staff.
Su-Fen Yen.
Sufenyen2000@yahoo.com.tw

The significance of appropriate sampling and cultivation techniques in the effective assessment of biodeterioration.
Discusses a case study on the best methods of sampling for bioassay in an historic building and the result that can be expected.
Caroline P Kyi.
CPKyi@aol.com

The solar tent - cheap and effective pest control in museum. This paper outlines
a practical, versatile method of treating a wide range of objects in a heated, yet RH controlled environment for the effective kill of insect pests.
Agnes W Brokerhof.
Agnes.brokerhof@ccn.nl

What works for us: issues that affect the Historic Houses trust of NSW's choice of treatment for pest control.
A practical Integrated Pest Management approach to pest control in a large number of historic buildings with few specialist staff.
Tamara Lavrencic and Alex Roach
tamara1@hht.net.au

Biodeterioration of in situ displays: case study of an archaeological trench at the Museum of Sydney.
This is a novel paper looking at the potential for controlling moisture levels in a location set in the ground, with all the problems that involves.
Vinod Daniel, Steve King and
Tamara Levrencic.
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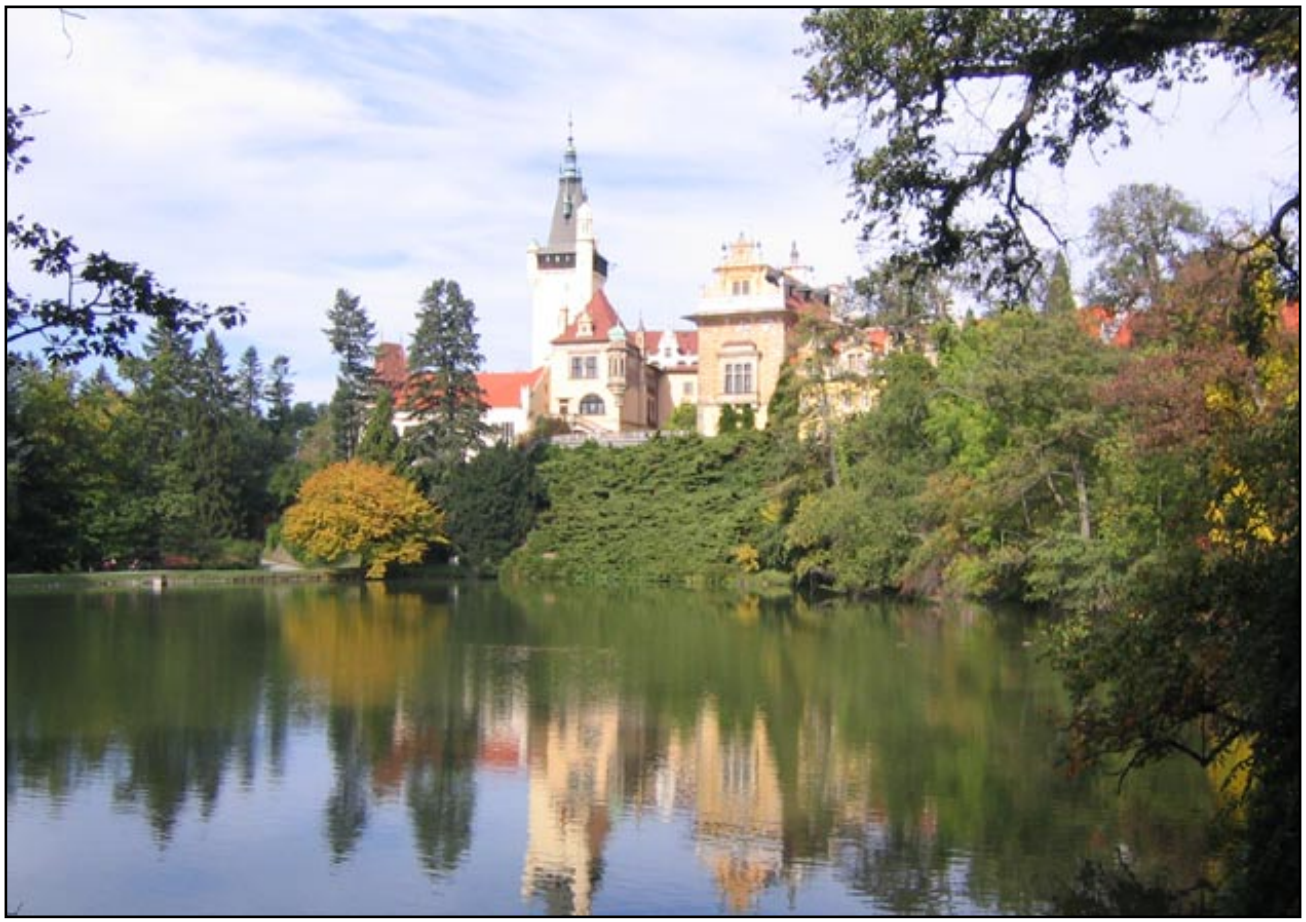
Study Tour of the City of Pragues' Botanical Department.

A group of natural history curators and conservators from British museums went on a study trip to Prague in October 2004, organised by NatSCA (The Natural Science Collections Association). Three were botanists one from Manchester and the other two from Cardiff and they visited the Department of Botany of the National Museum, which was located in a small town called Pruhonice outside the city of Prague, a fair way from the museum proper.

Pruhonice is well known for its castle, and the herbarium was actually housed within, with the majority of the collection being housed within the main ballroom. The Castle is the residence of the Botany Department, the Institute of Botany as well as the Academy of Sciences of the Czech Republic. This beautiful ornate building is in Czech Neo-Renaissance style and dates back to the 16th century.

The last owner, Count Silva-Tarouca, sold it to the state in 1927. It stands in Pruhonice Park, a botanical garden maintained by the Institute of Botany which is open to the public. The Gardens hold more than 100 species of Rhododendron, c.1500 taxa and cultivars of trees and 130 Water Lilies within the lakes. The Institute of Botany is also in charge of one of the largest collections (the third largest in the world) of cones and seeds of coniferous species, of seeds and fruits of broad-leaved trees and of samples of wood and bark.

We were met by Dr Blanka Skočdopolová, head of the Department of Botany who gave us a very informative and interesting tour of the collections. Inside the herbarium we were shown the storage facilities of the 2 million botany specimens with the earliest dating back to 1790. Most specimens were kept in pigeon holes in wooden cupboards but due to staff shortages almost 1 million specimens were still waiting to be mounted.



Pruhonice Castle and gardens maintained by the Institute of Botany.

Leonhard Fuch's field guide showing his hand written notes and drawings dating from 1545.

The herbarium was organised into two main groups: Czechoslovak and the rest of the world. For historical reasons the Czechoslovak collection also holds the specimens from Slovakia and the Transcarpathian Ukraine and comprises of c. 600,000 specimens. The Czechoslovak collection is organised alphabetically whereas the World collection is arranged numerically in accordance with the botanical system published by Dalla, Torre and Harm but is alphabetical from the genera down. Alphabetising the collection is preferred as this allows for new species to be incorporated whereas the systematic order does not allow for this.

The Department also holds 10,000 Type specimens which are stored separately from the main collections.
The library was extensive with over 100,000 books dated from 1487, some were incredibly rare including the first field guide, hand written and illustrated by Leonhard Fuchs in 1545.

The National Museum has recently built modern facilities for the Natural History collections to relocate to, which were visited the following day. Some of the departments had started to move specimens in but were still waiting for the shelving to arrive.

These large, spacious rooms will provide superb storage conditions for the specimens but the herbarium will seem like a different collection once it has moved away from its splendid stately home!

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The Preparation of Botanical Specimens for Display at NMGW from 1927-1959

The National Museum and Galleries of Wales (NMGW) houses approximately 1200 botanical wax models and mounted display material. The models are of an exceptional quality and allow for life-like material to be displayed within exhibitions irrespective of season or rarity. Miss Eveline Jenkins prepared and crafted 483 of these models during her 32 years of employment within NMGW.

In 1927 Eveline Jenkins was appointed botanical artist for the Department of Botany within NMGW. The post was created by the Keeper of Botany who required an artist to prepare scientifically accurate botanical specimens for display. Miss Jenkins was qualified and skilled in preparatory methods which have enabled her works to be exhibited up until present day (Lazarus, 2003).

Miss Jenkins was born in Monmouthshire in 1893 and studied at University College Wales in Aberystwyth. She achieved a B.Sc., majoring in Mathematics, Botany and Geology, but also studied Art, English and Gardening throughout her college years (Jenkins, notes 1924). Her first employment was as an art teacher in Wales and Cornwall, she later applied her artistic talents within the NMGW, during her 32 years service through illustration, preservation and modelling of plant material, her specialism being fungi (Jenkins, notes 1924).

Within the NMGW archives are records of detailed notes that she made in her sketchbooks and diaries. From these we can deduce how passionate she was about her work, and also learn the techniques she used to preserve the plant specimens to prevent them losing their colour and shape once cut and dried (Jenkins, 1937). She began by experimenting with quite common material such as ferns, conifers, evergreens, deciduous trees, grasses and herbs using solutions for preserving, bleaching and dyeing; testing each method and noting the results (Jenkins, 1937).

The following recipes are extracts from her notebooks (Jenkins, 1937).
Normal preserving solution –

25% Denatured alcohol
25% Technical acetone
50% Glycerine

Bleaching bath -
4 fl ozs Water
1 tsp Sodium bisulphate
_ tsp Oxalic acid (dry)
A few drops of Acetic acid
1 pt Denatured alcohol
1 pt Technical acetone

Copper solution -
1 quart Water
4 tbsp Copper sulphate
1 tsp Table salt
1 tsp Alum
2 tbsp Denatured alcohol
1 tbsp Glacial acetic acid
2 tbsp Copper sub acetate
_ tsp Sodium bisulphate

Miss Jenkins noted that the Normal Preserving Solution worked well for materials such as grasses, which only needed dyeing after this treatment, but other material turned brown and had to be placed in the Bleaching Bath. Green dyes could either be added to the Preserving Solution or the material could be placed in the Copper Solution and boiled for half an hour. This would help to keep the green colouration. The specimens would then have to be rinsed in water and ammoniated water, dried and placed in regular alcohol/acetone/glycerine solution for a day, then rinsed in cold water and hung to dry. The plants which responded well to these treatments could then be surface sprayed if required. The plants which did not respond to the preserving treatments would instead be modelled out of wax.

Miss Jenkins claimed no originality for her wax modelling methods. Her techniques seem to have been sourced from taxidermy and museum exhibition journals. Her memoirs also mention some correspondence with the

Buffalo Museum of Science with which she exchanged ideas. The main materials used for modelling were pure white, bleached beeswax, paraffin wax, Japanese silk or fine lawn, tinned copper wire, oil colours, cotton-wool, tissue paper, crepe paper, blotting paper, nylon thread and fine arrowroot. Her notes describe in detail how she constructed several models of fungi that are still held in the NMGW collection.

Her preparatory methods began with making detailed sketches of the freshly collected material noting colour and form. Plaster moulds were taken of the cap, stalk and volva whilst the specimen was still fresh. The wax was heated in a rectangular dish over a water bath and coloured with oil paints. Wax sheets were made by skimming damp blotting paper over the surface of the melted wax. The wax could then be peeled from the paper when still slightly warm and pressed into the plaster moulds. The stipe was cast in two vertical halves, strengthened inside with cotton-wool and wire. A piece of wire protruding from the base was retained to fix the finished model. Areas such as the veil and ring were made from waxed silk. The whole model was then assembled and attached to a block of peat by means of the protruding wire. The outer joins were sealed with a heated tool, and smoothed with a brush dipped in Xylene. Drifts of leaf debris, bracken and dried grasses were used to recreate the original habitats. Mercuric Chloride (corrosive sublimate) was used to saturate the dried materials as a precaution against moulds. The hot glue used to secure the dried material in place was also poisoned, along with the gelatine jelly representing mucilage on the cap and the gelatinous lining of the volva. The models were mounted onto sterilized blocks of peat, or turf saturated with poisoned isinglass to bind the soil. The models were sprayed using an aerograph pen with oil paints thinned with turpentine. The finished models were brushed with cellulose varnish diluted in a 50/50 solution of ether and acetate to indicate a viscid surface, or sprayed with Xylene and rubbed with arrowroot for a velvety finish.

Eveline Jenkins shown here working on one of her wax models of the Welsh Poppy *(Mecanopsis cambrica)*.

The modelling of vascular plants required some slightly different techniques. Stems were made by brushing wires with hot wax until they attained the desired thickness, each layer being allowed to set before the next was applied. The stems were rolled on a hard surface when still warm to improve their shape. Leaves were created by either brushing the specimen directly with hot wax, or pressing a waxed sheet onto the surface. The wax could then be reinforced with silk and wire, cut to the correct shape and peeled away to leave the impression of the venation. Petals and sepals were made from waxed sheets by using the real flower parts as templates. The wax replicas were then tied together with cotton thread and finished with a heated implement.

Miss Jenkins strove to perfect these techniques with every new model that she made, and in 1959 she passed on her knowledge to her successor Mr Roy Herbert. The making and repair of models still continues in the museum to this day. Although the application of poisonous chemicals is no longer acceptable, due to the health and safety issues they pose, many of the wax modelling methods used by Eveline Jenkins are still in practice.

The National Museums and Galleries of Wales still prizes its 483 wax models and 52 water-colour illustrations by Eveline Jenkins and exhibitions celebrating her work continue within the museum

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References

Jenkins, Eveline (1924) Personal notes

Jenkins, Eveline (1937) Diaries and note-books

Lazarus, M.H & Pardoe, H.S. (Ed.) 2003 The Catalogue of Botanical Prints and Drawings at the National Museums and Galleries of Wales. Pp 225-228.

Conference Dates

Calendar of ICOM Meetings and Events,

http://icom.museum/calendar2.html#cidoc04

The Eleventh Symposium on the Natural History of the Bahamas June 23-27, 2005 Gerace Research Center San Salvador,Bahamas

http://www.geraceresearchcenter.com/conferencesnaturalhistory.htm

ICOM-CC Triennial Meeting 12-16th September 2005, The Hague, The Netherlands.

http://icom-cc.icom.museum/TriennialMeetings/

SPNHC Realising Standards 12-18th June 2005. The Natural History Museum, Cromwell Road, London, UK. http://www.spnhc.org/

Useful web/email addresses

CHIN Canadian Heritage Information Network
http://www.chin.gc.ca/English/

Conservation distribution list /
condist/condist-request+consdist@lindy.stanford.edu

Cool Conservation on Line
http://palimpsest.stanford.edu/

The Getty Institute Conservation books and reports in pdf
http://www.getty.edu/conservation/resources/reports.html
Abstracts of international conservation literature
http://www.aata.getty.edu/NPS/

GCG Geological Curator's Group
http://www.hmag.gla.ac.uk/gcg/

ICOM International Council of Museums
http://icom.museum/

ICOM-CC International Council of Museums Committee for Conservation
http://icom-cc.icom.museum/Home/

The online archive edition of JAIC, the Journal of the American Institute for Conservation.
Volume 16, 1977 - Volume 39, 2000.
http://aic.stanford.edu/jaic/

The Natural History Collections List Server NHCOLL
http://www.spnhc.org/nhcoll.htm

NatSCA Natural Sciences Collections Association formerly BCG (Biological Curator's Group)and NSCG (Natural Science Conservation Group). (No web site as yet). Contact Secretary P.Brown@nhm.ac.uk

The Society for the History of Natural History
www.shnh.org

SPNHC The Society for the Preservation of Natural History Specimens. http://www.spnhc.org/

UKIC United Kingdom Institute of Conservation
http://www.ukic.org.uk/