

Editorial

Dear Members,

It's been a busy year for NatSCA - considering our role in the Subject Specialist Networks, considering a potential grant for increasing public access to and involvement with the UK's natural science collections, and as usual, our conference and a successful workshop on anoxia, held at the NHM, London. We've organised 2 workshops / seminars for next year, February 27th on Natural History Collection conservation assessment at Leeds Discovery Centre and October 8th on adhesives at the NHM, London. You can find a list of potential seminars on the website under the 'seminars and workshops' tab at the top of the page. If anyone has a wish list or a need for a particular type of training then let the committee know and we will do our best to arrange it.

I'd like to welcome Jan Freedman as our new Editor. He has taken over as from the next issue, so please send your papers and various submissions to him. If you know of any meetings that are going on in your area or are aware of new staff being appointed, or positions being left empty then let us know and we can publicise appropriately.

- Victoria Papworth

Contributions for Issue 14, March 2008

All articles, letters, news, adverts and other items for inclusion for the next issue of the NatSCA Newsletter should be sent to the address below by February 1st:

Jan Freedman [Editor, NatSCA]
Assistant Keeper Natural History
Plymouth City Museum and Art Gallery
Drake Circus, Plymouth
PL4 8AJ
phone: 01752 30 4774
email: Jan.Freedman@plymouth.gov.uk

Re-housing the Hymenoptera Nests Collection at the Natural History Museum, London

- **Suzanne Ryder, Department of Entomology,
Natural History Museum, London**

The Hymenoptera (Ants, Bees & Wasps) nest collection at the Natural History Museum is one of the largest and most diverse in the world. The collection exceeds a thousand examples from all over the world. The collection is also very important historically.

The Nests built by Hymenoptera (wasps, bees and ants) are remarkable feats of construction. Nest structure is the outward expression of complex behaviour patterns, can be used as a taxonomic character and are significant in interpreting the evolution of social insects.

Before undertaking the re-housing project, I took every opportunity to view nest collections of other museums and institutes. All of the collections I saw were in a generally poor state of curation and conservation. It seems they have been a problem for many institutes but have never been a high enough priority to be dealt with properly. Nests are often fragile and irregular in size and shape so their transportation and storage can be extremely difficult. Until recently, the Hymenoptera nest collection at the Natural History Museum was in poor storage and lacked any organisation which restricted access and increased the risk of damage.



Figs 1-3: Disorganised and overcrowded storage of the nest collection before the re-housing project was undertaken.

After compiling a condition survey, the nests were individually re-housed in conservation grade boxes with glass tops or bespoke Correx® boxes. The boxes with glass tops were available within the Museum. They came in a variety of sizes and were used where a suitable size was available. This kept the cost of the project down considerably.

The glass-topped boxes were cleaned as necessary and the base was lined with Plastazote®, a cross-linked polyethylene foam. We used several thicknesses and grades of Plastazote in order to select the most appropriate for the type of nest. The plastazotes used for this project were a 10mm standard (LD18), a 5mm supersoft (LD24) and a 30mm rigid (HD30). All the Plastazote used was white to easily detect any evidence of new breakage or pest attack. A 5mm supersoft Plastazote base was cut exactly to fit the bottom of each box, and a new layer of Plastazote of the appropriate density and thickness was then cut to the same size. The nest was placed carefully on this layer and used to roughly mark the size and shape that needed to be cut. The Plastazote was cut along the nest outline leaving a perfectly sized hole in which it would eventually

rest. The remaining piece of Plastazote was next glued to the base Plastazote using a pH neutral PVA. This meant that the base of the nest rests on an inert, non-abrasive surface and the second layer gave it the support needed to keep it in place. This method allows normal handling of the box without serious risk of damage to the nest.

The same principle was used for the inside of the Correx boxes. Large sheets of white corrugated plastic (Correx) were used to make bespoke boxes. The boxes were made by measuring the nest dimensions, calculating the necessary box dimensions, and then cutting, scoring and folding the Correx to make a secure box. To fasten the boxes we used paper fasteners which were covered with linen tape. The cost of materials for this project was not great, partly because we used a number of boxes already available in the Museum. The corrugated plastic sheets, Plastazote, glue, paper fasteners and linen tape did not amount to a great deal for the size of the collection and the huge improvement the boxes have provided. The biggest cost was the time it took. Bespoke boxes undoubtedly save space which can be vital in a museum with a large, growing collection, but it does take a considerable amount of time.



Figs 4 & 5: Show the construction of the Correx boxes.

The new boxes and lids provide protection from pests and pollutants, such as dust, although they are not completely sealed. The housing is an added layer of protection for the specimen.

After the nest were re-housed they were digitally imaged and copies of the images then attached to the boxes to allow easy identification of a specimen within, This reduced the amount of handling of the specimen and ultimately the mechanical damage caused to these very delicate specimens. Each nest was databased to capture all the information on the specimen and any associated specimens with it in the accessions registers. The images and database information were combined and will soon be available on the Natural History Museum website.



This work now means that what was an underused, vulnerable collection is now a very useful resource with easy access. Improving the housing and care of this collection, in a manner befitting its scientific and historical importance, made it much easier to move to a new location as part of the recent move to a new building.

Documentation Of The Bolton Museum
Frederick Reigen Mollusc Collection
- Bente T. Loudon

[Extract from Curatorial Project by Bente T. Loudon, submitted in part fulfilment of requirements of the M.A. in Museum Studies, Leicester]

I gratefully acknowledge support from former Keeper of Zoology Kathryn Berry who also identified the project, and introduced me to Modes.

Note: Since this work was carried out, this documentation process has become considerably out of date. Bolton Museum and Art Gallery have invested in a new database system (TMS) and no longer use Modes. All the old records from MODES have been transferred to this new system.

Note courtesy of Matthew Constantine, Senior Manager, Museum & Archive Collections, Bolton Museum & Archive Service.

Background

This historic collection of 144 accessions is stored separately from other mollusc material, which is arranged taxonomically. Specimens were counted and examined and a small handwritten minimum data label (archival quality card and ink) placed in each box. Relevant data was entered on MODES for Windows 1.5. Although a previously made card catalogue was in existence it was decided instead to work directly from the specimens, and to incorporate detail researched from documents in the History file.

Accession number was assigned using the year of acquisition (not of cataloguing as is usually the case ^{Davis 1994}), the accession number in the accession register and an ascending serial number assigned in the same order as the original species numbers. These could not be used directly because there are only 144 species in the Bolton collection and 692 species in the Catalogue and it was felt that the Modes software would not perform with missing numbers. Thus an entry was numbered, for example, BOLMG 1879.8.10

The specimens in Bolton are no longer mounted on glass tablets, but largely boxed and the boxes marked with the species number of the Catalogue ^{Carpenter 1857}; no shells are individually marked. The scientific name and its authority corresponding to the species number found with the specimens was researched from the Catalogue and entered as the Classified name. In some cases the boxes also contain labels that appear to have accompanied the shells on exhibit. If a different scientific name is included on such a label this was entered as subsequent field entry(ies) of Classified name.

Following the adoption of Carolus Linnaeus's binominal nomenclature ^{Knapp 2000, Winston 1999} a zoological specimen is given 2 names, a genus name and a species- or trivial- name. Following the trivial name is the author of this trivial name and the date of publication ^{Abbott 1974}. This trivial name was sometimes started with a capital letter but here we changed them to lower case. Evidence of redetermination was copied carefully onto the database, again as subsequent field entry(ies) of Classified name; regrettably there are no dates recorded.

Carpenter's names were used throughout and no revision or updating of the nomenclature attempted; thus Lamellibranchiata was used in preference to the later Bivalvia; the spelling Gasteropoda upheld.

The standards for documentation recommended by the MGC ¹⁹⁹² and Carter & Walker ¹⁹⁹⁹ were thus followed: data recorded was that inherent in the specimen and global to the collection, whereas unfortunately there was no data associated with the specimens nor post-accessional information.

References:

Abbott, R.T. 1974. *American Seashells- The Marine Mollusca of the Atlantic and Pacific Coasts of North America*. Van Nostrand Reinhold Company

Carpenter, P.P. 1857. *Catalogue of the Collection of Mazatlan Shells in the British Museum collected by Frederick Reigen Described by Philip P. Carpenter*. London: Printed by Order of The Trustees

Davis, P.S. 1994 'Documentation of Collections' in: Stansfield, G., Mathias, J. and Reid, G. (eds.) *Manual of Natural History Curatorship* HMSO

Carter, D.J. and Walker, A.K. 1999 'Documentation' Appendix 1 in: Carter, D. and Walker, A. (eds.) *Care and Conservation of Natural History Collections* Butterworth-Heinemann

Knapp, S. 2000 'What's in a Name?' *Nature* **408**: 33

Museums and Galleries Commission 1992 *Standards in the Museum Care of Biological Collections*.

Winston, J. 1999. *Describing Species: practical taxonomic procedure for biologists*. Columbia University Press, New York

A description of the collection, identifying its historical, scientific and cultural value, and its place in relation to the rest of the Museum's collection.

The Belgian collector Frederick Reigen made his huge collection of shells in Mazatlan, Mexico in 1848-50. An entire share was bought by Philip Pearsall Carpenter and from these about 8873 specimens (representing 692 species, of which 215 were described as new ^{Dean 1936}), which became the first or type set ^{Palmer 1951} were presented to the British Museum by him in 1857 ^{ANON 1906, Gunther 1912}. At that time it would have gone to Bloomsbury, the Zoology Collection not being moved until 1881-4 ^{ANON 1904}. The donation was subject to four conditions: 1) That it be preserved separate and intact 2) that it always be open to the use of students 3) that the donor be allowed to arrange the collection 4) that a descriptive catalogue be published -this he wrote (552 pages) ^{Carpenter 1857}. In developing improved but still separate storage and if web-publishing the Bolton part we would be paying tribute to these wishes.

Further duplicate suites of air-dried shells reached other museums in Britain and America. The Bolton specimens were purchased by the Library Committee in 1854, predating the foundation of the first museum in Bolton, the Chadwick Museum, by 29 years ^{History File}. This intact molluscan collection of 47 species of bivalve and 97 species of gastropod has exciting potential waiting for a researcher: it has scientific value as yet unexplored and it has a clear historical setting in time, place and social milieu ^{Fenton 1995}. It constitutes a valuable scientific and cultural resource. As a collection it has been kept in its entirety, and physically apart from the rest of the museum's taxonomically arranged mollusc collections.

It is accompanied by a copy of Carpenter's descriptive Catalogue, and is exceptionally well provenanced: all the shells originate from only one small site and the authenticity of the collection is not in any doubt ^{BAAS 1857}. Reigen deliberately collected many examples of each species, the large series illustrating variation in particular species and the aim being to exhibit all that was known of a local fauna; "...where objects are carefully noted that a collector of "good shells" would cast aside as worthless" ^{Carpenter 1857}.

The practice by Carpenter of giving the species numbers may well reflect the view commonly held from the time at least of Carl von Linne that species were fixed and unchangeable ^{Kardong 1998} - and hence of finite number: it was not until Darwin had at last made public his theory of organic evolution; together with Wallace in 1858 ^{van Oosterzee 1997}, "without question the scientific happening of the century" ^{Allen 1976}, "powerfully separating natural selection from the divine genesis" ^{Kardong 1998} that this view began to change.

Thus academic analysis of this collection can help illustrate the development of approaches to collecting, and history of scientific thought and method ^{University of Leicester 2000, Stansfield 1994} as well as "stimulate interest and awareness about our natural heritage" ^{Stansfield & Howard 1994}.

At the time of formation of the collection, and of the writing of the Catalogue, the term 'type' reflected the degree of similarity of the specimen to some *ideal* or *type* (the typological concept of species: species were perceived as immutable entities that could be defined by some perfect *type* and all the specimens that were *typical* belonged to that species or other category); it was not until the early twentieth century that the concept of *typification* (the system that makes objective identification possible by linking the name with an actual specimen) was formally introduced into botanical and zoological codes of nomenclature ^{Winston 1999}, that true taxonomic status ^{Davis 1994} was achieved. Hence, reference to 'types' in the Catalogue certainly need expert revision; it is likely that this collection represents a voucher collection ^{Stansfield, Mathias and Reid/Petit/Mathias 1994}, and as such can have importance for taxonomic research ^{Report on the BM(NH) 1981-3}. Other possible future uses cannot be ruled out ^{Reid 1994}.

References:

Allen, D.E. 1976 'The Naturalist in Britain' *Princeton University Press* 1994

ANON 1904 'The History of the Collections contained in the Natural History Departments of the British Museum' Vol. 1. The Libraries, The Department of Botany, The Department of Geology, The Department of Minerals. London: *Printed by order of the Trustees of the British Museum*

ANON 1906 'The History of the Collections contained in the Natural History Departments of the British Museum' Vol. 2. Separate Historical Accounts of the Several Collections included in the Department of Zoology. London: *Printed by order of the Trustees of the British Museum*

BAAS 1857 Meeting at Cheltenham Report: 'On Mollusca of the West Coast of North America', no exact reference, Bolton Museum History File

Carpenter, P.P. 1857 'Catalogue of the Collection of Mazatlan Shells in the British Museum Collected by Frederick Reigen Described by Philip P. Carpenter'. London: *Printed by Order of the Trustees*

Carter, D. and Walker, A. (eds.) 1999 Preface in: *Care and Conservation of Natural History Collections* Butterworth-Heineman

Davis, P. 1994 'Documentation of Collections' in: Stansfield, G., Mathias, J. and Reid, G. (eds.) *Manual of Natural History Curatorship* HMSO

Dean, Davy J. 'Conchological Cabinets of the Last Century'. *Journal of Conchology* Vol 20, No.8, July, 1936: 240-241

Fenton, A. 1995 'Collections research: local, national and international perspectives' in: Fahy, A. (ed.) *Collections Management* Routledge

Gunther, A. 1912. 'The History of the Collections contained in the Natural History Departments of the British Museum' Vol 2 Appendix. General History of the Department of Zoology from 1856 to 1895. London: *Printed by order of the Trustees of the British Museum*.

Kardong, K. 1998 'Vertebrates: comparative anatomy, function and evolution' McGraw-Hill

Mathias, J. 1994 'Housing and Maintenance of Collections' in: Stansfield, G., Mathias, J. and Reid, G. (eds.) *Manual of Natural History Curatorship* HMSO

Meester, J. 'The Importance of Retaining Voucher Specimens' In: Herholdt, E.M. (ed.) *Natural History Collections: their management and value* Transvaal Museum Special Publication No. 1, Transvaal Museum, Pretoria

van Oosterzee, P. 1997. 'Where Worlds Collide- the Wallace Line'. *Cornell University Press*

Palmer, K. V.W. 1951 'Catalog of the First Duplicate Series of the Reigen Collection of Mazatlan Shells in the State Museum at Albany, New York'. *New York State Museum Bulletin* 342:1-79

Pettitt, C. (1994) 'Using Natural History Collections' in: Stansfield, G., Mathias, J. and Reid, G. (eds.) *Manual of Natural History Curatorship* HMSO

Reid, G. (1994) 'The Preparation and Preservation of Collections' in: Stansfield, G., Mathias, J. and Reid, G. (eds.) *Manual of Natural History Curatorship* HMSO.

Stansfield, G. 1994 'Functions and Organisation of Natural History Museums', in: Stansfield, G., Mathias, J. and Reid, G. (eds.) *Manual of Natural History Curatorship* HMSO

Stansfield, G., Howard, P. 1994 'Natural History Museum Exhibition' in: Stansfield, G., Mathias, J. and Reid, G. (eds.) *Manual of Natural History Curatorship* HMSO

Stansfield, G., Mathias, J., and Reid, G. (eds.) 1994 Preface and Introduction in: *Manual of Natural History Curatorship* HMSO

University of Leicester, Department of Museum Studies: Option: Science 2 Natural Science Curatorial Course Material 1999/2000

Winston, J. 1999 'Describing Species: practical taxonomic procedure for biologists'. *Columbia University Press* New York

Shipping and handling of Natural History Specimens in Dangerous Goods: A US Perspective

- Andy Bentley, University of Kansas

Most collection holding natural history institutions, as part of their day to day operating procedures, deal with the shipping of specimens, through loans and gifts of material to other institutions as well as the accepting of incoming material. A large number of these contain flammable or hazardous solutions e.g. ethanol, isopropanol or formaldehyde in varying concentrations. Dangerous goods regulations, most in place long before September 11th, 2001, were brought sharply into focus after that tragic event.

Most specimen shipments, whether domestic or international, are sent by airmail to minimize the length of time specimens are exposed to the hazards of transport, thereby reducing the chances of damage and dehydration. Shipping dangerous goods by air presents particular problems. International shipments must comply with both the International Civil Aviation Organization (ICAO) technical instructions as well as national regulations. In order to meet commercial standards, shippers are also required to meet the International Air Transport Association (IATA) Dangerous Goods Regulations. Furthermore, some countries have added variations to many of these requirements.

Regulating agencies

The ICAO governs the implementation and adoption of standard aircraft shipping and packaging regulations by both the Department of Transportation (DOT) in the United States and IATA internationally. DOT regulations are unique to the United States. Other countries have similar domestically enforced regulations while a number rely on IATA for both domestic and international regulations. International (IATA) shipping regulations are followed by most countries. Domestic shipments sent through the mail within the United States must also conform to United States Postal Service (USPS) regulations while courier shipments (FedEx, UPS and DHL) must conform to the individual company's specific regulations (which for the most part follow IATA regulations). USPS and private courier regulations must meet or exceed the DOT or IATA regulations respectively; in many instances they are more restrictive.

Training

The first, and most important, requirement stipulated by all regulations is that all those who pack, handle or ship dangerous goods be properly trained. Training can be obtained from any number of commercial companies that specialize in Dangerous Goods or Hazardous Materials Training, and may range in price from \$300-\$500. For quantities above and beyond restricted quantities, more extensive training is required, which involves additional time and cost.

Dangerous goods/Hazardous materials

Dangerous goods/hazardous materials are classified according to Hazard Class and Packing Group. For example, most flammable liquids fall into Hazard Class 3. Within each Hazard Class, materials are classified into three Packing Groups.

Of the four substances most commonly used in wet collections only ethanol, isopropanol and formaldehyde are covered under dangerous goods regulations. Glycerin (glycerol) used for cleared and stained specimens, is not regulated in any concentration.

Ethanol (ethyl alcohol), most commonly used in concentrations of 70% and above, is regulated for transport. Concentrations between 10% and 80% fall into Packing Group III while concentrations above this fall into Packing Group II.

Isopropanol (isopropyl alcohol), most commonly used at concentrations of 50% and above, falls into Packing Group III at concentrations of 10 to 30% while concentrations above this fall into Packing Group II.

Formaldehyde (formalin) in concentrations above 10% is a Class 9, packing group III substance and is regulated for transport. What is called "10% formalin" in natural history collections is, in fact, 3.7% or 4.0% formaldehyde (formaldehyde is a saturated solution of formaldehyde gas in water, measured by weight or volume concentration) and as such is unregulated for transport.

The shipment of infectious substances, natural history specimens not containing dangerous goods (pinned insects, skins, skeletons etc.), biological materials other than natural history specimens and any material on dry ice is covered by a separate set of regulations while there may also be ancillary permitting requirements for the domestic or international transfer of biological specimens (US Fish and Wildlife, APHIS, CITES etc.).

Regulations

Domestic and international shipping and packing guidelines vary slightly in scope and limitations but both include special dispensations for smaller quantities of dangerous goods. The two sets of small quantity regulations are very similar in scope and content but have a number of limitations that must be adhered to. It is important to consult the original texts of both the DOT and IATA regulations before shipping. USPS and DOT regulations are available online^{1,2} while IATA regulations must be purchased³.

Domestic Regulations

In the United States, the shipment of dangerous goods (referred to as hazardous materials) are covered in DOT Title 49 CFR¹ (Parts 100 to 185) and USPS Publication 52². An exception to the regulations is made for dangerous goods in restricted quantities termed “small quantity regulations” outlined in DOT 173.4 and USPS Publication 52 (334). These small quantities are considered exempt from regular DOT and USPS hazardous goods requirements. Most fluid preserved natural history specimens can be packed and shipped utilizing these small quantity regulations.

1. Small quantities may be sent through the United States Postal Service via air transportation (Express, Priority and First-Class mail) or surface transportation as Standard or Parcel Post, or by any of the three major courier companies (FedEx, UPS and DHL) that follow DOT 49 CFR 173.4 small quantity regulations.
 2. Class 3 dangerous goods (all packing groups) are acceptable (ethanol and isopropanol).
 3. The maximum quantity of dangerous goods per inner receptacle cannot exceed 30 mL for acceptable liquids (as above). This inner receptacle cannot be liquid full at 55°C (131°F) and is to be constructed of plastic (having a minimum thickness of 0.2mm) earthenware, glass, or metal. A removable closure on an inner receptacle must be held securely in place using wire, tape or other positive means.
 4. Each inner receptacle must be placed within a securely sealed secondary package.
 5. Sufficient cushioning and absorbent material (that will not react chemically with the dangerous goods) must surround each inner receptacle and be capable of absorbing the entire contents of the receptacle.
 6. The secondary packages must be securely packed in a strong outer package (box) which complies with DOT mandated drop and compressive load tests without breakage or leakage from any internal receptacle:
 - a. Drop tests – free drop on top, bottom, long and short side and the junction of three sides of the package from 1.8m (5.9 feet) onto a solid unyielding surface.
 - b. Compressive load test – stack packages of similar size and weight to a height of no less than 3m (10 feet) for 24 hours.
 7. The gross mass of the package must not exceed 29 kg (64 pounds).
- Labeling - The address side of each package must be clearly marked with “This package conforms to 49 CFR 173.4” and complete return address and delivery address must be furnished. There are no other labeling requirements.

International Regulations

International shipments of dangerous goods are covered in Section 2.7³ of the IATA regulations. As above, restricted quantity regulations exist for international shipping, contained in IATA Section 2.7.1 and referred to as “Dangerous Goods in Excepted Quantities”. Dangerous goods in excepted quantities, in contrast to DOT and USPS regulations, are considered dangerous goods under IATA regulations but are exempt from

large portions of the dangerous goods regulations applicable to larger quantities.

1. The United States Postal Service may not be used for international shipping of dangerous goods. All international shipments must be sent using a private courier service (FedEx, UPS or DHL) that follows IATA regulations.
2. Class 3 dangerous goods (all packing groups) are acceptable.
3. As above, each inner receptacle may not contain more than 30 mL while the same construction, liquid full and closure security regulations apply.
4. Each inner receptacle must be placed within a securely sealed secondary package.
5. Sufficient cushioning and absorbent material (that will not react chemically with the dangerous goods) must surround each inner receptacle and be capable of absorbing the entire contents of the receptacle.
6. The same package drop and compressive load test regulations as above apply.
7. IATA regulations state that each inner receptacle must be placed within a securely sealed secondary packaging the total contents of which may not exceed 500 mL for Packing Group II liquids and 1 liter for Packing Group III liquids.
8. Labeling – each package must be labeled with the label below, having minimum dimensions of 100mm x 100mm (4” x 4”). This label must be filled in and signed by the packer. The “Nature and Quantity of Goods” section of the air waybill must be completed with the words “Dangerous Goods in Excepted Quantities”.

DANGEROUS GOODS IN EXCEPTED QUANTITIES

This package contains dangerous goods in excepted small quantities and is in all respects in compliance with the applicable international and national government regulations and the IATA Dangerous Goods Regulations

Signature of Shipper

Title _____ Date _____

Name and address of Shipper

This package contains substance(s) in Class(es)
(check applicable box(es))

Class: 2 3 4 5 6 8 9

and the applicable UN Numbers are: _____

Figure 1: Dangerous goods in excepted quantities label for international shipments.

All three major courier services (FedEx, UPS and DHL) accept dangerous goods in excepted quantities for international delivery^{4,5,6} and waive their normal dangerous goods surcharges for packages containing excepted quantities. All three couriers do, however:

- only accept dangerous goods on a contract or pre-approval basis
- only accept dangerous goods in boxes (no envelopes). FedEx has the added stipulation that the box must measure at least 7” x 4” x 4”.
- only ship dangerous goods to approved countries (there are various countries within which they are prohibited from shipping due in part to these countries not adopting IATA dangerous goods regulations for domestic transport). Packages can only be delivered to the designated international airport and no further.. The list of countries to which this applies changes constantly therefore the courier should be contacted for an up-to-date list^{4,5,6}. In some countries, additional customs, veterinary, or fish and wildlife fees may be incurred.

It has recently been noted that FedEx has regulations in place against the carrying of “dead animals” and that museum specimens fall into this category and are therefore prohibited in FedEx mail. There are various groups working with FedEx to institute exempt status for museum specimens and resolve this impasse.

Transport in personal baggage as carry-on or checked luggage

Due to the fact that DOT defines small quantities as non-hazardous, these quantities are allowed in hand and checked baggage on domestic flights but must be declared to the airline staff before boarding. The final decision as to whether or not to accept these packages is made by the pilot of the aircraft being boarded, thus you may be denied permission to carry the package on board at the last minute

With the present heightened security measures in force at airports and the policy of no liquids or gels (or limited to 3 oz bottles in a clear quart zip-lock bag depending on which airport you fly through) no specimens in fluid would be allowed as carry-on baggage at all.

Internationally, dangerous goods in any quantity are prohibited as carry-on or checked baggage and cannot be carried on your person or checked onto any international flight (IATA Section 2.7.3).

Natural history specimens

In real world collection scenarios, the common practice of wrapping specimens in cheese cloth or gauze moistened with alcohol and sealed in plastic would keep the material from being a dangerous good as long as no more than 30 mL of 70% ethanol was used in each individual package and the heat sealed plastic bags are at least 0.2mm thick. Specimens preserved in 3.7% formaldehyde can be shipped in regular mail both domestically and internationally without any dangerous goods requirements.

Tissues can be placed in cryovials or glass vials in less than 30 mL of 99% ethanol if the caps are secured with tape or Parafilm, and the vials placed in a secondary heat sealed plastic bag with absorbent material and packed similar to the above.

It has also been suggested that fluid preserved specimens may be placed in water (or reduced concentrations of alcohol) for shipment. Although this may put specimens outside of the scope of dangerous goods regulations, the possibility of damage to specimens from swelling (and subsequent shrinkage upon reinsertion into alcohol), cell wall rupture, mold, and bacterial growth will severely endanger the specimens, particularly if the shipment is delayed.

It is important to remember that dangerous goods regulations are not written to specifically address the shipment of natural history specimens. There are various groups that are in the process of working with the various organizations to have regulations put in place that will address certain shortcomings of the existing regulations for natural history specimen shipments.

References:

- 1 Title 49 CFR, Subtitle B, Chapter 1, Subchapter C: Hazardous materials regulations. US Department of Transportation (DOT). http://www.access.gpo.gov/nara/cfr/waisidx_99/49cfrv2_99.html
- 2 USPS Publication 52: Hazardous, Restricted, and Perishable Mail. Part 3: Hazardous Materials. Pgs 15-60. July 1999. <http://www.usps.com/cpim/ftp/pubs/pub52.pdf>
- 3 IATA Dangerous Goods Regulations, 48th Edition. 2007. Section 2 - Limitations pgs 9-80. International Air Transport Association. Not online.
- 4 FedEx Dangerous goods shipping website: <http://www.FedEx.com/us/services/options/express/dangerousgoods/hidden.html>
FedEx Dangerous Goods/Hazardous Materials Hotline: 1-800-463-3339.
- 5 UPS dangerous goods shipping website: <http://www.ups.com/content/us/en/resources/prepare/idg/information/definition.html>
UPS Hazardous Materials Support Center: 1-800-554-9964.
- 6 DHL dangerous goods shipping website: <http://www.dhl-usa.com/usgov/servopt>
DHL Hazardous Materials Hotline: 1-866-588-2002.

We apologise for the omission of the following from the last issue of NatSCA News 12

ADDENDUM

to Allington, L. & Sherlock, E., 2007. Choosing a microscope slide sealant, *NatSCA News 12*: 5-14.

ACKNOWLEDGEMENTS

The authors would like to thank Andrew Cabrinovic, Graham Bennell, Geoff Boxshall, Paul Brown, Gillian Comerford, Chris Collins, Sophie Conroy-Dalton, Tim Ferrero, Rony Huys, Miranda Lowe and Clare Valentine for their Valuable advice and support. A special thanks to Natalie Barnes, the initiator of the project and nematode supervisor.

BIBLIOGRAPHY

Barrow W J. 1965. *Permanence/Durability of the Book IV, Polyvinyl acetate (PVA) adhesives for use in library book-binding.* W. J. Barrow Research Laboratory.

Berger G A and Russell W H. 1986. Investigations into the reactions of plastic materials to environmental changes. Part 1. *Studies in Conservation* 31, pp 49-64.

Bockhoff F H, Guo K M, Richards G E and Bockhoff E. 1984. Infra-red studies of the kinetics of insolubilisation of soluble nylon. In: N S Brommelle, ed. *Adhesives and consolidants: preprints of the contributions to the Paris Congress.* IIC 2-8, pp81-86.

Booth M A. 1887. A thoroughly reliable cement. *The Microscope* 7, p297.

Borgia G C, Bortolotti V, Camaiti M, Cerri F, Fantazzini P, and Piacenti F. 2001. Performance evolution of hydrophobic treatments for stone conservation investigated by MRI. *Magnetic Resonance Imaging.* 19(3-4), pp513-6.

Blackshaw S M and Ward S E. 1982. Simple tests for assessing materials for use in conservation. In: J O Tate, N H Tenny and J H Townsend, eds. *Resins in Conservation.* Proceedings of the Symposium Edinburgh 1982, Scottish Society for Conservation and Restoration, University of Edinburgh Extra Mural Department, pp2.1-2.15.

Blackshaw S M and Daniels U D. 1979. The testing of materials for use in storage and display in museums. *The Conservator* 3, pp16-19.

Brown, P A. 1997. A review of techniques used in the preparation, curation and conservation of microscope slides at the Natural History Museum, London. *The Biology curator.* 10, pp1-33.

Brown P A and de Boise E. 2006. Procedures for the preparation of whole insects as permanent microscope slides and for the remounting of deteriorating aphis slides. *NatSCA News.* 8, pp15-19.

Cappitelli F, Zanardini E and Sorlini C. 2004. The biodeterioration of synthetic resins used in conservation. *Macromolecular Bioscience* 4(4), pp399-406.

Ciabach J. 1983. Investigation of the cross-linking of thermoplastic resins affected by ultra-violet radiation. In: J O Tate, N H Tenny and J H Townsend, eds. *Resins in Conservation.* Scottish Society for Conservation and Research.

Cronyn J M and Horie C V. 1985. *St Cuthbert's Coffin,* Dean and Chapter of Durham Cathedral.

Curran J and Hominick W M. 1981. Effect of mounting methods on taxonomic characters of adult male mermithids. *Nematologica.* 26, pp455-466

Darmon J C. 1975. Cemented brackets and cyanoacrylate. *Rev. Ortho Dento facilate.* 9(4), pp424-438.

David C, Borsn M and Geuskens G. 1970. Photolysis and radiolysis of poly(vinylacetate). *European Polymer Journal* 6, pp959-963.

De la Rie E R. 1992. Stability and function of coatings used in Conservation. In: N S Allen, M Edge and C V Horie, eds. *Polymers in Conservation.* The Royal Society of Chemistry, Special Publication No. 105, pp62-81.

Derrick M, Stulik D and Ordonez E. 1993. Deterioration of cellulose nitrate sculptures made by Gabo and Pevsner. In: D W Grattan, ed. *Saving the twentieth century: The conservation of modern materials.* Ottawa: Canadian Conserva-

tion Institute, pp169–82.

De Witte E. 1983. Resins in Conservation: introduction to their properties and applications. In: J O Tate, N H Tennet and J H Townsend, eds. *Resins in Conservation*, proceedings of the Symposium Edinburgh 1982, Scottish Society for Conservation and Restoration, University of Edinburgh Extra Mural Department, pp1.1-1.6.

Doncaster, C C. 1962. Sealing microscopical water mounts with soft wax. *Nematologica* 7, p258.

Elder A, Madeen S, Brown G, Herbel C, Collins C, Whelan S, Wenz C, Alderson S and Kronthal L. 1997. Adhesives and Consolidants in Geological and Paleontological Conservation: A wall chart. *SPNCH Leaflets*. 1(2).

Feast A A J. 1982. Synthetic lattices. In: K O Calvert, ed. Polymer lattices and their applications. *Applied Science*, pp24-46.

Feller R L. 1978. Standards in the evaluation of thermoplastic resins. In: *5th Triennial Meeting, Zagreb, Yugoslavia, 1-8 October 1978*. Paris: ICOM-Committee for Conservation, 78/6/4 pp1-11.

Feller R L. 1981. Developments in the testing and application of protective coatings. In: *6th Triennial meeting, Ottawa 21-25 September 1981*. Paris: ICOM-Committee for Conservation 81/16, pp1.1-6.

Feller R L, Curran M and Bailie C. 1981. Photochemical studies of Methylacrylate coatings for the conservation of museum objects. In: S P Pappus and F H Winslow, eds. *Photodegradation and Photostabilisation of Coatings*. American Chemical Society Symposium Series 151, pp183-196.

Ferreira A V and Combs C M. 1951. Deterioration of nitrocellulose solutions caused by light. *Stain Technology* 26 (2), pp81-4.

Gaynes N I. 1967. *Formulation of Organic Coatings*. New York: Van Nostrand.

Green D and Thickett D. 1995. Testing Materials for Use in the Storage and Display of Antiquities: A Revised Methodology. *Studies in Conservation*, 40(3), pp 145-152.

Holben E M. 1996. The shifting function of artists' fixatives. *Journal of the American Institute for Conservation* 35(3), pp 239-54.

Hooper D J. 1986. Handling, fixing, staining and mounting nematodes. In: J F Southey, ed. *Laboratory methods for work with plant and soil nematodes*. London: MAFF, pp59-80.

Horie C V. 1987. *Materials for Conservation: organic consolidants, adhesives and coatings*. Oxford: Butterworth-Heinemann.

Hulings N and Grey J S. 1971. A manual for the study of meiofauna. *Smithsonian Contributions to Zoology* 78, pp1-84.

Huys R and Boxshall G. 1991. *Copepod Evolution*. London: The Ray Society. p451 Appendix 2.

James F L. 1887. Finishing Balsam mounts. *The Microscope* 7, p24.

Johnson M. 1977. Nitrocellulose as a Conservation Hazard, In: *Preprints of the Papers Presented at the Fourth Annual Meeting, Dearborn, MI, 29 May - 1 June 1976*. Washington, DC: American Institute for Conservation, pp66-75.

Kamh G M E 2003. Evaluation of seven resins as stone surface consolidants for four limestone facies using a magnetostrictive ultrasonic technique. *International Journal for Restoration of Buildings and Monuments* 9(2), pp149-172.

King J D. 1889. Mounting in Glycerin or other fluids. *The Microscope* 9, p137.

Koob S P. 1982. The instability of cellulose nitrate adhesives. *The Conservator* 6, pp30-4.

Leonard F, Kulkarni R K, Brandes G, Nelson J and Cameron J J. 1996. Synthesis and degradation of poly(alkylcyanoacrylate)s. *Journal of Applied Polymer Science* 10, pp259-72.

Lyon H N. 1889. Cements, Varnishes and Cells. *The Microscope* 3, p70.

McNeill I C. 1992. Fundamental aspects of polymer degradation. In: N S Allen, M Edge and C V Horie, eds. *Polymers in Conservation*. The Royal Society of Chemistry, Special Publication No.105, pp14-31.

- MGC** (1992a) *Science for Conservators vol.3: Adhesives and Coatings*. Museums and Galleries Commission, London and New York: Routledge.
- MGC** (1992b) *Standards in the Museum care of Biological Collections*. No.2, London: Museums and Galleries Commission.
- Miles F D.** 1955. *Cellose Nitrate*. London: Oliver and Boyd.
- Mills J.** 1987. *The organic chemistry of museum objects*. London: Butterworth.
- Morse J.** 1992. Insect Collection Conservation. *Insect Collection News*, 8.
- Mound L A and Pitkin B R.** 1972. Microscopic Whole Mounts of Thrips (Thysanoptera). *Entomologist's Gazette*, 23: pp121-5.
- N B S.** 1982. *Making simple mounts in Canada Balsam or N.B.S. Numount*. Northern Biological Supplies (N.B.S), Microscopy booklet three.
- Oddy W A.** 1975. The corrosion of metals on display. In: D Leigh, A Moncrieff, W A Oddy and P Pratt, eds. *Archaeology and the Applied Arts*. London: International Institute for Conservation, pp235-7.
- Pike N.** 1890. On preparing, preserving and mounting objects of Natural History for the microscope. *The Microscope*. 10: p268.
- Rose C L, Hawks C A and Genoways H H.** 1995. *Storage of Natural History Collections: A preventive Conservation Approach*. Pittsburg, Pennsylvania: Society for the Preservation of Natural History Collections.
- Selwitz C.** 1988 *Cellulose Nitrate in Conservation*. Marina del Rey, CA: Getty Conservation Institute.
- Shap E W.** 1891. Ways and Means, Balsam mounts. *The Microscope*, 1, pp26-9
- Smith M, Jones N, Page S and Dirda M.** 1984. Pressure-sensitive tape and techniques for its removal from paper. *Journal of the American Institute for Conservation* 23, pp101–13.
- Somerfield P L and Warwick R M.** 1996. Meiofauna in marine pollution monitoring programmes. *A laboratory manual*. Lowestoft: MAFF Directorate of Fisheries Research, p71.
- Stevens T S.** 1891. Apathys cement for Glycerine mounts. *The Microscope* 6(5), p156.
- Stansfield G, Mathias J and Reid G.** 1994. *Manual of Natural History Curatorship*. London: Museums and Galleries Commission.
- Thickett D, Cruickshank P and Ward, C.** 1995. The Conservation of Amber. *Studies in Conservation* 40(4), pp217-26.
- Thomson G.** 1963. New picture varnishes. In: G Thomson, ed. *Recent advances in conservation*, London: Butterworths.
- Waggoner C W.** 1910. Some Phosphorescent Salts of Cadmium with Sodium. *Physical Review* (Series I) 31(4), pp358–66.
- Wagstaff R and Fiddler J H.** 1968. *The Preservation of Natural History Specimens Vol 2*. London: H F & G Witherby.
- Williamson C J.** 1992. 150 years of plastics degradation. In: N S Allen, M Edge, and C V Horie, eds. *Polymers in Conservation*. London: The Royal Society of Chemistry, Special Publication No.105, pp1-13.
- Zappalà A, Calvini P, Gorassini A and de Stefani C.** 2004. Lamination of Fragile Documents as Preliminary Intervention to Aqueous Mass Deacidification. A Study on Reversibility Effects. *Annali di Chimica* 95(3-4), 257 – 264.

The Insect Collection Managers Group [ICMG]

The Insect Collection Managers Group [ICMG] consists of exactly that, the specialist collections managers of the major insect collections in Britain and Ireland.

All insect collection-holding institutions in Britain and Ireland with a dedicated entomology post, should be represented on ICMG. In addition, the curator of the British Entomological & Natural History Society is a member, partly to link to the amateur collector community, and NatSCA is represented by an entomologist member of its committee, to provide a link to other museums with insect collections and to the curators responsible for them. It was recently decided that all active museum entomologists who are responsible for significant insect collections among a wider range of curatorial duties would be considered eligible to join the group. Anyone interested should contact Mike Fitton or Geoff Hancock at the email address below.

The aims of the group are:

- To enable the managers of the largest insect collections in Britain and Ireland to meet each other, discuss common problems, potential ways to resolve these and identify areas which might benefit from standardisation
- To set and promulgate standards of curation and documentation
- To undertake projects in these areas
- To promote cooperation between all holders of insect collections
- To promote and support outreach and training

Recent discussion has covered the latest developments in:-

- Integrated Pest Management.
- Legislation on collecting, import & export permits and to share experiences in respect to the tightening up of accession / acquisition of both old and new material by Biodiversity conventions and museum accreditation standards.
- Major acquisitions, loans, losses and thefts within their collections.
- The status and importance of voucher specimens and the distribution of specimens of recently introduced or threatening alien species between and to core museums to assist in monitoring and detection.
- Latest identification keys and checklists.
- Web-based initiatives,
- Surveys of holdings of British insects / collections spreadsheets, showing the size of holdings and where the largest and / or most important collections are located. This will be particularly useful for 'less popular' groups. The spreadsheet will be made widely available with the aim of gathering information on all insect collections.

Supplies & Suppliers

The Group identifies good quality suppliers and the performance standards discussed for cabinets, drawers, unit trays, Plastazote, collecting equipment, chemicals, pins, papers, ink, glues, environmental monitoring equipment etc. An annotated list of suppliers is held by Jeanne Robinson at Glasgow.

Training.

Another training day on basics of insect collection management for generalist natural history curators and for non-museum entomologists is planned and will be advertised through NatSCA, BENHS, RES and British Ecological Society soon.

NatSCA has agreed to host an ICMG webpage, which is yet to be designed.

The group generally meets once a year and each member institution takes it in turn to act as host. The 2007 meeting of ICMG will be held at the Central Science Laboratory, York in September.

The present chair of the group is Mike Fitton (m.fitton@nhm.ac.uk) and the secretary is Geoff Hancock (g.hancock@museum.gla.ac.uk).

The Entomology collections and other organisations represented in ICMG so far are:-
 Natural History Museum, London (Mike Fitton [chair]),
 Entomology Collection, Natural History Museum, London (Howard Mendel);
 University Museum of Zoology, Cambridge (William Foster);
 Hope Entomological Collections, Oxford (George McGavin or Darren Mann);
 National Museums Liverpool (Steve Judd or Guy Knight);
 Manchester Museum (Dmitri Logunov);
 Central Science Laboratory, York (Chris Malumphy or Sharon Reid);
 National Museums of Scotland, Edinburgh (Graham Rotheray);
 Glasgow Museums (Jeanne Robinson);
 Hunterian Museum, Glasgow (Geoff Hancock [Secretary]);
 National Museums & Galleries of Wales (Mike Wilson);
 Ulster Museum (Brian Nelson or Robert Nash);
 National Museum of Ireland, Dublin (Jim O'Connor);
 British Entomological & Natural History Society (Peter Chandler);
 NatSCA (Paul Brown).

Notice of NatSCA Annual Conference & AGM, 2008

**University of Glasgow
& at Kelvingrove Museum and Art Gallery**

“Effective Partnerships between museums, organisations & audiences”

Thursday 15th – Friday 16th May, 2008

Anyone wishing to present a paper on the theme please contact Maggie Reilly email:-
mreilly@museums.gla.ac.uk

*Please note that we ask speakers to submit written versions of papers for publication in
 the conference issue of NatSCA News and on the website*

AGM AGENDA

1.45 - 2.30 pm Thursday 15th May 2008:

- Apologies for absence
- Minutes of AGM Sheffield 2007
- Matters arising from Sheffield AGM minutes
- Chairman's Report
- Secretary's Report
- Treasurer's Report
- Membership secretary's Report
- Editor's Report
- Natural Science Conservation Report
- Election to committee
- Any Other Business
- Seminars
- Study Trips
- Date and Venue of Next Meeting.
- Vote of thanks
- Close

MINUTES
NatSCA AGM, 25.4.2007

Venue: Long Gallery, Millennium Galleries, Arundel Gate, Sheffield, S1 2PP

In Nick Gordon's absence, Vicki Papworth chaired the AGM.

1. Apologies for absence

Apologies for absence received from:- Jack Ashby, Adrian Doyle, Nick Gordon, Andrea Hallaway, Nicola McNicholas & Jane Mee.

2. Minutes of AGM Liverpool April 2006

These were signed as correct by the chair.

3. Matters arising from Liverpool AGM minutes

There were no matters arising

4. Chair's Report:

Vicki Papworth reported that there have been a series of Regional meetings with local and Hub museum members, concerning our Subject Specialist Network role with much willingness to be involved shown by attendees. We hope that our SSN status will be our organisation and not institutionally based. She presented the results of the SSN survey appended.

Vicki reminded AGM that we money allotted for bursaries to enable attendance of conference and future seminars.

5. Secretary's Report: Paul Brown

Attendance NatSCA committee 2006-2007. Meetings were held on 27.vii.06 at Yorkshire Museum; on 6.xi.06 at the Natural History Museum; on 5.iii.07 in Newcastle and 24.iv.07 in Sheffield.

4.vii.06 6.xi.06 5.iii.07 24.iv.07

Nick Gordon

Kate Andrew				X	X
Paul Brown	X	X	X	X	
Andrea Hallaway		X			
Jo Hatton	X		X	X	
Guy Knight					
Jane Mee	X	X	X		
Nicola McNicholas	X		X		
Simon Moore			X		X
Vicki Papworth			X	X	X
Maggie Reilly		X	X	X	X
Douglas Russell		X		X	
Clare Stringer		X	X	X	
Steve Thompson	X	X			

6. Treasurer's Report: Kate Andrew

This year, Kate Andrew has used the Charity Commission pro-forma to present the accounts as this is the format that the Commissioner's prefer for the annual returns. Given that we have only a current account and a deposit account and no other assets, much of the second page of the return is blank, but it does now

have a comparison with previous year's accounts. Velson Horie continues to act as our independent examiner of the accounts.

Reserves - We inherited quite significant reserves due to the good management of both pre-cursor bodies, the former NSCG and BCG. With the current stable state of membership and good attendance at well planned and budgeted meetings, we have continued to operate at a break even or slight profit most years allowing Natsca to continue to build reserves. Reserves now equate to close to two year's running costs.

In recent years, we have started to experience higher running costs, as institutions become less willing to support cash costs of staff involvement but the committee feels that we could afford to reduce reserves further. We decided that one way to support the charitable aims was to fund bursaries to attend the AGM, with eleven bursaries awarded for the Liverpool AGM. This meeting will be the third such meeting we have supported in this way.

The accounts presented today would have shown a £2,000 deficit and a reduction of reserves but for the award of the SSN grant.

Meetings - The 05/06 accounts have no annual meeting costs other than bursaries, since the 05 meeting was led by SPNHC, only one NatSCA meeting was run that year. This year's meetings were the AGM in Liverpool, a Biochemistry training course at Kew, some late payments from the Herbarium training course and an early payment for the taxidermy training course.

Newsletters - Three newsletters were paid for from these accounts.

Natural Sciences Collections Association	No 1098156		CC16a		
Receipts and payments accounts					
	For the period from	Period start date	To	Period end date	
		01-Feb-06		31-Jan-07	
Section A Receipts and payments					
	Unrestricted funds	Restricted funds	Endowment funds	Total funds to the nearest £	Last year to the nearest £
A1 Receipts					
Subscriptions	4386	-	-	4386	4323
Sale of back issues	-	-	-	-	19
Conference and training	5020	-	-	5020	880
Grants / awards from other bodies	4300	-	-	4300	3000
Bank interest	1	403	-	404	377
Sub total	13707	403	-	14110	8599
A2 Assets and investment sales, etc	-	-	-	-	-
Total receipts	13706.61	403	-	14110	8599

A3 payments					
subscriptions	35	-	-	35	35
Insurance	795	-	-	795	687
Newsletter printing and postage	3552	-	-	3552	3109
Committee travel expenses	665	-	-	665	866
Marketing and promotion	67	-	-	67	401
Operational expenses (postage, photocopying)	191	-	-	191	146
Conference and training course expenses	4992	-	-	4992	546
Bank charges	10	-	-	10	-
Bursaries	1009	-	-	1009	1886
Web site	150	-	-	150	2110
Subtotal	11435	-	-	11435	9777
A4 Assets and investment purchases etc.	-	-	-	-	-
Total payments	11435	-	-	-	9777
Net of receipts / payments	2271	403	-	2674	1177
A5 Transfers between funds	1550	1550	-	-	-
A6 Cashfunds last year end	730	23581	-	24311	25488
Cashfunds this year end	4501	22484	-	26985	24311

The accounts have been checked by Velson Horie who signed them as being correct. Acceptance of the accounts was proposed by Maggie Reilly, seconded by Jo Hatton and AGM accepted them nem. con.

7. Membership secretary's Annual Report 1st Feb 2006 – 31st Jan 2007: Maggie Reilly

NatSCA ended the year with 258 names on the database. This includes the eleven regular FOC mailings. It excludes the 17 members who did not renew for 2006. 17 Swedish colleagues received complementary mailings for 2006 only in thanks for their hospitality in hosting the study trip in May 2006. Therefore the total of paying membership for the year is 230 consisting of 59 institutional members and 171 personal members. Or by region: 203 UK, 15 Europe, 7 North America, 5 Rest of world. New members joining late in the year i.e. after November were held over to 2007 membership.

Standing orders have proved to be an efficient way to collect subs and so far 30 members are using this facility. Standing order forms can now be down loaded from the website. Due to huge increases in bank charges and the exchange rate favourable to the pound, we are unable to accept EU member payments by cheques in euros so this info was taken off website.

Maggie Reilly is still checking out the information on the Charities Paypal web payment system at <http://www.webanywhere.co.uk/index.php?tab=3D3>. Initial information suggests that this company are more geared up for creating and hosting a website than modifying an existing one hosted elsewhere.

Committee were agreeable to a £10 sub for unwaged members – this will go to AGM for approval. Once we agree the student rate to contact colleges with Museums courses and ask them to bring NatSCA to the atten-

tion of their students

Information on NatSCA to Chris Norris at AMNH who is currently on the Publicity and Outreach committee for SPNHC who are surveying the operation of other societies, which overlap with SPNHC

In the course of the year a query arose over what institutional membership entitled an organisation to and this was clarified to 2 places at conference and one vote at AGM.

Members are asked to keep either Vicki Papworth (v.papworth@nhm.ac.uk) or Maggie Reilly (mreilly@museum.gla.ac.uk) up to date with email addresses. For institutional members it can be problematic identifying the institutional contact – it would be very useful if institutional members can provide us with a named contact and email address, providing they want to receive emailings. Members without email will continue to receive information by post.

8. Editorial & Website Report: Vicki Papworth

Three issues of NatSCA news were published during the past year (issues 9 to 11) with many papers on the preparation and conservation of collections (botany, taxidermy), on education and reviews of seminars and latest parliamentary acts. Vicki asked AGM for papers for publication in NatSCA News and for information on permits, policies and other relevant documentation for the NatSCA website.

9. Natural Science Conservation (& Institute of Conservation) Report: Simon Moore

Convergence with ICON? Maybe not!

NatSCA cares very much about our membership and there have been concern from the conservator side about their perceived lack of representation, articles in *NatSCA News* or at the annual conference.

To try and address this Simon mentioned last year, about a possible convergence with ICON (the evolved UKIC) that was formed in 2005. To this end Simon informally polled the membership about converging NatSCA with ICON. Not surprisingly, the conservation side was in favour while the larger curatorial side, generally, was not and a few were quite strongly against this idea.

The main stumbling block is one of division that we have been trying to avoid for obvious reasons. NatSCA was formed from the Natural Sciences Conservation Group and the longer-standing Biology Curators' Group and we try to blend the conservator/curator lines and avoid division.

The problems of converging with ICON are that it would put up our modest subscription 4-fold and that we would lose a certain amount of our independence but give us a much bigger voice. There are many pros and cons with this issue but we were determined that NatSCA would not be divided within itself so that we would revert to a BCG and NSCG-converged-with-ICON situation.

The other problem of job description division is more complex since we have many curators who perform conservation tasks and conservators who have to do curatorial tasks. Why is this? Could it be due to the only slight recognition of Natural Sciences Conservation, after all these years and the lack of available posts? Simon considers this is the main reason and it's one we need to make known a lot more. In ICON we could have lobbied the heritage sector and may have gained more recognition. Can we do this with NatSCA? We all have an increasing work load and how many can afford to sit on yet more committees! On the plus side, however, there have been a few natural sciences conservator posts advertised recently.

What we need is someone to write a pointed, but not embittered, article in *Museums Journal* to make this point and hopefully the amount of job posts, even in these days of shrinkage, might increase. But we must keep up the pressure without appearing to moan.

In France they have no conservators or knowledge in Natural Sciences Conservation (except for a multi-disciplinary group called OCIM within the University of Burgundy at Dijon). Throughout the rest of Europe it is much the same although not quite so bad. ICOM does a good job of holding them together and part of our membership supports ICOM rather than NatSCA and that *NN* is becoming thinner. Fine perhaps, but we don't seem to hear much from ICOM after we agreed about staying in touch after the Dublin Conference.

Simon concluded by stating the following:

We decided not to converge with ICON due to increased subs, some loss of independence and not enough for the curatorial side, generally too much discontent within the ranks.

We are constantly under threat within the Heritage Sector since we work, largely on low-value and meta-stable objects.

Your committee works very hard each year to keep NatSCA as much as in the forefront as possible and, with our workload increasing and our budgets diminishing, it gets harder each year. The often Conservation angled seminars are going well but attendance could be much better – it gives the impression that some are keen enough to moan but not support.

As one of the few professional Natural Science Conservators on committee we need to help ourselves to serve the best interests of natural science conservators.

10 Election of Officers & ordinary members of NatSCA committee :

Below are the nominees for NatSCA committee posts to serve from 2007 to 2009/10, which reached the Secretary.

Post	Name of Nominee	Institution	Proposed	Seconded
1. Chair	Vicki Papworth	NHM Botany	Paul Brown	Dave Goodger
2. Secretary	Paul Brown	NHM Entomology	Maggie Reilly	Theresa Howard
3. Treasurer	Tony Irwin	Norwich Castle Museum	David Waterhouse	Peter Howlett
4. Editor	Douglas Russell	NHM Tring	Vicki Papworth	Maggie Reilly
5. OM 1.	Pip Strang	York Museum	Clare Stringer	Paul Brown
6. OM 2.	Peter Stafford	NHM Botany	Vicki Papworth	Paul Brown
7. OM 3.	Jack Ashby	Grant Museum	Vicki Papworth	Maggie Reilly
8. OM 4.	Jane Mee	Portsmouth Museum	Clare Stringer	Steve Thompson
9. OM 5.	Miranda Lowe	NHM Zoology	Vicki Papworth	Simon Moore

As there were vacant posts and candidates to fill them, no election was required. There were no objections to the candidates and so the Secretary asked the AGM to accept and elect those listed people en block onto committee to serve for three years for chair, Secretary and Treasurer and two years for ordinary committee members from this meeting.

Proposed by : Lindsey Loughman, Seconded : Steve Thompson

Kate Andrew promised to continue as acting treasurer until Tony Irwin is fully conversant with the job.

[Editor's note - Douglas Russell has since stepped down as Editor due to personal circumstances]

11 Seminars: Notice of ... Simon Moore

Simon is running an Anoxia seminar at the NHM, London in November 2007 which will be advertised

Vicki Papworth said that there will be a list of projected seminars on our website and that any requirements for seminar should be voiced.

12 Study Trips: Notice of trip to St Petersburg in 2007:

Steve Thompson reported that John Edmondson has not forwarded the planned study trip to St Petersburg and so this is now cancelled. Future visits may be planned for Budapest and Talinn.

13 Any Other Business

Claire Stringer mentioned the case of un-provenanced bird mounts presently housed in a Burton on Trent swimming pool building and asked for any interest.

Clare Valentine is now a 'member at large' for SPNHC and committee would like to co-opt her as our SPNHC representative.

NatSCA wishes to write a Natural Sciences appendix to the MA Code of Ethics.

We need a venue for next year's NatSCA conference & AGM. Any volunteers ?

Vote of thanks

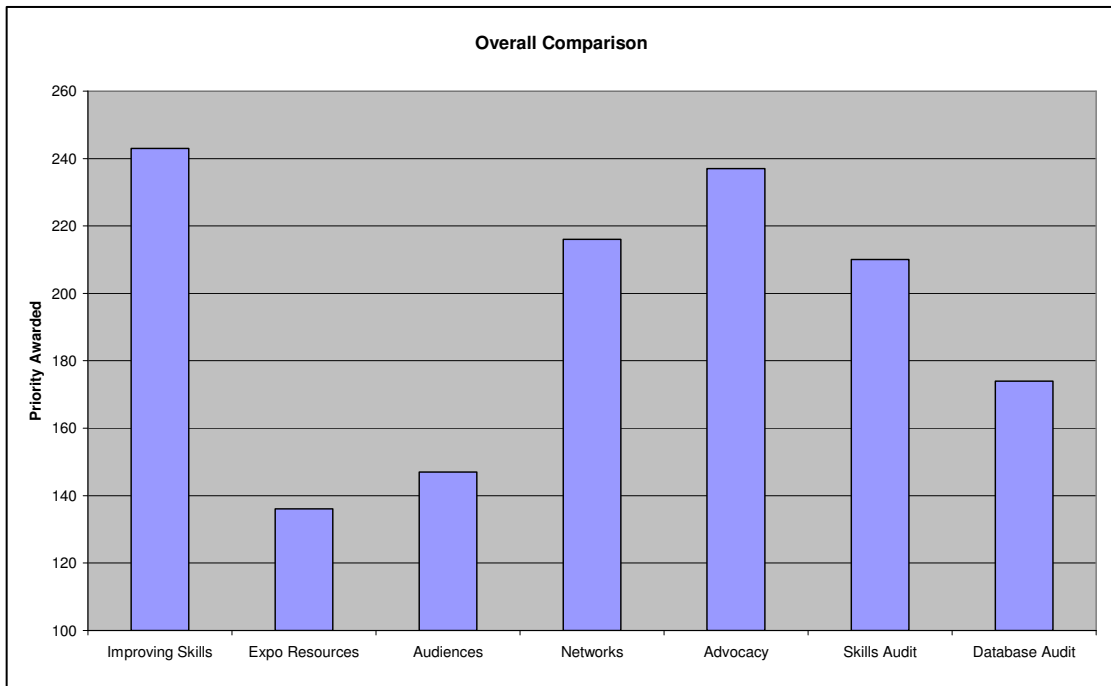
Those retiring from Committee, Nick Gordon (Chair) Kate Andrew (Treasurer), Jo Hatton (OM) & Guy Knight (OM) were thanked by the chair, in particular Kate for her long and consistent service and Jo for organising many meetings including this AGM. Paul Richards and the staff of Sheffield Galleries & Museums Trust were thanked for providing us with a fine conference venue at the Millennium Gallery and for the tours of Western Park Museum and the New Museum Store, and for Mrs Richards for organising the informal conference dinner at the Devonshire Fat Cat pub.

Close

APPENDIX SSN Survey results. Vicki Papworth.

I have created a comparative ranking, awarding points to each category according as to whether it was ranked as 1st choice, 2nd choice and so on for each returned form, giving a total points score. This is shown on the 'overall comparison' chart.

As you can see, in the overall comparison, 'improving skills' and 'advocacy' come out as the most important to most people, closely followed by 'networks' and 'developing skills'. There was also overwhelming support for the idea of employing someone to help coordinate the SSN activity and I think we should consider this when we submit our application. I'd like to gauge people's thoughts on what would be the best way to go about this? Full time, short contract? Part-time longer contract?



How have natural history collections in case study museums in Southwest England evolved in terms of display and interpretation?

- Hannah Paddon, Bournemouth University, Poole

This was a dissertation submitted as part of the requirement for the degree of Master of Arts in Museum and Collections Management at the School of Conservation Sciences, Bournemouth University

For ease of reference, the accompanying diagrams have been reproduced at the end of the text to allow them to be as large as possible.

Abstract

This paper introduces research undertaken for a Masters dissertation at Bournemouth University in 2005. With a focus on local authority museums in Southwest England, displays and the interpretation of natural history have been recorded and comparatively analysed in order to trace their developments since the Victorian period. Methodologies employed during the data collection stages are explained along with a synopsis of each objective achieved. The results include the modelling of trends in natural history display and the changing emphasis of importance placed on these museum collections. Finally, the limitations and conclusions of the research are drawn together, highlighting the need for targeted research on natural history collections across the country.

Introduction

The NatSCA Annual General Meeting 2007 was the first natural history focused conference I had been to. It was refreshing, if not exciting, to meet people who shared the same interest as me. Work on my doctoral research, currently titled 'The use of biological collections: an examination of modern redisplay of biology in British museums', began in October 2006 at Bournemouth University, thanks to an AHRC-funded scholarship. The precursors to the ideas for the research were grounded in my Masters dissertation. This paper therefore, is a brief overview of my previous research as a Masters student.

In 2005, I began a year-long Masters degree in Museums and Collections Management at Bournemouth University, where I was given the opportunity to conduct empirical research on a subject of my choice. I chose to explore the evolution of natural history display, from the Victorian to the modern day period, with a focus on the Southwest of England. The study addressed the evolution of natural history display with a particular focus on four local authority museums in Southwest England; Plymouth City Museum and Art Gallery (PCMAG), Bristol City Museums and Art Gallery (BCMAG), the Royal Albert Memorial Museum, Exeter (RAMM) and the Royal Cornwall Museum, Truro (RCM).

Using primary sources; museum archives, follow-up interviews, qualitative questionnaires and gallery surveys, it was possible to examine and understand the display and interpretation of natural history collections. These sources were combined to give the study a substantial museological and historical grounding. The study highlighted the lack of modern literature relating to the display of natural history, although there are substantial works relating to other aspects of natural history and to display in general. No studies had concentrated on local authority museums in the Southwest of England making this particular study essential and unique.

One of the key findings from this study was that of a trend in the development of natural history display and interpretation. This resulted in the production of pictorial timelines and a model to illustrate the changing trends in natural history display. The model could be used as a hypothesis for further research in Britain and elsewhere. The study highlighted the importance of natural history collections and provided an opportunity to suggest ways in which the subjects profile could be raised, for example, through gallery displays, publications and lectures for both members of the public and museum professionals. Overall, the project shed new light on the display and interpretation of natural history in Britain, illustrated by case study museums in the Southwest England.

Aims and Objectives of the study

The overarching aim of this research was to examine and understand how natural history collections in case

study museums in Southwest England have evolved in terms of display and interpretation.

The study investigated and described the evolution of natural history displays and then applied this model to the four chosen case study museums. Most of the collections within these chosen museums were not brought together until the Victorian period, which saw the introduction of the Museums Act of 1845 '[empowering] local authorities to set up and maintain museums' (Stansfield et al. 1994: 7). For this reason, the study concentrated upon and traced the development of their displays from this period onwards. The objectives for this study were to:

1. trace the developments in the display of this material, focusing on the Southwest region of England since the Victorian period
2. analyse the factors that affected the way in which natural history has been displayed and interpreted
3. examine the likely impact of current and future trends in display on those natural history collections
4. undertake the recording of data about natural history displays nationwide, with particular in-depth focus on the Southwest of England

Methodology

The initial research was focused on a multiple case study approach, whereby research using various sources of information (Creswell 1998: 61) – relevant literature, gallery surveys, archival documents and photographs – were employed. To compliment this study, follow-up interviews with museum curators were undertaken to obtain in-depth opinions relating to the main questions being tackled in the research. Using these qualitative methods, it was possible to gain rich, real data giving not only depth but also breadth of the research and its findings (Hart 2004: 393).

Relevant literature contained ideas of changing displays through time (Whitehead 1970 and 1971) and the 'architecture' of those displays (Yanni 1999), thus leading to the production of pictorial timelines. This empirical research, accompanied by reading across the broad topic and the archival material available, was the underlying rationale for the case study approach.

1) Archival research

In order to build a holistic view of the case study museums, it was necessary to delve into the records held at each of the institutions. This detailed research was carried out over a number of months from the conception of the idea onwards through the analysis stages.

Museum guidebooks and early committee reports were employed to gain an overview of the museums' origins, alongside the origins of their natural history collections. In researching these histories, extensive knowledge was gained of past curators, the changing roles of the museums and the innovative and often original ideas emerging in these institutions. One such idea was the novel way of displaying fresh flowers on a tiered plant table during the summer months of 1937 at PCMAG (Carter and Cumming 1937: 371-2).

Often the archival records were forgotten boxes of papers ranging from annual reports and communications to museum plans and roughly-sketched ideas. This archival research led to the review of the entire back catalogue of the *Museums Journal*, originally known as the *Museums Associations Journal*. This recorded the small and larger changes to the Southwest natural history galleries particularly PCMAG, BCMAG and the Royal Albert Memorial Museum. The use of this primary data in this empirical research was 'a means for describing and attempting to understand observed regularities, patterns, commonalities and/ or themes' (Fitzpatrick *et al.* 1998: 22).

Whilst collecting and collating archival documents, the natural history curators and other interested employees, unearthed photographic representations of the galleries in former years. Using this photographic evidence, it was possible to plot the changes in the types of casing, lighting, layout and taxidermy in the displays, all of which have evolved over time. This evidence made possible the production of a timeline for the development of the natural history gallery in the case study museum.

Along with photographic evidence original samples of lecture flyers used to advertise the lecture programmes within the PCMAG were discovered as well as original display labels from the natural history gallery. These labels are thought to date from the 1940s, typified by the language and fonts used. PCMAG and BCMAG retained records of previous natural history gallery displays and extensive plans (and failed

plans) for new installations. This wealth of archival material underpinned the analysis of changing trends to natural history galleries.

2) Survey of museum natural history galleries

Blaxter *et al.* (2001) explain that there are two forms of survey; those that involve people and those that don't. The survey conducted on the chosen natural history galleries does not involve people i.e. 'when the subjects which are being questioned by the researcher are really objects: materials or artefacts rather than people' (Blaxter *et al.* 2001: 77). This qualitative, primary data gives an in-depth, descriptive account of the survey subject which when analysed can 'take the reader into the setting that was observed' (Patton 1990: 26).

Other forms of data collection were rejected for such an in-depth study. These included questionnaires to appropriate members of staff or reading gallery guides (where available). It would have been less reliable and not necessarily based on up-to-date information and observations. It would also not allow for any additional aspects that could be added by the researcher whilst conducting the first-hand survey.

With the research questions in mind, it was clear that conducting a survey on the chosen museum galleries would help to answer one of the main research objectives: to record in-depth data about the natural history displays in the Southwest of England. The museums chosen for the survey were the foci museums because they are substantial and exhibit variations of systematic, thematic and interactive displays. These museums, run by local authorities, are an important focus of the in-depth Southwest England research.

Prior to visiting these galleries it was necessary to consider the specific aspects and elements which make up a gallery. A diagram was produced to ensure that all of the elements were noted during the surveys (see Figure 1, at end of text). This structured, standardised research diagram (Blaxter *et al.* 2001: 176) was produced to allow comparisons and analyses across the museum galleries and to 'avoid the varying quality of [data]' (Hart 2004: 357). The surveys, due to the size of the galleries and the range of elements that needed to be recorded, took between two and three hours to complete.

The observational surveys brought to light new questions about the displays of natural history. It was these findings, coupled with the archival research, which led to further research being undertaken for this project. These surveys have been fully illustrated by photographic evidence and accompanied by important museum sources such as plans and original display features.

3) Follow-up interviews

Brief interviews with the curators of the PCMAG and BCMAG, were undertaken to pose more in-depth questions about the gallery displays. PCMAG keeper, Helen Fothergill, was a major part of the design team for the museums new natural history gallery whereas BCMAG curator, Sam Trebilcock, has inherited the natural history galleries in the hope of being able to redevelop them in the near future. The interviews were conducted during the data collection process at the museums and sought to record the personal feelings of the curators along with their understanding of the history of the natural history displays and collections. The questions for these interviews arose after analysis of the archival documents and the surveys of the galleries.

4) Further research

Owing to the nature of qualitative data, analysis in the first stages of research revealed a trend (Creswell 1998: 56). From this emerging trend, it was possible to form a proposition based on the data from the case study museums. This proposition nestled closely with the research aim of tracing the developments in the display of this material, justifying the need for continued research.

Until this point, the research material had focused on the Southwest of England and it was felt that there was a need to examine natural history collections across the country if possible. In order to test this new proposition it was necessary to develop a questionnaire that could be sent to natural history curators nationwide.

A standardised questionnaire (Appendix 1) employing open-ended questions was designed and piloted on the research supervisor (Swetnam 1997: 50 and Patton 1990: 295-304). This would again 'avoid the varying quality of [data]' (Hart 2004: 357). The questionnaire design would be guided by the initial research and the original research questions. The questionnaire design would be guided by the initial research and the origi-

nal research questions. The use of open-ended questions promotes a ‘variety of responses’ from the respondent (Swetnam 1997: 50-1) providing rich, meaningful, qualitative data (Fitzpatrick et al. 1998: 29). Closed-ended questions were discounted as they afford bland, sterile answers (Swetnam 1997: 50-1). The only feasible option for gathering such large amounts of real data, in a short time, was a qualitative questionnaire.

In order to distribute the questionnaire to nationwide museums with natural history galleries, it was necessary to retrieve their gallery and contact details from a reliable source. The databases on the ‘24 Hour Museum’ website (www.24hourmuseum.org.uk) was searched for museums with natural history collections. This website was established by the government Department for Culture, Media and Sport (DCMS) and the Museums, Libraries and Archives Council (MLA) as an independent charity (24 Hour Museum 2005: 1 page). The exact term entered into the website search engine was ‘natural sciences’ as there is no term ‘natural history’. This search generated 507 museums with such collections but it was realised that there were some falsities with the search:

1. the search term ‘natural sciences’ included geology collections, which were not a consideration of this study
2. the search located museums with natural science collections, it did not specify galleries, so it was also recognised that not all of the museums would have natural history displays
3. ‘museums’ in the form of historic houses, nature centres and planetariums etc were discarded, the study was limited to *bona fide* museums

Taking these points into account, the total number of true museums with natural history collections was expected to be approximately 50% of the total search results. The amount of collections on display was anticipated to be around 50%.

The self-completed questionnaire was sent to the museums via email as it deemed that this would be the best way to administer a nationwide survey. Table 1 illustrates the advantages of using an email questionnaire.

Criteria	Internet Questionnaire
Cost	<i>Very low</i>
Speed of data collection	<i>Fast</i>
Ability to reach geographically dispersed segments	<i>Very high</i>
Hard-to-recall data obtainable	<i>Good</i>
Respondent anonymity	<i>Possible</i>
Interviewer bias	<i>None</i>
Need for interviewer supervision	<i>No</i>
Response rate	<i>Moderate</i>

Table 1 Advantages of the Email questionnaire method. Source: adapted from Frazer and Lawley 2000: 3

The final question on the questionnaire asked museums whether they would supply photographic or addi-

tional information that would be of value to the research. The electronic format facilitated the ease of transfer between the institution and the researcher, to the study write up. Some of the museums in the search had no contact details other than an address and/ or telephone number. These museums were contacted via telephone in order to determine whether they had a designated natural history gallery. In either case, an email address was recorded and the museums were sent an electronic copy of the questionnaire. The final number of museums contacted was 221, 211 of these were contacted via email with the remainder contacted initially via telephone and followed up with electronic correspondence.

Results

Plymouth City Museum and Art Gallery

The strong photographic evidence uncovered at the PCMAG allowed for the assembly of a case study timeline. The timeline traces the development of natural history display in the PCMAG from the Victorian period to the present day. The photographic evidence is accompanied by written information taken from various museum sources and personal thought. (If you would like a copy of the Plymouth City Museum and Art Gallery timeline, please contact me).

Southwest England: remaining case study museums

Using surveys of the current natural history galleries of PCMAG, BCMAG, RAMM in Exeter and the RCM in Truro, it was possible to create a comparative table of all four local authority museums natural history galleries. The qualitative, primary data was collected using the criteria as defined in Figure 1. This included issues such as labelling, lighting and types of display. By asking set questions of each gallery it was relatively straightforward to compare and contrast findings for data analysis. Photographic evidence was also taken during each gallery survey.

British museums: questionnaire responses

As explained in the methodology chapter, the focus on Southwest England within the research was limited to testing four case studies. In order to distribute the questionnaire nationwide a standardised, open-ended format was produced and sent via email. This questionnaire recorded a wide variety of responses providing rich, meaningful, qualitative data (Fitzpatrick *et al.* 1998: 29).

The final number of museums contacted was 211. At the end of the questionnaire, respondents were invited to make any further comments that they felt might be of use or interest to the study. Some took the opportunity to include photographs, rough ideas for future redisplays and supporting websites to gain more detailed information where possible. The amount of photographs submitted meant that a comprehensive pictorial timeline charts the trends in the design of natural history displays from the Victorian period to the present day and enables the reader to identify particular periods of interest where necessary. (If you would like a copy of the British museums timeline, please contact me).

Discussion

The aim of this research was to examine and understand how natural history collections in case study museums in Southwest England have evolved in terms of display and interpretation. In order to accomplish this, four objectives were identified at the beginning of the study. These were:

1. to trace the developments in the display of this material, focusing on the Southwest region of England since the Victorian period
2. to analyse the factors that affected the way in which natural history had been displayed and interpreted
3. to examine the likely impact of current and future trends in display on those natural history collections and
4. to undertake the recording of data about natural history displays nationwide, with particular in-depth focus on the Southwest of England

Objective 1

This important objective was accompanied by identifying case study museums in the Southwest with a particular focus on PCMAG.

Rich photographic evidence, accompanied by archival and journal research, was presented as a series of surveys for comparative analysis. The timeline focused on the history of PCMAG natural history displays with details of the galleries after each development.

Developments in natural history display were also traced across the Southwest by carrying out detailed surveys on local authority case study galleries. These surveys were comparative as the same factors were analysed at each gallery. Evidence of display practices at different stages throughout the last 100 years was recorded and the data was presented in tabulated form.

Finally, questionnaire responses from nationwide museums were used to gain a broad picture of the British development in natural history display but could also be used to further back findings from the Southwest case study museums. These British findings were presented as a comprehensive pictorial timeline.

From the research a flow diagram (Figure 2) has been produced to illustrate the distinct changes to natural history displays since the Victorian period. Although the flow diagram shows a move away from taxonomic/ systematic displays in the 1920s, some museums retain the original installations from the Victorian period, for example, the Sladen Gallery at the RAMM. These galleries act as museums within museums and record the display of natural history in former eras.

In-depth gallery surveys were conducted in PCMAG, BCMAG, the RAMM and the RCM natural history galleries, the results for which were shown in the tabulated analysis. Comparisons can be drawn from the galleries. For example, all of the main natural history galleries in the Southwest of England are located on the ground floor of the museums. This may be due to the design of the building or the size of the gallery itself. However, there may also be a link between gallery location and visitor popularity. Helen Fothergill, keeper of natural history at PCMAG explained that their natural history gallery is the 'most popular gallery with family groups' and points out that 'natural history galleries and exhibitions nationwide [have] consistently attracted the widest audiences from 'A's to the 'holy grail' of 'C2's, 'D's and 'E's (H. Fothergill 2005: pers. comm.). (NB: talking about social inclusion groups).

Objective 2

The development of natural history displays since the Victorian period is due to a number of factors. It is important to identify those factors. Figure 3 illustrates the main and subsidiary factors affecting natural history display and breaks them into two categories, external and internal factors. External factors are usually out of the control of the museum, whereas the internal factors are direct effects of the museum governors, professionals and even the collections themselves.

Objective 3

Hub funding, from the 'Renaissance in the Regions' project, is funding nearly all local authority museum natural history galleries in Southwest England. Most have undergone or will undergo gallery redisplays in the future. This funding accompanied by Heritage Lottery Fund (HLF) money and in-house budgets has revolutionised natural history collection displays.

PCMAG redisplayed their natural history collections in 2004, largely funded by money from the HLF (H. Fothergill 2005: pers. comm.). This new gallery combines basic interactive games, multi-sensory activities and an inviting atmosphere with the re-interpretation of specimens from the collections. Similarly, the RAMM plans to redisplay their collections within the museum. This project is on a larger scale than that of the PCMAG whereby most of the museum galleries are being redisplayed. David Bolton, Curator of natural history explained that '[RAMM] are embarking upon an exciting venture to create a new museum which will incorporate all the most up-to-date methods of displaying and interpreting museum collections' (D. Bolton 2005: pers. comm.). This £15 million project is being funded by the HLF, Exeter City Council and a fundraising effort by the museum itself. (See figure 3).

With the influx of cultural funding to the Southwest, natural history galleries are now becoming innovative, inviting spaces of interactivity and informal learning. This study has traced the development of natural history galleries, particularly concentrating on displays since the Victorian period. Tracing the display history has illustrated the reflection of fashions in each distinctive period. For example, the starkness of 1940s natural history displays in comparison to the somewhat overwhelming presentations of the Victorian and Edwardian periods.

Common technology installations in natural history galleries include microscopes. These are often linked to screens for easier viewing. Many museums in the survey included these types of technology as a means for

visitors to examine specimens more closely. However, it seems that one natural history 'hands-on' favourite will always remain; the touchy-feely specimens, for example, skins, furs and skeletons are displayed allowing the visitor to come into direct contact with the specimens. These types of hands-on activities are relatively low cost and incorporate sensory access for all, particularly for those with sight disabilities.

The move, in recent years, to incorporate high-tech gadgets and interactives seem to have been received with mixed reactions. For many curators there are doubts about learning associated with using computers as the main sources of information. Helen Fothergill, keeper of natural history at PCMAG points out that '[natural history] seems to be focusing on computer-based information sharing...but only one person can gain anything from this at a time'. It is also reliant on visitors being able to confidently use computers and also that the technology will always be working.

The current fashion of high-tech natural history galleries could remain in British museums for many years however, in the opinion of Helen Fothergill goes further to say, 'I think there will be a reaction to the whizzy hi-tech or specific target audience galleries and a re-focus on all-inclusive object rich spaces filled with little gems you need to search out' (H. Fothergill 2005: pers. comm.). To a certain extent this is already happening but many museums and curators seem to be heralding the arrival of high-tech gadgets to their natural history galleries. There needs to be a balance between the high-tech aspects and the simple viewing of specimens so as not to distract or detract from the objects themselves. If not could there be further moves towards virtual galleries and a rejection of the 'real McCoy'?

One of the major points highlighted by this study was the push towards inclusivity and access for all. It also became apparent that most funding is appointed for education in galleries in fact Alison Armstrong, Natural Sciences curator for Bradford Museums suggests that 'all funding today is in 'education' in then broadest sense so that drives the direction museums and displays go in' (A. Armstrong 2005: pers. comm.). A focus on the National Curriculum in new displays has led to alternative themes for natural history galleries as with PCMAG. There has also been:

'more pressure to respond to ethical, environmental and conservation issues and 'excuse' the use of dead animals (even though this does not seem to be a real issue with the visiting public' (H. Fothergill 2005: pers. comm.).

It is also apparent that there are pressures from those who fund the displays. If these funds come from private individuals and corporations they often have an impact on what is expressed in galleries. Unfortunately, this often leads to biased views:

'As there becomes a greater need to cover costs, corporate sponsorship of galleries will push interpretation and the use of collections in specific directions' (H. Fothergill 2005: pers. comm.).

When considering all of the aspects involved in the display and interpretation of natural history, it is clear that the future of these displays rest upon multiple factors. Whether the curator has the final say in the redisplay process or the type of specimens govern the displays. It is certain that the developing technological world and sources of funding will have a tremendous influence on the presentation of collections in the future.

Objective 4

The Southwest of England has a number of local authority museums but there were four chosen for this study; PCMAG, BCMAG, the RAMM and the RCM. These museums make up four of the five hub museums in the Southwest and all contain natural history galleries.

A standardised questionnaire was sent via email to all British museums with natural history collections. The research gathered from these museums illustrated definite trends in the display and interpretation of natural history collections. From the archetypal Victorian display which is found at the RAMM to the modern, interactive display at the PCMAG. The archival data at the museums highlighted the influence of fashions and more importantly the personal opinions of the curators, on the display of natural history collections.

The ultimate results of the research were the development of a trend model (Figure 2) and the production of two timelines, the first produced from PCMAG data and the second from the Southwest England and British museums data.

Out of 211 galleries approached with the questionnaire, surprisingly only 39 of the respondents had designated natural history galleries but from these respondents, valuable information was retrieved. For example,

it was possible to gauge when the last redisplays took place and who had funded the projects. This important data highlighted a change in museum funding and explained the recent surge in natural history gallery redisplay. It also backed regional findings i.e. many have been or will be funded by HLF or hub money, and suggests one reason for the planning of future redisplays. This data was then transposed onto a map of the British Isles for analysis. It was extremely interesting to note that local authorities ran more than 75% of those museums with natural history galleries. This finding further backed the decision to concentrate the in-depth study on local authority-run museums in the Southwest.

The nature of the questionnaire allowed respondents to add as little of as much information as desired. Some respondents returned their questionnaire with photographs of their natural history galleries and gave more detailed descriptions of the changes to displays over the years. These extra pieces of information formed the basis of the British timeline, a pictorial record of natural history display and interpretation from the Victorian period to the present day. Personal thoughts and observations of the changing trends in display and interpretation were added to give support to the photographic representations.

The British data highlighted the importance of local authority museums in the preservation, conservation and continued display of natural history. Many respondents added that their museums once had natural history galleries but these have given way to other departments and supposedly 'more popular' subjects.

Limitations

In hindsight, there were a few limitations in this study. These limitations were the methods used in identifying the museums to survey across Britain and the time frame for the case study museum research.

A standardised, open-ended questionnaire was designed for distribution to all British museums with natural history collections. In order to forward the questionnaires to the correct museums it was necessary to retrieve data from a reliable source. The 24 Hour Museum website (www.24hourmuseum.org.uk) was employed as the only source for collecting data. In retrospect, it would have been useful and more reliable to double-check the museum collections using the Museums and Galleries Yearbook, produced annually by the Museums Association.

The questionnaire would have benefited from the addition of one question: *How will display and interpretation of natural history change in the future?* This would have allowed for comparison amongst professionals and could act as an opportunity for further study. It would be interesting to compare the thoughts of curators in local authority museums and university museums. These museums often have different agendas, for example, university museums are typically aimed towards researchers and those undertaking higher education whereas local authority museums must cater for all visitors.

Time permitting, it would also have been useful to spend more time researching the case study museum archives. As with most museums, the archives were vast and proved to be of great use. They charted the history of the collections along with some of the personal thoughts of the curators and keepers of the past. It would also have been useful to conduct further, fuller interviews with the curators and possibly other museum staff such as designers, educators and managers. This would have given a more holistic view of natural history display and interpretation whilst viewing it from another angle.

Conclusions

The first major finding from this study was the trend in display and interpretation. Using the information gathered from the South West case study museums, and by further backing these findings with the data gathered in the questionnaires, it was possible to trace the evolution of natural history display from the Victorian period through to the present day. As a consequence, two pictorial timelines were produced; the first using specific data information from the PCMAG and the second incorporating illustrative examples of typified galleries in British museums throughout the period. The study found that there were distinct periods of display design and influencing fashions that dictated these galleries. The Victorian period focused the presentation of specimens on systematic sequences with little interpretation simply basic, descriptive information. In the 1920s there was a move towards habitat displays particularly in the form of dioramas. The 1950s and 1960s saw overcrowded galleries becoming stark with a focus on environmental and topical issues. Presentations of natural history collections in the 1980s were typified by dark galleries including backlit photographs and text panels. Modern day galleries include themes loosely based around the National Curriculum and interactive activities to aid learning. Most museums involved in this study fitted the trends model (Figure 2). The model was formulated to illustrate the trends in natural history display and interpretation across the case study museums but could also be used in further study. It would be possible to use the

model to test the trends in museums across Britain and elsewhere.

The second major finding was that of the low number of museums with designated natural history galleries. Standardised questionnaires were sent, nationwide, to museums listed as having natural science collections. The second question asked: 'Does your museum have a natural history gallery?' Surprisingly, only 39 of the 129 respondent museums retained a designated natural history gallery. Of the remaining 129, only eleven museums included natural history specimens in other galleries with 79 museums having no natural history on display at all. Some curators commented that the galleries and natural history collections were 'rationalised' due to the difficulties of sorting and conserving such collections and the fact that 'the collections do not lend themselves to permanent display' (M. McGinnes 2005: pers. comm.).

With so many British natural history galleries being disbanded or 'rationalised' many questions arose. Where do members of the public go to view such specimens? How will environmental and topical issues be addressed without the aid of natural history specimens? How will research into collections be carried out if they no longer exist? The history of natural history collections in individual museums should be researched and recorded fully before any attempt is made to dispose of these irreplaceable collections. Without these collections, either on display, in store, or ideally as hands-on interpretative galleries, the link that museums could and should have with learning, schools and the national curriculum in the area of science in general or natural history in particular would be weakened.

There is a genuine need to recognise the importance of the archival evidence held at museums especially within natural history departments. These records often chart the development of the galleries, displays and the collections themselves. Nationwide or regional projects could be set up to record in-depth details of natural history collections and their origins. These records could be used to contribute towards modern displays of early naturalists associated with local areas or events held at the museum in the past. For example, PCMAG has installed a 'collectors corner' (Figure 4) using lecture advertisements from the 1910s and information about the collectors that have donated their collections to the museum. This is incorporated into the theme, 'Collecting Nature'.



Figure 4 'Collectors Corner' at the PCMAG 2004
Source: reproduced with permission of PCMAG 2005

In addition, the recording of in-depth natural history data on a national scale could lead to the increased profile of natural history as a subject within both the museum profession and with members of the public.

Societies such as Natural Sciences Collections Association (NatSCA) and the Society for the History of Natural History (SHNH) promote the use and conservation of natural history collections with aims to '[act] as an advocate, [provide] training and [promote] best practice' (NatSCA 2005: 1) and are 'devoted to the history of botany, zoology and geology in the broadest sense' (SHNH 2005: 1). These societies act as forums to which natural history professionals, and indeed amateurs, could express their views and make valuable contributions. Moreover, conferences and seminars that focus on natural history could incorporate collecting and present day natural history collections. As mentioned previously, the topic of former collectors and the profile of natural history in the past would make for interesting presentations within natural history galleries. This could encourage a greater focus 'on the history of the collections & collectors' (H. Fothergill 2005: pers. comm.).

Overall the profile of natural history as a subject needs to be raised. Members of the public are often unaware of the vast collections of specimens held in storage or the history behind them. Some of the collections held in museums are of tremendous significance and were collected by prolific naturalists. Without recognition from museums nationwide, through gallery displays, publications and lectures, the profile of natural history will diminish.

This study sought to trace the development of natural history display and interpretation in the South West of England. By considering the key objectives, including the analysis of factors affecting natural history display, the research produced a number of interesting findings. These findings highlight the need for further targeted research into natural history collections, their display and interpretation.

Acknowledgements

I would like to thank: Prof. Mark Brisbane (School of Conservation Sciences, Bournemouth University) for his endless support, direction and enthusiasm; Helen Fothergill (Keeper of Natural History, Plymouth City Museum and Art Gallery) and Kelly Dilks (Assistant Keeper of Natural History, Plymouth City Museum and Art Gallery) for their help and patience during research at the natural history department; Sam Trebilcock (Curator of Biology, Bristol City Museum and Art Gallery) for her time in discussing natural history redisplay at Bristol; David Bolton (Curator of Natural History, Royal Albert Memorial Museum, Exeter) for his correspondence; Sara Chambers (Curator of Natural Science, Royal Cornwall Museum, Truro); Bill Grange (Ex-Curator of Natural History, Derby Museum and Art Gallery) for his valuable comments and responses to the questionnaire and Michael Cooper (Registrar, Nottingham City Museums and Galleries), Alison Armstrong (Museums Officer for Natural History, Bradford Museums Service), Angela Houghton (Reading Museum Service) and Eliza Howlett (Oxford University Museum) for providing photographs, presentations and detailed information about past and present displays of natural history.

References:

- 24 Hour Museum 2005 About Us, Brighton: 24 Hour Museum. Available from: www.24hourmuseum.org.uk/etc/about/aboutindex_gfx_en.html (accessed 20/08/05)
- Blaxter, L., Hughes, C., and Tight, M., 2001 *How to research* (2nd Ed.), Maidenhead: Open University Press
- Carter, C., and Cumming, A. A., 1937 'A new form of Plant-Table', *Museums Journal*, 37 (8): 371-2
- Creswell, J., 1998 *Qualitative Inquiry and research design: choosing among 5 traditions*, California: Sage Publications
- Fitzpatrick, J., Wright, D., and Secrist, J., 1998 *Secrets for a successful dissertation*, California: Sage Publications
- Frazer, L., and Lawley, M., 2000 *Questionnaire design and administration: a practical guide*, Chichester: Wiley
- Hart, C., 2004 *Doing a Masters Dissertation*, London: Sage
- NatSCA, 2005 *The Natural Sciences Collections Association*, London: NatSCA. Available from: www.nhm.ac.uk/hosted_sites/natSCA/ (accessed 15/11/05)
- Patton, M., 1990 *Qualitative Evaluation and Research Methods* (2nd Ed.) London: Sage Publications
- SHNH 2005 *The Society for the History of Natural History*, London: SHNH. Available from: www.shnh.org/ (accessed 15/11/05)
- Stansfield, G., Mathias, J. and Reid, G., (eds.) 1994 *Manual of Natural History Curatorship*, London: HMSO
- Swetnam, D., 1997 *Writing your dissertation: how to plan, prepare and present your work successfully*, Oxford: How to Books Ltd
- Whitehead, P., 1970 *Museums in the history of zoology*, *Museums Journal*, 70 (2): 50-56
- Whitehead, P., 1971 *Museums in the history of zoology*, *Museums Journal*, 70 (4): 155-159
- Yanni, C., 1999 *Nature's Museums: Victorian science and the architecture of display*, London: The Athlone Press

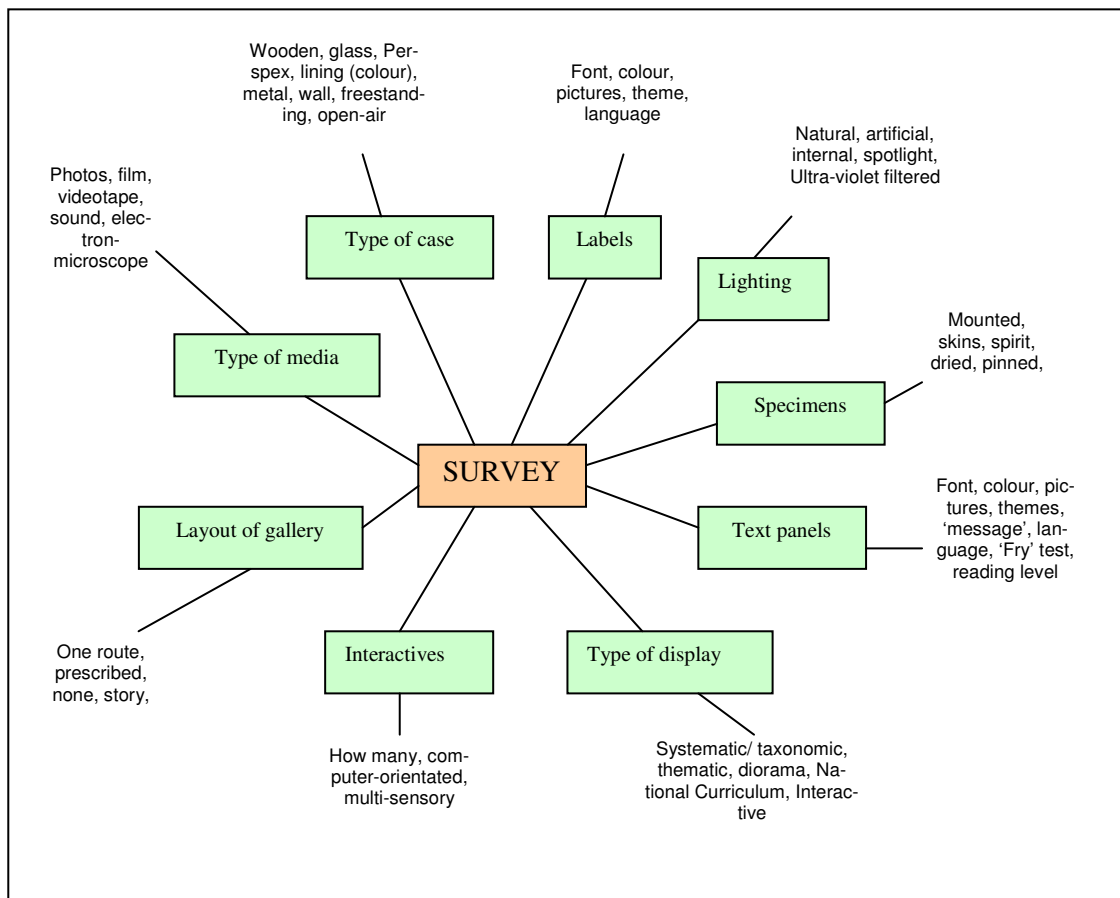


Figure 1 Mind-map of natural history gallery survey elements. Source: H Paddon 2005

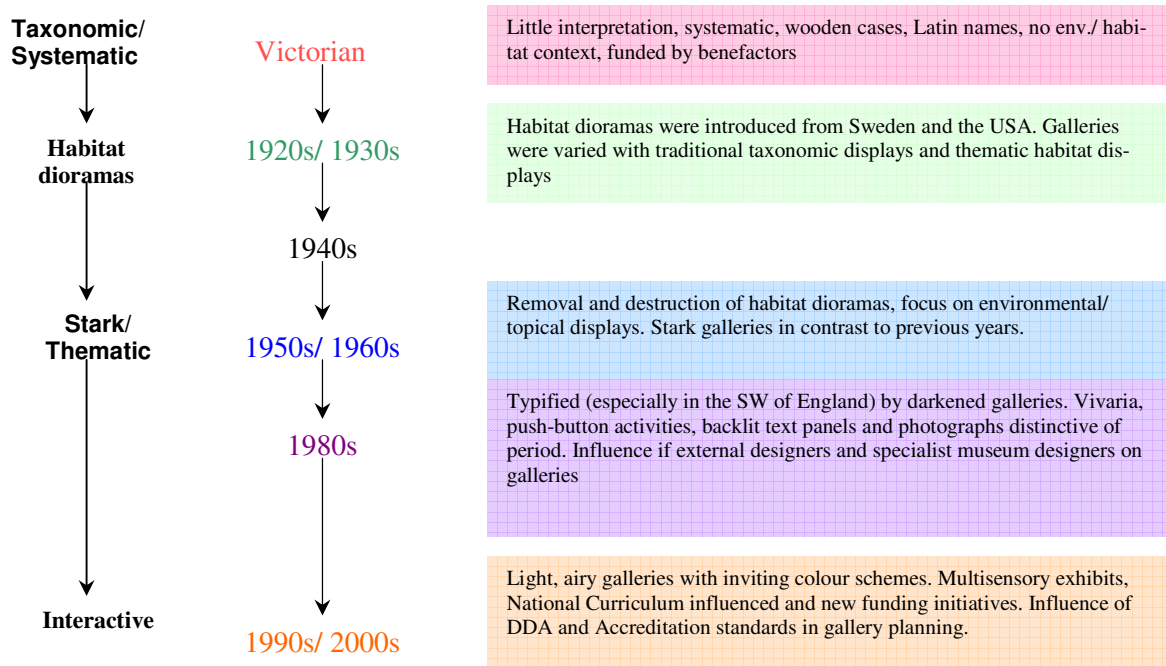


Figure 2 Natural history display development from the Victorian period to the present day. Source: H Paddon 2005

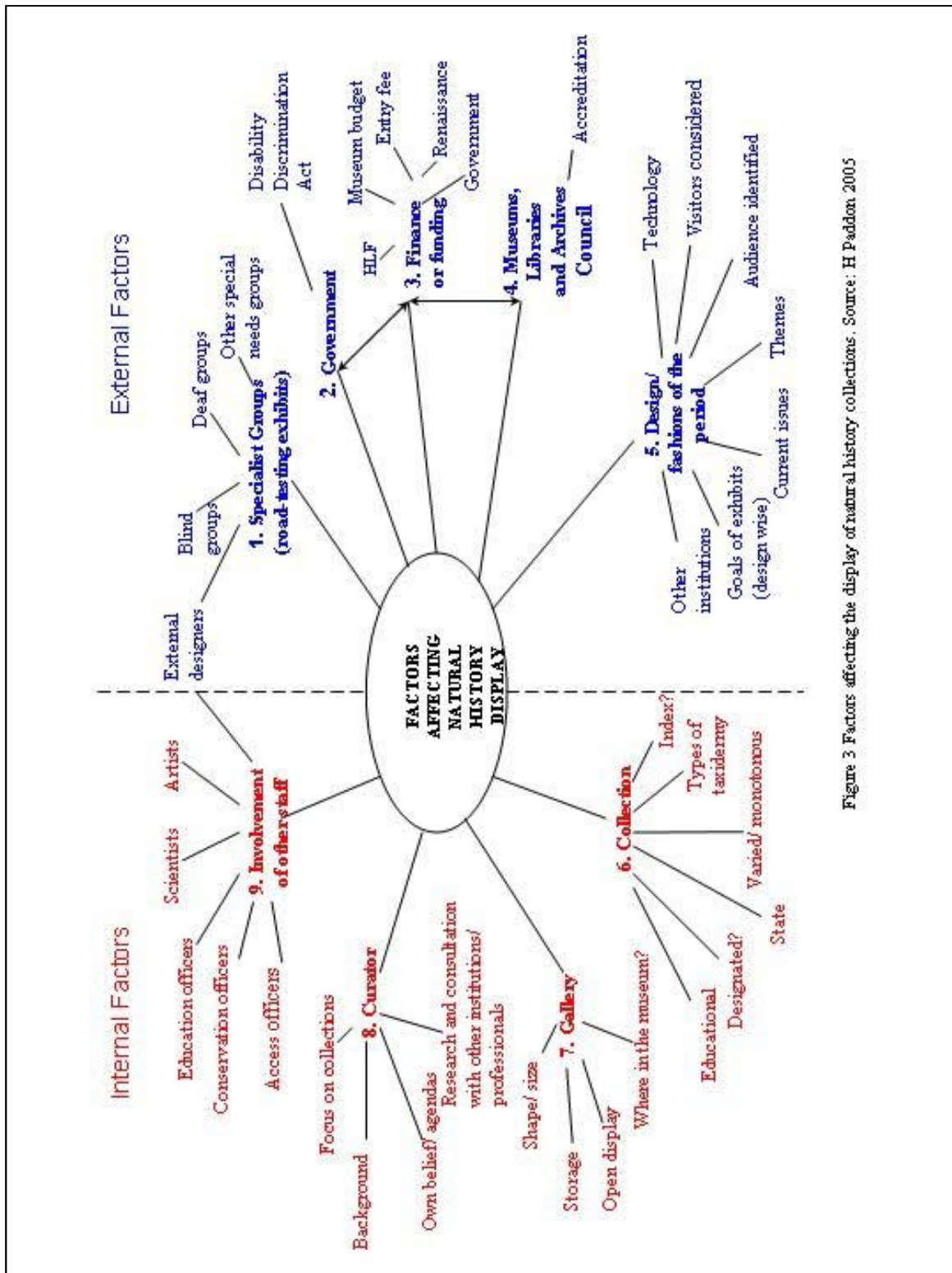


Figure 3 Factors affecting the display of natural history collections. Source: H Paddon 2005

Figure 3: Internal and external factors affecting natural history display