

The Biology Curator

The Publication of the Biology Curator's Group

ISSUE 7

NOVEMBER 1996

Diary Dates

GCG AGM — Geological Models.

27th November 1996, Manchester Museum.
Contact: John Nudds, Manchester Museum, Oxford Road, Manchester, M13 9PL.

Local Information, Local Collections.

30th January 1997 at Wollaton Hall Natural History Museum.

The value of links between local museum and environmental databanks.

Contact: Graham Whalley (Further details inside).

Insect Pests in Museums.

10th-11th March 1997, Natural History Museum, London.

A two-day course by David Pinniger covering pests and damage, pest identification, pest environments, pest monitoring and control, pest management and other topics.

Contact: Phil Ackery, Dept. of Entomology, Natural History Museum. Tel: 0171 938 9346.

'What's in the Box?' — Collection Access and Care.

16th-17th April 1997 at The National Museums and Galleries of Wales, Cardiff.

Registration of Interest and Call for Papers
Two-day Joint Conference, with AGM's between the BCG and Natural Sciences Conservation Group.

Celebration of Bicentennaries of Charles Lyell and James Hutton.

30th July-3rd August 1997, London and 5th-9th August 1997, Edinburgh.

Contact: Lyell Hutton Conference Office, Geological Society, Burlington House, London, W1V 0JU.

COMMITTEE REPORT

The committee met on the 9th September, and eleven of the thirteen committee members attended. In a full agenda, a wide range of issues were discussed, of which I shall give the key ones below.

The editorial team at Bolton are now in full control of the TBC (as you can see from this issue) but are always open to suggestions, and the format of the journal may yet go through a number of minor changes.

We have been concerned over the future of the collections at a number of institutions, most notably at the Passmore Edwards and Bristol Museum, the latter prompting the initiative over collections at risk, about which more anon. Among other places under discussion were Leicester and Eton College, for which we are keeping a watching brief.

Mike Palmer was thanked for the considerable amount of work he has put in on this cell, especially with regards to the Collections at Risk initiative. There should be a report on this in a future journal, and the BCG session at the MA Conference in Harrogate will have discussed this and the orphan collections initiative. A working party has been set up to take this forward, and will meet early in December. The draft report on orphan collections was also discussed, and the final product will be published here, and in the Geological Curator, as well as other appropriate places, after the MA Conference. We have been receiving good support for this project from all those so far approached, including Val Bott, MGC Deputy Director and Stephen Locke, MA President and Hampshire county Museums Director, who both kindly agreed to take part in the Conference session.

Nick Goff has been gathering in more people into the documentation cell to assist with the work he has been doing on the Spectrum guidelines for natural sciences, and Steve Garland has been similarly recruiting help for the biological recording cell, which is currently looking at the Millenium Fund bid being tendered by the National Federation for Biological Recording. A meeting on these issues is to be held at the beginning of next year.

The touring exhibitions paper published in an earlier edition of TBC met with no response, and is to be shelved as a national project. However, it is possible that a regional

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Deadline: All items for next publication to reach Editors by 8 January 1997.

scheme may be set up in the Yorkshire and Humberside region, which, if fruitful may be expanded at a later date.

The committee have been cooperating with Wiltshire Constabulary over the fate of a major egg collection which they had confiscated, prosecuting the owner. It is expected that a satisfactory conclusion to this business will be reached in the near future.

The next four meetings, from the Paris trip in November to next years proposed Vienna trip, were discussed and are being taken forward. See the events timetable elsewhere in this issue. Ideas for further meetings were also discussed, as were "Stage 2" meetings. These are intended to be small meetings at a higher level of specialism than our normal meetings, but the ideas proposed so far have, for various reasons, failed to come to fruition. Nevertheless, suggestions for these and other meetings, as well as offers of venues, will still be welcomed by committee.

Finally, an eye is being kept on our reserves which are currently decreasing, although this is in part due to the fact that there have been a number of out-of-the-ordinary expenditures this year.

As ever, we are endeavouring to keep the membership as up to date as involved as possible in the activities of the group. If there is anything that you would like to suggest or feel should be brought to the attention of the committee, please get in touch with one of the committee members. Thanks.

Steve Thompson

Orphan Collections Report

After much debate and many re-writings, a more or less final draft of this report has now been produced. This runs to four sides of A4, plus associated material, and comprises an introduction, a review of the current situation, possible routes for action, and a summary and recommendations.

An outline of this report and the surrounding issues was presented at the MA Conference at the beginning of October, in a session covering this and the collections at risk initiative. The session was most successful, attracting around forty people, with as many from outside the subject as inside, and including AMC officers and museum directors. There was considerable discussion after the presentations, and the feedback from the audience was entirely positive. Any negative comments were confined to what we had left out, and these issues are in fact ones that we have covered in our investigations. I feel the response was most encouraging, and that we have a mandate for taking the initiatives on.

Some changes will probably need to be made to the report following the feedback at the conference. The final report will be published in this journal and in *The Geological Curator*, as well as in other appropriate places. If anyone would like to see the current draft of the report, please get in touch with me at Scunthorpe Museum, Oswald Road, Scunthorpe, North Lincs, DN15 7BD. (01724 843533). Your comments will be most welcome.

Collections at Risk: Can you help?

As you probably know, the Collections at Risk Cell is currently embroiled in a major overhaul. In a nutshell the aim is to move from the traditional reactive approach of writing letters of concern in response to immediate threats and instead, and where possible, take up a more proactive role by submission of views and comments to museum governing bodies at the consultative stage of any proposals likely to threaten the well being of a collection. This isn't going to happen overnight, however, initiatives towards this are currently being developed. In order to maintain the momentum achieved so far, whilst also continuing to deal with current collections at risk, it is vital that the cell expands beyond its present number, i.e. just me. What is required are people to spend a small amount of time reading through material, either relating to new initiatives or to specific cases and feed comments back to me — two, three or four heads are better than one. A cell comprising individuals spread across the regions would also be useful.

I don't need to sell the importance of the cell's work to you, many of you already have experienced collections at risk, while unfortunately, many more of you will in the near future. So if you feel you'd like to help, don't delay, pick up the phone today.

Mike Palmer
Natural History Centre
Liverpool Museum
William Brown Street
Liverpool L3 8EN
Tel: 0151-478-4281/4291

Please can you make a note of Mike Palmers change of telephone number since the last issue of 'The Biology Curator'.

NATIONAL BIODIVERSITY NETWORK - UPDATE

The meeting on 24 September 1996 gave feedback from the regional consultative meetings. There is no room here to go into detail, but the bid will be put forward in early November. Local Records Centres will be able to take part in the project by forming local consortia of organisations. These consortia will have to achieve certain accredited standards and sign-up to agreed terms and conditions. BCG hopes to be involved in developing both accreditation standards and the terms of operation, but it is not certain who will develop these yet!

My main worry concerns the unambitious targets set by the project. By June 2000 it is planned to have only 20 centres "sorted", with another 30 to 35 done by the end of 2000. This will still leave gaps. What happens if over 20 are ready to participate immediately is not clear. I suspect that there will be problems!

My advice to centres in museums is to start talking to partners for possible consortia. Try to prepare yourselves for the project in case the bid is successful next spring. If you are in an area where conflict is more frequent than co-operation, the bid organisers assure me that it will be a

priority to target "problem" areas and to mediate to enable consortia to be developed.

Steve Garland

BCG Biological Recording Cell

Local Information, Local Collections

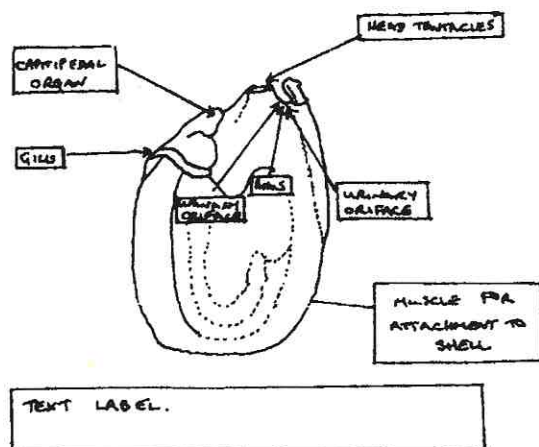
A BCG one-day seminar examining the links between collections and biological recording. Speakers will examine the role of collections in the underpinning environmental data, and its many uses such as the biodiversity and the ubiquitous Local Agenda 21 initiatives. The need for new collections to be made to support new environmental records will be discussed.

Anyone interested in contributing to this meeting please contact Graham Walley at the Nottingham Natural History Museum, Wollaton Hall, Nottingham NG8 2AE. (Tel: 0115 928 133/Fax: 0115 928 3692/Email: gw@notmusanthist.demon.co.uk)

The date planned for is Thursday 30th January 1997 at Wollaton Hall.

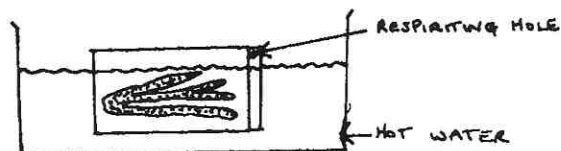
PROCEDURE FOR CURATING OLD GLASS MUSEUM JARS

If the jar has a complex system of outside and inside labels it is advisable to do a quick sketch to ascertain the position of each.



First the lid is removed from the jar, either by easing off gently with a scalpel or by softening the seal in warm/hot water (not boiling). It is important to make sure that the respiring plug in the lid is removed or pushed out, otherwise the jar might explode due to pressure from the vapourising preservative. Don't allow water in!

The specimen is carefully withdrawn from the jar and placed in a holding tray with liquid until required. Outside

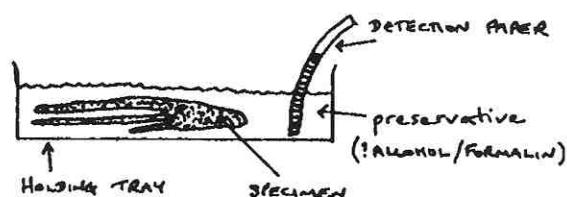


labels associated with the specimen are soaked off and dried. Once dry put in a box for safe keeping.

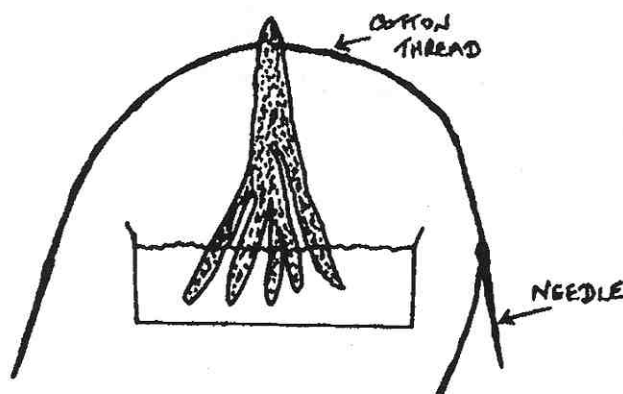
The jar and lid are then cleaned using a scalpel or soft kitchen abrasives and left to dry. Take all traces of paint off.

At this stage whilst the jar is drying, some of the following procedures might be undertaken:

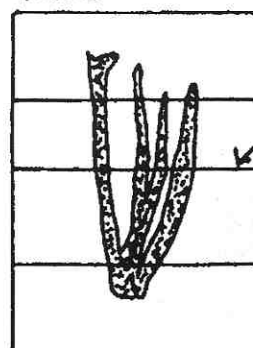
(i) the preservative is checked using detection paper. In many cases it is often not apparent what preservative has been used. (Simon's gravity method, detection papers, Alizarin preps).



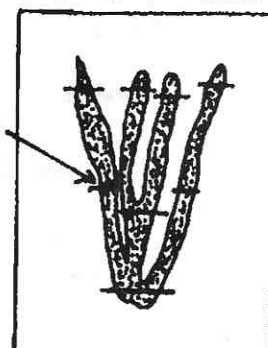
(ii) the specimen is rehydrated using sodium tri-phosphate or Decon 90 method.



TIED AROUND PLATE

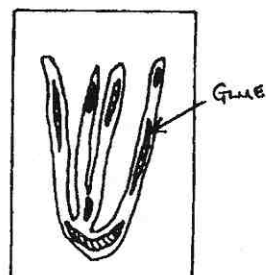


SEWN OR TIED DIRECTLY ONTO PLATE



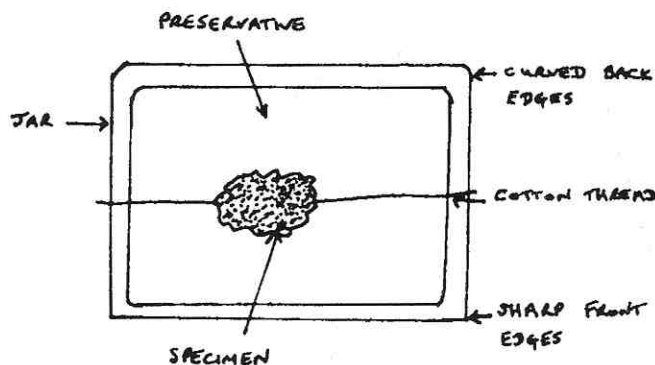
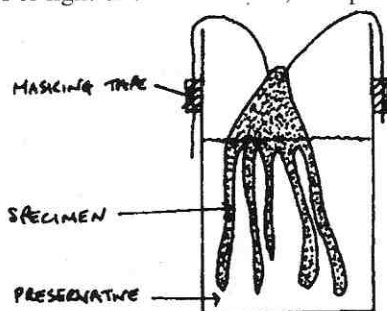
(iii) the specimen is re-strung for direct hanging or onto a backing plate, using cotton thread. (not plastic, plastics can deteriorate in preservative.)

USING GLUE

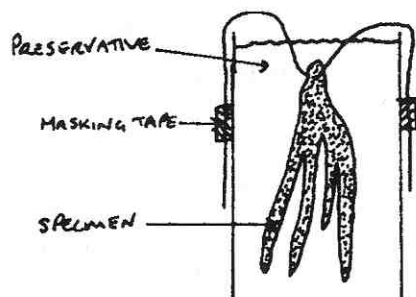


(iv) the specimen is glued directly to the backing plate, using 1% "Necoloidine" in a 50-50 mixture of diethyl ether and isopropanol.

The jar is then half-filled with preservative and the specimen is gently lowered in. Check which is the front and back of the jar. The front edges of the jar are usually sharp. If the specimen is being hung directly then allow plenty of excess thread. For light or small material, the specimen can

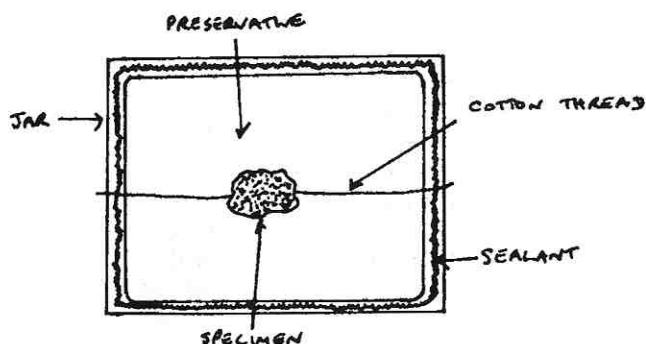


be arranged at the required height by temporary attachment of the thread to the sides or back of the jar using masking

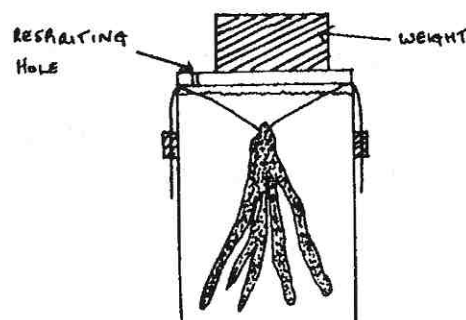


tape.

Fill the jar with preservative to about an inch from required height. Place jar in an area where it will not have to be moved.



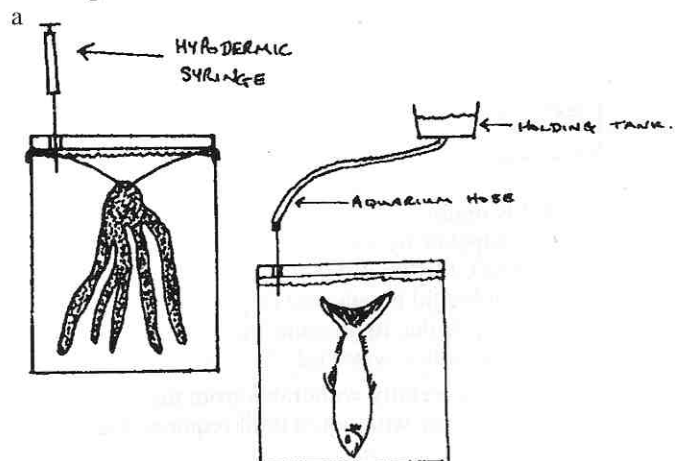
Next, carefully run a line of silicon around the lip of the jar. It gives better results if the line can be made constant. During this time the lid can be warmed slightly on a hot plate.



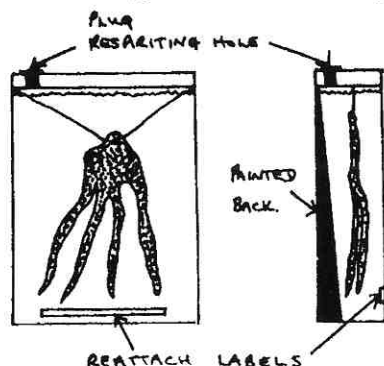
Place the lid (rough side down) carefully into position, making sure the respiring hole is not covered. Clean off any excess silicon around the edges and place weight on top of the lid, (make sure weight will not stick to the lid with silicon) and leave it overnight. (24 hours means that the silicon has a good time to set.)

Trim cotton threads back. Remove tape. Smooth down with silicon.

Using



hypodermic needle fill jar up with preservative to just below the sealed edge, so when jar stands the preservative is not against the seal. For larger jars, an airline of aquarium hose can be fitted to a 5mm hypodermic needle and preservative



can be added from a holding tank. Then plug respiring hole with silicon and leave for another 4-8 hours before moving.

If so required, the jar can now be repainted and any outside labels reattached. It is good conservation practise to note down, for future reference, exactly which sealant and methods have been used for each jar.

A COMPARISON OF TWO PAPERS AND TWO INKS FOR USE AS COMPUTER GENERATED LABELS IN FLUID PRESERVED COLLECTIONS

*Julian Carter, Conservation Officer
Zoology Department
National Museum and Gallery of Wales, Cardiff
Cathays Park, Cardiff, CF1 3NP*

Introduction

With the possible discontinuation of Resistall paper (supplied by Preservation Equipment Ltd in the UK) which the National Museum of Wales (NMW) Zoology Department currently uses in producing labels for use in fluid preserved material, a possible replacement was required. Work done by other workers (Crawford Ross, 1961; Pettitt, 1975; Lambiris, 1990) suggest a number of possible alternatives which included the 100% rag paper Goatskin Parchment produced by Wiggins Teape (now Arjo Wiggins). Goatskin Parchment had been used previously by the department and is commonly used in natural history collections but had lost favour at NMW when the last batch purchased in the late 1980's disintegrated on immersion in fluid. This was apparently due to a change in production methods. However Goatskin Parchment is still manufactured and is being used by other institutions. As a result it was decided to compare the Goatskin Parchment currently manufactured with the Resistall paper.

In conjunction with these papers it was decided to look once again at computer generated labels for use in fluid preserved material. This is an area that continues to be unclear, although Pitkin (1995) provides a good overview. Looking at the available data two inks were chosen to look at, both of which are for use in deskjet printers, which are reasonably cheap and easily available. The two inks are both manufactured by Graphic Utilities and are available through

Misco Computer Supplies. These were the black indelible ink and the PermaDri™ black pigmented ink. Both inks are available as refill kits for the deskjet cartridges.

Test Procedures

Labels were produced on a PC using Filemaker Pro. The labels were printed on the papers Resistall and Goatskin Parchment using a HP 500 deskjet printer. The labels were printed using the two graphic utilities inks; indelible black and PermaDri black. Once printed the labels were allowed to dry overnight. Labels printed on Resistall paper in the usual manner were used as the control. These were printed using a hand operated printing press and carbon black ink, with information hand-written on using a Rotring pen with Indian Ink

The fluids for use in the testing procedures was as follows:

- 0.1 Molar Hydrochloric acid (HCl).
- 80% IMS
- 4% formaldehyde
- De-ionised water

Before any label was placed in the test fluids the label details were written on using a Rotring pen with Indian ink and then it was rinsed in water to remove any 'excess' ink which would otherwise run. This has been recommended specifically when using the indelible ink (Pitkin), but was done as standard with all the labels.

On removal from the test fluid the label was placed on a flat glass surface and a scalpel blade lightly stroked across the print image to assess the robustness of the image from abrasion and the wet strength of the paper.

Two tests were then carried out. One to induced immediate changes and the other to look at longer term storage in the test fluids. Both tests used heat to accelerating the ageing effects.

1. Boiling Test

The test fluids were brought to boiling point, using an electric laboratory heater in a fume cupboard, and the labels immersed (with great care) into the fluid for a period of 60 minutes.

2. Storage test

The labels were placed in fluid storage jars of each of the test fluids and placed in a glass fronted heated cabinet at a temperature of 50 to 60°C for a period of three weeks.

Results

The results have been summarised in Table 1. In all cases the PermaDri ink kept a better image than the indelible ink, whilst the Resistall paper had better image abrasion resistance.

Discussion

1. The Papers

During the running of these tests it was reported from the USA that Resistall paper was to be manufactured once again removing the immediate need to find a replacement. However it is interesting to note that the current Goatskin Parchment that is available is suitable for use in fluid collections, more so in alcoholic collections, but is not as good as Resistall. The more waterbased the solution the softer the Goatskin becomes and the more easily the print is abraded from the surface, although provided the paper is handled reasonably carefully this should not be a problem.

| Fluid | Paper | Ink | Boiling Test | Storage Test |
|-----------------|--------------------------|------------|--|--|
| 80% IMS | Control – (Resistall) | Indian Ink | No change | No change |
| | | Indelible | Fading of print but remained readable. | Fading of print but remained readable. Became smudgy due to ink running. |
| | Goatskin Parchment | PermaDri | No change; surface image resistant to abrasion. | No change; surface image resistant to abrasion. |
| | | Indelible | Fading of print but remained readable. | Labels less 'smudgy' than Resistall, but more faded. |
| | | PermaDri | No change; surface image resistant to abrasion. | No change; surface image resistant to abrasion (IMS sample stronger). |
| | | Indelible | Fading of print but remained readable. | Labels less 'smudgy' than Resistall, but more faded. |
| 0.1 M HCl | Control – (Resistall) | Indian Ink | No change in image, although paper more easily damaged. | No change in image, although paper more easily damaged. |
| | | Indelible | Paper becomes softer, surface damages more easily but image only slightly faded. | Label slightly faded and 'smudgy'. Paper easily torn. |
| | Goatskin Parchment | PermaDri | Print image remained strong but easily abraded. Paper much weaker. | Image remained good but the paper disintegrated on handling. |
| | | Indelible | Paper becomes softer, surface damages more easily but image only slightly faded. | Label slightly faded and 'smudgy'. Paper easily torn. |
| | | PermaDri | Print image remained strong but easily abraded. Paper much weaker. | Image remained good but the paper disintegrated on handling. |
| | | Indelible | Paper becomes softer, surface damages more easily but image only slightly faded. | Label slightly faded and 'smudgy'. Paper easily torn. |
| Deion. water | Control – (Resistall) | Indian Ink | No change | No change |
| | | Indelible | Image fades almost completely. | Label very faded. |
| | Goatskin Parchment | PermaDri | No fading, image robust. Paper still strong. | No fading but image easy to abrade off. |
| | | Indelible | Image fades almost completely. Paper weaker than Resistall sample. | Label very faded. |
| | | PermaDri | No fading of image but paper weaker than Resistall sample. | No fading but image very easily abraded off. |
| | | Indelible | Image fades almost completely. Paper weaker than Resistall sample. | Label very faded. |
| 4% form. | Control – (Resistall) | Indian Ink | No change | No change |
| | | Indelible | Image fades almost completely. | Image fades almost completely. |
| | Goatskin Parchment | PermaDri | No change in image. | No fading of image although it can be abraded off more easily than the IMS sample. |
| | | Indelible | Image fades almost completely. | Image fades almost completely. |
| | | PermaDri | No change in image though less robust than Resistall sample. | No fading, but image very easily abraded off. |
| | | Indelible | Image fades almost completely. | Image fades almost completely. |

2. The Inks

The first of the two inks to come to note was the indelible ink which was being used by certain departments at the Natural History Museum (Pitkin, 1995). However this is considerably inferior to the NMW's current system of handprinting labels and cannot be recommended. It appears with alcoholic collections the image will initially fade but remain readable. However in increasingly waterbased fluids the ink continues to run causing a smudgy appearance and eventually becomes very faint, despite the fact this is advertised as a waterproof ink! However the PermaDri ink proves to be very different giving a non fading image in both alcohol and formaldehyde based preserving fluids. This probably relates to the fact that this a pigment based ink. This thus allows computer generated labels to be produced for fluid collection specimens greatly improving the use of the curator or conservators time in collection based work.

Conclusion

Resistall paper would still be the preferred choice for fluid collection labelling. However if this paper does become unavailable then the Goatskin Parchment would be usable, especially with alcohol based fluid collections.

The Indelible ink is however unsuitable for use in fluid collection labelling although it will retain a readable image in alcoholic fluids (stability probably relates to the water content of the fluid). The PermaDri ink however has proved very satisfactory for used in fluid collection labelling and as a result can be recommended.

Note on deskjet refill systems

Both of the inks tested are available as refill packs for the inkjet cartridges. Despite manufacturers instructions this always seems to be a messy business so care is advised to prevent black fingers or splodges on your clothing! Problems can occur with the refilled cartridges depositing drops of ink on the paper. If this happens block the breather hole on the top of the cartridge with some sticky tape over the top. If the jets on the cartridge remain or become blocked then wiping carefully with a dilute detergent solution such as Decon 90 will help clear the jets.

References

- Lambiris, A.J.L. 1990. Herpetological Collections, in E.M.Herholdt (Ed) Natural History Collections - their Management and Value, Transvaal Museum Special Publications No.1, pp13 - 26.
- Pettitt, C. 1976. Label materials for wet preserved biological specimens, *Museums Journal* 75 (4) 174 - 176
- Pitkin, B., 1995. Labelling specimens in the life science departments at the Natural History Museum, London using computers.
- Ross, G.C. 1961. Labels for biological materials, *Museum Journal* 61 (3) 177 - 179.

Suppliers

Misco Computer Supplies Ltd
Freepost
Wellingborough

Northants
NN8 6BR
Tel: 0181 207 4414
Preservation Equipment Ltd
Shelfanger
Diss
Norfolk
IP22 2DG
Tel: 01379 651527
Fax: 01379 650582
Arjo Wiggins
Sample and Advisory Service
Tel: 0800 993300
Fax: 01322335620

UK Systematics Forum, Insect Collections Group

In *The Biology Curator*, No. 5 Mark Shaw described the recently formed group of collection managers of the major insect collections in the British Isles, which is operating under the auspices of the UK Systematics Forum. The group held its third meeting at the National Museum of Ireland, Dublin on 22nd March and some points of general interest are briefly summarised below.

Storage Systems. Insect cabinets of the design recently developed by the Natural History Museum, London have now been ordered by two other member collections of the group and they are being considered by other museums. Pending publication of more details of these metal, pest-proof cabinets anyone interested should contact Nigel Fergusson (0171 938 8919 or email ndmf@nhm.ac.uk) for more information. Drawer sizes regarded as standard and likely to be purchased in the future are being investigated with a view to developing common specifications and co-ordinating ordering.

Pest Control. The two-day courses on pest control in museums held at the NHM are now open to outsiders. Details from Phil Ackery (0171 938 9346 or email pra@nhm.ac.uk). The cost is £100.

Charging Policies. The group identified benefits of realistic standardised charges for commercial enquiries, etc. It is also clear that as a result of pressure from curators, particularly those in university and national museums, provision for 'bench fees' is now included in many research grant applications for projects involving collections. However, grant giving bodies varied considerably in their willingness to fund such expenses. An item for future discussion by the group is charging for certain kinds of loans.

Databases/checklists/the British fauna. Mark Shaw reported that his article in the January *Antenna* (The Royal Entomological Society's bulletin) had stimulated a good response. The RES has established a standing committee to identify the society's rôle and

commitment to the British insect fauna. At the NHM a new programme of work is being developed on the British insect fauna, including the collections, and involving maintaining a taxonomic database. This is partly in response to the UK Biodiversity Action Plan.

Collections – scope for rationalisation. The group agreed that there is very little scope for rationalisation (between institutions) of current holdings. Any benefits would be far outweighed by the various costs involved. The real scope for rationalisation between collections lies in future acquisitions.

Anyone wanting to find out more about any of these topics, or make any comments, is encouraged to contact **any** member of the group (listed with contact details in *The Biology Curator* 5:5). The next meetings is to be held in Cardiff in early November, when new topics for discussion will include deposition and curation of survey and voucher material and the collections of deceased amateurs.

Mike Fitton, *The Natural History Museum, London*
(0171 938 9446, email: mgf@nhm.ac.uk).

CULTIVATED VOUCHERS IN HERBARIA

John Edmondson

National Museums & Galleries on Merseyside, Liverpool
Museum, William Brown Street, Liverpool L3 8EN

North-west England is an area rich in historic gardens which have been a major route for plant introductions since the late 18th century and which continues up to the present day. It is not surprising, therefore, that cultivated vouchers are relatively strongly represented in the Liverpool Museum herbarium (LIV) in that more than 13,000 of our 300,000 specimens appear to be of garden origin. I would like to highlight a few of the problems this poses, and outline some solutions which are being applied here.

1. Who is the collector?

It is obvious that cultivated vouchers have two kinds of collectors: the person who pressed the specimen (preparator), and the person who obtained plants or propagules in the wild (field collector). From the point of view of curatorship, determining who was the field collector is sometimes problematical even though their identity is a pointer to the site and date of the introduction from the wild. From a nomenclatural point of view it may be more significant to record the name of the person who prepared the dried specimen, especially if they were also responsible for naming it and for first publishing the name. A further category of collector is the person who amassed the collection (the herbarium or garden proprietor). Museum collection records can confuse these three categories of collector, and when documenting such collections on computer it is necessary to differentiate between them.

2. What is the date of collection?

Confusion over dates of collection is widespread; for example, in the J.E. Smith herbarium¹ a date sometimes appears as part of the specimen data, but this refers to the date of preparation rather than of collection in the field. Examination of watermarks has shown that some collections were mounted up in batches, and this helped to confirm that the dates were not those of collection in the wild. In the Joseph Dickinson herbarium² the widespread practice of noting the year in which the plant was first introduced to cultivation in Britain is believed to have been followed. Although dates from the 18th century and earlier clearly belong to this category, it is more difficult to deal with recent introductions because not all the dates recorded by Dickinson agree with the conventional published dates of introduction such as those found in *Hortus cantabrigiensis*.

3. Where are the specimens filed?

In principle, all our cultivated vouchers are filed in separate folders within the familial and generic sequence of the Extra-European herbarium. Thus the 'cultivated' category is treated as being equivalent to a geographical area of the kind adopted in most large herbaria. However, this presupposes that the specimen is clearly a cultivated one; but many occupy a grey area between obvious cultivated status and definite wild origin. Indeed the folders should more correctly be labelled 'cultivated or unlocalised', since specimens with no obvious provenance are filed here *faut de mieux*. There has also been a tendency, when filing specimens of British origin, to incorporate cultivated vouchers into the main British and Irish herbarium because they arrived as an integral part of a collection acquired from elsewhere. While preparing a database of Red Data Book specimens from the British and Irish herbarium which supposedly contains only wild-gathered plants, I found that 150 of the 4000-odd specimens were either clearly labelled as being of garden origin, or were labelled as coming from sites remote from their known native distribution in the UK. Most of these latter sites were later found to be the places where the 'collectors' lived.

4. Why prepare vouchers of cultivated plants?

Although garden plants are generally more accessible than plants gathered in the wild, and certainly the facilities for pressing them should be far better, this does not mean that collections are rich in such material. It is understandable that garden staff are sometimes unenthusiastic at the prospect of seeing their flowering material hacked off and pressed, never again to be seen by their visitors. This is particularly true of the plants most highly prized for showing, such as Orchids. On the other hand, garden plants (especially those of wild origin which are not pre-selected to be easily propagated) have only a 'half-life' in cultivation; they 'decay' at varying rates dependent on factors such as their susceptibility to pests and diseases, their longevity as perennials, or changing fashions in decorative planting. This is an area where further research is needed, especially where *ex-situ* conservation is the aim. 'Press them before you lose them' might therefore be an appropriate policy, in line with the precautionary principle.

Another reason for preparing a voucher might be to make a record of the date on which a new variety had been developed or discovered. The 1995 edition of the International Code of Nomenclature for Cultivated Plants³ introduced the concept of Standards (equivalent to Types in conventional plant nomenclature); the following British institutions are recognised repositories listed in the Code's Appendix 6: University of Cambridge (CGE), Royal Botanic Gardens at Edinburgh (E) and Kew (K), the Hillier Arboretum, the Liverpool Museum (LIV), University of Reading (RNG) and the Royal Horticultural Society, Wisley (WSY) (see below).

More often, vouchers are simply a way of preparing a sample which can be sent elsewhere for identification; living material often does not travel well. There is thus an argument for developing links between gardens rich in horticultural rarities and museums able to curate the vouchers and administer loans. Ness Botanic Garden⁴, for example, adopted a policy between 1967 and 1976 of recording the location of each species and variety in the garden and of preparing a dried voucher specimen for the herbarium. These vouchers are frequently consulted by visitors to the Liverpool herbarium and on loan, which enhances the information on the plants in cultivation and thus contributes to the objectives of the Botanic Garden.

5. Why are older specimens important?

It is sometimes thought that freshly gathered material is inherently more suitable for research than previously preserved material. It is odd, to say the least, that the huge investment in past exploration and collection should be dismissed in this way. I suspect that it is partly due to the attitude of bodies funding research towards the 'ownership' of the collections in which they do not hold a direct stake. This view also comes from a realisation that the gradual increase in the size of collections often brings with it an increase in space requirements and running costs which increasingly limits the discretion of research budget holders to retain such material in the longer term.

Different arguments apply to historic specimens, however, because they are often irreplaceable in the sense that the communities from which they were gathered have often been destroyed. In the case of garden plants, this is very often the case, in that there is a constant flux of improvement, selection and reintroduction which displaces early plant varieties from cultivation. Unless vouchers are prepared, along with illustrations prepared by specialist artists, horticulturists may lose all trace of earlier varieties apart from the often vague published descriptions. This is particularly true in the North of England, where florists' societies in the 18th and 19th centuries were the focus of a vigorously competitive hobby by growers of *Auricula* Primulas. Some of these earlier varieties are now only known from single paintings such as those of James Bolton (1735-1799)⁵, a Yorkshire artist and naturalist who specialised in making drawings of cultivated plants from the living collections of his patrons. We do not know whether Bolton ever made pressed vouchers of these *Auriculas*, as some historic herbaria from his home town of Halifax which may once have contained such vouchers were destroyed

following a long period of neglect. Policies for the preservation of orphaned and neglected collections are vital if further losses are not to occur.

Even relatively modern research material can be valuable when preserved as vouchers. New techniques for extracting DNA have enhanced the importance of such material, as these now allow older specimens to be exploited, and if the quality of scientific research is to be validated by being repeatable, reference to the original research materials may be essential. But a major hurdle, for many researchers, is access to accurately named voucher material; 'original' names, not checked by specialists, are not reliable enough, nor can early garden catalogues be interpreted in the absence of voucher material. This is a further argument for ensuring that herbarium collections are kept in institutions where they are actively curated and made available on loan.

6. How can cultivated vouchers be used in multi-disciplinary research?

Curators and preparators may not anticipate, at the time the specimens are prepared, what future purposes might be served by preserved material of living collections. For example, cultivated plant specimens often retain evidence of fungal attack, and research into a particular host - parasite relationship of a new pest may depend in part on establishing a time frame for the spread of the infection. Seeds introduced from the wild are often treated to remove potentially harmful fungi, yet this routine treatment may remove associated fungi which contribute, through a mycorrhizal association, to the fitness of the living plant. There is thus an argument for encouraging seed collectors in the wild (and perhaps even in gardens) to take not only a sample of the plant, but also its associated soil. To the best of my knowledge no British herbarium currently stores soil samples along with their plant and seed collections, yet future *ex situ* conservation projects may depend on access to such material.

In a different context, I was recently asked by members of the Guild of Pressed Flower Artists to tell them which garden plants best retain their natural colour on drying. Some familiar examples are repeatedly used in decorative pressed flower arrangements, yet other species which are equally suitable are not used. This may seem a trivial example, yet it serves to illustrate what a wide spectrum of possible uses are embraced by cultivated voucher specimens.

In conclusion, multi-disciplinary research into garden herbarium vouchers will bring together workers in garden history, horticulture and plant taxonomy, and will require access to a wide range of library and archive materials. Within Britain, there is no single pre-eminent collection of cultivated herbarium vouchers, but there is a strong case for developing such a research centre at Wisley, which is also the home of the National Council for the Preservation of Plants and Gardens. The Royal Horticultural Society, which is already an International Registration Authority for many groups of garden plants, is to be commended for advancing plans for such a facility.

Footnotes

1 The Liverpool Botanic Garden herbarium, founded by William Roscoe in 1799, contains a set of 2,700 specimens



supplied by Sir J.E. Smith which are largely duplicates of specimens now kept in herb. LINN-Smith.

2 Joseph Dickinson (c. 1805-1865) was a lecturer and physician at Liverpool School of Medicine and Liverpool Royal Infirmary. He became Secretary of Liverpool Botanic Garden, from whose living collections he prepared vouchers.

3 International Code of Nomenclature for Cultivated Plants (1995), edited by P. Treharne et al., is published by Quaterjack Publishing, Wimborne as vol. 133 of the series *Regnum Vegetabile*.

4 The University of Liverpool's cultivated herbarium (part of LIVU), which is now incorporated into the Liverpool Museum's herbarium (LIV), was previously kept at the University's Botanic Garden at Ness which had been founded in 1897 as the private botanic garden of Arthur Kilpin Bulley (1861-1942). Bulley, a socialist and philanthropist whose wealth was derived from cotton trading, sponsored many field expeditions by noted collectors such as George Forrest.

5 A biographical memoir of James Bolton of Halifax was published by the National Museums & Galleries on Merseyside in 1995.

PLANT COLLECTIONS FOR NON-BOTANISTS WORKSHOP PART 1

It is stating the obvious to say that not all museums blessed with having a natural history collection have a full set of specialist curators and that the most common absentees from the equation are botanists. This workshop, held at Liverpool Museum on 26th February 1996, set out, therefore, to fill an equally obvious gap by providing practical guidance for non-botanical curators with plant collections in their care. It must be said, however, that of the 57 people who attended many had come for supplementary purposes while others just wanted to see what other curators got up to. This was fine as the largely practical nature of the day allowed people to get what they wanted out of it.

The day started with two introductory presentations looking at herbarium practice, then and now. This was followed by two practical sessions. The first covered aspects

of vascular plant curation and care comprising:- 1. The Preparation of Material in the Field; 2,3 & 4. Mounting Techniques à la The Royal Botanic Garden, Edinburgh, The Natural History Museum and The National Museums and Galleries of Wales; 5. Conserving Old Collections; and 6. Collections Arrangement. The second practical session focused on non-flowering plants and economic botany collections and included:- 1. Fungi; 2. Lichens; 3. Bryophytes; 4. Large Algae; 5. Diatoms; and 6. Economic Botany and Timbers. Many of the write-ups for these are based on information sheets used for the sessions while others are retrospective compositions. Neither, unfortunately, capture the impromptu question and answer nature of the demonstrations, however, all demonstrators included here will be happy to talk to you further should you have any specific queries. The afternoon was taken up with tours led by members of Liverpool Museum's Botany Department looking at the Natural History Centre; the James Bolton Exhibition; the Plant Room and use of living plants in NMGM. The day concluded with a well earned cup of coffee and a lively 'Curators Question Time.'

Mike Palmer

Natural History Centre

National Museums and Galleries on Merseyside

Herbarium Practice, Then and Now

THEN: Herbarium Collections

Dr Angus Gunn, National Museums and Galleries on Merseyside.

The tradition of collection and pressing plants for study dates back to the latter half of the 16th century with the establishment of herbaria at the Universities of Bologna (1570), Basel (1588) and Oxford (1621). The oldest surviving collections are probably in the Naturkundemuseum in Kassel (c.1569) and one of similar age in the Vatican collections.

These early collections consisted of specimens pasted into bound volumes and were used in very much the same way as a book of illustrations.

By the 18th century, herbaria began to be kept on loose sheets. This had a number of advantages. Specimens could

be compared side by side, and the order of the herbarium could be re-arranged to take into account new acquisitions and new ideas on how they should be sequenced. These advantages led to the demise of bound volumes except for some exsiccatae¹. Some amateur naturalists continued to use bound herbaria throughout the 19th century and pre-prepared "flower books" could be purchased for this.

In 1751, Linnaeus published his views on how herbaria should be prepared -

"The plants should be dried between sheets of paper and as quickly as possible, but hardly with a hot iron. The herbarium specimens must be as complete as possible; the fructification should receive extra care; they should be stuck on the paper by means of fish glue; there should only be one specimen per sheet.; the genus to be written on the front side, the species and the ecological and geographical details should go on the back side; the herbarium should be arranged methodically."

Apart from the unusual positioning of the label details on the reverse of the sheet, a curator who followed Linnaeus's recommendation today would not go to far wrong.

The 19th century saw a period of experimentation with mounting techniques, some more successful than others. Adhesives such as starch based pastes and, later, latex based adhesives were sometimes used as alternatives to animal glues with considerable success. Fixing specimens with gummed paper strips or attaching by sewing were also extensively adopted and are still used to a small extent today. Some (Withering, 1830) even went as far as recommending that specimens were kept un-mounted in folders to make them "*conveniently accessible for study*". Although never scientifically verified, observations in the Liverpool herbarium (which has representatives of virtually every type of herbarium preparation technique ever used) suggest that specimens which have been stuck down onto their sheet have fared much better than other methods. Loose specimens in particular have suffered damage through years of handling while specimens attached solely with paper strips have also been more easily damaged. The disadvantage of all-over adhesion is that it is more difficult to remove parts for study. A good modern compromise is to keep a portion of the specimen loose in a fragment capsule which is attached to the sheet.

At an early date it was realised that, in general, the more rapidly a specimen can be dried the better preserved the specimen is, thus, from the end of the 18th century, new methods were tried to speed the drying. William Withering (1796) described the method use by Thomas Velley, to press his herbarium, particularly algae and grasses using a hot iron. These specimens are still preserved, in excellent condition, in the herbarium at LIV. Other methods devised such as a heated sandbox were recommended. The biggest advance in drying technique was probably the introduction (Collins 1910) of corrugated cardboard separators which could be placed at intervals in bundles of drying specimens to allow air through the bundle and speed drying. More recently still, improving the airflow using a gentle heat source to create convection currents through the bundle or by using small fans means that modern herbaria can dry and press hundred

of specimens very rapidly to a very high standard. Microwaving has been tried but it can be difficult to control and the very high temperatures produced kill any seeds on the plant so reducing its value.

Returning to adhesives, the 20th century has seen the introduction of synthetic adhesives the most popular of these have been PVA based. It is perhaps not widely realised that all PVAs are not the same and woodworking formulations are much less desirable than the "conservation" grade types that can now be obtained. Methyl-cellulose adhesives (the adhesive in most modern wallpaper pastes) have also been used. They have the advantage that it is a fully reversible treatment although the strength of the bond on narrow parts of the specimen such as twigs means that gummed linen tape strips are used to ensure these parts remain firmly attached.

¹ Exsiccata (pl. exsiccatae) is a set of dried specimens, usually with printed labels. Exsiccatae are usually prepared as sets for distribution. The term is often used to denote bound sets but is not be restricted to that usage. Conservation note: Bound exsiccata should be stored on their sides, not upright like a book.

NOW: New Developments in Botany Curation: Some Advantages and Disadvantages .

Dr. Rob Huxley, Natural History Museum.

The last 20 years have brought a number of new challenges to the herbarium manager. In particular, new user needs, new technology and health and safety demands. The introduction of new methodologies and loss of old have impacted on important aspects of collections management such as: **risks to specimens, accessibility of collections information, and health and safety**. What is the impact on these elements of four areas of change in the last 10 years ?

1. Accommodation - Compactors
2. Destructive uses - Chemical analysis
3. Pest Control
4. Digital Imaging

1. Accommodation- compactor storage

Space for collections is becoming increasingly at a premium as demand for laboratory space increases and new collections of material continue to pour through the doors. In response, many institutions have installed compactor units. These have their accompanying advantages and disadvantages.

Compactors can pose **risks to botanical specimens** if they do not have doors on individual cabinets. The trade off against lighter cheaper units is the increased risk of pest infestation and spread when aisles are left open. However, when closed the unit seals of compactors provide an extra barrier to infestation. The benefits are reduced overcrowding and related physical damage. Compactors can reduce **accessibility** when several workers wish to use different aisles of the compactor simultaneously. Scheduling visits and dividing large units into blocks can reduce this.

2. Destructive uses - molecular analysis

Destructive sampling for chemical analysis has been used by lichenologists as a vital taxonomic tool since the 1860s. The essential technique of thin layer chromatography would have been impossible without the removal of material and the usefulness of the collections to science considerably reduced. **Accessibility** is increased by unlocking the suite of molecular characters available to the taxonomist.

The main **risks to specimens** are the gradual destruction of the specimen by repeated use and the damage caused by inexperienced handling and removal of samples. In the NHM, researchers are required to take only small fragments for analysis; any unused fragments and a slip recording the results are attached to the sheet or packet to prevent unnecessary repetition of the analysis. Supervision should reflect the experience of the user who may be from a non-herbarium background. See following list of questions to ask before permitting destructive techniques.

- 1) How abundant in the collection is material of that species?
- 2) Can alternative material be used or collected for the purpose?
- 3) Is there a non-destructive alternative or is one likely to be developed sufficiently soon?
- 5) Has the method been used before?
- 6) Will someone in the future want to repeat the work on the same specimens? i.e. will the specimen be reduced further?
- 7) What other methods of study, known or potential, are you preventing by allowing this destructive action?
- 8) What is normal taxonomic practice in a given classificatory group? (e.g. chemical analysis essential in lichens)
- 9) Is the material type or historically important?
- 10) Who is carrying out the work- an experienced taxonomist, a chemist, a student etc.

3. Pest control

The needs of DNA workers and Health and Safety have had drastic effects on the way we protect material from pests. Substances such as mercuric chloride and lauryl pentachlorophenolate are no longer used in most collections and freezing is often the only method although heat treatments are being considered. The effect on molecular characters of the latter require investigation.

Ceasing to use chemical treatment possibly increases **risk to specimens** by reducing protection from pests particularly for specimens on loan. **Accessibility** is increased as chemical treatments damage valuable molecular characters. The **health and safety** risks of using potentially toxic/carcinogenic chemicals are removed by abandoning chemical treatment.

4. Electronic data capture - imaging

Digital imaging has an important role to play particularly when applied to delicate historical material. The Natural History Museum is piloting digitisation of parts of the 17-18th century Sloane Herbarium which is unavailable for loan and increasingly fragile. Capturing digitised images reduces

risks to specimens by reducing need to handle and enabling "virtual loans". Accessibility is improved by making images available to a wider audience.

PRACTICAL SESSIONS

PREPARATION OF MATERIAL IN THE FIELD

Hints for Hard-Pressed Collectors (with apologies to Peter Davies)

Demonstrated by Dr John Edmondson, Head of Botany, National Museums and Galleries on Merseyside.

The following points are some of those which most frequently arise when botanists are asked for advice on procedures for pressing plants in the field. For further information the following main references are recommended:

Hints for Hard-pressed Collectors. Peter Davies. *Watsonia* 4: 283-289, 1961.

The Herbarium Handbook. D.Bridson & L. Forman (editors). R.B.G. Kew, 1992.

Manual of Natural History Curatorship. G. Stansfield, J. Mathias & G. Reid (editors). H.M.S.O., 1992.

- Specimens should be as complete as possible. Don't ignore roots, fruit and shoots.
- Data should be complete, and retained with the specimen, not inferred later.
- Record information which is either not obvious from examining the specimen (e.g. height of tree) or which may change colour with time (e.g. flower colour).
- When recording geographical information, use grid or lat/long co-ordinates as well as place names.
- Use a personal numbering system if possible; a single number sequence, unencumbered by code letters and symbols, is greatly preferred.
- Modern molecular techniques require rapidly dried, uncontaminated specimens. Use silica gel sachets in sealable bags to preserve small leaf samples.
- High quality information on the substrate can add value to the specimens; it may be helpful to include a well-mannered geologist in an expedition.
- Duplicates provide a powerful way of obtaining and exchanging information on identifications of your collections, and are also a legal or moral requirement when working abroad.
- Plant-animal associations (e.g. pollinators) and plant-plant associations (e.g. epiphytes, fungal associates) should be recorded.
- Rapid drying is essential. Use lots of drying paper, keep the presses warm and change the paper frequently (at least twice a day). Separate fleshy samples from the rest.
- Custom-made presses are much more effective than improvised boards. Specify springy timber (e.g. beech, hickory) and use rivets in preference to nails or bolts.
- When obtaining plant presses, don't skimp on straps. Use wide, nylon straps with stout buckles in preference to narrow leather ones, as the pressure achievable depends greatly on one's ability to grip and tension the straps.

- Every specimen takes at least as long to prepare after collection as it does to collect it in the first place. Sufficient time needs to be set aside for such work when planning a project.

MOUNTING TECHNIQUES 1

Demonstrated by Rita Calder, Mounting Technician, Royal Botanic Garden, Edinburgh.

There is one full time mounter/preparer at the R.B.G. Plant specimens are received for mounting in paper 'flimsies' each complete with its own identification label. This is glued onto the bottom right-hand corner of a c. 42.5 x 26 cm mounting board using Gloy Paste (water-soluble). We use 3 weights of boards - an archival quality lightweight or medium-weight for most specimens and heavy-weight for heavy or spiny plants. The specimen is arranged on the board, showing where possible upper and lower leaf surfaces, a small envelope is glued on with representative pieces of the plant in it. A pile of specimens is prepared in this way.

The second stage is gluing the plant on to the board using a water-soluble conservation quality PVA glue (also used for leather work and book-binding) mixed with some water on a large heavy glass sheet. The back of the specimen is placed on the glue and then put on the mounting board with sheets of blotting paper in between each board. After recommendations from visiting curators, I have started placing a sheet of greaseproof paper on top of each glued specimen to prevent the blotting paper from sticking to it. The specimens are piled up in a wooden box, metal weights placed on top, and left to dry for approximately 12 hours.

The third stage is taping and stitching the glued specimens on to the boards. We use sticky brown tape of a fairly heavy quality cut into strips of varying widths. Strong poly/cotton thread secures heavy specimens onto the boards. I use this third method as little as possible because of the pressure on dried and brittle stems. I try to confine sewing to thick roots, stems etc. I prefer to use the gummed strips.

MOUNTING TECHNIQUES 2.

Vascular Plant Mounting Techniques at the Natural History Museum.

Demonstrated by Jenny Smithers, Plant Mounter Supervisor, N.H.M. London.

All plant specimens are stuck down firmly to archival quality mounting paper by means of a PVA gum (J Hewitt and Sons, PVA - M155). The gum is applied to the plant specimens and labels by means of two 1.5" paint brushes. Labels, other information and capsules containing plant fragments or fruits are attached to the bottom right hand corner of the mounting sheet using PVA gum. Two separate pots of gum are used, one for the specimens and one for the labels. This helps to keep labels free from plant debris when attaching them to the mounting sheet. When the gum has been applied, covering all of one side of the plant specimen, it is placed on the mounting sheet then covered with a sheet of waxed paper and several sheets of drying paper. On top of this a foam rubber pad is placed and the whole pile of specimens and pads etc., put into a press. It is left here for

about 15-20 minutes. When satisfied that all that specimens have adhered firmly, small straps, cut from linen tape are stuck to various parts of the plant to double secure it to the mounting sheet. The whole sheet is then returned to the mounting box for the curator to incorporate into the collections.

MOUNTING TECHNIQUES 3.

Demonstrated by Tony Tipper, Herbarium Manager, National Museums and Galleries of Wales.

The materials used for mounting are:

1. Gelatine backed linen tape (CCI approved)
2. Lignin free, Calcium carbonate buffered mount board
3. Water soluble glue for sticking labels
4. Lignin free seed envelopes
5. Lignin free sleeves for keeping specimens in
6. Brown manila folders for separating species
7. Lignin free Type folder

The best material is taken for mounting. It is positioned so that both sides of the leaves or fronds can be seen. If it is a large fern then the top half is cut and placed with the fertile side down. No material is lost from one specimen. If it is a very large specimen then several sheets will be attached together. Care is taken to ensure the specimens are not mounted centrally on the sheet as this causes bulking in the middle when laid one on top of another. The linen strips are cut very thinly and used initially as anchor points to stabilise the whole specimen and then more careful mounting is required.

After mounting the specimen is held upside down to ensure there are no unsecured areas that are hanging down that could be damaged through handling. No glue is used to attach the specimens to the sheets as all the specimens are frequently frozen as a means of pest control and no glue has yet been proven to be able to cope with frequent freezing, and not causing stress to the actual specimen. Linen straps are extremely strong and flexible and allow for some movement of the specimen, allowing contraction and expansion with fluctuating relative humidity. Vascular material is housed flat within cabinets in Flora Europaea order.

Old, poor mounting techniques found within the collections includes usage of metal pins, glue and sellotape. These are removed and remounted using standard practice. Heavily glued specimens are humidified using gore-tex linings to prevent water soaking onto the specimen, this appears to help strengthen the specimen. Transference of all the data is very important and any new conservation information should be added at this stage for example if the sheets have been cleaned using a plastic rubber, what glue has been used on the label, method of pest control etc. All old labels must be kept.

Materials used for packaging cryptogamic material:

1. 100% rag paper
2. Secol (melinex) envelopes, open along two edges to prevent acid build up within

3. Bulky lichens and fungi laid within acid free tissue and placed within small specimen boxes

Data is typed directly onto the computer and then printed out. The specimen is placed within the melinex envelope and then placed within the folded packet. If there is a lot of loose material then the edges of the packet are folded inwards to prevent loss. Large fungi are freeze dried but are monitored frequently for pest damage, these are housed along with other bulky material within boxes whereas other cryptogamic material is housed upright in packets, in alphabetic generic and species order and then numerical vice county order.

Any incoming material is frozen at -20 C for 72 hours, this applies to both vascular and cryptogamic material

CONSERVING OLD COLLECTIONS

Demonstrated by Caroline Cotgrove, Paper Conservator, N.M.G.M.

This session was to demonstrate how the Paper Conservation Section and Botany Department had combined to find a solution for the preservation of the Royle Collection, a 19th century collection from India by John Forbes Royle.

Many examples of the problems encountered were displayed, e.g. very brittle specimens, unsuitable specimen sheets, overcrowded sheets, ink degradation of the paper, mercuric chloride on paper and specimen. Many examples of the solutions chosen to deal with different problems were displayed. Details of all the materials used were discussed.

The method that is currently employed for this collection is to remove the specimen from the original sheet, all information is cut out and preserved. Specimen adhered down onto a sheet of cotton rag paper, of a suitable weight, using 2% sodium carboxymethyl cellulose solution (SCMC), applied with a small soft brush, later strapped with linen tape. All labels are attached by a method depending on the media used, adhered down or hinged with Japanese paper. Cotton rag paper fragment folders are also adhered to each sheet. The sheets are then housed in archival quality specimen and genus folders.

A full account of the Royle Conservation project can be read in *Conservation and the Herbarium*, published by IPC, Leigh, ISBN 0 9507268 6 9

COLLECTIONS ARRANGEMENT

Demonstrated by Donna Hughes, Assistant Curator, Botany, N.M.G.M.

This demonstration looked at how herbarium specimens are protected and taxonomically grouped by placing them inside various folders and covers. Different methods in which these are then arranged within the herbarium 'cabinet' were explored, dependant upon the type of collection being curated.

Herbarium sheets are housed in their respective species 'folder'. These one-fold covers should be acid-free, light-weight (with grain running parallel with the fold) and just slightly larger than the herbarium sheet. Each species folder may hold one or more examples of that species but should not become overcrowded. An additional folder may be used or a spine incorporated into the existing folder to

accommodate more material. If the later method is used it is important to ensure the folder is still larger than the mount sheets themselves. The bottom right hand on the outside of the folder should be marked in either pencil or waterproof ink with i) the country or district (in larger herbaria), ii) the species epithet and number (see orders), and iii) any infraspecific taxa.

Species folders are then grouped and placed within a genus folder either in alphabetical order or their systematic order. In turn, the genus folders can be kept in systematic or alphabetical order. Again these folders should not become overcrowded. They should be made from thin acid-free card and scored with a spine c.2cm. The folder should close slightly larger than the species folders for their protection. Some herbaria use different coloured genus folders or coloured labels to indicate geographical areas. The folder should be marked on the outside bottom right-hand corner with i) the respective family and number (if any), ii) the generic name and number (if any), and iii) species epithet and number (if any) or the initial letters of its contents e.g. D-H.

Type specimens need extra care and protection. They are usually housed in folders which totally envelope the herbarium sheet by overlapping on all four edges. They should be made from acid-free paper about the same weight as the species folders. So that these important specimens can be identified immediately in the cabinet, the folders are usually banded with a bright colour (often red) on the outer folded edge. The outer of the folder should be printed with the name of the institution and its herbarium code (see Index Herbariorum) and the word TYPE in bold letters. Written in the bottom right-hand corner should be the name of the specimen (full; with author), if it is a synonym then also write the currently accepted name. The type folder should be placed in its respective species and genus folder, to the top of the pile.

The folders should be housed in dust-free cabinets with pigeon-hole compartments. The size of the folders used is often determined by the size of the compartments. The folders should be able to be removed easily without damage. The arrangement within the cabinets determines the accessibility to the collection for both the curator and visitors to the herbarium. A simple way to order the collection is alphabetically. Though this has its use at species level, it is impractical to arrange the whole collection this way because related, similar taxa will inevitably be housed far apart from each other, causing problems when trying to access specimens for identification.

Systematic arrangements of the collection places closely related taxa together. Several different sequences are used by herbaria, and the choice is often based on tradition and familiarity. British and Commonwealth collections are most often based, with modification, on *Genera Plantarum* (Bentham & Hooker 1862-83), continental herbaria are often based on "Englerian" arrangements (e.g. Dalla Torre & Harms 1900-07), while many American herbaria base their collections on more recently devised systems such as Takhtajan (1987) or Cronquist (1981).

At Liverpool, the European herbarium follows *Flora Europaea* (Heywood *et al* 1964-80), an "Englerian"

sequence, while the Extra-European Herbarium and British Herbarium, which is ordered according to Kent (1992), follow "Cronquist" based schemes.

A selection of useful and relevant books was also displayed as part of the demonstration:-

Essential reading for setting up a British herbarium:
The Herbarium Handbook. Edited by D. Bridson and L. Forman. (1992).

New Flora of the British Isles. Clive Stace. (1992).

List of Vascular Plants of the British Isles. D.H. Kent. (1992).

Flora of the British Isles. Clapham, Tutin and Moore. (1987).

Systems in general use in herbaria:

Bentham and Hooker, *Genera Plantarum* (1862-1883)

Dalla Torre and Harms, *Genera Siphonogamarum* (1900-1907) (known as the 'Englerian' system)

Cronquist, *An Integrated System of Classification of Flowering Plants* (1981)

Dahlgren, Clifford and Yeo, *The Families of the Monocotyledons: Structure, Evolution and Taxonomy* (1985)

Useful books to have on hand:

The Plant Book. D.J. Mabberley (1993)

Dictionary of British and Irish Botanists and Horticulturists. R. Desmond (1994)

Botanical Latin. W.T. Stearn (1992)

Index Herbariorum. Holmgren, Holmgren and Barnett (1990)

Flora Europaea. Heywood *et al.* (1964-1980)

**Vascular Plant, Families and Genera*. R.K. Brummitt (1992)

& a gazetteer of the British Isles and a local flora if published.

* Now available as a text file on the Internet.

Here ends Part One of *Plant Collections for Non-Botanists*. Part Two will look at curatorial aspects of non-flowering plant and economic botany collections. Part Three will look at storage and display.

Historic Collections - The SPNHC Conference, 1996

This years SPNHC (Society for the Preservation of Natural History Collections) conference was held at the Academy of Natural Sciences in Philadelphia, USA. The conference had a central theme based on 'Historic Natural History Collections', and a workshop on the 'Valuation and Insurance of Natural History Collections'. Fewer Brits made it to this years conference than last years at Toronto, probably reflecting on both tighter budgets and the Cambridge WCCR held in August.

The talks occurred over two days and were then followed by the workshop. The whole event was surrounded with organised tours of other institutions and the Academy's

collections. The end of conference banquet was particularly fine being held in the academy's Dinosaur Hall, with a excellent spread of food, Cajun music and a free bar!

The talks started with Meredith Lane of the National Science Foundation (NSF) discussing the changing views of natural history collections, in which she outlined the problem that many early American collectors did not have suitable depositories for their specimens, and this was used to emphasise that natural history collections are a fundamental and indispensable resource when many specimens cannot be re-collected. The main point was the importance of co-operation not competition if all the information on all collections is to be brought together. NSF is working on the development of computers in Natural history collections, but finds there are two main problems;

- Using a standard relational database.
- Standardising the fields to be used in the database.

An evolved catalogue will improve a specimen's value. The delegates were encouraged to 'think of new and expanded ways to contribute and make relevant to society the output of natural history collections'. The requirement to make collection information more available requires interconnectivity between museums, increasing the collection value as a whole whilst aiding research, education and even entertainment. The act of any museum trying to database it's entire collection as a whole is a daunting one, but which can be started by putting selections of the collection onto the World Wide Web.

Robert Waller (Canadian Museum of Nature) discussed preventive conservation planning, specifically for large and diverse collections and related this to implementing and being responsible for funds directed towards preventative conservation measures. Robert outlined the means of setting up such plans with the objective of setting up a pragmatic method for setting priorities which adopts or adapts existing systems.

The basis of the plan is three systems:

1. Risk assessment and management; this identifies and assesses the risks and uses this to identify and evaluate risk mitigation methods with an approach that is comprehensive, cost effective and convincing.
2. A system of setting up categories of specimens to direct resources available for risk mitigation projects by identifying the most important part of the collections. Specimens are given a 'value' with type or recent extinct species being of highest priority.
3. A collection profiling system to identify the issues affecting collections. This works on a base unit known as a collection storage unit which is effectively a cabinet, drawer unit or shelf, and looks at factors such as the collection processing level and the level of preservation, but works by only recording practical information. The collection profile provides a base for determining activity and resource levels required for continuous maintenance, whilst aiding proposals for remedial maintenance projects comparable amongst different collections.

It was concluded that several frameworks must be applied which require a great deal of information, but it is possible! The advantages of planning means effective use of resources,



The Academy of Natural Sciences, Philadelphia

accountability, a sense of accomplishment and overall success.

Robert Huxley (Natural History Museum) described the reorganisation of posts at the NHM to the assembled audience, many of whose institutions had or were undergoing similar changes. It was explained that curation had been recognised as an activity in its own right which had led to the development of a more co-ordinated collection management structure allowing museum wide programmes (pest control, training, data capture) with overall co-ordination by a cross disciplinary steering group. In the staff set-up a collection leader has an equal role as a researcher. The curators spend most of their time directly on the collections but there is crossover into advisory and research roles. The aim has been to improve the flexibility of resources by using staff where they are most needed, providing a standard of maintenance that is common to all collections, improving communication and to provide a direct collection input into the corporate plan. It was felt important that research still played a role with curators as this improves the understanding of researchers' needs, develops specialist knowledge, aids regular dialogue and improves overall collection knowledge.

John Simmons (Natural History Museum, Kansas) explained the setting up of the US Organisation for Biodiversity Information, US-GOBI, in April 1996 with the aim of setting up the infrastructure required to organise the information derived from biological collections and associated biodiversity for maximum accessibility - 'biological collections to function as a community in response to the global biodiversity crisis'.

Onto historic collections. Jane Pickering (Oxford University Museum) considered the items surviving in the Tradescant Collection from the 17th century. Of the original '12 cart loads' of specimens making up this collection only

40 specimens, all zoological, have survived. Using the risk assessment system developed by Rob Waller, the collections survival over the last 400 years was considered. The material to be initially lost was that most susceptible to pest attack. However the effects of physical damage from visitors also appears to have been extensive, suggested by the loss of the bird egg and insect collections. The other major factor causing loss was custodial neglect. Many specimens lost their data and may still be in the museum. Most of the surviving specimens are the tougher parts such as bones and horn and show evidence of insect damage and physical damage from poor storage and handling. However little evidence of damage from light exists, neither does damage from fire and water appear to be evident.

Robert Huxley (that man again) gave his second talk of the day (a bit keen!) on the challenges facing the large historical herbarium collections at the NHM. Some 200 000 specimens were collected before the 1800's and the current state of access and storage to this material is unsuitable. The historic collections have a wide range of users: scientific community (large number of types); historical research; horticultural researchers; commercial bodies such as publishers; showing off to VIP's.

The collections are open to the usual risks such as fire, theft, physical handling and dust/ abrasion, although some collections had the additional risk of pirates plundering the ships when being brought to Britain!. Accessibility is particularly low, with no loans of certain parts of the collections, difficulties in locating specimens/ drawings, and little data readily available with many specimens (difficult to link specimens with publications, etc). The collections now need to be properly assessed and prioritised to direct remedial conservation work such as reinforcing paper mounts, separating prints from drawings and methods to reduce handling. The hope is to set up a special collections

room with the collections themselves being digitised and collated on database to allow greater availability of information.

On a different type of historic collection Tom Strang (Canadian Conservation Institute) described the work the CCI had been carrying out on a permafrost fossil tree site in Northern Canada which has intact but fragile unpetrified cones, needles, tree stumps and leaf remains. The CCI has been using PEG (polyethylene glycol) to try and conserve the fossil material as it is similar to wet archaeological wood. They have also been using parylene coating technology to try and consolidate this very delicate subfossil material. The site is very exposed and barren. The CCI have also been attempting to measure the rate of soil loss at the site which is estimated to be about 4 million years of fossil material per year. This was done by detailed surveying of the site using plane, theodolite and G.P.S. All the tree stumps were mapped out in order to follow their rate of deterioration, and any which had been dug up were reburied. Many areas at the site are showing large expanses of exposed leaf matter which is extremely delicate. The greatest threat to the site now appears to be 'ecotourism' trampling over the site. Already visitor damage has occurred at the site which has no protected status. The extensive baseline study carried out by the CCI will give a gauge for all future research.

Anatomical collections featured quite strongly at this conference. Thomas Crist (The Wistar Institute, Philadelphia) described the conservation work carried out on the fluid preserved collections at the Wistar Institute, and the health and safety plans developed to carry out the work. Where the fluid needed replacing then the formaldehyde has been replaced using a non-toxic fixing solutions (the details of which I couldn't catch but will attempt to find out) which was meant to incorporate a formaldehyde scavenger. The concept was interesting but the exact details need to be investigated as this was obviously a non standard preserving medium.

Problems with fluid preserved anatomical collections were also discussed by Andries van Dam (Museum of Anatomy, Leiden). Although the collections at Leiden date back to the 1500's some of the main problems relates to the newer combinations of preservative fluids, jars and sealants. Problems encountered are decreases in fluid levels, loosening of lids, and warping of plastics. These can be related to:

- Fluctuations in internal pressures in the storage container, related to environmental change.
- Dropping of fluid due to diffusion through the container lid or seal.

If the temperature rises then the vapour pressure in a storage jar will rise, causing an increase in pressure. The less air space in a jar the greater this effect will be (less volume available for fluid expansion). Conversely a decrease will cause negative pressure, a problem which is rarely recognised. Thus the recommendation that fluid collections are stored at a constant temperature, preferably at a lower temperature than the one at which the jar was sealed as this will create a slight negative pressure. However to combat temperature increase Andries recommends the following to reduce the effects of increased pressure: fill ethanol based

solutions to 90% of volume and aqueous fluids to 95% volume.

With diffusion effects it has been noted that silicon rubber sealants have a greater water loss than sealants such as Tixophalte (Shell). This is important to consider since a negative pressure can be caused by diffusion, especially with plastic containers which will ultimately deform. The result is that plastic containers tend to require regular venting, but to do this regularly is time consuming. This has led to the development of a two way valve which consists of a piece of silicon tubing as a gasket on a polypropylene stopper at one end and a piece of polyethane rod on the other. As a negative pressure develops the silicon gasket expands and thus lets air in, whilst an increase in pressure will allow vapour to escape. The valve will not react to small temperature fluctuations and removes the need to store fluid collections at constant temperatures in order to avoid temperature changes. At Leiden they are still using phenoxetol with which glass jars cannot be sealed with the impervious tixophalt sealant. A silicon sealant has to be used which is more permeable and can hence lead to the formation of a negative pressure which can cause the glass lids to crack. The use of a two way valve can prevent this.

Richard Rabeler (University of Michigan Herbarium) described the problems facing a small college herbarium with the loss of its curator. Often in such situations the replacement of the curator is unlikely. Three options can be considered:

1. Donate or sell the collection: simplest option but assumes that there is no interest in maintaining or using the collection, but may be best if there is no curator. It is important to consider whether to loan or donate the collection rather than place on permanent loan.
2. Donate or sell historical collection: this retains the teaching specimens but the 'curatorially expensive' specimens are cared for elsewhere. Ethics need to be considered, and involves separating the collection.
3. Retain entire collection: often the case even in the absence of a curator where the collection tends to be used to say 'we have it' rather than utilise it.

Gretchen Anderson (The Science Museum of Minnesota) described the use of conservators in 'visible labs' as a means of raising public awareness. However the plexiglas lab which has been setup has no facilities such as water or fumigation and is thus limited in the activities that can be shown, appearing to be mainly a workspace for general collection management activities which is mainly manned by volunteers (cf. the visible lab set up at NHM for the work Adrian Doyle et al carried out on the plesiosaurs). However it does allow contact between the public and behind the scenes activities.

The theme of fluid collections was continued by Lisa Palmer (Smithsonian Institution) who discussed the importance the type of storage container and how this may affect fluid quality. A survey of a whole variety of container types was carried out. Overall it was found that there was little difference in glass jars. Most differences appear to relate to container volume, particularly the fluid to specimen ratios. Plastic containers were found to be generally not

suitable for long term storage with ethanol based fluid collections. In general, when compared with glass containers, the fluid pH was lower as was the ethanol concentration and the volume levels. Often the possibility of a reaction between the container and the fluid. It was noted that the greatest variable in this study relates to collection management, and demonstrates the need to set standards and not rely on folklore.

Janet Waddington (Royal Ontario Museum) talked about the problem of a white efflorescence which has been observed on calcitic echinoderm and some bivalve fossils from the Silurian. The fossils are stored in wooden draws of oak or plywood with many variants in finish. In an attempt to find the cause of this efflorescence a modified form of Oddy testing (a method for detecting the effects of corrosive chemicals by monitoring the tarnishing of metal coupons, usually silver, copper and lead) was carried out. This involved hanging metal coupons in the cabinets to see if there was any pattern in the specimens which have been affected. The controls coupons, which were outside the cabinets, showed more corrosion than those in the cabinets, showing a buffering effect from atmospheric pollution. Some of the affected fossil was then clean and placed in sealed jars to carry out an Oddy test, but again no corrosive chemicals were indicated. Temperature and humidity measurements showed that the cabinets were also buffering the fossils from environmental effects. Samples of the efflorescence were then examined under a variety of analytical tools: XRD, FTIR and XRMA. This found gypsum, calcium formate and a whole range of calcium sulphate hydrates. No correlation between the wood type and the efflorescence could be found. Overall no conclusion to the cause of the efflorescence could be found though it is thought possible that the cause could relate to a one off event such as a past period of very high humidity, though attempts to replicate such conditions have yet to produce results.

Staying on the subject of efflorescence, David Von Endt (Smithsonian Institute) revisited Byne's disease, raising some interesting questions. Byne's disease forms on mollusc shells as a result of volatile acids released from wood leaving a white efflorescence on the shells and essentially consists of a calcium formate - acetate complex. The research induced the effect on oyster shells (calcite), cowry (aragonite), and bone (calcium phosphate) at 80°C in the presence of pure formic acetic and formic acids, a 50/50 mixture of each and a 75/25 mixture of each. In addition various materials were tested at 80°C in the absence and presence of water and various levels of oxygen enrichment for their ability to induce Byne's disease: oak; pine; poplar; masonite; paper trays; cork; cotton. By taking air samples from the reaction vessels and using mass spectrometry the chemical changes were examined. It was found that in the dried state the paper trays; cotton; and poplar released very little formic acid, whilst the other materials tested released high concentrations. When water, and oxygen, was added the formic acid produced increased considerably in all cases (oak produced the highest concentrations) except the cotton wool. With acetic acid, very little was produced by the materials either in the dry or wet state, although the addition of oxygen did increase production, though not to the levels that were expected. Overall, only cotton wool did not induce Byne's disease on

the shell material. However in only one case was the calcium formate - acetate double salt found, which was considered to be the main component of Byne's disease. The efflorescence was found to be composed primarily of calcium formate and calcium acetate, and another related but previously undescribed mineral. SEM studies also noticed the presence of micro-organisms on some of the shell samples, which may suggest another mechanism for the formation of the efflorescence.

The conference finished with a series of talks related to computers and the utilising of databases which essentially consisted of people showing their various systems.

The morning of the second day also saw an amusing 'interlude' billed as 'Video presentation: A different kind of science and conservation at the academy'. In the first clip the video shows the catching of a new species in Yellowstone National Park - a "Barney". The next clip showed Earle Spamer and Ned Gilmore of the Academy looking very serious and sitting in immaculate lab coats being interviewed on the Canadian 'Discovery' Channel about the discovery of this new species, "Barney" (-a cuddly purple dinosaur) and how they tracked its movement to a shopping mall by following press reports! How a straight face was kept whilst being interviewed.....

Overall a good conference which was worth attending, even if it meant having to check out numerous American bars and late night diners!

Julian Carter

Conservation Officer, Zoology Dept

National Museum and Gallery of Wales

Cathays Park, Cardiff, CF1 3NP

Report on the Second World Congress on the Care and Preservation of Natural History Collections, University of Cambridge, 20-24 August 1996.

Delegates to the Congress began to arrive on Tuesday afternoon and evening with lectures commencing first thing on Wednesday morning and running until Saturday. Lectures throughout the conference were held in a large lecture theatre close to the Zoology Museum, while poster sessions, tea breaks, workshops and lunches were on the other side of the road in the Department of Earth Sciences.

A small but very useful trade fair was available throughout the meeting. The number and quality of the posters presented was impressive, sensibly poster authors were asked to indicate times that they would be available to discuss their posters during tea & lunch breaks. This area was an important opportunity to meet other delegates and start conversations that were continued later in the pubs, where many of the more fascinating interactions took place.

Approximately 280 delegates from around the world were registered and while the Natural History Museum was well represented there were only a relatively small proportion of delegates from UK local authority museums.

The Keynote Address entitled *Natural History in the 21st century* was by Professor Nicolai Vorontsov of the Russian Academy of Sciences. Professor Vorontsov argued that natural history should be studied because it is an inherently interesting subject and thus worthy of study. However the perceptions of biology by the public and politicians gave it low priority compared to other subjects.

Possibly as a result of this low regard there is a shortage of biologists, particularly taxonomists. Professor Vorontsov said that not only does biodiversity need to be studied and protected but the specialists that study it need protecting too. It is up to the scientific community to change the perceptions of politicians and business people and convince them that natural heritage is as valuable than cultural heritage.

Professor Vorontsov pointed out that we are only 7 generations removed from Linnaeus yet the advances made in biology are enormous. As an example he gave an overview of biological discoveries this century, among them immunogenetics, a synthetic theory of evolution, a change of the species concept, numerical taxonomy. The past few decades have seen the invention of new techniques such as electrophoresis, electron microscopy.

Prof Vorontsov summed up that despite all these advances the discovery and description of new species is limited by the number of personnel available. On a global scale resources are stretched. It has been estimated for example that in rainforests approximately 90% of the species have been undescribed when the forest was destroyed.

The morning sessions continued with three lectures on perceptions and attitudes towards natural history.

Dr Jack Horner gave an entertaining talk which raised a number of questions about the purpose and use of collections. In mentioning the film *Jurassic Park*, he pointed out that the computer generated dinosaurs looked, moved and behaved in the film as a direct result of the latest research being carried out on museum collections. He posed the question: "Do models, reconstructions and computer generated images or information count as data?"

Dr Horner's talk showed that as theories, techniques and technology advanced existing collections need to be re-examined, many new discoveries have been made from existing collections. However he stressed the importance of proper field collection of specimens and associated data in the first place.

Dr Horner discussed the importance of making collections available for study by specialists, pointing out that if the collections were not used there was not much point to collecting them in the first place. Each generation of scientists finds new techniques which not only lead to brand new discoveries but may allow reinterpretation of old ones. However certain study techniques are destructive and it may have to be accepted that in order to answer some questions some specimens may be destroyed. The dilemma is that if collections are not worked on they are useless, yet should curators allow a destructive technique to be used?

Dr Richard Leakey noted that the people to whom he should be talking such as politicians and businessmen were not at the conference, he was already talking to the converted. He stated that as his career changed from curator

to head of a government department to politician, his own viewpoint has changed. He now found himself on the other side of the same argument he had as a curator: "Why are museums and collections important?"

Dr Leakey explained the situation in some developing countries where it is difficult to justify support for museums when the countries themselves are so poor and marginalised. He pointed out that the status of curators is low and even if well qualified earn a lot less than the national average. There is the genuine problem of a brain drain to more developed countries. Some radical decisions may have to be made, for example, a museum often founded by a colonial power may now be in the middle of a city on a valuable piece of land. Should the land be sold and the money used to move the museum and pay a living wages to the curators?

Collections and museums should be balanced with the interests of local populations. In Africa for example, local people can see their country's fauna in the wild, they often wanted to see exotic non-native animals.

Tim Radford (*The Guardian*) suggested that journalists and scientists have something in common, they both ask questions. He observed that the value, meaning and significance of objects changes over time. He made the point that when dealing with the press, museum curators in the UK can use the public and media perception of them as being the voice of authority, quoting a curator lends an air of truth! He finished by saying that it is up to curators to promote themselves and their collections, if information is not shared then it cannot be valued and if the public does not value a museum it is effectively dead.

Sir Robert May (Chief Scientific Officer, Office of Science and Technology) spoke about the present Government having a concern for the stewardship of the environment. It supports science for improving the quality of life and its use to create wealth for the country (or at least to avoid costs to the country). The government input to natural history collections is concentrating on taxonomy and systematics research which is based on collections in natural history museums. In world terms the balance of resources is wrong, with the majority of work to be done in the third world where there are fewer trained people or resources to tackle the problem. Sir Robert also noted that in case we get complacent in the UK, the rate of destruction of SSSI's is equivalent to the rate of rain forest destruction.

Dr John Nudds (Manchester Museum) gave an overview of the Manchester meeting on the value and valuation of natural history collections. The published proceedings will be available shortly.

Dr Meredith Lane (US National Science Foundation) & Dr John Busby (World Conservation Monitoring Centre) considered some of the issues involved in establishing international databases. How museums tend to go their own way in developing a system and it is then difficult to exchange data. The potential opportunities are that information will be globally available via the Internet. Collections data will become a very valuable resource in the future.

Martin Jakobowski and Richard Herrington (both NHM) described the relevance of museum collections to industry

(eg. microfossils to the oil industry). For example, as the number of micropalaeontologists in the oil industry has fallen dramatically there has been rising concern that micropalaeontological collections held by oil companies are at risk and likely to be disposed of. Some notable examples were given, eg. BP collection of 60,000 slides of foraminifera and ostracods etc. Jakobowski considered why a museum might consider acquiring such a collection : to enhance the existing collections; for public relations reasons; to generate income (with future inquiries from the industry); to help raise public awareness and because of the materials relevance to science. One point he raised was that if you are going to accept a collection you should try to get funding or sponsorship for its up-keep as part of the deal.

The discussion that followed concentrated on the ethics of taking collections from industry and trying to attract funding at the same time. Some thought this unrealistic as most collections were being disposed of because of financial constraint, loss of staff or storage space etc., and so it would be most unlikely that financial support would be forthcoming. The added danger was that if proper disposal was thought to be likely to incur costs, such collections would just be quietly got rid of. Some delegates saw the possible danger of a shift in emphasis of work towards income-generating.

Dr Des Griffin (Australian Museum) pointed out that nature conservation is as much about people as wildlife. He posed a question - "Do we do what we can now or do we wait until we have a full record of biodiversity first ?" Whilst all species are not known and all habitats are not fully explored, museums can make an extremely significant contribution to the understanding and preservation of global biodiversity. He made reference to the need for museums to get involved in politics and raising our public profile by forging better links with NGOs and the environment movement.

He then went on to discuss repatriation of material and/or data in this context.

Rob Waller (Canadian Museum of Nature) & Tom Strang (CCI) both spoke about the need for training in natural sciences and outlined some of the pitfalls and problems that can occur - largely due to misunderstandings and lack of training in conservation. Rob Waller and his colleagues at the Canadian Museum of Nature have just published *Developing Staff Resources for Managing Collections*.

Friday's presentations were given by curators from a number of developing countries, who gave detailed case studies of how their collections were being developed and used.

For example in Mexico they used the collections to establish which species of indigenous tree to plant in a recently deforested area. (Perhaps someone should tell the Forestry Commission !)

IT Workshops

Angela Spinezze of Willoughby Associates *The future of databases* Willoughby Associates were awarded the contract to develop the LASSI project using their Multi Mimsy system on the Oracle database. She suggested that new

developments in databases will change the way that information will be stored and accessed. Dr Spinezze described Oracle which is an open system which can be used on the Internet as well as a stand-alone PC. Oracle can incorporate standards such as SPECTRUM.

Surveys showed that the largest user group on the Internet have educational occupations and that these users are likely to be interested in museum information. At present information is just stored, but in future information will be managed.

Other programmes such as Geographic Information Systems (GIS) and visual reproductions would increase the range of the audience.

More powerful searching tools and artificial intelligence would allow a wider range of searches, such as thematic and automatic abstracting.

The Jason Project - Phil Phillips (National Museum on Mersyside).

The Jason project was developed in the USA by Dr Bob Ballard to allow schoolchildren direct access to field scientists during an expedition or example for, children can control the direction of a remote submersible. Live pictures were transmitted from the site and children could talk to the scientists involved ; Liverpool Museum was one of the few British institutions to take part.

Charles Copp demonstrated two databases developed for geological information. GD2 on Advanced Revelation and the Inter Agency Earth Sciences Database. He demonstrated the difficulties with GD2. The programme is very specialised and not very adaptable as it has a complicated programming language. It is difficult to interrogate, like similar programmes it may be difficult to access or exchange data with other programmes.

The Inter Agency Earth Sciences Database uses a more widely commercially available programme Paradox. The idea is that core information is kept as a number of data tables. For network use this is kept on a fileserver and different users interrogate the data.

The Internet Cafe was lacking in any advisors to show on how to get the best use of the Internet and it was left to delegates to find their own way about.

The first day workshops were really just demonstrations and there was little time to participate.

CONSERVATION WORKSHOPS

As an organiser and participant in one of the workshops, Kate Andrew was only able to *Meet the UK Natural Sciences Conservation Community*. This workshop was intended as a forum for demonstrators from a representative selection of natural science conservation disciplines to work on specimens and demonstrate current thinking and discuss problems. Members of the Natural Sciences Conservation Group were on hand talk to participants to share problems and possible solutions. The range of projects on show and the effort which those taking part had put into preparing material was impressive. Present were Kate Andrew (geological mounting and packing); Paul Brown (microscope slides); Caroline Buttler (large mineral storage boxes); Caroline Cotgrove and Donna Hughes (herbarium

conservation); Simon Moore (freeze drying fat); Vicky Purewal (wax plant model conservation); Maggie Reilly (fluid collections); Simon Trodd (Corex boxes for taxidermy mounts); and the staff of DeMontford University, Lincoln College with a demonstration of work being undertaken on natural history specimens on their conservation degree course.

May Cassar opened the Building Environmental Control Strategies for Housing Natural History Collections Workshop and then introduced Dr Tadj Oreszczyn (UCL) who discussed the recently relaxed approach there is to temperature and relative humidity (rH) limits. There was some discussion of ventilation and using carbon dioxide sensors to control ventilation. This was felt to be particularly appropriate for galleries where there is a need for increased ventilation tied to an increase in the number of people. It was pointed out that air conditioning works by controlling temperature before rH, the latest ideas including a broader band of tolerance for rH and more relaxed temperatures, primarily for human comfort, were discussed. The workshop then went on to consider the use of more integrated designs to take into account using ventilation and heating systems to control rH (with a humidistat rather than a thermostat). One delegate mentioned keeping a close eye on the legal requirements for working spaces. Lawrence Butt (Norman Foster Associates) then described the complexities of the new system in the Earth Galleries at the Natural History Museum, which uses a combination of temperature control (heating/cooling) together with automatically controlled ventilation.

Andrew Culver (Collections Care Forum) lead the Assessment and Surveys of collection condition : Why, When and How ? Workshop. He managed to cram a great deal into the two hours starting from the basic premise of why you would want to do a survey in the first place. Sample reasons were : to determine the need to improve conditions; prioritize specimens needing conservation or for monitoring changes. Caroline Buttler & Vicky Purewal (both from Cardiff) and Rob Huxley (NHM) all talked about surveys they had been involved in and demonstrated how to tailor a survey design to your specific needs. The workshop then went on to demonstrate how one might go about carrying out a survey.

A useful workshop with participation from all the delegates. This was about the only chance to hear other delegates experiences and gave an interesting view on making priorities when for some delegates this meant rescuing collections during warfare or terrorist attacks! It makes holes in the roof look fairly minor in comparison.

Dr William Vartorella gave a lecture and ran a workshop on Fundraising, in which he claimed never to have paid for a plane ticket, a photocopier or a new computer. Apparently it's as easy as looking in the Sunday colour supplements and targeting companies that use wildlife pictures for their ads. ! It might well be if you can talk like Mr Vartorella ! There is a copy of his handout in the BCG Archives should anyone be interested.

Saturday morning saw the last few stalwarts back in the lecture theatre at 9am. After an opening comment by Rob Huxley (NHM) about what has been happening since the

Madrid resolutions were made, namely that a working party has been deciding possible ways forward for the WCCR - the meeting was throw open to the floor. After much debate it was decided that a small task force chaired and chosen jointly by Des Griffin and Dr J Mutangah, the Director of the Kenyan Museum Service, should decide about the next moves. These being to evaluate the Madrid Resolutions and identify how to implement them.

Incidentally, the Director of the Kenyan Museum Service has offered to host the next Congress !

The packed daily programme from 9am to around 6pm meant that evening events were the best opportunity to meet other delegates and to chat. The first two evenings there were drinks parties, the first held in the impressive Great Hall of St John's College with its painted ceiling. The second was in the upper galleries of the Fitzwilliam Museum. The following night, Thursday, an evening of Elizabethan Dance brought a team of dancers dressed in sumptuous replicas of Elizabethan costume to the Great Hall in St. John's to entertain a somewhat bemused audience to three "sets" of dances performed to taped music with a quick break to down a glass of wine in between ! Whilst a substantial portion of the audience seemed to subscribe to the "men-in-tights" school of dance appreciation, a fair number took part in the first of the audience participation dances and found counting three steps forward, one back and two sideways not quite as straightforward as it might have seemed, before most of the remaining delegates joined in an Elizabethan conga.

The final social event of the conference the Banquet, was outside most of our price ranges, but our sources tell us that it was a sumptuous affair, with over tones of "wafer-thin mints" !

Most delegates stayed in St. John's College with a small, but select BCG contingent further up the road at New Hall. We all found the rooms, excellent catering, conference car park and helpful college staff were up to hotel standards.

The organisation of this event was impressive, the technical staff of the Department of Earth Sciences were on hand at all times, serving lunch and drinks, operating projectors and microphones, directing delegates and solving problems. The conference administrator and organiser were also on hand all week and made what must have been a tremendous undertaking, look moderately effortless. Although Chris Collins seemed to have shorter hair than previously, he didn't look quite as stressed as his counterpart at the First World Congress in Madrid !

It became apparent through the course of the meeting that it was concentrating on the scientific use of collections, in particularly systematics and biodiversity. Most of the papers were concerned with the contents and research use of collections. The approach was more curatorial and there were few papers on practical collections conservation. Overall the talks seemed aimed at the national museum and academic level. There were no speakers from local authority museums to explain their point of view; although we suspect that museums in many countries have similar problems to UK local authority museums, research is probably the last thing many local authority curators have a remit for. In fact a major problem is basic collection management and care,

particularly where collections do not have natural history curators, this was not touched on by the congress.

Sir Robert May for example spoke only about funding for taxonomic and ecological research, not the more mundane but equally important problems of storage and documentation.

For all the enthusiasm about global information exchanges a number of points were overlooked; in taxonomy it is still necessary to examine specimens and original documents, although computers may help to locate specimens and may possibly shorten search times. Condensing information for data entry may omit valuable data. Paper records often have annotations and may be used to verify identities of researchers etc., in the rush to computerise we should not undervalue written records.

Several speakers talked about management of information which seemed slightly worrying. The reality is that information is a valuable commodity and there was little explanation of how this would be dealt with.

The number of talks and nine o'clock start made for long and tiring days. The most valuable part of the meeting were the workshops, where the delegates could actually discuss their different problems and approaches to solutions. The major disappointment for us all was scheduling clashes meant that we were all only able to attend one conservation workshop, when they were all so relevant. For example on the second day a chance to meet UK natural sciences conservators, (a room which should have been open throughout the whole congress) was timetabled against workshops running at the same time. In future we suggest that workshops and discussion groups occupy a more prominent part of the proceedings.

It would seem nothing much has changed since Paul Richards' review of the Madrid Meeting (Newsletter Feb. 1993, Vol.10, No.1) !

The attendance of the authors at this Congress was possible as the result of each of us receiving a £100 bursary from the Biology Curators' Group for which we are very grateful.

| | |
|------------------|---------------------------------------|
| Kate Andrew | Shropshire County Museum Service |
| David Lampard | Ipswich Museum |
| Clare Valentine | The Natural History Museum, London |
| Tony Walentowicz | Chelmsford Museums Service |

WORLDWIDE WEB SITES

Please send in any favourite sites, useful sites or just plain funny sites of interest to natural science curators.

Chris Collins tells me that there is an on-line Newsletter set up as a result of the Cambridge World Congress of 1996. To request inclusion on the mailing list send an e-mail to WCCR-request@esc.cam.ac.uk

Ingrid Birker at the Redpath Museum, McGill University, Montreal, Canada sends details of their Homepage on <http://www.mcgill.ca/redpath>

The Natural History Museum home page is on <http://www.nhm.ac.uk/index.html> This should contain information on the UK Systematics Forum too.

Manchester Museum has range of pages available. Collections information on line is present for parts of the Invertebrate Zoology, Minerals and Vertebrate Zoology collections. The home page is on <http://www.mcc.ac.uk/museum/> but turn off your "auto load images" setting first, because the home page is rather heavy on slow images!

The most exciting recent development from a local authority museum is from Hampshire County Museums Service. Their pages are part of a big Hampshire site covering many of the County Council's functions. The Museum Services pages are extremely extensive, and contain detailed collection catalogue information. The botany catalogue contains a list of vascular plant species, with the lowest level giving quite detailed catalogue entries. The search facility is excellent, but try to use more than the one word, because 'adder' brings up ladder and bladder too! Do have a look at this excellent information resource at <http://www.hants.gov.uk/museums/index.html>

Steve Garland

Book Review

Rose, Carolyn L., Hawks, Catharine A. and Geonways, Hugh H. (editors). 1995. *Storage of Natural History Collections: a Preventative Conservation Approach*. Society for the Preservation of Natural History Collections, 448 pp. Price \$36.00.

(This is a complementary volume to *Storage of Natural History Collections: Ideas and Practical Solutions* (Rose and de Torres, 1992)).

Contents

This new monograph claims to provide the basic information required to select storage approaches that are appropriate in a particular set of circumstances, and to make informed judgements about all aspects of collection environments.

It is presented in 5 sections together with a glossary and comprehensive (17 page) index. The following description of contents is drawn largely from the Preface to the book.

Section 1 'Creating and Managing Storage Facilities' explores the factors that cause deterioration and threaten collections, and the assessment of those risks. Methods of creating a protective and secure building for housing collections, as well as maintenance policies and procedures to retain its protective qualities, are then discussed in detail. Topics include: facilities management, architectural design concerns, and approaches to security, fire protection and emergency preparedness.

Section 2. 'Creating and Monitoring Storage Environments' focuses on the localised environment of storage facilities. This section presents methods to estimate storage space needs, to choose among the macro- and micro-

environmental options, and to select environmental control systems. This section also explores the specialised environments that prevail in cold storage, low-oxygen storage, and especially in the fluid environment of wet collections. Monitoring methods to enable staff to understand existing collections environments and to evaluate new environments in terms of temperature, relative humidity, air quality, pest control, or human health and safety are also covered.

Section 3 'Selecting and Testing Storage Equipment and Materials' discusses the materials that form the immediate environment surrounding specimens and objects. It explores the compositions and properties of storage equipment, and other housing materials. Topics covered include the materials science of cellulosic materials, including wood and plastic products, of plastics, and the identification and testing of storage components.

Section 4 'Storing Archival Collections and Collection Documentation' discusses issues that have an impact on the long term preservation of a variety of collections documentation media. In addition to photographic materials and paper-based library and archival holdings, the care of modern media such as videotapes and compact disks is also discussed.

Section 5 'Funding for Collections Care' looks at funding strategies that have been successful.

Assessment

The publication of a new monograph relating to natural history collections is always a cause for celebration. This exhaustive and carefully researched book, with extensive references, useful glossary and excellent index provides a thoughtful and practical approach to a subject which has, until recently, received scant attention.

The main reservation of this reviewer concerns the merits of attempting to cover all matters relating to storage in a single volume. Some chapters (e.g. those dealing with architectural considerations, security etc.) deal with general museological concerns which are already the subject of an extensive literature. In practice, a curator embarking on a new storage project would be wise to consult this literature rather than rely on the condensed version in this volume.

The question also arises as to whether it might have been preferable to produce a combined volume on storage *and handling*. Many writers have adopted this approach as there are some areas where the two are inextricably linked. However, this would have produced an even more unwieldy

volume. (In fact handling is dealt with in some chapters ('Paper Documents') but not in others).

Some chapters are particularly valuable in that they deal with topics specific to natural history collections which have not been covered adequately elsewhere. Such topics include 'Storage in Standard and Ultra-Cold Freezers: Living Biological Specimens', and 'Storage in Fluid Preservatives', both of which are excellent and sharply focussed. (The latter chapter duplicates much of the material in *Manual of Natural History Curatorship* which was apparently not available to the authors). The inclusion of case studies (e.g. Pest monitoring) is useful as it allows the reader to compare theory and practice.

There are some minor inconsistencies and omissions. For example, whilst in some places the special needs of natural history collections are considered in some detail, (e.g. 'Wet Collections' in the Chapter on Fire Protection), in large sections of Section 1, no mention is made of the special needs of natural history collections. In the 'Health and Safety' section of the Chapter on 'Architectural and Design Considerations' it might have been appropriate to discuss the specific building and design needs for processing natural history collections (e.g. pathological specimens which might be carrying dangerous pathogens; material which might have been treated with highly poisonous pesticides). In 'Storage Equipment' a discussion on the suitability of compactor storage units of different types of natural history collections would have been useful.

UK readers should note that references tend to be heavily weighted to North American literature, and that organisations referred to (funding bodies, sources of information, specialist suppliers) are, without exception North American. However, all in all, it must be said that this is a carefully prepared and very useful monograph, and one which any natural history curator embarking on a storage project should consult. It is available for \$36 from SPNC Treasurer, 121 Trowbridge Hall, University of Iowa, Iowa City, Iowa 52242-1379, USA and may be purchased with *Storage of Natural History Collections: Ideas and Practical Solutions*, for \$70. Optional air mail \$10 per volume, \$20 for the set.

Geoff Stansfield

September 1996

Auk Egg Search

All but one Great Auk egg in this country has been traced by the author of a book on their history.

The un-located one was known to have been sold by Spinks Auctioneers between 1975 and 1980.

If anyone knows where this egg is please contact: Errol Fuller, Oxenhoath, Hadlow, Kent, TN11 9FS or 'phone 01732 810615.

CURATOR

Natural History Museum

Department of Botany

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The closing date for applications is 22 November 1996.

The Natural History Museum is working towards Equal Opportunities.

Dr Rob Huxley

Head of Curation Division

Department of Botany

The Natural History Museum, Cromwell Road, London SW7 5BD, UK

Phone (44) 171-938-8823

Fax (44) 171-938-9260

E-mail: r.huxley@nhm.ac.uk

Museum Home Page URL: <http://www.nhm.ac.uk>

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E-Mail: bolmg@gn.apc.org. (If possible please send on disc using Word for Windows or ASCII-file with hard copy).

Copy Dates: 8th January, 8th May and 8th September

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Secretary: Steve Thompson Tel: 01724 843533

Treasurer/Membership Secretary: Kathie Way Tel: 0171 938 8892

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