

The Biology Curator

The Publication of the Biology Curator's Group

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Diary Dates

BCG Annual conference & A.G.M.

This year's AGM will be a joint meeting with NSCG and is confirmed for the 18 - 19th April 2001 at Oxford University Museum. The conference will address on Collecting and the Future of Collecting. This will cover acquisitions, disposals, ethical issues, and end up with a session looking at the future of collecting.

Digital Learning - Biology Collections & New Technologies

Department of Museum Studies, Leicester University
Date: Tuesday 30th January 2001

IT usage has moved way beyond simply using computers for documentation purposes. Digital technologies are re-shaping how we use, interact with and display biological collections. They offer new ways of communicating and affording access to the huge resource and potential contained within our collections. This meeting aims to explore some of the many ways digital technologies are being used and look at the potential for providing access, information and new ways of using and interpretation.

We are aiming for talks in the morning and first part of the afternoon followed by an informal market place type thing with various applications, web sites etc. up and running in the afternoon. Speakers thus far include:

Ross Parry (Lecturer in New Technologies, Dept Museum Studies) - Museums and the New Technologies

David Dawson (Re:source) - New Opportunities
Adrian Norris and *Maggie Pedley* (Leeds Museum Service) - Products, Problems, Pictures & Priorities
Using computers to support Natural History Collections in Leeds Museums & Galleries

Nick Gordon (Leicester City Museums/ BCG Documentation Cell) - Biology Term lists Project
Malcolm Scoble (NHM) - ENHSIN: Remote access to NH databases across Europe

Keith Bloor (Stoke Museums) - The Virtual Store, NH Collections at Stoke Museums

John Hopwood (Education City) - Virtual Reality and Virtual Galleries
Haley Sharpe Associates (speaker TBC) - Use of IT in Exhibitions and Displays

Contact: Nick Gordon, Curator (Natural Sciences)
New Walk Museum, Leicester LE1 7EA
Phone: 0116 2554100
Direct Line: 0116 2473030
Fax: 0116 2473084

SPNHC Conferences

SPNHC 2001 Meeting - 'Living Collections'

California Academy of Sciences, San Francisco
Dates: 21-26th June 2001

For more information contact:

Jean Demouthe, California Academy of Sciences,
Golden Gate Park, San Francisco, California 94118
e-mail: jdemouthe@calacademy.org
phone: 415-750-7094 fax: 415-750-7090

SPNH 2002 Meeting - 'Hazardous Collections and Mitigations'

Redpath Museum, McGill University, Montreal
Dates: 8 - 13th May 2002

For more information contact:

Ingrid Birker, Redpath Museum, McGill University
859 Sherbrooke Street West, Montreal, PQ,
Canada, H3A 2K6

Backyard Biodiversity Day

Dates: 21st-24th June 2001

Backyard Biodiversity Day is a national event to celebrate the existing diversity of British fauna and flora. Aimed particularly at children aged 9-12 years, their teachers and families, the event seeks to excite interest in the natural world by encouraging people to spend just 15 minutes seeking out and observing wild species, no matter how humble, and to record them in an appropriate way and share their discoveries with others.

The event is organised by Action for Biology in Education (ABE) - a charity that promotes biology at all levels of education - working in partnership with the Chelsea Physic Garden, and will be publicised to schools and conservation bodies. A booklet of suggested activities and giving background and practical information is available. Training sessions are arranged in some areas for teachers.

Biology curators are invited to participate in various ways, sharing their expertise and the biodiversity of their collections to educate children, teachers and parents.

For your suggestions and more information contact:
Virginia Purchon, ABE Hon. Secretary,
54 Gondar Gardens, London NW6 1HG.
Tel: 020 7813 3652 Fax: 020 7794 8693
Email: abe@gondar.co.uk
Website: www.biodiversityday.org

BCG Committee Secretary's Report

BCG committee has been reviewing the constitution, and has made changes, which now need to be approved and ratified by the membership. The current constitution and the proposed new constitution are printed here to give the membership the opportunity to examine them before the AGM. The purpose of these changes is to try and remove some inconsistencies and to make sure that the constitution reflects the way in which the group actually operates.

Also printed here are the minutes of the last AGM. It is hoped that you will read these before attending the AGM, so that the business of the AGM can be conducted as correctly and efficiently as possible.

The notice for the 2001 AGM and an agenda will be circulated following the next committee meeting, probably in the next issue of *The Biology Curator*, if that issue is printed sufficiently far in advance.

Minutes of the BCG AGM 2000

Monday 3rd April 2000, Scarborough Spa Conference Centre

1. Apologies for absence: No apologies were made.
2. Minutes of the last AGM:
Minutes for the 1999 AGM held at the Powell Cotton Museum were not available for presentation and the Secretary offered his apologies for this situation. Since it was pointed out that minutes are not officially required under the Group's constitution, it was suggested that the meeting should proceed without them on this occasion - proposed by Julian Carter, seconded by Steve Hewitt.
3. Matters arising: There were no matters arising.
4. Chairman's report:
I am pleased to report that we have had another good year with membership holding up well and with a good programme of events including a very successful visit to Leiden and an excellent Molluscs meeting at Oxford University Museum, culminating in this joint conference with the Geology Curator's Group and Natural Sciences Conservation Group. I sincerely hope that this will reinforce our recent trend of widening our influence through close contact with other organisations, particularly GCG and NSCG. We are also currently working towards closer links with SPNHC (The Society for Preservation of Natural History Collections), the Care of Collections Forum and the Guild of Taxidermists. We also now have a

formal link with the UK Systematics Forum through Howard Mendel who will attend meetings of their Entomology Management Group on our behalf, while another of our members, Steve Garland, is now a member of the MA Council.

Your committee has been busy again this year, although increased pressures at work have meant that many of us have been unable to do as much as we would have liked - I certainly count myself amongst them. However I would like to offer particular thanks to Kathie Way for keeping our finances in good shape and for organising a memorable visit to the Netherlands, to Steve Thompson for his sterling work as Secretary and especially to our new meetings organiser, Nick Gordon, who has not only master-minded this conference and the Molluscs meeting but has also taken over responsibility for the documentation cell. Jo Hatton, has performed the unenviable task of minutes secretary with great efficiency and has also provided us with the venue for one of our committee meetings and has been working on some new publicity material for BCG. Howard Mendel has been monitoring Biological recording matters, particularly the development of Recorder 2000 and the funding of Biological Record Centres. Unfortunately, two committee members have resigned during the year - Shona Allan and John Harrison. We would like to thank Shona, for representing Scottish members so well - she has been one of best attendees at committee meetings, despite the long journeys. Thanks also to John for his services to committee, particularly in connection with last year's AGM at the Powell-Cotton Museum.

Special thanks should also go Pat Francis and Kath Berry for all their work in producing the *Biology Curator*. I am sure that you will have noticed how slim recent issues have been and this has nothing to do with their excellent efforts - I am afraid it is simply because we are not receiving enough contributions. The current *Biology Curator* had to be delayed for a few weeks before we could gather enough copy for an issue. However, with Nick Gordon's help, we are hoping to produce a series of 'themed' issues, linked to particular meetings, with write-ups of relevant talks, demonstrations and seminars. We also hope to produce a special 'legal' edition based on updated versions of talks given at the 'Legal Eagles' meeting in Edinburgh in 1998 - Steve Thompson is still beavering away on this. What we do need to revitalise the *Biology Curator* is to find a managing editor that can work alongside our excellent production team of Pat and Kath.

So, what of the year ahead? The next planned event will be a day visit to Kew - a new departure from our usual events - perhaps it is time that we visited more collections near to home. Later in the year, we hope to make our annual pilgrimage to the continent, this time

with a visit to the Natural History Museum at Budapest. We also plan to be represented at the MA conference in Jersey in October, although we will not be organising a session there due to travel costs. Unfortunately, this will be the second year running that we have not run an MA session so we will make a point of doing so in 2001 - unless the venue is even more difficult!

I would end with a final plea for more input from our members. I know that you are all rushed off your feet but we do need your individual support. If you feel that you have something to offer to the group, please do not hesitate to contact a committee member - or even volunteer to join the committee - there is plenty to do.

5. Secretary's report:

BCG committee have held three meetings since the last AGM, in May, September and January. While we have not yet achieved my aim of getting every committee member to the same meeting, attendance has been very good, despite the fact that some members have necessarily to make long journeys. I feel sure that this commitment will continue throughout the coming year.

We are currently working on producing a range of publicity material, including leaflets, a poster and display stands. We hope to have this ready for the autumn. If possible, and if we decide to attend, it would be good to have this ready for the MA conference, at which we intend to have a stand. With the conference being in Jersey, attendance becomes problematic because of the cost of travelling and accommodation.

We continue to monitor collections, though at present there are not too many that have come to our attention, the principal ones being those at Ipswich and Norwich. It would be nice to think that this was a true reflection of the situation at present. However, we suspect that there are many cases out there that we are not yet aware of. If any of our members know of situations that they feel we should be aware of, please let us know.

We have held the usual set of meetings this last year and they have met with what has now become our customary success. Leiden was fully booked and the Mollusca meeting in Oxford was full to overflowing. Not content with that, it is great to see so many people at this meeting, our best attended ever. Nevertheless, we feel we can do better yet and hopefully next years meetings will be better than those so far. These are to include a study trip a little closer to home, looking at the Botanic Gardens at Kew, in which considerable interest has already been expressed. We also intend to take our now annual study trip abroad to Budapest, and plans for this are developing. Next year we hope to go

further yet, with a trip to the US, but travel arrangements for that cannot be made yet, so watch this space.

On the subject of meetings, we hope to be able to print papers from the meetings quickly after the meetings. To this end we are encouraging speakers to bring copies of their papers with them, so that they can be passed directly to the editors. You will have seen that recent issues of The Biology Curator have been thin, and the current one is late. This is in no part due to the editors themselves, who have done an excellent job, but down to the fact that the material has not been coming in. There seems to be a reasonable amount in the wings, but do try and come up with material for the newsletter.

We hope that we have been doing a decent job of managing the affairs of the group. If you have any comments or suggestions that you feel the committee ought to be aware of, please speak to one of the committee members. Thank you.

6. Treasurers report:

The Treasurer presented the accounts and explained the deficit in the Leiden visit account. This was due to subsidy of rail fares from Amsterdam to Leiden in order to keep the cost of the trip close to 250 pounds. Membership fees will remain at £8 for the time being. It was noted that if The Biology Curator were to get larger (which we sincerely hope it will) most of the groups savings would be used up in printing costs. However, we are happy to keep the subscription to £8 per annum for the time being. KMW also noted that she was still wasting a lot of time chasing people for cheques, she urged people to pay their subscriptions promptly at the start of the year.

7. Event Organisers report:

This is a new post taken on by Nick Gordon, who takes responsibility for finding venues and speakers and ensuring the smooth running of all our meetings, (no small task). NG informed members that we are hoping to hold a meeting on documentation sometime in January/February 2001. As well as suggestions for speakers at our meetings, the main problem seems to be locating venues large enough to accommodate us. Nick made an appeal for likely venues, he pointed out that persons hosting events would have very little to do, book a room with lecture facilities, sort out the food and he will do the rest.

8. Review of Constitution: discussion

ST pointed out that the constitution was now 5 years old and is due for review. It was agreed to either publish the group's constitution again in a forthcoming TBC or send copies to members as individual handouts for suggestions and feedback. Any proposals can then be fully discussed and voted on at next year's AGM.

9. Election of Officers:

Lyndsey Loughtman from Manchester Museum, who was co-opted by the committee during the year, was duly elected by committee nomination. No other nominations had been received.

10. Any other business:

Websites: ST informed the membership that a BCG website was currently under construction. Any members knowing of or wishing to place links to the website to let ST know.

11. Date & Venue of the next AGM:

This had not been decided at time of meeting, offers of venues from the membership were requested.
(Oxford - see page 2.- Ed.)

BIOLOGY CURATORS GROUP

Existing constitution

1. The name of the group shall be the Biology Curators Group.

2. The aims of the group will be:-

to promote the exchange of information between individuals or institutions concerning the management of biological collections and records, their research, conservation and interpretation;

to present the views of curators of biological collections;

to publish a journal on biology curation on a regular basis.

3. There shall be the following membership categories:-

Individual membership, open to any individual interested in the aims of the group;

Institutional membership, open to any institution interested in the aims of the group;

Honorary membership, for which individuals may be recommended by the committee and approved by an annual general meeting.

Individual and institutional memberships will be granted on application to the committee.

4. Rights of members

4.1. Individual members shall be eligible to:-

attend and vote at all meetings;

receive one copy of each edition of the journal;

stand for election to the committee.

4.2. Institutional members shall be eligible to:-

nominate one person who shall have the right to attend all meetings of the group;

receive one copy of each edition of the newsletter.

4.3. Honorary members shall have the same rights as individual members.

5. Committee.

5.1. The management of the group shall be vested in a committee consisting of the officers and nine committee members.

5.2. The officers of the group shall be the Chairman, Secretary, Treasurer, Membership Secretary and Editor. Any officer may fill more than one of these posts if the committee agrees that it is in the best interests of the group.

5.3. The officers of the group shall be elected at the annual general meeting. They shall serve for three years but will be eligible for re-election to that post at the end of that time.

5.4. Committee members shall be elected at the annual general meeting. They shall serve for three years and shall be eligible for re-election only if there are insufficient nominations to fill the committee posts that would then be vacant. Otherwise they shall be eligible for re-election after one year.

5.5. Nominations for officers and committee members must be supported by two members of the group. Nominations must be received, in writing, by the secretary at least two weeks before the annual general meeting.

5.6. When more than one nomination is received for any officer's post, the election shall be decided by a majority vote at the annual general meeting.

5.7. If more nominations for committee member's posts are received than there are vacant posts, then candidates will be elected in order of the greatest number of votes at the annual general meeting.

5.8. The committee shall have the power to co-opt.

5.9. The quorum of the committee shall be 4 members, or $\frac{1}{3}$ of the committee, whichever is the greater, one of whom should be an officer.

6 Financial management

6.1. An annual subscription, the rate to be decided at the annual general meeting, shall be levied on all members.

6.2. A bank account shall be maintained by the Treasurer on behalf of the group.

6.3. The committee shall nominate those of its members authorised to sign cheques. Two signatures shall be required for each cheque, one of whom shall be the treasurer.

6.4. No officer or member of the group shall be appointed to a salaried office of the group, receive any benefit in money or money's worth or be interested in the supply of goods or services at the cost of the group.

6.5. An annual statement of the accounts of the group shall be presented to the annual general meeting.

7. Annual general meetings.

7.1. An annual general meeting shall be held in each calendar year.

7.2. Resolutions to be put to the annual general meeting must be submitted in writing to the secretary, to arrive at least four weeks before the meeting.

7.3. An agenda for the annual general meeting shall be circulated to all the members, to be received at least two weeks before the meeting.

7.4. Resolutions to be put to the annual general meeting must have the written support of at least two members of the group.

7.5. Resolutions put to the annual general meeting shall be decided by a single majority vote of the meeting.

7.6. 20 members of the group shall constitute a quorum at an annual general meeting.

7.7. A report of the activities of the group during the preceding year, together with a statement of the income and expenditure of the group, shall be presented to the annual general meeting for its approval.

8. Extraordinary general meeting.

8.1. An extraordinary general meeting shall be called if it has the support of at least one quarter of the voting membership.

8.2. A quorum at an extraordinary general meeting shall be 20 members of the group.

9. Dissolution of the group.

In the event of the dissolution of the group, any net funds and assets remaining after the satisfaction of all

proper debts and liability will be transferred to another body having similar objects.

Draft BCG Constitution for consideration at A.G.M.

1. The name of the group

The name of the group shall be the Biology Curators Group.

2. The objects of the group

The objects of the group will be:-

to raise the standards of curation and conservation of natural science collections.

to raise awareness of the scientific and cultural value of natural science collections.

to promote the exchange of information between individuals or institutions concerning the management of biological collections and records, their research, conservation and interpretation;

to promote good practice in the care of collections

to represent the interests of all concerned with the care and management of biological collections;

to publish at least annually The Biology Curator (TBC), the official organ of the Biology Curators Group.

3. Membership categories

There shall be the following membership categories:-

Individual

Institutional

Honorary life - for individuals who have given outstanding service in the field of biology curation or to the Group. Candidates will be proposed by the committee and ratified at the AGM.

4. Rights of paid-up and honorary members

4.1. *Individual members shall be eligible to:-*

attend and vote at all AGMs and EGMs;

receive one copy of each edition of TBC;

stand for election to the committee.

4.2. *Institutional members shall be eligible to:-*

nominate a representative who shall have the right to attend, and to vote at, AGMs and EGMs;

receive one copy of each edition of TBC.

4.3. *Honorary life members shall have the same rights as individual members.*

5. Management of BCG.

5.1. *The management of the group shall be vested in a committee of elected members.*

5.2. *The officers of the group shall be the Chairman, Secretary, Treasurer, Membership Secretary and Editor. Any officer may fill more than one of these posts if the committee agrees, by majority vote, that it is in the best interests of the group.*

5.3. *The Chairman of the group shall be elected at the annual general meeting. He or she shall serve for three years, but will be eligible for re-election to that post at the end of that time.*

5.4. *The remaining officers shall be appointed from within the committee.*

5.5. *Committee members shall be elected at the annual general meeting. They shall serve for three years and shall be eligible for re-election only if there are insufficient nominations to fill the committee posts that would then be vacant. Otherwise they shall be eligible for re-election after one year.*

5.6. *Nominations for committee members must be supported by two members of the group. Nominations must be received, in writing, by the secretary at least two weeks before the annual general meeting.*

5.7. *If more nominations for committee members posts are received than there are vacancies, then an election will be held at the annual general meeting.*

5.8. *The committee shall have the power to co-opt additional members as required, for a single meeting or until the following AGM. Co-optees shall stand down at the AGM following co-option, but may be co-opted again by the new committee.*

5.9. *The quorum of the committee shall be 5 members, one of whom should be an officer.*

6 Financial management

6.1. *An annual subscription, the rate to be decided at the annual general meeting, shall be levied on all members.*

6.2. *A bank account shall be maintained by the Treasurer on behalf of the group.*

6.3. *The committee shall nominate three of its*

members to sign cheques, normally the Chairman, Treasurer and Secretary. Two signatures shall be required for each cheque, one of which should be the Treasurer's.

6.4. *No officer or member of the group shall be appointed to a salaried office of the group, receive any benefit in money or money's worth, or benefit in any way from the supply of goods or services to the group.*

6.5. *An annual statement of the accounts of the group shall be presented to the annual general meeting.*

7. Annual General Meetings.

7.1. *An Annual General Meeting (AGM) shall be held in each calendar year, the date of which shall be notified to the membership at least 8 weeks before the meeting.*

7.2. *Resolutions to be put to the AGM must be submitted in writing to the secretary, to arrive at least four weeks before the meeting, and must have the written support of at least two members of the group.*

7.3. *An agenda for the AGM, including any resolutions received, shall be circulated to all the members, along with the minutes of the previous AGM, to be received at least two weeks before the meeting.*

7.4. *Resolutions put to the AGM shall be decided by a single majority vote of the meeting.*

7.5. *20 members of the group, including at least one officer of the committee, shall constitute a quorum at an AGM.*

7.6. *A report of the activities of the group during the preceding year, together with a statement of the income and expenditure of the group, shall be presented to the annual general meeting for its approval, and subsequently published in TBC.*

8. Extraordinary general meetings.

8.1. *An Extraordinary General Meeting (EGM) may be called by the officers of the group at any time. The membership will be notified at least two weeks before the meeting. Any paid-up member of the group with just cause may request the committee to call an EGM. Any paid-up member of the group with the written support of 20 paid-up members of the group may instruct the committee to call an EGM within three months, but not within two months of an AGM.*

8.2. *A quorum at an EGM shall be 20 members of the group.*

Notices and requests

Project Sea-silk (byssus)

Natural History Museum Basel, Switzerland

With a view to an exhibition at the Natural History Museum of Basel, Switzerland, I am making an inventory of all objects in sea-silk still existing in European Museums and private collections.

Sea-silk is the product of the beard of the *Pinna marina* (*Pinna nobilis* L). With a length up to one yard it is the biggest shellfish of the Mediterranean Sea. It fastens itself in the sand and on the rocks along the coast with the byssus, which consists of very fine, very strong filaments. These fibrous tufts - they can be up to eight inches (200 mm) long - are the basis product for sea-silk. The tufts cut from the mussel have to be washed in soapy, then in clear water, dried, combed and spun like silk. The result is a most fine, iridescent brown-golden textile material, very resistant yet very supple.



It is not yet proven if sea-silk was already known as textile material in the ancient world. The oldest object found up to now is a cap dated 14th century found in St Denis near Paris, France. In the 17th and 18th century there existed a lively production of sea-silk in the southern parts of Italy. Taranto and Sardinia were important centres of manufacture, made mostly by home-workers or in convents and orphanages.

Sea-silk was highly appreciated as a very rare, very luxurious textile material, often given as a gift to royalty and noble persons. Many English and German

travellers mentioned it in their books, and some of them brought an object home: small knitted textiles like gloves, stockings, cravats - or some sort of fur, unspun sea-silk sewn on fabric: caps, collars, handbags. Objects were also shown at international exhibitions such as the Great Exhibition of 1851 in London.

Many of these objects found their way into private collections as curiosities. This may be the reason, why most of them are kept today in natural history museums and not in textile collections.

I would like to know the following:

Do you have any objects fit the above description?

Do you know how it came into your collection?

Do you have any written information about it?

I would be grateful for any information - your help will be very much appreciated. Thank you in advance!

Please contact:

Felicitas Maeder, Voluntary collaboratrice,
Natural History Museum, Augustinergasse 2, CH-4001
Basel, Switzerland. Phone ++41(0)61-271.57.70
(office) / Fax ++41(0)61-271.58.10 / e-mail:
felicitas.maeder@unibas.ch

Any comments?

I have come across three situations now in which the larvae of *Stegobium paniceum* beetles have been associated with damage to wood and wonder if any members can add to this body of evidence. In all cases the ID of the beetles was confirmed, in one situation by NHM staff, but both they and staff at the Forest Authority Research Station at Alice Holt insist that they have no record of such damage being caused by this species.

In truth the damage is not that severe - the larvae seem to "graze" along the surface of the wood, forming open, meandering galleries as they go. These are certainly as noticeable as bark beetle galleries. *Stegobium paniceum* is closely related to the notorious "woodworm" and, I imagine, could well have the necessary cellulose digesting enzymes as part of its make-up.

Jan Dawson, Deputy Curator (Biology)
New Walk Museum, 53 New Walk,
Leicester, LE1 7EA

Conference reports

Legal Eagles - Wildlife collections and the law (part 1)

Proceedings of the BCG Conference, 30 April - 2nd May 1998, at the Royal Scottish Museum, Edinburgh

(The items in this section are transcripts from tapes. No attempt has been made to police the spoken grammar with word processing tools - Ed.)

Introduction: The legal background to museum work.

Jeremy Warren, MGC.

I've been asked to speak to you today about the work which the Museums and Galleries Commission has been undertaking, in fact for some years now, with regard to museum collections and their legal status. Like any other type of organization museums and galleries have to work within a tight framework of the law. You'll be discussing in the course of today's meeting how museums, and your collections in particular, are affected by a variety of more specialist legislation, including in the case of natural science collections both international treaties and health and safety legislation but I'm going to try and talk to you a bit today about the legislation which specifically governs the museums in which we all work and more particularly their collections.

It is something of a surprise to many people to realize that in fact within the United Kingdom there is very little legislation specifically governing museums and galleries. The major exception to this rule is the group of national museums and galleries. One of the distinctive features which define a national museum is the fact that it is established and governed by statute. Most other museums have to rely on the more general provisions either of local authority legislation or charity law. Moreover, as we shall see it is the law of charity which provides the overarching framework within most museums' work. In the MGC's view there are some serious problems with the law as it stands in relation to museum collections and this is why we published the discussion document 'The Legal Status of Museum Collections in the United Kingdom'. Essentially today I'll be taking you through the main issues raised in this but there is quite a lot in the booklet that I won't have time to speak about and I hope you'll all find it of use as a general introduction. We've more recently followed up the 'Legal Status' booklet with some formal advice to government and I'll touch on that more briefly at the end of my talk.

What are the visible symptoms of these problems? The MGC has along with many others become increasingly concerned in recent years at the relative vulnerability of museum collections. This can be seen most obviously in the apparent ease with which public and semi-public institutions, local authorities and universities in particular, have been able on occasion to pursue moves to dispose of valuable items or indeed whole groups of material from the museum collections which they apparently hold in trust. Often, and certainly in terms of publicity, these are the ones that hit the headlines, these are valuable works of art. For example, the Royal Holloway and Bedford New College's successful move to sell three paintings from its founders bequest, or the now happily abandoned plan by Edinburgh University to sell works of art from the 1824 Torrie Bequest. But other types of material are also involved. The University of Newcastle sold the very important George Brown Collection of South Pacific ethnographic material *en bloc* in 1986 and last year Eton College, the museum collections of which are provisionally registered decided to sell off almost the entire contents of its natural history museum. You may also be aware of various local authorities which over the past two or three years have threatened fairly widespread disposals from their museum collections (in each case these have been headed off at the last moment). The MGC has long accepted that there are circumstances when museums and art galleries may, working within the context of agreed collecting and management policies, have entirely legitimate reasons for disposing of objects from collections. We would never oppose sensible and sensitive collections management and any system that aims for wider legal protection for collections must reflect such practical issues. Many of the cases which have received so much publicity during the past few years have sadly not been so much to do with collections management as with asset stripping, realisation of capital assets. The issues here are both moral and practical in our view. Museums hold their collections in trust on behalf of the public. For almost all museums a large part of the collections came by gift or bequest from publicly spirited individuals usually in the expectation that they would remain permanently in the institution and in the public domain. Attempts to break the conditions or wishes of donors almost always result in bad publicity for the institution and by extension for the wider museum community. Perhaps the most recent and vivid example of that was the Burrell Collection saga where the Glasgow City Museums wanted to change the terms of Sir William Burrell's will and they had quite sound reasons for wanting to do that. It ended up resulting in a very lengthy and expensive legal case with a sort of Pyrrhic victory for the museum service but quite a lot of damage to the public perception of museums. The second problem with which we are concerned is no less serious but slightly different and it

is exemplified by the case of Chatterley Whitfield Mining Museum near Stoke on Trent which in 1993 closed and subsequently went into liquidation. Like all registered museums the collections at Chatterley Whitfield had not been included in the balance sheet and this had perhaps produced a false sense of security on the part of the museum authorities and indeed organisations like the West Midlands Museums Council and the MGC. In the event, along with all the other assets of the museum most of the collections were seized by the liquidators and subsequently sold at public auction to help pay creditors. In other words it was demonstrated to us that the insolvency provisions of company law meant that museum collections may be at risk in the event of liquidation. That case was particularly ironic because the collections ended up netting at auction about £250,000. By the time the liquidator's fees had been settled something like £14,000 got to creditors and a quite important collection was destroyed.

Does this, therefore, mean that the law is ineffective in protecting collections? As is so often in these sorts of issues the answer is both no and yes. Those museums which are established by statute (and as I said earlier, that's mostly the nationals) will all have some provision in law governing disposals from their collections. There are a few national institutions, for example the National Gallery in London which are absolutely prohibited from any disposal but most nationals now have limited powers of disposal which reflect what most people would view as sensible or good practice. The British Museum, for example, may dispose by means of exchange, gift or other means of damaged or decayed material, duplicates and items which, in the opinion of the trustees are unfit to be retained and when the disposal would not be to the detriment of students.

Legislation covering disposals by nationals is quite conservative in its scope but one aspect of more recent legislation which is slightly more radical came with the Museums and Galleries Act of 1992. This act not only formalised arrangements to allow most nationals to transfer objects in their collections to other nationals it also provided a cut off point of 50 years for observance of any special conditions attached to gifts or bequests.

The situation is less comforting when it comes to the local authority sector. Local authorities have changed significantly in recent years. Whereas in the last century they had a role, in effect, as trustees for the public benefit, in recent years they have moved closer to a culture within which they see themselves, and indeed are organised internally, as trading bodies. This makes protection of collections held by local authorities more difficult. Since their statutory powers range much wider than normal charitable purposes,

unless gifts to local authorities are extremely carefully worded they may not be regarded as charitable and therefore may not enjoy any protection and legally local authority collections are mostly part of the corporate property of that local authority. There are, however, two more positive factors which help to mitigate this position. First, the local authority accounting body, SITFA, has since 1994 required local authorities to account for all their fixed assets and in doing this they have to draw up asset registers of all material assets which include museum collections. At the same time, however, CIPFA introduced a new concept of community assets, which they define as "assets that the local authority intends to hold in perpetuity that have no determinable use for life and that may have restrictions on their disposal". All local authority museum collections should be treated by their owners as community assets in this sense and perhaps all of you who work there should ensure that they are doing that.

The second important point to note with local authorities is slightly more tricky to grasp but very important. A number of local authority museums began their lives as learned societies, often in the nineteenth century, only later passing under the control of a local authority. In other cases learned societies or other charitable bodies may have passed on their collections to municipal museums. In these circumstances the collections or items concerned may well form a special charitable trust and in this case the local authority will not be the corporate owner of the material but will simply act like any other trustee in respect of that property. In other words, they may not be able to sell the material even if they wanted to, at least not automatically.

The law is similarly unsatisfactory and indeed confusing for universities. Their museum collections are in strict legal terms the private property of those institutions even though they are still mainly publicly funded. But when it comes to individual cases the picture is more varied. The older collections such as the Ashmolean, Fitzwilliam or the Hunterian would almost certainly be regarded as special trusts and, therefore, will enjoy greater protection. The picture is much less likely to be clear with more recent collections and certainly collections which start as teaching collections within departments will within the law at least have very little protection.

As I think you can see from what I have said so far the law and the concept of charity is crucial for almost every sector of the museum world. This is perhaps, then, a good moment to look at what is meant by charity and the protection it can afford collections. Charity is an ancient and well-tested legal concept which goes back to Elizabethan times at least. The modern law derives from an act of parliament of 1601,

which set out the fundamental charitable categories or purposes, which were defined, and still today are defined as religion, education and poverty. Museums are defined as charities through the educational purpose and it is important to emphasise the mere holding of a collection is not a charitable purpose. You have to demonstrate that you are using that collection for educational purposes in order to qualify as a charity. Many museums, especially independents, are registered as charities and they register with the Charity Commission in England and Wales and with the Inland Revenue in Northern Ireland and Scotland. It is important to understand that the act of registering is not the same as creating the charity. Indeed some important categories of museums, notably the nationals and those which are part of universities are known as exempt charities. This means that they are not required to register and nor are they subject to supervision in the way that registered charities are but they enjoy the benefits of all charities. The majority of museums which register as charities choose also to form themselves into companies limited by guarantee and their chief reason for doing that is to reduce the potential liability facing trustees should the museum become insolvent. Trustees of an ordinary charitable trust have potentially unlimited liability if that trust gets into difficulties. If you form the charity by company limited by guarantee you can limit your liability normally to one pound.

Charitable status can be of help in protecting collections, although I must emphasise that it is never possible absolutely to prevent the disposal of collections or individual items. Collections would generally form part of a museum's charitable property and that means that it must be used in a way that fits the purposes and the objects of the charity. If a charity has powers of disposal written into its constitution then a decision to dispose of material will rarely be questioned. If it does not, however, then in order to dispose of collection items the charity must make special application for what is known as a scheme and it must make this application to the appropriate regulator. In England and Wales that would be the Charity Commission, in Scotland the Lord Advocate and in Northern Ireland the Department of Health and Social Services. When they consider an application for a scheme the Charity Commission and its equivalents or indeed the courts if it gets that far will take into account a number of factors. They will certainly examine whether the property concerned was given with particular conditions attached, which might allow it to qualify as a special trust. Along the same lines they will examine whether the properties to be disposed of might form part of what is known as the permanent endowment of the charity. It is quite difficult to define exactly what is meant by special trust and permanent endowment. Lawyers will tell you that it needs to be looked at on a case by case basis,

but speaking very generally in terms of collections they might, for example, be those parts that have existed since the establishment of the museum as a charity, so the founding collections of a museum, or which may be inalienable because of special conditions attached to gifts, bequests or indeed purchases. Generally the charity supervisory bodies will not willingly give permission for permanent endowments to be disposed of and certainly not to fund current expenditure. They may either refuse permission altogether or else invoke the so called *cypres* doctrine, and that is to direct the property to the closest possible alternative use and obviously in the case of museum collections that might mean proposing their transfer to a museum with similar collections. Indeed this happened with the Chatterley Whitfield Museum where the Charity Commission successfully argued that one element to the collections, the British Coal Collection, which in effect had been put on permanent loan to the museum from British Coal formed a special trust and therefore could not be seized by the liquidators. So that collection was subsequently transferred to the National Coal Mining Museum for England and is now held in trust by that museum.

In Scotland a further factor may be taken into account, and it is worth pointing out here that Scotland has a separate legal system and operates according to the principles of civil law, whereas the rest of the U.K. operates according to the principles of common law and often it means that things are done much better north of the border, certainly as far as the protection of collections is concerned. In terms of charity law, most charity law is similar but there are one or two important differences. In Scotland the Lord Advocate or the Courts are able to give special attention to the spirit of the original intention behind a gift and also the interests of the locality. In Scotland they distinguish between private trusts which are intended essentially to benefit an individual or group of individuals and public trusts which are clearly intended to benefit the public and in the case of the bequest of Sir James Erskine of Torrie to the University of Edinburgh they did decide that the effect of Sir James' intentions, although he didn't express them very clearly in his will was to create a public trust for the benefit of the people of Edinburgh and the students of the University.

I think you will be able to see from this that there are ways in which charitable law can be used to give added protection to collections and in the legal status document we came up with a series of recommendations and I'll touch on the main points of those. As you will have perhaps gathered by now it is crucially important when establishing a museum as a charity to give very careful attention to the wording of the object and purposes of the museum and to ensure in particular that these incorporate somewhere as a fundamental purpose of a charity the holding of a

collection in trust. The more you can use words like 'in trust' and 'in perpetuity' the easier it is to demonstrate that the preservation of that collection is a really fundamental purpose of the charity. But we concluded in this document that the best way under the existing law to ensure safety of collections is in fact to separate out the collection holding activity of a museum from the risk taking operational side through the establishment of two separate trusts and the problem with Chatterley Whitfield was that the museum went bankrupt, the collections were part of the assets of the entity that went bankrupt and therefore could be seized and so because most charitable trust museums are established as companies limited by guarantee their assets are particularly vulnerable should they get into any kind of financial difficulties and obviously if you are a company the rules of company law take over when you get into an insolvency situation, although any charity, even if it is not a company will risk having its assets seized to pay liquidators. So we have advised where practical, and certainly when starting new museums, a separate holding trust for collections should be set up with a management agreement between the two trusts to govern working relations and responsibilities. Another important recommendation is that museums and their trustees should take steps to ensure that they are aware of which parts of their museum collections could be considered as permanent endowments or covered by special trusts. Often when these crises arrive they are made worse because everyone is taken by surprise. No one within the museums tends to have looked at the collections and say well what conditions did that Victorian benefactor put to the gift of that important part of the collections. As curators it can be very helpful to see if you can be well informed of what the background of the acquisition of the collections was. Finally donors should be encouraged to be precise in terms of the wording of wills and deeds of gift and they should in particular make it clear if they wish a gift to be inalienable and again often the problems have come because wills and bequests are very imprecisely worded and people who want to exploit that can point to these inaccuracies and do so. Of course potential donors must always be made aware that museums are entitled to refuse gifts or bequests on the terms required by donors. A gift or bequest may be made more secure by means of a 'gift-over' clause, as it is called, through which a statement is added to the gift essentially specifying that if the beneficiary does not comply with the agreed terms the collection or gift should be transferred to another beneficiary institution. The most recent case in which this happened was with the Fitzwilliam Museum which in 1990 took over the remains of a collection called the Reitlinger Collection, which had been set up as a museum in 1950. The crooked trustees had been selling off material for years and it was actually rather by accident that the Fitzwilliam discovered that they were

the gift over beneficiary and they went to go to court to claim what was left of the collection.

Some of these suggestions are quite complicated and by no means free of further problems. To take the separate trusts concept as an example, trustees of a collections trust could find themselves facing quite onerous liabilities to ensure the collections continuing accommodation and care if the operating (risk taking) trust fails and there is no obvious new home for the collections. Also there may well be VAT implications and inevitably running two trusts causes more bureaucracy and we have had a mixed response to this proposal. Some people think it is a very good idea and there are a number of cases where museums have gone ahead with this solution and there are lawyers and museum curators who are vehemently opposed to this solution.

Should the law therefore be changed? Well, I believe that most people who are concerned to ensure the longer term security of museum collections would think that it should be and it is worth remembering in this context that the 1996 government policy paper on museums 'Treasures in Trust' actually stated that "a museums collections are to be held on behalf of the public as inalienable cultural assets" which you think is fairly clear. The new government has accepted the principals within 'Treasures in Trust' and so, in theory, should be committed to making that statement of intent work. I think that this short survey will have shown you that it does not really reflect reality at present. The MGC has made a number of recommendations to the government therefore. In particular we have proposed that the government should take steps to establish in statute a much broader concept, which we have described as public museum collections. This in a way would be much closer to the situation in continental Europe where local authority, university and indeed other types of museums are covered by national legislation. The main purpose of setting up a concept of public museum collections would be the recognition that collections, established for the public benefit and funded through the public purse do effectively belong to the public, which has, accordingly, certain expectations and rights. Clearly ways should be explored in which this can be achieved without affecting the existing legal ownership of the collections as it is unlikely to be a starter if universities or local authorities were told they will lose their ownership of these collections and for good and bad reasons we find that people are quite jealous about asserting their ownership. Possible ways of doing this might be extension to the whole of the United Kingdom of the Scottish concept of public trust about which I talked earlier or giving statutory definition to the MGC's Registration Scheme. At the moment registration is a very important voluntary way in which to regulate conduct in terms of acquisition and disposal

but it is a voluntary and non-statutory scheme. In our view public museum collections could include nationally funded, local authority, university and armed services museums. The position of independent museums would need further consideration because most do not receive regular public funding. Nevertheless the considerable benefits they receive from their charitable status might mean that they too should be included in the new statutory concept or alternatively they might be encouraged voluntarily to subscribe. And the concept of public museum collection should finally reinforce the presumption that museum collections are indeed inalienable cultural assets. The MGC would not wish to see a situation where it became impossible for museums to exercise sensible collections management decisions, for example by transferring material to another public museum collection, but it should become impossible for governing bodies to asset strip and flout conditions agreed with benefactors. We are currently awaiting the reaction of Government which is consulting its lawyers so I can't tell you what their opinion of our advice is but that has really brought you up to date with a broad survey of the legal background to museum collections and how we think it could be improved and what we are doing to try and achieve that.

The Work of the Wildlife Liaison officers

Bryan Robertson, Lothian and Borders Police.

I am Sergeant Bryan Robertson, and I'm the Co-ordinator for the 9 Wildlife Liaison Officers for Lothian and Borders Police, a job I have been doing for seven years, part time. Indeed, everybody in Lothian and Borders Police and, for that matter, in Scotland, who is a Wildlife Liaison Officer is doing it part time. For my part, I've got a full time beat sergeant's job in East Lothian. To do my Wildlife Liaison job I've got to beg, borrow and steal time, finance, whatever expertise is needed, and that's the only way it's getting done. However, I have no real complaints there, though I am a bit envious of Steve and one or two other forces in England, with four or five full-timers. Perhaps it's fair comment to say in this environment there is more than one way to skin a cat, and the job is still getting done in Scotland.

So, what are we? Well, in some quarters Wildlife Liaison Officers are referred to as a virus. We come from unknown origins, where circumstances permit, we expand and spread and we tend to cause havoc wherever we go. Perhaps that's true for some people and I'm pleased about that. As far as origins are

concerned, it is a wee bit unknown but I like to put forward the idea there are two origins. Let's go back to 1982 when the 1981 Wildlife and Countryside Act came out. Literally overnight somebody threw this wad of potential offences at Chief Constables and said 'here get on with it, it's up to your officers to deal with all these potential offences, taking eggs, plants whatever'. This was really a problem for Chief Constables – how do they deal with that?

At about the same time, there was a case down in the south of England, which went drastically wrong in court and caused a fair bit of embarrassment for the police force concerned. There was a bit of a post-mortem to decide what went wrong and what we are going to do with it. To his credit, a former Assistant Chief Constable, Terry Rands, who was interested in wildlife to begin with, took this on board. The norm is to identify the lowest rank involved in a case, which has gone wrong, and point the big finger and say 'you're it, you're to blame'. Mr Rands did not take this attitude. He quite rightly identified the fact that it was totally unacceptable to expect constables to be out there, 'jacks of all trades', specialists in traffic, drugs, community involvement and now wildlife. So from my point of view, he is the grand daddy of us all. He decided that the way his force was going to meet the challenge was to identify somebody who, though not a specialist in wildlife nor a specialist in wildlife law to begin with, but would learn more about the various acts that the police force was going to get hit with and build up a reservoir of expertise. And so the WLO was born!

We have increased from those days. My force has nine officers this year, though up until last year we only had two. Strathclyde has one for every Division, and so it increases all the time. By and large this is being caused by public and media interest. There is a problem out there. When we get some meaningful figures, it seems to indicate that things are getting worse but I don't personally believe that. I think it is because we are becoming better at recording things and getting the message across. Wildlife crime is another thing for the police to deal with. It is a typical area to work in, in that there are seldom any witnesses out there, but that is not to say that we can't take that challenge, try and do something about it, and keep the public informed. We want to do a better job than we have been doing in the past and I think we are.

I'm going to show you some slides which will better explain, perhaps, some of the areas we do get involved with. Before I do that I must warn you that there is the very odd gruesome slide to be found so if you could just bear with me. I mentioned earlier that it is part of our job to build up a knowledge of not just the law but of experts. Where are they? What can they do for us? I would like to think I've got a good working

relationship with the museum staff here. Just through my job in general I come across dead specimens. I'm quite happy to donate them, let the museum benefit and let the public benefit and therefore I've got no qualms about coming in and getting statements, species identified whatever.

There was a problem regarding sand martins [slide] on a nice piece of salmon water here [slide]. The ownership of the water changed hands and the new owner decided he wasn't interested in various planning acts, the Wildlife and Countryside Act, indeed anything whatsoever. He just wanted to improve the fishing. So he put a huge piece of machinery in the middle of the Tweed, dug out all the pebbles from the bottom and shored up this sandy bank, which he reckoned had collapsed. He carried this out in May, a couple of years ago. The adult Sand Martins were flying in and out but the people on site had no idea of what they were doing. They were simply following instructions from some well-healed and titled person living elsewhere. We went down, got some of the boulders back away from the bank, dug in and managed to prove that there were several nests entombed by this activity. I was helped by people who were non-birders, so I brought the nest and the eggs into the museum here, got them identified and got a witness statement from your colleagues.

We have got to be alert to all sorts of things. We get informed by the public and we find cases ourselves. There are many ways we actually come across wildlife offences. For example, I'm sure you've all got this type of magazine or paper in your area, with adverts in. Lo and behold, in one there was someone selling a stuffed otter. I followed that one up, but I couldn't prove the cause of death for the animal. What I could prove was the fact that it was for sale, it was advertised for sale and that in itself is an offence.

A somewhat different case is seen here. [slide of a dead badger] To begin with, this sounded like something terrible had happened in some woodlands some 15 miles from here. This had been found by somebody going for a walk. What you don't see in the slide is the back end of that badger all churned up, apparently eaten. The story came with the added extra that some lads had been up in that area with lurcher type dogs. The inference was that somebody had been training a young dog to catch and kill badgers. We have an excellent relationship with a forensic veterinary pathologist nearby and for the princely sum of £30 we established that the animal had been tied up with a noose but had died of natural causes and a fox or something had come along afterwards and had a bit of supper out of its back end. As far as the noose was concerned, some local kids, about ten or twelve years old, not the ones with the dogs, had found this badger before us, tied a string to it and dragged it around the

woods playing with it, as you do. I've included this one to highlight that not all is doom and gloom out there. We are always happy to take on board public reports, but quite often they are totally unfounded. This is a crow trap, something which is prevalent at this time of year. They have caused some problems but these are hopefully being addressed. It is quite legal for gamekeepers and land users to put out these traps. They are specifically intended to catch crows so that they take away the pressure from the birds that they are trying to cater for. The problem was that in the past there was very little legislation to cover these things. All sorts of species were getting captured and basically just dying a horrible death. In one case, further north in Scotland, a golden eagle managed to fly into one of these funnel traps, and died from starvation. Since the turn of this year there has been new legislation in force. These things are legal under a general license, but there are now one or two stipulations that must apply. This will be a great help to us in order to deal with people who set these traps out in the open and just fail to check them on a daily basis.

This is another type of trap [slide] that is to be found out there, totally legal, and it's again designed to catch crows, (Hooded Crows, Carrion Crows). The idea is that the target species comes along, lands on the perch, the perch collapses and the crow is caught. Whilst that is legal and I'm quite happy with that, the thing is open to abuse. This is the same type of trap, [slide] just a somewhat different design. That's a feral pigeon captured in one of the compartments and there is no way that device is going to catch a Carrion Crow. However, it is suitable for catching a goshawk, as indeed it did. A member of the public found it, released the bird and reported it to the RSPB, who in turn reported it to me. The padlock on the central compartment is where the pigeon was, to stop the public releasing the feral pigeon in the first place. Myself and a couple of RSPB investigators went out, sat out in the woodland for about an hour, quite a short watch, until we got someone going back to the site and we submitted a report against the gamekeeper on that estate. This is just one example of something that is legal but regularly abused, and is an area we are actively involved in, certainly in Scotland.

Another field we are very much interested in is the poisoning of our wildlife. I think most people are aware that red kites are being released in Scotland, and have been for several years now. Already this year in Scotland we've had at least one poisoning of a red kite, and it's happening in every UK County on an almost monthly basis. There have been poisons blatantly laid out in the open within 10 miles of where you're sitting at present, and it's my job to do something about it. It is a horrible thing and it is also a dangerous field for us to work in, with health and safety issues of paramount importance. The method is to shoot a rabbit or pigeon,

lace it with anxines (pesticides that are being used as poisons), and leave them out in the open. Crows and foxes are usually the intended targets but whatever comes along and eats it is going to die, be it hedgehogs, red kites, eagles, whatever. In this area, south and central Scotland, the common Buzzard has been a success story. They are now breeding almost everywhere, which is great, but they have also become probably the biggest targets. They are dropping like flies to poison, shooting, trapping, and so on, and they are not even a major hazard. I was speaking to a gamekeeper yesterday and he is adamant the buzzards do not cause a major problem, but they are still getting slaughtered.

Here is another trap [slide], not a very good view of one, but again, a legal trap, designed to catch stoats and weasels. The idea to put it in a place where it is not going to catch the non target species. Excellent, no problem. However, put the same trap on a pole, preferably surrounding a pheasant release pen, and then you're going to catch something like a Long-eared Owl. Owls are, without a doubt, interested in pheasants within their release pens, even if they are not catching many, but that could just as easily been a Sparrowhawk, Goshawk or something like that.

This is one that Bob and Andrew might remember from their past and caused a fair bit of debate by way of identification. Everybody agreed at the end of the day as to what it was, and indeed it was a juvenile Honey Buzzard. The number of breeding Honey Buzzards in the UK is small and the number of times they breed in Scotland is tiny but this could have been a Scandinavian bird that had flown over. It was actually found shot within a mile of my home. When I heard about that I had some very unprofessional thoughts.

We also have a problem with finch trapping. It's one of these pastimes dotted about the UK, which seems to centre on certain areas, including, I'm afraid to say, old coal mining communities. Certainly in Scotland, that is a fact. It's quite legal for people to breed finches and show them, and I've got no difficulty with that, but it is quite often the case that the best bird is one freshly caught from the wild, as long as you can tame it enough so that it doesn't kill itself flying about in it's box on the day of the show.

Going back to something that Steve has just shown you, egg collecting. There are still hardened groups of people within the UK who are determined to do this. Already on Mull this year, a sea eagle's nest has been robbed. It is incredible, but it is something we've got to be alert to. I suspect we will be involved in these cases for some time to come. Perhaps in another generation or two it will have died out, but certainly this hardened core will stop at nothing. We, the police,

are dependent on experts. In other words, someone from the RSPB, helping out the police with identification of eggs and collections of eggs. As you can imagine it is going to take some time to deal with something like that, and it does happen. Sometimes there is no catalogue of identification, and to prove a case from scratch you've got to identify every egg and have people prepared to go into the witness box and say, yes, that is the egg of such and such.

People have touched on taxidermy. This was a bird found in someone's freezer [slide], and was obviously destined to become a taxidermy specimen at some later stage and was awaiting transportation. I have all sorts of things in my freezer from time to time. My wife put her foot down at the otter I had a fortnight ago. This chap had the hawk and the reason I've put this one in is because whilst we were searching this chap's house, we found this species (and not *Homo sapiens*)(?) so he got caught on two accounts there, and shame on you if you can't identify this!

To finish off with, this is what we are trying to protect in the wild at this time of year, clutches of Peregrine Falcon eggs. In East Lothian, which is just east of you, is a nest site which is traditionally the first clutch to hatch in Scotland and they are just at the point of hatch now, so we're giving that a fair bit of extra attention. With any luck they will be something ready to fly off in a few weeks time. Thank you very much.

Health and Safety Issues.

Allan Young, Royal Museum of Scotland.

Perhaps I should explain my role in RMS. I appear in the programme here as the Health and Safety Officer that's not quite how I see myself. My department, which is Administration, co-ordinates health and safety activity and I will try to say a bit about how we manage health and safety in the course of my talk this afternoon. What I intend to do is very quickly to outline the key legislation relating to health and safety, particularly as it applies to the work of biology curators.

The Health and Safety at Work Act is a key piece of legislation. It was introduced after a fairly extensive commission review in the early seventies and it has been compared in its importance with the Factory Act of 1833 which puts it fairly high in terms of legislation. The significant thing about it is it is an enabling act. It does not deal in a great deal of detail with the minutiae of legal management. It sets a framework within which regulations can be made to deal with a range of activities and that is the way the framers of the Act saw it being taken forward. They

saw it as legislating for a range of activities and progressively bringing together all previous legislation so that it was brought together within this one code. The Act also introduced the use of approved codes of practice, which was another significant development. So, since 1974, health and safety legislation has depended increasingly on statutory regulations, regulations made by statutory instruments which are much simpler and easier to manage than changing laws which depend on great complex parliamentary procedures and getting time in the programme. Statutory regulations are simple by comparison, they are easy to do, they are easy to amend, they are still under the control of parliament and they are subject to the overriding control that they cannot go beyond the ambit of the enabling act. So there is a control. You cannot just legislate without regard. The statutory regulations, the statutory instruments have the force of law. Prosecutions may take place on the basis of an infringement – an offence against a statutory regulation. Approved codes of practice do not have force of law but the courts and tribunals increasingly have regard to the way that employers have used codes of practice – if they have taken account of them or if they have not. So the code of practice which was a completely new concept is increasingly becoming quite an important aspect although not, as I say, having the force of law.

Since 1974 we have become increasingly involved with the European Community and the European Community, itself, has been concerned with health and safety and a directive of 1989 gave birth to what is colloquially known as the 'six pack' – six regulations which very largely cover the range of work activity. Two were mentioned by the last speaker, the Management of Health and Safety at Work Regulation and the Display Screen Equipment Regulation. The other four are Workplace Health and Safety which deals with the general regulations of work places to ensure that employees have a safe environment. Another regulation dealing with Personal Protective Equipment where employees have to wear protective equipment, be that ear defenders, protective safety glasses or whatever. Another deals with manual handling. This is quite an important one and is perhaps one that biology curators might know very well, although on the face of it, do not seem to have a great deal of interest in. Perhaps manual handling training is something that needs to be quite wide spread. It is something we are beginning to recognise here, It is not just the porters and the house-men that need to be trained in handling – there are lots of people who handle things and don't see themselves as manual handlers but when they get a sore back they begin to get the message. We've got to get to them before the sore back develops. The sixth regulation deals with work equipment. So these are the six main regulations. There is one more, not within the six pack, the Control

of Substances Hazardous to Health and that is perhaps the one that will concern most of you and probably most of you have had some experience.

The 1974 Act, as I said, is the key basic legislation to which increasingly everything feeds back. That Act requires that employers ensure that as far as is reasonably practical the health, safety and welfare of employees and other persons who would be affected by work place activity. That is a fairly key comprehensive requirement on employers to ensure the health and safety of their staff. The Act also places duties on employees. It requires them to take reasonable care of their own health and safety and of the health and safety of other people with whom they work or who may be affected by what they are doing so there is a responsibility also on the employee. There is a responsibility also on the employee to have regard for duties and requirements imposed by the employer. You cannot ignore with impunity requirements which have been put upon you by your employer. There are cases where someone has been injured and has subsequently taken an employer to a tribunal where the award, while in favour of the employee, has been significantly reduced because the employee has not had a proper regard for the duties and requirements imposed by the employer and has not co-operated fully. Indeed it is possible under the Act to prosecute employees for disregarding health and safety requirements so the 1974 Act imposes a duty of care and imposes responsibilities on employers and employees.

The Management Regulations and the Control of Substances Hazardous to Health regulations impose a further duty which is to carry out assessments of risks to health and safety of employees and others arising out of work activity. This is an important development and one which has involved many of you. It certainly has involved us over the past few years in bringing our procedures up to date and ensuring we are providing a safe and comfortable and proper environment for our staff. The one good thing about the COSHH Regulations and the Management Regulations is that if you have done an assessment under COSHH you don't need to do another under the Management Regulations. Basically what the regulations require is that assessments are undertaken to evaluate the risks to health which arise from work which might be hazardous in some way and to determine as a result of the assessment what needs to be done to ensure that a proper working environment is provided. What does this mean? It means that we need to look at hazards. What are the hazards? What risks are posed by these hazards? If we don't do that we are not able, effectively, to discharge our duty of care and responsibilities under the 1974 Act.

So what is a substance hazardous to health? The regulations say any substance capable of causing adverse health effects or disease arising from work activities. It then goes on to list quite a number of things. It picks up on substances, which are specified in the regulations, which have a maximum exposure limit. It picks up on substances for which the Health and Safety Commission have approved an occupational exposure standard. It refers to substances on the approved supply list under the Chemical Hazards Information, Packaging and Supply Regulations, which are toxic, corrosive or irritant. It refers to biological agents, it refers to dust concentrations and then it refers to anything not covered by these categories, which causes a health hazard. So basically you have got to regard anything as potentially a health hazard but you have got to take a balanced view. It would be very beguiling just tie everything down and close your eyes and hope that nothing happened. You are in the real world; we have to move on. The way we have approached it here is to make general surveys. We have virtually worked through most of our basic COSHH assessments. There is one major area Geoff Swinney and I are going to talk about in the next couple of weeks which is related to taxidermy and I had hoped that I might have been able to have a bit more to say to you about taxidermy today but we haven't got to that stage. But we have made a general survey of risk areas and it is important to do this and eliminate hazards that are inconsequential or trivial. It is important to be comprehensive because you can easily enough, once you have got a long list, start to go through it and say, well, is that really significant? Does it affect many people? Is there a real risk? If there is a risk, what is it? There is a great importance in getting a general survey of the field and then work down.

Your concern will mainly be with biological material, with dead animals, with bits of animals, with bits of insects and possibly bits of birds. You need to know where they came from. If you know where they came from you may have some idea of what possible hazards they carry. If you bring something home and your overnight bag from the Far East, which is furry, it may contain 'nasties', which you don't really want to find. There are import regulations which have to be observed and obviously if you are importing material from abroad you have to follow the regulations and you have to employ an agent who is well apprised of these regulations and able to advise you properly on the procedures you should follow. But it is important to know as much as possible about material you are using so that you can get some sort of insight into what sort of risks it might pose. You have got to consider how significant the risks are. Again, in relation to the regulations, what exposure limits might apply? That is perhaps not appropriate in relation to biological material but in terms of chemicals it is. You need to

look at the level of access, the number of people who are involved. What the process involved? There are processes in taxidermy involving de-fatting where there is a possibility of a spray. Is the aerosol created by de-fatting a potential health risk, if so what should we do about it. We need to think about the implications for other people. If there are others moving through the laboratory are they likely to be put at risk by the activities that are being carried out. What processes do we have in place to reduce risk because most people have an instinctive recognition that you should treat any material, organic or chemical with some caution?

So you have to assess all of these aspects and consider what you need to do. Do you need to do anything? If you need to do something what do you need to do? Is the process so dangerous that you should not be carrying it out? Is there an alternative way of carrying out a dangerous process? Can you substitute something less hazardous? Should you separate off the process? Do you need to enclose it? Do you need to enclose it completely or partially? You need to look at the length of exposure. Are people going to be exposed for long periods and what are they exposed to? Do they need protective equipment? Should they be wearing goggles? Should they be wearing masks? What information have you got over the whole process? You have got to record what you do and it is important, even if you decide that something is not a hazard you record the fact that you have looked at it and decided it is not a hazard because you may need to refer to that and keeping records, tedious as it is, is actually quite important. I suspect that is why Administration got the job of doing this because they keep records. That is an area we have been trying to build up a body of information so that we know what is being done so that we can show that we have taken steps to protect staff and to protect visitors so that we know when we need to go back because there is no point in doing an assessment and forgetting about it. You have to go back. You have to review it. You may need expert guidance.

I mentioned earlier, the structure we have in RMS; I'll say a brief bit about that. We don't have a Health and Safety Officer as such. We have a system of co-ordination. I co-ordinate over the organisation as a whole. We have departmental co-ordinators covering COSHH and covering General Risk Assessments, covering VDU assessments and they provide advice and guidance to line managers and to staff involved in carrying out processes and link back with my own department for co-ordinating purposes.

To explain, briefly, how this works in relation to COSHH, we have a member of our conservation department who is the COSHH assessor and she requires departments to complete assessment forms in

respect of all processes undertaken. The operator carrying out the process completes the form and the departmental assessor and line manager check it over and ensure that they agree with the assessment as carried out. The assessment then goes to the COSHH assessor who will review what has happened, will make any alterations or recommendations, obtain further information if necessary, identify any high risk factors and, if necessary, deal with the department on that and consider whether any alternative processes should be used. Once agreed the assessment will then be logged and that will be our record that that process has been assessed. We can then come back periodically to review. We would review COSHH assessments on an annual basis. We require departments, if they change processes, to send us an amendment form and that enables us to update our record. So that, in a very simple way is how we deal with COSHH and it is how I would expect most organisations would operate.

I did mention the need for expert guidance. We do this in-house with our own resources. We do draw in expert guidance. Currently we have engaged the Institute of Occupational Medicine to look at our Taxidermy Department and provide us with a report. We believe that was necessary because there were aspects of that where we did not feel qualified to make judgements and it is important to know where to make judgements. The regulations talk about assessors being competent persons but they don't specify in any detail what they mean by competence. Assessors have got to know the process, they have got to have the relevant technical knowledge, but most importantly, they have got to know the point at which they need to call expert back up.

We see health and safety as a positive factor. A lot of people consider it an intrusion and a bit of a chore and it is to a certain extent but it is important. The law is quite clear. Employers who do not observe the regulations put themselves in danger of prosecutions. It is important for employers, museums or anyone else, to ensure that they have proper procedures in place. It is important for staff working in organisations to ensure that they follow the procedures that are laid down. If you look at the process in that way and see it as a means of providing an effective environment for working and a means not of restricting what can be done but of ensuring that things can be done to the best effect and in an environment where all of those coming in contact, staff, visitors and others, can feel safe and secure and that is objective.

Legal issues in collecting, keeping and using biological material.

Lynn Garvey, Enforcement Co-ordinator, Global Wildlife Division, Department of Environment, Transport and the Regions.

The title of my talk sounds rather mammoth and we might have to limit that a little bit because we only have an hour. We will do a quick cooks tour of as much of the controls as we possibly can.

The first question I suppose we ought to ask is why do we have controls at all? The answer to that I am told is that the removal of plants and animals from the wild for commercial purposes has been identified as the primary factor after habitat destruction that is currently driving species to extinction and we don't want that. The CITES Secretariat have estimated that the total trade in live and dead animals and plants has an annual turnover of a staggering \$20 billion. This is the legal turnover of the wildlife trade. There is also a substantial illegal trade in wildlife estimated by the US Fish and Wildlife Service as being second only to the illegal trade in drugs and arms. So it is an enormous commercial activity that we are talking about. Some figures about the type of wildlife that is being popularly traded, 25-30,000 primates per annum lawfully traded, 2-5 million wild birds are traded every year, 10 million reptiles skins, 7-8 million cacti and a staggering 500 million tropical fish. So that's part of the reason why it's so important that we have controls.

The UK itself, although not a range state to an enormous quantity of wildlife is nonetheless a significant wildlife consumer. The pet trade in this country is booming. Figures for 1993, which is the last time we had a real review on this show that over a million reptiles were imported and consignments of 5,000 iguanas at a time weren't unusual which is quite a staggering figure. In the bird trade significant figures are also available and in one particular year a well-known trade magazine published 94,700 advertisements for a staggering 961 species and that's in one year. Of that particular figure a significant proportion, 80% of them in fact, were CITES species that were being advertised for sale. So it is an enormous market that is going on out there in the United Kingdom. Taxidermy specimens are also popular. They are popular with people like collectors and also they're becoming more popular for public houses it seems and theme managers alike. There appears to be a chain of restaurants going across the south of England who thinks it's fun to use stuffed specimens of wildlife to decorate their walls, floors and even their tables I'm told. So specimens of taxidermy are becoming increasingly popular. We're not quite to the Victorian standards yet but I think we

seem to be seeing a small revival in that collecting sphere anyway. So this boom in wildlife trade has resulted in a growing number of laws and regulations aimed at controlling that trade and ensuring that it is at least sustainable.

The next question we ought to be asking I suppose is what laws affect the UK taxidermy trade in general and specifically the museum collections, which affect you. The laws surrounding wildlife are many and complex. The enforcement is also complex. It is different between Scotland and the rest of the United Kingdom. What we are talking about here is the enforcement of what is basically criminal law and in Scotland you have a totally different system to the system that operates in England, Wales and Northern Ireland. In Scotland your criminal law is based on the old Roman law and you have your sheriff court and in England and Wales they have magistrates' courts and all in all it's very much a different game up here. In addition the way you collect evidence to prove a case in Scotland is different to the way you collect evidence in England and Wales and the police will explain to you the hurdles that they have to get over to prove offences both north of the border and south of the border. So the laws in Scotland, England, Wales and Ireland are enforced differently. The law in Northern Ireland is actually different to the law in England Scotland and Wales, but there is one piece of legislation which applies to the entire United Kingdom you'll be pleased to hear and that is familiarly called The Control of Trade in Endangered Species (Enforcement) Regulation, Statutory Instrument No. 1372, 1997 or COTES for short. The COTES regulation then is the one piece of harmonising legislation we've got for the United Kingdom. This latest regulation actually came into effect from 1st June of last year and it gives the powers of enforcement, it specifies the offences and it creates the penalties appropriate in the United Kingdom to enforce the European Unions principal regulation No. 338 of 97. This is a European Council regulation and it equates roughly with an Act of Parliament. This piece of legislation will give you the dos and don'ts of interpreting the Control of Trade in Endangered Species throughout the European Community. It is aimed at harmonising offences throughout Europe so that each and every member state should be operating in the same way. We should be introducing the same sort of controls although, of course, it is for the member states to introduce individual national legislation to implement their own particular penalties and how they operate in the individual member states. This is the principal regulation 33897. It's further explained by another piece of legislation, the Commission regulation 93897 called the Implementing Regulation and this equates to a sort of statutory instrument under the UK system and what this particular piece of legislation does is explain the

principal regulation. The principal regulation is the dos and don'ts; the implementing regulation is how you do and how you don't do something. It is quite an important piece of legislation and it also contains a number of definitions, which are going to be handy as well.

So what is protected? This is another piece of European legislation, 2307 of 97, which actually came into force in November 1997 and it updates 33897 in that the species list that was attached to 33897 was obviously typed by somebody who had sausages for fingers as there were a number of typos in there and a few omissions which were a bit tragic so this particular regulation came in very, very quickly to put that to rights. So 230797 gives you the full list of species. The species list under the Convention itself is divided into three annexes, Appendix 1, 2 and 3 with Appendix 1 containing the most endangered species in the world, e.g. the Giant Panda. Appendix 2 containing the species that are not quite so threatened as the Appendix 1 species but are non the less seen to be in trade and need to be monitored. Appendix 3 species are those species were an individual country has identified that they are having a problem. For instance the minor bird coming over from Thailand was recognised to be coming out in such quantities that the Thai Government asked for a listing of that species onto Appendix 3 so that if any other member state or party to the conference received an application to import minor birds from Thailand they would flag it up as a problem and come back to the Thais to confirm whether or not this import was with their blessing or not. So we've got three appendices coming out of the Convention itself, now Europe has further muddied the water further on that by interpreting those three appendices into four annexes and it is the annexes which are going to bite in the United Kingdom so that is what you are going to be looking at because the controls are of course paper controls issued by my department and you are going to have to know what annex your species is to know whether or not you need to apply for a relevant piece of paper .

The principal legislation protecting the indigenous wildlife of England, Wales and Scotland is contained in the Wildlife and Countryside Act of 1981, now about to celebrate it's seventeenth birthday. It is still the principal piece of legislation for looking at the protection of indigenous populations but it doesn't cover Northern Ireland where the equivalent is the Wildlife Northern Ireland Order of 1985, coming into course four years after the Wildlife and Countryside Act.

For us I think the most important piece of legislation to look at is the effect of European legislation on CITES specimens collected for or in use in museum collections. The latest information is in the pack I've

already provided for you and that applies not just to museums but to zoos, botanical gardens and other scientific institutes. I'd like to draw your attention to the European Principal Regulation particularly to Article 8 which states that it is an offence to purchase, offer to purchase, acquire for commercial purposes, display to the public for commercial purposes or use for commercial gain, to sell, keep for sale, offer for sale or transport for sale any of the specimens of the species listed in Annex A of the regulations. So what species are listed in Annex A? All of the species that are on the CITES Appendix 1 species list are included in Annex A, including what they call the charismatic mega-fauna of the tiger, the elephant, the rhino and all the other species – around 8,000 in total. Also listed on Annex A and extending the protection from the CITES list are some of the Appendix 2 species which are deemed to be particularly at risk within Europe including the golden eagle, so although it's a CITES Appendix 2 species within Europe it's Annex A listing means that it is treated as if it's an Appendix 1 species, it's given added protection. Not only the live specimens are given protection but also the dead specimens are given protection and also their parts and derivatives are protected (full list in pack provided). Before 1st June 1997 when this latest regulation came into effect the Department of the Environment, Transport and the Regions had issued a number of exemptions one of which permitted zoos, scientific institutes etc including yourselves, the museums, to display to the public and sell to each other Appendix 1 specimens. The new European regulation doesn't allow member states to individually exempt provisions so we have had to phase them out I'm afraid and only the European-wide derogation's can now apply.

This isn't very good news for museums on the face of things; it sounds as if you would have to apply to the Department for an individual certificate for each and every specimen you want to put on display. That would be a horrendous job both for yourselves for having to catalogue and apply for each certificate and for us on the receiving end for having to actually process them. There is hope, however, because in Article 30 of the Implementing Regulation there are general exemptions which allow the sale of artificially propagated plants, live captive bred specimens of species listed in Annex 8 of the Implementing Regulation (non of those species are regularly traded in the United Kingdom) and worked items made from specimens acquired before 1st June 1947. That last derogation is the one that might well apply to some of the items in your museum collections, some of the older stuff is obviously going to be within that particular bracket. There is a further definition of what are a worked specimen and that's contained under Article 2W of the Principal Regulation 33897. It describes a worked specimen as being an item which requires no further work on it and is a household item,

an item of jewellery or ornament. A tanned skin that requires further work on it will not fall into this category. A full mounted specimen that was prepared before 1st June 1947 would.

Additionally, you can look at Article 30 of the Implementing Regulation 93997. This is a general European-wide derogation, which allows zoos, museums, botanical gardens and other scientific institutes to apply for a one-off certificate. The certificate is going to allow you to display for commercial purposes all Annex A specimens covered by the certificate and it allows the sale of the specimens to other scientific institutes holding a similar certificate. It won't allow a general sale or an auction, for that you would have to apply for an individual exemption under Article 10 of the Regulations. But under an Article 30 certificate, if it were a sale, a loan or an exchange with a similar museum or institute then you wouldn't have to apply for a separate certificate. Such a certificate is intended for Annex A specimens that are intended for captive breeding or artificial propagation from which conservation benefits will accrue to the species. The second criteria is the one you are going to be most familiar with which is that they are intended for research or education aimed at the preservation or conservation of the species and that's what museums do best – they are there for educational purposes. There are some criteria for the issue of this Article 30 certificate however, and provided your organisation a member of the federation of zoological gardens of Great Britain and Ireland or you're registered with the Museums and Galleries Commission, or you're a member of the Botanic Gardens Conservation International then the Department is already satisfied that the aims and objectives of these institutions satisfy the requirements of Article 30. So if your organisation is a member you just apply to the Department for your Article 30 certificate and you provide proof of your membership and you should get your Article 30 certificate no trouble. If your organisation isn't a member of one of these worthy bodies then you are going to have to apply for your Article 30 certificate and you will also have to give supporting evidence of your application and that has got to include a brief statement of the nature and purpose of the institution concerned, the details of the number and type of specimens maintained in the collection, details of past success at breeding and propagating.

There is another exemption, which might be of interest to museum collectors, collections and other scientific institutes, which is the use of labels by registered scientific institutions. These proscribed labels are issued by the Department of Environment, Transport and the Regions and they can be used for non-commercial inter-institute loans, donations and exchanges of herbarium specimens, preserved, dried or

embedded museum specimens and live plant material for scientific study. The labels themselves must bear the full five-digit registration number for your scientific institute and you must tell the Department each time you use a label. So if you register for these labels you'll be given a little stock of them and each and every time you use a label you have to report it back to the Department saying what you've used it for, what you've sent out on loan or as a donation or as an exchange. The details of the type of research undertaken also have to be included in the return and how it is meant to help the conservation of the species that has gone out. I should just add that the general exemption that used to apply to CITES species for museums and scientific institutes was phased out from 31st March of this year which means from 1st April you would require this Article 30 certificate to display your Annex A species. We haven't had very many applicants for these so it appears that you're all in breach of serious European regulations.... I strongly recommend that you do it right away.

I want to very briefly move on to the controls under the Wildlife and Countryside Act 1981. This is the primary piece of legislation in England, Wales and Scotland that controls the protection of our indigenous population. Section 1 of that Act prohibits the taking, killing and possession of wild British birds and their eggs with some exceptions. You can't go into a museum without noticing that you have wonderful displays of local birds and their eggs – I just sincerely hope they are all legal. Section 5 and 11 outlaws a variety of methods of taking or killing wild birds and animals respectively and this could of course affect your parts of the museum when you are given donations because mere possession of an illegally taken wildlife subject can in fact make you liable to prosecution as being in possession of it which would be a little bit embarrassing so it would be as wise to be on guard as it were for any specimens coming to you that appear to have been shot, poisoned, pole-trapped or otherwise look as if it's had a rather dodgy end to it's life. Road traffic kills are all right, I think they're the main form of donation. Full details of what is legal and what is not can be gleaned from the Wildlife and Countryside Act. You can of course have possession of certain game birds that have been shot, they're not covered by the Wildlife and Countryside Act, and indeed there are the Corvids that can be trapped using the Lawson trap and legally dispatched by being knocked on the head or other humane methods of dispatch. It is perfectly alright to have those birds but if you have a otter, for instance, that looks as if its perhaps been poisoned or drowned in lobster pots perhaps that ought to start ringing alarm bells when you have thirty coming to you that have been drowned in lobster pots in one bay. Just to be aware that there is a problem and to put you on warning there are controls concerning the possession of these pieces of wildlife

and if you are in any doubt I should make friends very quickly with your local police wildlife liaison officer.

Section 6 and 9 of this particular piece of legislation prohibits the commercial activity relating to British birds and certain other animal and plant species that are listed in Schedule 5 of the Act and it is this last piece that I want to dwell on a little bit at the moment because there has been a very recent change. In fact it was as of midnight on 16th April new or additional statutory protection was given to 15 species of animal and 17 species of plants. The animal species affected include the stag beetle, the basking shark, the water vole and large copper butterfly to name just a few of course. The plant list has been extended to include several species of moss, lichen and fungi as well as more recognisable species such as the bluebell. This particular step was the conclusion of three years review of the levels of protection afforded to British wildlife and it's under the title of the Third Quinquennial Review of Schedule 5 and 8 of the Wildlife and Countryside Act 1981. It is hardly a catchy title, but this title actually hides the fact that there's been an awful lot of work going on out there identifying what species are at risk at the moment within the United Kingdom and requiring some form of protection from commercial activity. In accordance with statutory obligations during 1995 and 1996 the Joint Nature Conservation Council and the three country agencies including the Scottish Natural Heritage reviewed the status of our native wildlife and advised the Secretary of State of their recommendations late in 1996. During 1997 the Department of the Environment having been privy to these recommendations then undertook a period of consultation with other government departments and with non-governmental organisations and other organisations who have a wildlife interest alike to try and find out what rationale was behind each species that was nominated for protection and also the impact that having given that particular species that protection would have. Once the officials were happy that they have considered the case for protecting each species as thoroughly as possible and it takes over a year, so he had to be pretty happy, they then undertake to take in the concerns of other interested parties. Recommendations are then accepted on the review findings and are presented to the Minister for Environment, who is Mr Meacher and that happened in March so it takes quite a while. The Minister signed the implementing order on 20th March and as a consequence the increased level of protection came into effect 21 days later on 16th April except for one species. This was the freshwater pearl mussel, which was given immediate protection. The reason for that was because of the perceived threat of the raids on mussel beds and then being stripped in the 21 day laying period that is the norm. This was particularly brought into practice because of a problem that had

been occurring here in Scotland in fact where a traditional trade had become out of control and had passed from the normal, I understand they're called the tinker population, into wider commercial fields and people were going out there who wouldn't normally have been associated with the trade and actually stripping beds and killing mussels to get at the pearls. So to protect this species from that irresponsible sort of behaviour this particular part of the regulation came into effect immediately and that just proves we can work quickly when have to.

So how are these changes going to effect the activities of museums I can here you mutter. In essence, as of 16th April the possession of any of the 15 animal species will require a licence if it is to be considered lawful. This restriction is brought about by virtue of Section 92 of the 1981 act which states that 'if any person', and that includes yourselves, 'has in his possession or control any live or dead animal included in Schedule 5 or any part of or anything derived from such an animal he shall be guilty of an offence'. I should just point out that these are Level 5 offences triable summarily only which means in England and Wales at magistrates court level that you are liable to a fine of up to £5,000 and in Scotland it's a sheriff court that would hear such a complaint and the maximum fine there is also £5,000. There is no custodial sentence associated with a complaint under the Wildlife and Countryside Act.... Yet, but watch this space. So it's a heinous crime to be in possession of a live or dead animal included in Schedule 5. This Section is time controlled though the same as any other section in the Wildlife and Countryside Act such as say 9.1. which prohibits the killing, taking or injury of an animal and only relates to those actions carried out after, as in this case, the 16th April 1998 when the protection came into place for them. In accordance with Section 9.3 an offence for possession would only be relevant if the animal in question had been taken on or after 16th April 1998. However, were there is reason to question the age of a specimen, your friendly police wildlife liaison officer may well require evidence to confirm that this is the case, so this is an instance where paperwork records might have to be updated somewhat quickly. The sale of both animals and plants taken from the wild on or after 16th April is also restricted. So if you want a licence for any of these 15 species, including your basking sharks which you might be knee deep in suddenly then the licensing authorities you have to apply to depend on where your museum is. So in Scotland you would apply to the Scottish Natural Heritage people, while applicants for licences to sell specimens must be submitted to the Secretary of State for Scotland or Wales or to the Department of Environment, Transport and the Regions if you're in England. The licenses, you'll be pleased to hear, are applied for under the provisions of Section 16 of the 1981 Act and they can be applied for scientific or

educational purposes which of course would apply to museums, however, you should bear in mind that each application will be dealt with on a case by case basis so don't forget to tell us if it is for educational or research or whatever purpose when applying for such a license.

The cautionary tale to this one is that newly protected species are there because the situation with their sustainable wild population has become a worry and that these controls are there to prevent it from becoming worse. The statutory instrument that I'm referring to that has introduced these wonderful new controls is called No. 878 of 1998. It was laid before Parliament on 26th March 1998, it varied Schedules 5 and 8 and it took effect from 16th April except for the freshwater pearl mussel and that took effect from 22nd March, the day that the ink was dry on the statutory instrument as it were.

The work of the Partnership for Action Against Wildlife Crime (PAW)

Nick Williams, DETR.

The subject of my presentation is an exciting initiative aimed at combating wildlife crime and is known as the Partnership for Action Against Wildlife Crime, or PAW for short. My name is Nick Williams, I'm the Chief Wildlife Inspector and also the head of the Wildlife Crime and Inspectorate Unit of the Global Wildlife Division of the Department of the Environment, Transport and the Regions (DETR). My background is in research as a field biologist but I've been stuck behind a desk for the Department for almost a decade now.

Let me start by outlining the structure of my talk. Initially, I am going to give you a brief introduction to the DETR and it's role in this area of wildlife law enforcement. We'll then look a little bit in detail about the background and current structure of the partnership. I'll briefly run through the terms of reference and then I'll talk to you in some detail about ten of the key initiatives and outputs that we've done. Finally, I'll take a look forward and see what is being planned for the future.

DETR was formed almost exactly one year ago, the day after the Labour landslide victory at the general election. It was announced on 2nd May 1997 that we were going to be headed by the Deputy Prime Minister, John Prescott, who is the Secretary of State for environment and transport. Our remit is very wide ranging and its responsibilities include the former DoE, Department of Transport and the regional

offices. As far as the environment is concerned, we deal with issues affecting the environment here, with housing, planning, the countryside and roads. We also play a full part in the international arena, actively contributing to issues such as pollution, climate change and other factors affecting the global environment. DETR also has a responsibility for wildlife conservation both at home and abroad and although our main headquarters is at Ealand House, near Victoria Station, in central London, DETR's Wildlife and Countryside Directorate (WACD) are located at Tollgate House in Bristol.

Many acts of parliament and regulations are available in the UK to protect wildlife. They tend to be rather complicated and there are certainly far too many to mention here. The key pieces of legislation, administered by WACD, are the Wildlife and Countryside Act 1981, the CITES Convention, which Lynne talked about, the EU Habitats Directive and also the Zoo Licensing Act, but as I say there are many others. These, and other measures, fulfil obligations placed upon us by European and international agreements, as well as taking measures to protect our own native species and habitats. However, the bottom line is that all these rules and regulations are all very well, but they are effectively worthless if they are not properly enforced, and that's where the Wildlife Crime and Inspectorate Unit fit in.

Following an internal review of wildlife controls in the early 1990s, DETR shifted its emphasis by removing certain outdated bureaucratic controls, and used the freed up resources to give greater support to enforcement efforts. We at the Wildlife Crime and Inspectorate Unit are at the heart of DETR's efforts to support the statutory enforcement authorities in combating wildlife crime. The Unit is composed of eight full time staff, including myself, and about 70 part time consultant inspectors, one of whom is here today and he's in your ranks. The work falls into three categories. One is enforcement liaison and casework, where we have links with the statutory enforcement authorities i.e. the police and customs, and provide information from our records. We've got the Wildlife Inspectorate, which undertakes a range of inspections to do with birds registered, and following up on import and export of endangered species under the CITES permitting system. The third area is that we take a lead in government policy relating to wildlife law enforcement, and this includes acting as secretariat to the partnership.

There is strong evidence to suggest that wildlife offences are on the increase. In addition, primarily because of the high commercial value placed on certain rare species, organised criminals are becoming increasingly involved in obtaining and trading in such specimens illegally. The primary statutory

enforcement agencies for virtually all wildlife controls are the police for internal matters, for example, killing and taking, and sales offences, and customs for smuggling in or out of the UK. However, it is clear that police and customs and excise officers cannot deal with this problem on their own. Enforcement officers, for example, cannot be expected to have detailed knowledge of all the legislation, or knowledge of individual species and their particular peculiarities. So DETR and certain other government departments and agencies also have a key role to play, and one of the main objectives of the partnership is to support the network of police wildlife liaison officers, or PWLOs, and customs CITES liaison and intelligence officers, or CCLIOs, and to assist them in whatever ways we can.

So, moving to the background of the partnership. Following the review that I mentioned earlier, the Enforcement Working Group was set up for a year long look at enforcement on a national basis, and it reported to ministers in July 1995. It identified that there was a large number of government agencies and some non-government NGOs involved in wildlife law enforcement, and there certainly was a need for more co-operation and co-ordination between them. PAW was launched in November 1995 to bring together experts in the field of wildlife law enforcement, as well as to allow a strategic look to be taken at enforcement activity and to provide a forum for discussion of issues at a strategic level. The day to day work is overseen by the Wildlife Law Enforcement Steering Group, or WLESG, jointly chaired by DETR's head of the Global Wildlife Division, my boss, Robert Hepworth, and Deputy Chief Constable Mick Brewer from Warwickshire Constabulary. PAW has a wide membership. Other organisations involved include Customs and Excise, and other government departments, for example, the Home Office, Scottish and Welsh Offices, the Crown Prosecution Service, the Crown Office here in Scotland, as well as the Environment Agency, the Country Conservation Agencies and certain NGOs with specialist knowledge in enforcement matters, for example, Traffic International, the RSPB and the RSPCA. The Steering Group is supported by a small number of sub groups, which are tasked to take forward specific projects and initiatives, and this is basically where the work is being done. For example, we've got a DNA and Other Forensic Techniques Subgroup, which I'll mention tomorrow. We have a group looking at legislation and proposals for strengthening enforcement provisions within key legislation. We've got a group managing the annual national Police Wildlife Officers conference and we've got another group looking at data management exchange. Also the Steering Group is advised by a contact group. Originally this composed of representatives from country sports and sporting interests. Later it was extended to sustainable users

network, which consists of a group of organisations, mainly animal keepers and traders.

To briefly run through the terms of reference. The first one 'to provide a strategic overview of wildlife law enforcement activity in the UK'. 'To improve co-ordination and communication between the organisations involved'. 'To oversee the dissemination of advice and guidance'. 'To oversee and co-ordinate follow-up action to the Enforcement Working Group'. 'Contribute to the development of wildlife law enforcement policy and to make recommendations to government departments and other relevant organisations'.

So let's look at what we've actually achieved. The tangible output was 'Wildlife Crime, a guide to wildlife enforcement in the UK'. It was a direct response to Police Wildlife Liaison officers and CCLIOs, who were seeking a compendium of all the relevant wildlife legislation. This was the first document to bring together all the relevant wildlife legislation within the UK in one book. In addition to supplying information about controls, it also gives practical advice on steps to be taken when carrying out wildlife investigations, so primarily it was aimed at wildlife law enforcement officers, but it is clearly of value to anybody who is involved in wildlife law enforcement or impacted by it, for example, maybe environmental consultants. Certainly it was well received, and the first edition sold out very quickly. We've done a lot of amendments, taking on the new COTES regulations which came in last year and a new edition is already at the printers, due to be published, I hope, before the end of May, but if you are impatient and you've got access to the Internet we've already published the second volume on the internet.

The second output was a major national conference, held in London in October 1996, entitled 'Combating Environmental Crime'. This event succeeded in raising the profile of environmental crime in general and PAW members made a key contribution to this event. In fact the first morning wholly dealt with wildlife issues. The one thing I think that emerged from that conference was that wildlife law enforcement was leading the field compared to other forms of enforcement concerned with environmental crime within the UK, for example, waste crime, radioactive substances and CFCs.

The next point I've mentioned here is sponsored research at the Laboratory of Government Chemists. I'm going to cover that tomorrow. It is to do with the guidance we issued for enforcement officers who wish to use DNA evidence in their investigations. We also issued a standard sampling kit, which any veterinary surgeon can receive, and it has got all that they need to be able to take a blood sample or even a tissue sample

from a bird or other specimen. Another publication in the wildlife crime series is some work that I did, 'A Directory of Forensic Expertise'. Some of you, I think, participated in that and may well be in this book.

The next thing is the publishing of a range of legislative proposals. From discussions, particularly within the Legislative Subgroup, it emerged that there were some shortcomings, particularly from the Wildlife and Countryside Act, as far as the enforcement officers were concerned, and the Subgroup has come up with a range of proposals which are aimed at improving the enforcement powers within that legislation. It contains a package of separate proposals covering powers of arrest, introduction of custodial sentences, rationalising provisions of extending time limits for the beginning of prosecutions, and provisions for warrants. It also includes a proposal for a specific power to be introduced to take blood samples for DNA analysis. We know that environment ministers are sympathetic to the proposals and we are looking in detail at how to take these forward. We can't make any promises, there is no legislative slot yet available or set aside for this, although there appears to be a willingness amongst environment ministers to push these forward. We will just have to wait and see what happens.

Last year we introduced a new award, funded by the WorldWide Fund for Nature - the 'Wildlife Enforcer of the Year Award'. This was aimed at raising the profile of wildlife enforcement nationally and also in police forces and customs staff. Traditionally wildlife offences have not been a high priority, and there are other issues that the statutory law enforcement authorities have to deal with, but we wanted to raise the profile within those organisations. It is also a way of recognising the efforts of individual officers who frequently undertake their wildlife related enforcement activities in addition to their normal duties, so it is something that is tacked on to their job description and not infrequently they do that in their own time. Last year it was jointly won by a customs official and a police officer.

The concept of PWLOs was first introduced more than a decade ago, but it has been a slow process convincing all chief constables of the more than 50 or so police forces in the UK that they all need at least one. However, in the last 18 months, all forces have nominated at least one PWLO and I'm delighted to say that several forces have many more than that. For example, I believe that both Tayside and Strathclyde, locally, have 15 or more PWLOs in their forces. The RSPB played a key role in promoting the concept of a network of police wildlife liaison officers and back in June 1989 they organised the first national PWLO conference, which took place in Derbyshire. Primarily because we don't have a single national police force,

no one constabulary was able to find the resources to organise this event, so it had been left to the RSPB, a non-government organisation, to do so for the last nine years. However, one of the first tasks the Partnership undertook when they were set up was to establish a committee to take over the running of this event, and we at DETR played a key role in organising last years event in Carmarthen in October. It was a very productive weekend and we are now in the process of finalising the written proceedings for that, which I hope, will be published in the next couple of months. In addition, we are already well into planning this years conference, which is scheduled to take place at the MOD police headquarters at Wethersfield in Essex from 16th-18th October.

A key element of PAW is to provide opportunities for partners to share expertise, specialist knowledge and skills as widely as possible. One of the main ways in which this has been achieved is by encouraging partner organisations to invite external specialists to assist in their internal training courses. This has just taken a major step forward with the introduction of a national training course for PWLOs, which has been developed by the Warwickshire Constabulary, and the first ever week long training event was run at Warwickshire headquarters for 16 PWLOs earlier this month. It took more than a year to put this together and the agenda included a comprehensive cross-section of the key issues and some of the key legislation. I have not seen a full report of the event but early comments suggest that it was extremely successful, and I know that another course is already planned for September. Our Scottish partners, led by Tayside Police and the Scottish Office, launched a poster campaign in October 1997 entitled 'Stop Wildlife Crime, Tell the Police'. Publicity is an area which PAW recognises that more work needs to be done. This was a good start, no doubt, and a key principal of PAW is that, in addition to the more traditional definition of enforcement which relates to investigation, prosecution and the associated penalties, and to be fully effective, enforcement must encompass proactive deterrent activities, such as publicity, education and of course training. DNA and other forensic techniques were quickly recognised by the Partnership as a major tool in the investigator's toolbox, and we set up a subgroup to take that forward. There are two projects that we have got ongoing to promote DNA technology; collaborative research projects, but I will cover them tomorrow.

Moving on to the EU Law Enforcement Workshop. As part of the UK's six month presidency of the EU from January to June this year, my branch of DETR organised a two day event in London in early March. The main objective was to bring together key personnel within our counterpart organisations in Europe, but also further afield as well. The first day

focused on wildlife enforcement issues in Europe, with a rather more global approach being taken on the second day, including a special session on tigers, and the issue of illegal trade and combating that. Again, there was a significant contribution from PAW members. It was a very successful event, with 150 people attending, including about a third from overseas. We are, again, working on compiling the proceedings and I hope to publish them this summer.

That has reviewed some of the key things we have been up to over the last two and a half years, so now I will just have a look ahead a little bit. I mentioned the PAW contact group for country landowners and sporting interests and the sustainable users earlier. I must be honest with you and be forced to admit that this idea was not particularly successful. We never really got passed agenda 1 on the meetings, which was their concern or perception that, because the RSPB and the RSPCA were NGOs sitting on the main group, there would be a biased outcome, and they wanted full membership of the Partnership Steering Group. The issue was never fully resolved and so what we did was call an open seminar in January this year in London and invited all PAW members to participate. It was a productive event with many good ideas emerging. I think the key point that everyone recognised was the importance of a partnership approach, and it is just a matter of getting the structure right to maintain an atmosphere of trust in the organisation without compromising any investigative activities. My personal belief is that we can find a workable and effective solution, and we've drafted some in-house proposals based on that seminar, and subsequent representations, which have been circulated internally this last week. We're hoping to get ministerial approval in the next three weeks, with a view to launching a revised structure for the Partnership on 15th June for our next scheduled meeting in Bristol. I hope one of the ways forward will be to enable other organisations, which wouldn't necessarily consider themselves to be involved in law enforcement, to become members of the Partnership. This would enable them to keep up to speed with what's going on, and also to provide the contacts which are needed by the enforcement authorities, because you own and hold lots of expertise that they may need to tap into. So I can't be too forthcoming about the outcome of that, but I am hoping that in the longer term, maybe even the Biology Curators Group might want to join the Partnership.

PAW members made a positive contribution to the meeting of environment ministers of the Group of 8 industrialised countries, which was held at Leeds Castle in Kent at the beginning of the month. Ministers committed themselves to a range of action to help fight against environmental crime, including specific references to the illegal trade in wildlife, so I think

we've succeeded to some extent in raising the profile of wildlife enforcement here. We are looking in-house now at how to take these matters forward.

A booklet is being prepared to help raise the level of awareness of wildlife crime amongst magistrates and others in the judiciary, basically because it was felt that there was a disparity in sentencing. Similar cases being taken in different parts of the country were getting very different penalties. In particular, this document is intended to emphasise the effect of such crimes on the conservation status of rare species. Traffic and the RSPB have jointly sponsored it, and I think it will be published in the next couple of months. One of the problems we've experienced in trying to raise the level of awareness concerning wildlife crime, and in arguments to change the legislation, is that there is no central record of wildlife incidents or even prosecutions. Basically there is a great deal of anecdotal information, but very little hard data to work with. Many organisations, including ourselves, gather information, but it's often incomplete or difficult to access, and we know that there is quite a significant level of duplication. So we bid in-house for some resources within DETR's research project to gather some hard evidence on wildlife crime over a given period. Also, and perhaps more importantly, to try and devise a means by which such data can be gathered in the future without costing us too much and without too much resources being put into it. I am already aware that some work has recently been done by a researcher in Scotland, Ed Conway, sponsored by the Scottish Office. I'm looking forward to receiving the publication of his report, which I believe is imminent, and certainly we are going to take that on board when we review and write the specification for the project which we are due to let, I hope, in the early autumn of this year.

So, just to recap then. I began by outlining where DETR fits in to the wildlife law enforcement equation. I reviewed the background and structure to the partnership including its terms of reference. I've discussed a number of the key initiatives, ten in fact. There are a lot more activities that we're involved with which I haven't had time to mention here, but one of the key objectives is to provide opportunities for all those involved in enforcement to be able to share expertise and knowledge, and that manifests itself in many ways. So just building up contacts by meetings has been extremely successful. And finally, I've looked at the future. I hope I've been able to convince you that the Partnership really is an exciting development in the fight against wildlife crime. I believe we've taken some major steps in the last two and a half years or so, and I recognise that there is a great deal to be done, but I think we have proved that the partnership approach is a very effective way

forward and it will be useful in combating this type of wildlife crime.

Guidelines for destructive use of biological material

Richard Thomas, Natural History Museum

I'm going to talk about guidelines for the destructive use of biological material. Effectively there are two versions of this talk I could give you. There's the short version. There is really no difference in principal between destructive sampling of specimens for molecular work and any other kind of destructive sampling. In fact, as you have probably gathered from some of the stuff that Alan was saying earlier, destructive sampling for molecular work is sometimes much less destructive than some of the techniques used as standard by morphologists when they are doing some of their techniques. I'll give you the slightly longer version of the talk which is derived from an article in a now extinct publication called 'The Ancient DNA Newsletter' six years ago, and written by Havov , Bob Wayne and myself and much of the material in that article has subsequently been incorporated in the NHM's policy document on sampling for molecular purposes from the collections.

The somewhat longer version: I think we need the somewhat longer version because there is this cultural difference between molecular biologists and museum curators. Curators often see molecular biologists as sort of evil interlopers who soak up valuable resources and take up space that could be better used for storing collections. Some of the molecular biologists see curators as traditionalists who don't recognise or are incapable of recognising the path-breaking importance of their research. There needs to be some way of mediating between those two sorts of cartoon extremes. Specifically you need criteria for evaluating requests for the use of material and that pre-supposes having somebody around who is qualified to evaluate the requests. You also need to consider that a museum or holders of a collection should expect to get back from a loan of material.

In 1992 we came up with five criteria for evaluating requests for destructive sampling of specimens. The scientific value and the feasibility of the project, the qualifications of the investigator or the lab to do the work, could they possibly get this material some other way other than destroying specimens like from captive populations or wild populations. The volume of the material required relevant to what is in the collections, so if they are going to grind up half of the single existing individual of something it would probably not be a good thing. And finally, the staff effort required to

fulfil the terms of the loan. I will go through all of these in slightly more detail.

Feasibility and scientific value: Is it of sufficient interest to justify the damage done to the collections? A lot of ancient DNA work initially started out looking a little bit like stamp collecting, saying ooh, we got the oldest sequence and that is about as far as it went. If some question of general importance is not being asked you might ask yourself whether it is worth destroying the specimen. Is it technically feasible? We have heard a lot about what is and isn't feasible today. It is a rapidly moving field. Techniques are improving. I think PCR was probably the one big thing and there is not much we are going to be able to do with specimens where the DNA is just no longer there. Hence there are limits, and I would be extremely sceptical for requests for material over a few tens of thousands of years at the very outside. Also, be very sceptical of projects requiring intact DNA of more than, at the very outside, a few hundred base pairs. Evaluation of the scientific value and feasibility usually requires having somebody around with a little bit of experience in this and I realise that most smaller museums don't have any in-house experience. The NHM and some of the other larger museums that do have that type of experience are generally willing to help evaluate the requests for the use of material.

The qualifications of the investigating laboratory to do the research. Do they have the technical competence. You might ask if they have a relevant publication record or some other relevant experience that indicates that they have got the technical competence, the facilities and the ability to work carefully enough to maintain the sort of standards that we've heard from Alan. Working from ancient material or material out of collections is often a little bit hit and miss. The success rates are generally not anything like 100 percent and if somebody comes in and asks to have a sample of all 532 specimens from a particular family, you'd tell them that you could give them half a dozen or so and see how they get on before they come back and slash and burn their way through the rest of your collection.

Could they get this material some other way? Generally speaking, with the difficulties of working with material from collections people generally aren't going to treat your collection as a free candy store to go pick up anything they need rather than making a slightly greater effort to get it from a fresh source. There are quite a few situations in which sampling from a collection is definitely legitimate in my view for extinct and endangered taxa. Increasingly in the world it is getting logistically or politically harder to sample from some groups of organisms in some places.

This might be a good point to bring up a point that I was hoping Alan would but didn't - Museums being repositories of specimens that maintain DNA in a very good state rather than in frozen tissue or other methods of preserving nucleic acids and other bio-molecules in a very high state of preservation. We maintain a small frozen tissue collection at the museum which fairly opportunistically gets specimens from, for example collecting trips along the continental slope - fish that are fabulously expensive, each of these individual fish costs hundreds of pounds if you cost it out to collect. We take small samples of muscle tissue and freeze them at -80 degrees. Again, that not something a lot of museums are going to have the wherewithal in funds, space and expertise to do but there are places like our institution and a number in North America and increasingly some of them will be willing to take on specimens like that.

Volume of material relevant to what someone wants: I recall us having a request for somebody wanting a pretty sizeable fraction of a grasshopper that had been collected on one of the Cook voyages. That was a very unique and historically important specimen. Rightly in my mind the curators in the museum decided that they shouldn't really grind up most of this specimen for molecular purposes. But in many cases, like in our vertebrate collections, somebody wants a few square millimetres of hide or a few bits of muscle tissue it's not doing significant damage to the specimen. There is a huge grey area between these extremes and that's where the judgement of the curator comes in and consultation, where required, with people with the relevant molecular experience.

The staff effort required to fulfil the terms of the loan. Obviously you all work very hard and your funding is not adequate and you don't have time to do the basic stuff you need to do to maintain four collections so you don't have time to deal with molecular workers swanning, in wanting huge amounts of your time and lop bits off your specimens. So molecular workers, in general should be willing to travel to collections and do the sampling themselves where that's appropriate under the eyes of the curator and at the convenience of the curatorial staff. I think fees for the loan requests and bench charges can be required where appropriate. I'm not suggesting they be required all the time but where appropriate it is a reasonable thing to ask. Molecular work tends to be regarded as expensive and is often supported by grants so it's a relevantly minor thing to include bench fees when processing fees for loans within a grant proposal.

What the museum or collection holder should get back from a destructive sample of a specimen. The NHM requires that people give back all the extracted nucleic acids. We have a facility to store them, it's not a problem for us, some institutions it will be a problem

and there needs to be more communication amongst curators about what to do with returns from molecular projects like this. We require, minimally, an electronic copy of any sequence data taken or derived from a specimen and hopefully the people that go to the trouble to do this are going to submit the information with a sequence data base where it will have a proper accession number and hopefully they will have included the specimen registration number in the record (in the sequence data bases there are facilities for that). Museums should get back copies of experimental protocols where they differ from already published protocols so that other people, if they are successful, can use them as well.

We are all trying to justify our existence to funding bodies. It is important that, where appropriate, museum staff are authors on publications or at bare minimum the use of the collections are acknowledged. Collections have to justify their existence in the eyes of funding bodies. Sampling for some of these molecular projects adds value to the collection. You should get back reprints, status reports on projects using material from the museum collection, keep track on people like Alan who sits on material for years without doing anything with it.

A prosecution case study.

Steve Downing, West Yorkshire Police

Bob Philpott who was originally going to present this talk is committed on an operational matter so you've got me instead. Bob was going to talk to you about Operation Avocet. It was a Wiltshire case; it started in Wiltshire and spread throughout the country. I'll give you a brief insight into that and then talk about my own case.

Before I look at the case history we need to discuss the legislation to see why I did and why Bob did what we did, then what we did and what impact this will have on your selves. The legislation covering the collection of wild birds is not new. Whilst Henry VIII was busy collecting wives he was also busy preventing museums and egg collectors collecting eggs. He had an act of parliament that said no person shall from the first day of March to the last day of June take or destroy any egg of wildfowl from the nest upon pain of punishment of one year and to forfeit for every egg of crane or bustard twenty pence, every egg of heron, bittern or spoonbill eight pence and every egg of other wildfowl one pence. A long time ago those penalties were quite severe. I'm sure old Henry there was more concerned about protecting his menu than the birds but nonetheless I have to applaud his sentencing policy. From 1880 there was a succession of acts of parliament protecting wild birds and their eggs. In

1894 under the Wild Birds Protection Act the Secretary of State was enabled or empowered to prohibit on application by county councils the taking or destroying of eggs in any year or years in any place or places within that county. There was a second part which also allowed him to prohibit the taking or destroying of any kind of specified wild bird in that same county.

The next major milestone for the protection of birds was 1954. The Protection of Birds Act 1954 prohibited the taking, and only the taking, of eggs, not possession. Effectively that meant that you had to be caught in the first minute. Where does taking start and taking stop? Is it immediately after you've taken it? Is it the point where you give the egg to a person who didn't take it? Is that a joint taking? Is it when you're walking down the lane? It's definitely when you get home. But it is a grey area. There is a bit in between that is very difficult to sort out so effectively we didn't use it very much; it wasn't an effective piece of legislation. However, as far as you are concerned and as far as we are concerned i.e. the enforcement agencies, we will use that Act of Parliament to dispose of eggs.

By the time the Wildlife and Countryside Act came in (it is dated 1981 but it actually came into force in September 1982) Parliament clearly decided enough was enough as far as bird egg collections were concerned. For the first time we got rid of the problem with the original act and we had a definition of wild birds. No longer were we interested in County orders. No longer were we going to be specific to individual species in one area and change it next door (very difficult near county boundaries for example). This time it is any bird of a kind, which is ordinarily resident in, or a visitor to Great Britain in a wild state. I will apologise to the Scots contingent, I speak in English law, but I am fairly confident that that section is the same in the Act in Scotland.

Game birds are excluded but from the egg point of view they are given partial protection in Section 24 of the Game Act of 1831. Again, that was not so much to do with the preservation of the bird rather so that someone with authority could shoot them. That piece of legislation, which applies to game bird eggs, is only applicable to England and Wales, it doesn't apply in Scotland.

Now we know what a wild bird is if we have a look at the offences. The Wildlife and Countryside Act again, 1981. Section 1.1.3 'It is an offence to take or destroy the egg of a wild bird'. This is the piece of legislation that we use to seize egg collections. This is the only one that carries the power of seizure. This is an all-encompassing Act; it is the one we use for virtually everything and Section 1 deals almost entirely with birds. For the first time, Section 1.2, it is an offence to

possess. We have got rid of the problem of possession that we encountered in the Protection of the Wild Birds Act, 1954. It is also an offence to control, and with a large egg collection, you often find that they may be possessed by one person while being controlled by another. Some of the big collectors certainly house them away in safe houses, taking elaborate precautions to protect their egg collections.

Both Bob's case and mine were very, very complicated. We both found eggs. It would have been very nice to have found climbing equipment, binoculars, maps, model makers kits, model drills, egg blowing kits, embryo solvent – good evidence to show we had a taking – taking is obviously easier to prove. What we did find were data-cards. In my case we had a full set of data cards and these were pivotal, in fact the only evidence we had really of what had actually gone off.

In Bob Philpott's case, the Wiltshire case, the police were given some information that the Jourdain Society was holding its AGM at the Red Lion in Salisbury in July 1994. The information said that on display were eggs, nests and photographs so the police visited and sure enough the Jourdain Society were in fact having their AGM. On a large table there were items being displayed which included photographs of one particular nest site and what appeared to be the nest and eggs from that particular nest site. Those photographs were taken in 1994 also and were from Turkey. There were slides, photographic albums and a large number of eggs. Some of those items were identified there and then and given to an owner - ownership was claimed. Other owners just walked away from them and the ownership was never established. There was some quite rare stuff, golden eagles, red-throated divers, an endless amount of rare species that had been photographed and those photographs were on display. At that time it was impossible to say what was lawful and what was unlawful in this collection and so it was all seized. Bob and his team then started to amass intelligence about the people who had been at the conference and in September 1994 nine houses were raided across seven police forces and a total of 13,000 eggs were seized. Subsequently six of those people were successfully prosecuted for the illegal possession of 11,000 eggs and the disturbance of some of the rare birds with fines from £5,000 down to a conditional discharge. That was the first part of the case, the criminal side was over. Bob had a large amount of unused material, unused eggs for which there would never be a prosecution case. He was stuck with that – what does he do with it? In my case, the West Yorkshire case, in October 1995 we received a request from Hampshire to interview a man who had been found disturbing Dartford warbler. The officer that did the raid knew my defendant from old. We knew lots about this man so it was decided to

visit him with a warrant. In his attic, his loft area, there were five cabinets, some 3,000 eggs (600 clutches) and fortunately a full set of data-cards detailing everything. The cards and the collection were seized and the eggs were rationalised into four cabinets rather than the five just to make it easier to get them out of this loft space as we were quite concerned that they would be damaged. Being sued is not a good idea even though it happens quite regularly.

The data cards showed that these eggs were all collected by a Dr George Franklin. Dr Franklin was ninety years old and very ill having suffered a fractured skull. He was too ill to interview and, in fact, was never interviewed. He was never prosecuted and sadly he has since died. There was some confusion whether or not he had given this collection to the Jourdain Society or whether it was with the defendant or whether he was cataloguing it. There was a little bit of confusion in there, where the Jourdain Society backed off at one point. They have since denied all knowledge of this collection. We had the data cards but we had no other evidence to show that it had been taken so we were looking at possession offences.

The best defences are twofold. One, shift the collection outside the UK [i.e. falsify the data] so that the Wildlife and Countryside Act doesn't apply. Two, make sure that the data says that the eggs were collected pre-Act, Wildlife, again the Countryside Act doesn't apply. Obviously data that can prove or show that that occurred is good evidence, and perhaps I ought to mention that the onus is on the defendant to show that these things were done lawfully, not the police (most of the wildlife crime legislation dumps the onus back down to the defendant to prove that things were lawful rather than for us to prove that they were unlawful which is the normal way we go about things). Nonetheless we still have to get a reasonable level of proof rather than just say he did. So those were the two best defences and the data cards went along to prove that. [OHP of three schematic data cards] Card *a*, *b* and *c*. When we started to analyse these cards (600) we found that type *a* was used by Franklin, we think, between 1921 and 1967. The type *b* card was used from 1967 (slight overlap) onwards; his last egg was collected in 1983, post-act. The type *c* card with fancy little printing marks there were found scattered all the way through the collection. Wherever we had a problem with the eggs we found a type *c* card. There were other things; for instance, the type *c* cards were used when Franklin was in two different countries on the same day. Clearly it was all wrong. The *c* cards were printed after the date the eggs were collected. The *a* cards were all typed, 130 of them, so were the *b* cards, the *c* cards all hand written. Why were they hand-written? It wasn't his practice, he kept meticulous records. On the original card there was a little box for sex. When Franklin did it he put hen. On

the *c* cards it was a scientific symbol. On the *c* cards all of the scientific names were wrong. There was something obviously wrong with the *c* card collection. We managed to persuade the magistrates that the *c* cards were, in fact, being used to launder fresh eggs. Re-writing cards is fine provided you keep the old data. Some of the cards were a bit tatty but provided the old data was there you can rewrite it, you can put it on computer disc, you can do what you like, provided, when asked, you can produce the original data for the *c* cards.

During the eleven-day trial the defendant produced a field data book and, unfortunately for him, it didn't all go in his favour. He produced the field book and some of the data in the field book and some of the data which had been written by hand, by Franklin, didn't go along with the cards. He just simply tried to explain it as a mistake but here is a person who is meticulous. Also a lot of the *c* card entries in the book had just simply been cut out. He also, on his data cards, had a single egg of a black vulture collected in 1919 and the field data book said it was collected in 1959. The same with a red-footed falcon collected in Hungary in 1929 – on a *c* card it was in fact collected in the early 1950s. We also found, when we were looking at the consecutive numbering of set marks, it might go a, b, c in order on an *a* card but d would be on a *c* card, hand-written and completely wrong. It looked to us, and we managed to persuade the magistrates that these cards were being used to fill gaps where the eggs had been destroyed, damaged or beyond keeping or if the collections had been split. It was also nice to find a new batch of *c* cards and there were spaces in the cabinets so again we were able to show on the balance of probability that he was going to be feeding yet more eggs into this system. It was extremely complicated but we got there in the end of the 3,000 eggs a lot of them were collected from the 1920s right through until 1983 and remember the defences – ship them out of the country, put them on data before the Act. They were his defences. The eggs were taken as part of the enquiry into offences under the Wildlife and Countryside Act. There are no other powers, no other offences. However, with the evidence on the data-cards to show that some of the eggs were in fact certainly not collected outside the country, and were not collected on the days they were purported to be collected on, and evidence from the data cards show that a vast number of them were collected post 1954 when the taking was unlawful, the bulk of the remainder were taken in contravention of the Protection of Wild Birds Act, 1894. So I'm stuck with a collection which was obtained unlawfully. I didn't go to get it because it was obtained unlawfully. Nor did Bob. But once it is in our possession then we have a problem and this is where I hope we can reassure you that we will not be coming after your collections. They are in our possession - what do we do with them?

Fortunately we have come across this problem before and there is a Police Property Act, 1897. This gives us guidance. The police cannot, obviously, once we are in possession of something that has been obtained unlawfully, just give it back. 'Where property has come into the possession of the police in connection with their investigation of a suspected offence then a court of summary jurisdiction' (a magistrates court) 'on application by a police officer' (and in fact we very rarely take these proceedings, we just sit back and wait to be sued) 'or the claimant of the property may make an order for the delivery of the property to the person appearing to the court to be the owner'. So we sit back and let the egg collector sue us and say 'give me my eggs back'. The second part is perhaps as important in egg collecting cases, 'if the owner cannot be ascertained then the court can make an order in respect of that property'. You can argue that egg collections obtained unlawfully at the time they were obtained were the property of the Crown. To you and I, they were wild, no one had ownership, and no one had rights to take those wild eggs. So effectively, unless you want to say the Crown owns the eggs in which case we use the top section or we say we all own them i.e. nobody owns them, there is no owner, then we use the bottom section. And these are the two bits under the Police Property Act that we use to let the courts decide, not the police, not the Crown Prosecution Service and in fact in these complex cases we would miss out the magistrates section right away because we would go to county court. There is a right of appeal. Bob has already passed this first hurdle and he has got the magistrates to agree that our version is the right version, there are other precedents but their defendants are appealing. And I understand, and I don't know whether anybody has actually ever had one of these letters, that some of them have been writing to museums saying it is us today it's you tomorrow (if they get through this 1954 barrier).

In Bob's case he decided to stop at 1954 but I decided that that would leave the loop hole still available because all he would then do is push the data to prior to 1954 or use the external collection as the loop hole to retain these unlawful collections. So in my case I am looking at anything after 1894 and anything outside the UK. I have written to 13 embassies saying quite simply, this egg was collected in your country on this date, was it unlawful? If it was, then they are your eggs and we will be prepared to pursue that ownership claim on your behalf. So I've extended it a little bit and I think that will seal off all of the loopholes.

As you can see, your collections are safe. We have no powers to seize them. We would have no need to seize them – we're giving our eggs to Liverpool Museum.

Access to Collections

BCG, GCG and NSCG Joint Conference, Scarborough
3-4th April 2000

Keeping and Accessing a Hazardous Collection

Victoria Purewal, Department of Biodiversity and Systematic Biology, National Museum and Galleries of Wales, Cathays Park, Cardiff, CF10 3NP.

Natural science and anthropological curators are becoming aware of the potential hazards that their collections in particular are presenting. These collections have been treated with various mixtures of organic and inorganic pesticides and/or fungicides to prevent pest and mould attack. Invariably the information relating to identity, concentration and date of the application is not present. The problem associated with this material is whether to keep it as discrete collections that cannot be accessed, or to continue using the collections by implementing safety measures that will allow the collections to be handled without the risk of contamination. The aim of this project was to identify and quantify the residues present on the herbarium sheets within the NMW herbarium and establish whether handling the collections could pose a risk to health. Mercury, arsenic and barium were identified and the research established that contamination could occur through handling material containing these residues.

Introduction

It is unlikely that many historical natural science collections have managed to survive this long without being exposed to pesticides or fungicides during their lifetime. As the date, amount and nature of the chemical were invariably not recorded, it has been easy to overlook potential 'invisible' health risks. The botanical collection within the NMW herbarium as with other natural science collections, had not been considered a health risk because it was believed that pesticide/fungicide applications made many years ago would have dissipated by the present day (Merrill, 1948). The NMW herbarium has no documentation accompanying collections that have been donated to the museum, or regarding its own methods of preservation, although senior curator's can recall specimens being fumigated with carbon disulphide up until 1975. From about 1930 it is thought that paradichlorobenzene was applied to the zoological specimens and naphthalene was placed within botanical cabinets. Drione a silica aerogel, desiccant, dust and Constrain a permethrin based micro-emulsion have been applied to the insides of the botanical cabinets since 1995.

Brown and yellow tide marks present on the herbarium sheets did not relate to the methods previously described and so a research project was undertaken to identify this discoloration. The aim of the project was to determine whether the collections housed within the NMW herbarium had been subjected to other chemical applications, and if so whether the chemicals were hazardous.

No information was available with regards to analysing residues on paper and so a literature search was carried out to find information relating to:

- (i) standard techniques in residue analysis and
- (ii) general pesticides/fungicides applied to herbaria.

A questionnaire was sent to key institutions abroad and in Britain, from which 15 main pesticides were identified (See table 1).

Table 1: Chemicals known to have been applied in botanical institutions.

	Chemical applied
1	Arsenic trioxide
2	Barium fluorosilicate
3	Carbon disulphide
4	Carbon tetrachloride
5	DDT
6	Ethylene oxide
7.	Lauryl pentachlorophenate
8	Mercuric chloride
9	Methyl Bromide
10	Naphthalene
11	Paradichlorobenzene
12	Phosphine
13	Pyrethrum
14	Hydrogen cyanide
15	Vapona/ Dichlorvos/DDVP

Method and Results

Several different analytical instruments were employed for this research, as it was not known which would be the most sensitive technique for residues on paper. 85 samples were taken from the mount sheet below the specimen. The paper was then digested in nitric acid, diluted with distilled water and centrifuged. The most successful methods were achieved with Inductively Coupled Plasma Mass spectrometry (ICP-MS), Cold vapour flow injection mercury system (FIMS) and Atomic Absorption Spectrophotometry (AAS).

The analytical results indicated that the majority of the NMW herbarium had been treated with mercuric chloride (corrosive sublimate) arsenic trioxide and barium fluorosilicate (these being the most common applications to natural history specimens). From table 2 it can be seen that the concentration of mercuric chloride remaining on the herbarium sheet varied considerably from zero readings to as much as 424 ppm (parts per million).

Arsenic had not previously been strongly associated with botanical collections, however the concentrations

found were substantial and the number of sheets that showed positive for arsenic were considerable. High concentrations of barium were also identified. This was most probably derived from barium fluorosilicate, a bait for silverfish recommended for application by Kew.

The results of this project are calculated in ppm as the concentration in the paper is related to the concentration that can be absorbed through the skin. The LD50 in rats for mercury absorption through the skin was 41 ppm (41 ppm killed 50 out of 100 rats) (Ellenhorn et al, 1997).

The Health and Safety Executive (HSE) have produced guidelines on working with toxic chemicals and the occupational exposure limits (OEL). These are based on a time-weighted average (TWA) of 8 hours, which are calculated in mg of vapour to a metre cubed of air (EH/40 1997).

These levels have been produced by the HSE because mercury and arsenic in particular are extremely toxic (See table 3).

Table 2: Results of AAS analysis of 9 samples for arsenic, barium and mercury.

Sample No.	sample	wt g	dil	As $\mu\text{g/g}$	Ba $\mu\text{g/g}$	Hg $\mu\text{g/g}$	As $\mu\text{g/ml}$	Ba $\mu\text{g/ml}$	Hg $\mu\text{g/ml}$
2	paper	0.0730	10	26.160	330.80	423.69	0.191	2.4150	3.0930
14	paper	0.0640	10	15.250	4.9280	0	0.097	0.0310	0.0110
23	paper	0.0620	12	11.516	4.9930	0	0.059	0.0260	0.0180
50	paper	0.0600	10	3.6330	3.8000	0	0.0218	0.0230	0.0590
51	paper	0.0660	10	17.257	19.242	0	0.1139	0.1270	0.0660
52	paper	0.0810	10	6.2460	359.506	49.74	0.0510	2.9120	0.4030
82	sp of 50	0.1200	10	0	1.5000	0	0.0060	0.0100	0.0200
83	sp of 51	0.0800	10	0.6400	8.7300	0	0.0050	0.0100	0.0700
84	sp of 51	0.0100	10	0.5900	5.8300	0	0.0010	0	0.0700
blank 1		0.1200	10	0	0.0500	0	0.0050	0.0100	0
blank 2		0.0700	10	0.4500	0	0	0.0030	0.0030	0
blank 3		0	0	0	0	0	0	0	0

Results in bold relate to actual amount of metal in PPM in the paper sample. This is a sample of the main results.

Table 3: Toxicology results for arsenic, barium and mercury

	Mercuric chloride Mg/m ³	Arsenic trioxide Mg/m ³	Barium fluorosilicate Mg/m ³
STEL	0.015	_____	_____
LTEL	0.025	0.1	0.5
Routes of entry into system	Absorption through skin Inhalation Ingestion	Absorption through skin Inhalation Ingestion	_____
Short term effects	Eye contact = irritation, burns, even permanent damage. Breathing = lung irritation, coughing possible pulmonary oedema	Hoarse voice, irritation of nose, eyes skin and throat. Nausea, vomiting, diarrhoea, loss of appetite, coughing, chest pain, giddiness, headache, breathing difficulty.	Barium poisoning results in a rapid onset of paralysis, gastrointestinal symptoms, cardiac dysrhythmias, hypertension, and often severe hypokalemia. The acute syndrome can be fatal. *
Long term effects	Sore gums, shakes, loss of memory, teeth and appetite, weakness, kidney and brain damage. Possible Carcinogen	Damages the heart, brain, lungs, gastrointestinal tract and kidneys. Eventual skin, bone marrow and peripheral nervous system damage.	Repeated or chronic exposures have been reported to cause osteosclerosis, as with fluoride.
Carcinogen	Possible	Yes Class A Oncogen	_____
Reproductive problems	Foetal damage and genetic mutations	Malformations of mice/rat offspring	_____

All of the information received on Toxicology came courtesy of the Welsh National Poisons Unit, Llandough Hospital, Cardiff.

STEL stands for short term exposure levels usually within a fifteen minute period. (HSE, 1997)

LTEL long term ---, 8 hour dose 5 days a week (HSE 1997)

No information available at present

Little * Ellenhorn et al

The NMW herbarium is an extremely important resource and is one of the largest herbaria in Britain. To make a collection such as this inaccessible would be mortifying but necessary, if the health of staff and visitors was put at risk.

The first precautionary steps taken were to close the herbarium to staff and the public. Air quality control was carried out on both lower and higher plant herbaria. Fortunately, due to the air-conditioning within the lower plant herbarium and the open layout of the higher plant herbarium, the air quality was not registering levels of mercuric chloride vapour above 0.0001 mg/m³, which are well within the recommended HSE guidelines of 0.025mg/m³ (EH/40,1997). Further tests have been carried out on

the vapour emitted from highly contaminated sheets. Controlled conditions gave results of ca.0.1mg/m³ for sample 2. Sheets holding concentrations ca.1000 ppm were producing mercury vapour 28 times greater than the recommended HSE guidelines. Sheets with very high concentrations of mercury generally had yellow/brown discoloration around the specimen. It may be possible to determine highly contaminated sheets through the colour of the residue and this could be a topic for further research.

Once the over all air quality had been deemed safe, the herbarium was re-opened for staff use only. Base line measurements had to be taken through biological monitoring to determine whether arsenic or

mercury had accumulated in the blood and urine of staff. Urine tests give accurate information relating to the exposure to contamination that has occurred in the last 3 months. Blood tests will only give information relating to the past 5 days, and if fish has been eaten within this period then the blood test will not be accurate as fish are extremely adept at storing heavy metals within the flesh and the liver.

One problem was that it took too long to actually implement the tests. By the time the staff had been sent for tests they had not been in contact with the main herbarium for at least 3 months which could have rendered the biological monitoring fruitless. However, even after this delay two members of staff did show slightly higher than normal mercury and arsenic levels at the first test.

Safe Standard Procedures Employed

Precautions were taken immediately and this included:

-
Informing all visitors to the collections of the possible problems of contamination.

- ❑ Ensuring work was only carried out in well-ventilated areas.
- ❑ Wearing powder free, nitrile gloves (Fisher Scientific, UK) whenever accessing the collections. (These are thrown away after single use).
- ❑ Washing hands after handling collections, particularly before eating, drinking or smoking.

One year after these precautions were implemented, staff returned for their health surveillance and within this time all staff members' contamination levels had returned to normal.

Conclusion

The conclusive analysis on this collection singled it out as a hazard in its entirety, however its removal would not have provided a means to an end as the numerous other collections within the museum may well have been contaminated too. Until conclusive analysis has been done all historic natural history collections should be treated as potentially hazardous. If suitable precautions are carried out then maintaining and accessing the collection should continue as normal.

Future research has been initiated on the identification of organic residues present on the collections. The very number that may have been applied and the hazards they may pose should never be underestimated!

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Study Trip

Royal Botanic Gardens - Kew

Mike Palmer, Buckinghamshire County Museum

On the 19th June, one of the hottest days of the summer, a small band of seven curators congregated in the main reception of the Herbarium Building. We were met by Lourdes Rico of the Leguminosae Section who began with a brief introduction.

The main herbarium comprises some 7,000,000 specimens including at least 250,000 Types. What was previously a small botanical collection was substantially enlarged in 1866 by the purchase of Sir William Hooker's herbarium and library followed by the bequest of George Bentham's collection. The original purpose built herbarium building was brought into use in 1877. As the collections grew subsequent wings were added (1902, 1932 and 1960) eventually forming an enclosed quadrangle. Further storage space was completed under the quadrangle in 1989. Despite the recent addition of a further floor to the rear wing the annual addition of some 30,000 specimens to the collections means that a fifth wing will soon be required.

The collections are arranged broadly in the Family order of Bentham and Hooker (Genera Planetarium, 1862-1883) with some modifications. Within Families the arrangement follows the most recent major work while within genera specimens are arranged geographically.

Collecting is mainly from the tropics concentrating on poorly collected areas and areas of current research interests. Attempts are also made to avoid overlap with the Natural History Museum and the Royal Botanic Garden, Edinburgh. The main collecting areas are Tropical Africa, particularly East and South-Central

Africa, Southeast Asia, particularly Malaysia and Tropical South America, especially Brazil. All new collecting must have correct permits and meet all current agreements.

In the past, Mercuric Chloride was the preferred means of protecting herbarium sheets against pests, although this has now been discontinued for Health and Safety reasons. Other substances, including lauryl pentachlorophenolate have been tried and rejected for similar reasons. Similarly, repellents, notably naphthalene and paradichlorobenzene are no longer used. Pest control now relies on good storage, good housekeeping, monitoring and freezing. Statistics for pest monitoring, observed later on the tour, showed *Stegobium*, *Lasioderma* and *Anthrenus* to be the main pest species. Two members of staff were assigned to monitoring as part of their wider duties with David Pinniger acting as consultant. Hanging and floor traps were observed throughout the collections.

Introduction out of the way we embarked on a circumnavigation of the four wings. The cabinets observed on the ground floor were all of wood and of high quality although the felt seals had caused some problems with insects. Newer cabinets, as seen in the Euphorbiaceae room, were of metal with plastic cushioned seals. Example specimens made available included plants collected by Charles Darwin and botanical material from the sarcophagus of Tutankamen. Kew has also made extensive use of cibachrome prints of specimens, for reference, certain loans etc., which are also stored within the main sequence.

In addition to the main collection a few separately stored named collections exist. The Wallich collection of trees from Calcutta, donated by the Linnean Society, includes stipulations of the gift that it be stored separately and that the material is not loaned out. The collections of Hewitt Cottrell Watson, William Borrer and the Rev. Lightfoot were also observed.

The Collections Management Room provided an indication of the amount of material moving in and out of Kew to and from the rest of the world. Loans in, loans out and exchange material were coded with different coloured tags with individual batches being assigned transaction numbers. All incoming material is quarantined in a separate building before being frozen for five days at -30 degrees Celsius and then passed to the Collection Management Room for subsequent distribution to the collections.

Passing into the long and expansive library we were presented with a choice display of contents. In addition to books library staff also manage the archives, maps, prints and drawings. On display was a selection of

original watercolour from *Curtis's Botanical Magazine* sealed in Melanex. Originally these would have been stored in cabinets within the main herbarium, however, were later removed to the Library and cibachrome prints left in their stead. Illustrations in the magazine, founded in 1787, were hand coloured up to 1948. It was interesting to note that each member of the small illustrative team had particular responsibility for particular colours. A selection of books were also displayed including *Ortus Sanitatus* which, dating from 1484 is one of the earliest printed herbals. Throughout the library most books are on open shelf display with the exception of pre-1800 publications which were locked behind glass and the *Banks' Florigeum* facsimiles which were secured with metal bars. Sheets of foam and pillows stuffed with polystyrene beads were available for viewing larger and more delicate volumes.

The spirit store, housed in the basement, comprised some 64,000 jars of which around half comprised orchid specimens, and to which around 1,000 new specimens were added per year. The majority of jars are housed in a compactorised system with a small number of larger jars stored in cupboards. For historical reasons a wide range of jar types are present although Copenhagen jars are presently used. The specimens are stored in Kew Mixture (53% IMS, 37% water, 5% formalin and 5% glycerol, 70% IMS, 29% water, 1% glycerol), however, when any specimen leaves the store for loan or just to a curator upstairs, it is transferred into a Copenhagen Mixture (76% IMS, 18% water, 5% Glycerol). Loans are sent out in plastic bottles. The collections are stored numerically so that the oldest specimens are at one end and the newest at the other. This is done so as to achieve maximum utilisation of space and avoid periodical reorganisations. The computerised numbering system is vital, therefore, in locating specimens, with numbers written in red on both lid and jar and coated in varnish. The stores are maintained at a temperature of 15 degrees Celsius. Formaldehyde and alcoholmeters are present throughout the store to detect atmospheric vapour levels with warning lights both within and without the store. The store has its own separate air conditioning unit and is kept at negative pressure to avoid any movement of fumes to other parts of the building. Large containers of premixed batches of both mixtures used are connected by pneumatic pipes to nozzles in the fume cupboard for easy filling and topping up.

The quadrangle store houses extensive compactor units, which contain, amongst other things, the Palm collections. The traditional technique of mounting palms on sheets has been superseded by a loose arrangement within four-folded folders (like a giant fragment capsule) or more rigid 'green boxes' of varying depth. Information labels were attached both

to the lid of the box and also lose within with the specimens. This allowed more material per specimen to be stored together and less need for pressing. Gymnosperms are stored similarly.

Next stop, the Mounting Room. Pressed plants are attached using watered down PVA glue. Labels and fragment capsules are similarly attached. Linen tape is used for thicker stemmed specimens. Specimens are laid out in accordance with standard considerations (as covered in the *Herbarium Handbook*). Sheets are stacked, separated by sheets of waxed and drying paper, and weighted down by small sandbags. The current team of six mounters process around 30 to 40 sheets each per day.

Having completed the main building we moved on to the three-storey Mycology Building where we were met by the head of Section, Dr Brian Spooner. The fungi collection comprises around 800,000 specimens including 35,000 Types stored throughout the sequence. The British collection, 40,000 is stored in compactorised herbarium boxes in the Mycology Building with the remaining tropical collections housed in the quadrangle store of the main building.

A separate collection of Myxomycetes is kept in shallow white boxes which again includes Type material. In accordance with the Morton Agreement with the Natural History Museum, Kew doesn't officially collect Lichens, however, some are maintained due to their importance in the taxonomic understanding of Ascomycete fungi.

Fresh material is dried in an oven with airflow of 40 degrees Celsius. Most specimens only require a day; however, larger specimens are sliced and may require longer. Once dried they are frozen at -40 degrees for 5 days. They are then stored paper packets and glued to sheets using a spot of PVA (the spot allowing easy removal of the packet from the sheet for loans). Each sheet may consist of a number of packets with the packets being positioned to avoid lopsidedness within the stack. Genus covers contain species covers, which may be further sub-divided on geography for common or numerous species. Bar coding of specimens was introduced six years ago linked to the Herb Track database. Currently new and loaned material is being bar coded with a plan to include Type specimens as well. The collection was formerly arranged according to Saccardo, however, Kew, over the last few years have evolved their own system based on a range of published works.

Although some fungi are stored in spirit this methods of preservation is not encouraged as it means that many important stain reactions cannot be carried out, it leaches colours and, depending on the type of spirit, has adverse effects on the DNA. At one point it was

considered that freeze drying fungi specimens would be beneficial for DNA extraction, however, with improvements of DNA extraction and amplification techniques air dried specimens are producing good results.

Spore prints are kept either on paper or on slides some of which are stored with the specimens in packets while other form part of a separate slide collection. Spores are also dried and frozen for lab cultures and molecular investigation.

Culture collections are kept in three mediums; under mineral oil, dried (need growing on every six months) or in liquid nitrogen. Liquid nitrogen levels need to be checked every two weeks – a fairly simple process, as we were able to observe.

Next on the programme was the Centre for Economic Botany (CEB) where we were met by Dr Hugh Prendergast. Unfortunately, this coincided with a power cut plunging the collections into near darkness. This, however, could not disguise the large size of the collections, around 76,000. Parts of the collection dates back to the days of Sir William Hooker who had a keen interest in what plants around the world were being used for. Acquisition tries to focus on those plants and products which are disappearing whether due to the product having been replaced, changing culture or because the species itself is threatened. The collection is stored in a compactorised storage. To avoid earlier experiences with pests, primarily *Stegobium*, the store is maintained at a temperature of 12-13 degrees Celsius. Relative humidity is maintained at 64-65 percent. It was interesting to note that the collection included both raw materials and finished products (by comparison Liverpool Museum's economic botany collection contains generally only the raw materials with the finished products being part of Humanities ethnographic collections).

The collections are stored systematically down to genus and then alphabetically. Included here were important collections such as objects made from the Paper Mulberry from Japan c. 1860/1870 and Japanese Lacquer while collection of plant products used in Chinese medicine provides an important reference for checking material currently being sold in this country. Just before we left the CEB the lights came back on and we were briefly able to view many of the things we had only heard about.

With high noon long gone and still know sign of lunch we trekked across to the other side of the Gardens in search of the Jodrell Laboratory where we were met by Dr Nigel Veitch. Founded in 1876 to allow greater scientific research the laboratories were built well away from the herbarium so as not to pose a fire risk. Today Jodrell covers four broad areas of research

Cytogenetics are largely occupied with surveying chromosome numbers, shape, size and DNA content across the plant kingdom to provide a better understanding of how different species are related and thus a more realistic classification of the plant kingdom. The behaviour of hybrid species chromosomes is also studied to aid prediction in future natural and cultivated hybrids.

The Anatomy Section complements the main herbarium botanists through maintaining and adding to Kew's anatomical microscope slide collection, currently totalling 95,000. These are stored vertically in metal fireproof cabinets. The Section also receives a large number of enquiries from identifying tree roots to food contaminants to charcoal from archaeological digs. The Section is also responsible for publishing the *Anatomy of Dicotyledons* and the *Anatomy of Monocotyledons* book series.

Molecular Systematics studies variations in DNA, RNA and proteins. The Section has a major input into the understanding of the taxonomy and classification of Angiosperms while the determination of genetic diversity within endangered plants species plays a major role in planning their conservation. The DNA Bank contains some 10,000 samples of plant genomic DNA (and still growing). These are stored a -80 degrees Celsius. As and when required this material can be extracted and amplified for further research.

Biological Interactions is primarily concerned with the identification of biologically active compounds in plants. Useful compounds, once identified can then be sought for in related species to find the best source. Such chemicals can be used for pharmaceutical drugs e.g. taxol from the Pacific Yew, and pest control e.g. *Calceolus* spp being investigated as a whitefly deterrent. It was noted that while fresh material generally contains a wider selection of active compounds, many of the more stable chemicals can still be extracted from herbarium specimens and thus can help to refine costly field searches.

With the time now approaching 3.00 p.m. we retired in search of shade, seating and food and a chance to reflect on the large number of Kew staff who enthusiastically welcomed and showed us around their respective territories. Thanks to all.

Book reviews

The Liverwort Flora of the British Isles, by J.A. Paton (1999). Harley Books, Colchester. 626pp, + glossary and scale. Price: £52.50. ISBN 0-946589-60-7.

This lavish production is a joy to scholars as much as to artists and bibliophiles. The British liverwort and hornwort flora is not only described in detail hitherto unmatched in this country, but every species is copiously illustrated by a full plate of immaculate line drawings.

There can be no doubt about the authoritative nature of this book. It includes accounts of life history and anatomical characters of taxonomic importance, as well as the wider ecological and biogeographical features of liverworts, and touches, too, on considerations of conservation.

In presenting this encyclopaedic volume to bryologists, the author expresses the hope that it will help all of them, whether amateurs or professionals, beginners or the more experienced, to identify liverworts accurately. Those of them who rely on the dichotomous keys, however, will unfortunately encounter difficulty. This is often a consequence of the complexity of critical groups and of language, but not always.

Successful discrimination between entire-level species of two very common genera, *Nardia* and *Mylia*, for instance, depends on two attributes of the underleaves. Whether they are free or jointed to the lateral leaves is variable in the former, invalidating the use of this character as an infallible means of discrimination. Dependence must therefore be placed on the underleaves being said to be "small but usually conspicuous" in *Nardia*, but "absent, or usually minute and inconspicuous" in *Mylia* (p. 43, couplet 72). Dimensions quoted for their length in *N. scalaris* are "to 400 (600) :m" (p. 291) compared with illustrations showing those of *M. taylorii* (p. 261) and *M. anomala* (p.263) to be in the order of 475 :m and 570 :m, respectively. The beginner would therefore not find his way to one or other of these species by means of the key. Nor would he be able to name *Lejeunea patens* and *L. lamacerina* correctly, for these two species are distinguished by the differing angle each presents at the junction of the postical margin of the lobe with the keel of the leaf. Couplet 5 on p.490, however, describes instead the angle between the postical margin of the leaf (*i.e.* the margin of the lobule) and the keel. In nearly every case, this would lead to each species being mistaken for the other. These are the sorts of problems that only a thorough testing of keys by keen bryologists will bring to light.

Experienced bryologists will welcome this book, for it lays before them the views of one of today's most respected hepaticologists. They might dislike the innovative use of average cell dimensions, which, without ranges and/or standard deviations, are often unhelpful. Couplet 22 on p.265, for instance, fails to assist the reader in attempting to discriminate between non-fertile *Jungermannia hyalina* and *J. paroica* for precisely this reason. Nevertheless, although there are bryologists who might wish to debate points of taxonomic judgement, there will, I think, be universal gratitude to the author for the opportunity she has given them to assess their own opinions in a much wider context than formerly. It is a book that ought to be accessible in public libraries and in as many private ones as possible, for it contains an enormous wealth of information that will benefit aspiring and established bryologists alike. Mrs Paton has made a splendid contribution to bryology.

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Collections research

Unique herbarium collections

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Herbarium specimens and their labels provide a huge amount of information, which is an invaluable research and voucher resource for botanists. Most collections consist of a mixture of specimens collected by individuals for their own herbaria, and duplicates collected for exchange with other botanists. Whilst researching records for a number of rare plants, I have found it necessary to visit or borrow material from a variety of herbaria to build up a reasonable picture of the species history and distribution in each site. This has also allowed me to quantify how many collections are unique to individual herbaria.

The numbers of exsiccatae represented in one, two, three, four or five or more herbaria are shown in Table 1 (an exsiccate is here defined as any unique combination of collector, date and locality).

This shows that on average, 83% of the specimens only occur in one collection and are not represented elsewhere.

Much of the duplicate material was distributed through the Botanical Exchange Club of the British Isles, and now resides in the larger herbaria. Many local herbaria have local collections which are not represented anywhere else. It is clear that all herbaria contain a high proportion of unique information.

Table 1. Numbers of exsiccate (herbarium species) represented in one, two, three, four or five or more herbaria for ten rare species investigated in detail. With the exception of *Pilularia* (data courtesy A.C. Jermy and A. Lockton), all data compiled by TCGR.

Species	Number of herbaria investigated	Number of different herbaria exsiccatae					
		1	2	3	4	5+	Total specimens
<i>Ajuga pyramidalis</i>	10	58 (85%)	6	2	1	1	68
<i>Apsaragus prostratus</i>	12	156 (84%)	16	7	2	4	185
<i>Filago lutescens</i>	20	142 (74%)	29	6	5	11	193
<i>Filago pyramidata</i>	20	165 (82%)	19	4	7	6	201
<i>Fumaria purpurea</i>	18	200 (84%)	22	6	5	6	239
<i>Hieracium cambricum</i>	5	20 (64%)	7	3	-	1	31
<i>Hieracium linguans</i>	7	15 (83%)	1	1	-	1	18
<i>Pilularia globulifera</i>	69	516 (87%)	57	6	5	8	592
<i>Salvia pratensis</i>	9	148 (98%)	2	1	-	-	151
<i>Schoenoplectus triqueter</i>	12	101 (83%)	12	6	-	2	121

The Biology Curator

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