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## Editorial

It has been a busy year again for curators all over the country. The NatSCA conference at the Horniman Museum and UCL's Grant Museum was a great event including talks focused on how museums can make more of their natural science collections in innovative ways. The theme for the conference came at an apt time with potential collections at risk in some museums.

This issue of *NatSCA News* includes three articles based on talks at the conference; the iconic giant squid at the Natural History Museum, London, using natural history collections to support higher education at UCL's Grant Museum, and a case study of a collections review based on the spirit collections at Plymouth City Museum and Art Gallery. There are also articles about undertaking a large collections move at Leicester, a new natural history gallery redevelopment at the Royal Albert Memorial Museum, Exeter, understanding the interpretation of taxidermy in museums, and digitally imaging archives at the Royal Botanic Gardens, Kew.

As always, a very big thank you to the reviewers for spending a lot of time reading the articles and providing feedback which ensures the articles are of a high quality for the reader. We welcome manuscripts of all kinds for the next issue – collections at risk is particularly topical now – and don't forget to start writing your papers for the York Conference.

Jan Freedman [Editor]  
David Notton [Assistant Editor]  
16<sup>th</sup> Nov 2012

If you are interested in submitting a manuscript for the next issue, please contact;

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## View From The Chair

Having missed a committee meeting and, by all accounts, a very successful AGM/conference earlier this year, I have been keen to put my NatSCA hat back on. It's been great to return to the Chair - coming back to conversations about something other than the consistency of vomit, the design of nappies or how much sleep I've had recently. My heartfelt thanks go to Paolo Viscardi for chairing in my absence, I understand he was brilliant (a future Chair in the making perhaps?).

My short time away from it all has meant that I can look about with fresher eyes. It would be easy to become despondent: natural science jobs being cut across the country, more news of collections at risk, a seeping away of expertise from the sector and calls for NatSCA to do more for the natural science collection community lest we fade away. However, in this edition of *NatSCA News* at least, I choose to wave a flag for all the positive projects I have come across recently. It is also a pleasure to report on the progress NatSCA has made strategically.

NatSCA has raised the profile of the sector at national events like the recent MA Conference in Edinburgh, Paolo Viscardi (his name crops up a lot) representing NatSCA at the 'Elephant in the Room' session. Committee members Paolo, Beulah Gardner, Miranda Lowe and Paul Brown with Trevor James of the NBN/NFBR also met with Hedley Swain (Director, Museums and Renaissance at Arts Council England) earlier in the year to discuss how natural science collections fitted in to the 'Arts' section of ACE and raised our profile with our national funder at the same time. Paolo also produced a 'Campaign for Natural Science Collections' document soon to be available on the NatSCA website.

I was personally delighted to see Bristol advertising a natural science curator post. It has been a long time for such an important collection to be so under-staffed and under-funded. I hope that the temporary ACE-funded post will be converted to a permanent one by Bristol City Council and NatSCA will certainly give as much support as needed to the new incumbent to try and ensure this happens. Our partnership trainee biology curator programme is still going strong with Kate Andrew securing another two years' funding from the HLF for further curatorial trainees.

NatSCA continues to arrange training and networking events - we are always looking for ideas and so please get in touch with the committee if there are any topics you would like to see covered. I am looking forward to the 'Natural Science Collections and the Law' seminar on 8th February in Manchester as well as our annual AGM/conference in York (28th February-1st March). We are also hoping to re-invigorate the NatSCA website as well as '*NatSCA News*', using the former to disseminate the 'news' and the latter to become the peer reviewed 'Journal of Natural Science Collections'.

I hope that the next time I write a 'View from the Chair' I can report on how this positive groundswell of activity has continued...

Clare Brown  
11th Nov 2012

## NatSCA AGM, 14.00 to 14.40, Thursday 29<sup>th</sup> March, 2012

Horniman Museum, London.

### AGENDA

1. **Apologies for absence** were received from Angela Smith and Jan Beccaloni
2. **Minutes of AGM Great North Museum, Newcastle upon Tyne, 3<sup>rd</sup> March, 2011.** These were signed as the correct record by the Acting Chair.
3. **Matters arising from Newcastle AGM minutes.** None.
4. **Update on HLF 'Skills for the Future' project** Kate Andrew

Year 1:- The curatorial trainees finished in the first few weeks of March - Gina Allnat, Ben Lawrence and Russell Dornan were the biology trainees, plus Gemma Tynan, ceramics - none had found museums jobs by the time they finished, although most had been invited to interviews.

Year 2:- The trainees started in mid March 2012 - this year we have two biologist - Andrew Lawton at Manchester and Kirsty Garrod at Leeds, both of whom attended the meeting along with Russell Dornan from year 1. The two other trainees are in agricultural history and social history (Hereford and Coventry).

Late last year, the Heritage Lottery Fund invited holders of 'Skills for the Future' funding to apply for an extension to their projects, and we have applied for a further 8 trainees over two years, two per years will be biologists again and NatSCA have kindly agreed to continue to support the scheme via a cash payment - this plus the time supervising trainees has been critical to building up the match funding requirement, we thank host museums, mentors and the Natural History Museum for their valued input. The funding decision will be announced in late May"

In fact - we have been awarded the funds, but since I haven't yet had an approved press release through HLF, so its only partially official at the moment.

5. **Chair's Report:** Paolo Viscardi (Acting Chair in the absence of Clare Brown on maternity leave)

I am representing the committee in the capacity of Acting Chair while Clare Brown, the legitimate Chair of NatSCA, is on maternity leave. I'm sure you will all join me in offering Clare congratulations on the new addition to her family.

NatSCA has had a busy year, as Natural Science collections have faced a variety of threats. Some of these have been genuinely criminal, others have only appeared so from the perspective of natural science museumologists.

The funding situation has gone from bad to worse for many museums as the MLA has been disbanded and its responsibilities passed on to ACE. This has been a major shift in the way in which museums receive support. This has led to shortfalls in funding and the loss of posts in several museums around the country, particularly in the West and East Midlands, so collections at risk have been in the forefront of our mind. We can assure you that NatSCA are taking this seriously and on top of our usual letter-writing expressions of concern, we are due to meet with representatives of ACE this April in our SSN role to discuss the future of natural science collections at a more strategic level.

The situation regarding theft of rhino horn to fuel the black market use in Asian medicine has also been troubling, with thefts from collections around the UK and across Europe. NatSCA have been active in issuing guidance on this issue and liaising with the Museums Association and press to highlight the risk to col-

lections. We have also been in contact with the Animal Health and Veterinary Laboratories Agency, AH-VLA with concerns over the sale of historic rhino material overseas by auction houses. We are pleased to hear that the law has recently changed in this area and such overseas sales are now prohibited - we like to think that our input has contributed to this outcome.

Continuing in a more positive vein, the HLF skills for the future programme has been very successful, as Kate just discussed and our Entomology and Herbarium seminars have proven very popular and well attended. There will be more seminars coming up, so make sure you are signed up to Jiscmail and keep an eye on the website.

Speaking of the website, it is due to be overhauled in the near future since the new Scratchpad system has been launched. Hopefully this will provide us with an opportunity to make the site easier maintain and more user friendly. There are also plans afoot to update the FENSCORE database, which still provides useful information about natural science collections around the country. So far we have been in contact with members of the FENSCORE group from 2002 and we are exploring safe mirror hosting and a migration of the database from Perl to something a bit more up to date like MySQL.

Finally, we are pleased to announce that after considerable effort on the part of Paul Brown, we have managed to obtain the rights to reproduce the excellent Walker and Carter book Care and Conservation of Natural History Collections. We hope to be able to update sections of the book and make the whole freely available through the NatSCA website.

## 6. Secretary's Report: Paul A Brown

	Grant Museum 1/7/ 2011	Leeds Museum 21/10/2011	Natural History Museum, London 6/1/2012	UCL London 28/3/2012
Kate Andrew	✓	X	✓	X
Jack Ashby	✓	✓	✓	✓
Clare Brown	✓	✓	X	X
Paul Brown	✓	X	✓	✓
Jan Freedman	✓	X	X	✓
Tony Irwin	✓	X	X	✓
Miranda Lowe	✓	✓	X	✓
Claire Mellish	X	X	✓	✓
Simon Moore	✓	X	✓	✓
Nicola Newton	✓	✓	✓	X
David Notton	✓	X	✓	✓
Maggie Reilly	X	✓	X	X
Beulah Gardner	✓	✓	✓	✓
Roberto Portela Miguez	✓	✓	✓	✓
David Geltsthorpe	✓	✓	✓	X
Paolo Viscardi	✓	✓	✓	✓
Vicky Purewal	✓	X	✓	✓
Angela Smith	X	✓	✓	X

## 7. Treasurer's Report for 2011/2012: Tony Irwin.

The Treasurer's report for 2011/2012 is in the form of the Accounts Sheet, with attached notes.

Attention is drawn to the continued drop in subscription income; increased income from meetings (which includes a small surplus for the year); a slight drop in operational costs due to fewer committee members being able to attend all the meetings; and consequently a smaller overall loss during the year.

At the year end, our assets were just over £20,000 – about twice our annual “turnover”, and within the guidelines for a charity such as ourselves.

As long as we continue to make a slight surplus on meetings, we should be able to keep our finances at the current level, but we need to be aware that income from meetings should not be used to maintain low membership subscriptions, so if costs rise, subscriptions will have to follow. Any surplus from our activities, of course, can be used for bursaries, supporting symposia, undertaking surveys and improving our website.

I thank my colleagues on Committee who have worked hard to keep to costs to a minimum, thereby giving you, the membership, excellent value for money.

I also thank Steve Garland for stepping in at short notice to examine the accounts. As he found them in good order, I would like to place them before the meeting for acceptance after I answer any questions.

Tony Irwin, 27 March 2012

*NATSCA ACCOUNTS 2011-2012*  
(1 Feb 2011 - 31 January 2012)

	2011-12			2010-11	
<b>INCOME</b>					
<b>Subscriptions</b> (*note 1)					
123 Personal @ £15.00	1845.00			2070.00	
1 Incorrect rate	14.66			29.27	
5 Student @ £10	50.00			80.00	
4 pers.sub for 2010 @ £15	60.00			30.00	
38 Institutional @ £30	1140.00			1410.00	
1 pers.sub for 2012 @ £15	15.00			165.00	
4 inst.sub for 2012 @ £30	120.00			180.00	
<b>Total of 176 subscriptions</b>		<b>3244.66</b>			<b>3964.27</b>
<b>Other income</b>					
Interest (deposit account) (* note 2)	10.19			11.28	
Incorrect payment (refunded)	0			180.00	
<b>Total other income</b>		<b>10.19</b>			<b>191.28</b>

<b>Meeting income</b> (*note 3)					
2010 AGM (meeting fees & conf meals)	270.00			1585.00	
2011 AGM (meeting fees & conf meals)	4310.00			300.00	
2011 Entomology Workshop	1140.00				
2012 Botany Workshop 1	205.00				
2012 AGM (meeting fees & conf meals)	1057.00				
2009 Taxidermy and Law	0			555.00	
2010 GCG Street Seminar	0			273.71	
2010 Osseous materials workshop	0			480.00	
<b>Total meeting income</b>		<b>6982.00</b>			<b>3193.71</b>
<b>TOTAL INCOME</b>			<b>10236.85</b>		<b>7349.26</b>
<b>EXPENDITURE</b>					
<b>Subscriptions, etc.</b>					
Information Commission (data protection)	35.00			35.00	
National Biodiversity Network	30.00			0	
<b>Total Subscriptions Expenditure</b>		<b>65.00</b>			<b>35.00</b>
<b>Meetings</b>					
<b>2011 Conference</b> (*note 4)					
Speakers expenses	403.29			582.60	(2010agm)
Room hire and catering	3841.20			1202.61	(2010agm)
Bursaries	628.09			300.00	(2010agm)
Miscellaneous	10.00			103.50	(2010agm)
<b>Entomology Workshop</b> (*note 5)					
Speakers expenses	0			350.00	(taxid. law)
Room hire and catering	847.57			560.00	(taxid. law)
Bursaries	0			54.70	(taxid. law)
<b>Osseous Materials Workshop</b>				332.73	
<b>Pest Odyssey Conference</b> (*note 6)					
Contribution	600			500.00	(GCG sem.)
<b>Misc bursaries</b>				100.00	
<b>Total meeting expenditure</b>		<b>6330.15</b>			<b>4086.14</b>

<b>Committee expenses</b> (* notes)					
Insurance	835.70			842.83	
Travel to meetings	984.10			2265.19	
Postage	14.65			4.92	
Printing & distribution of newsletter	2459.61			1290.76	
Miscellaneous	1033.00			981.44	
<b>Total operational costs</b>		<b>5327.06</b>			<b>5385.14</b>
<b>TOTAL EXPENDITURE</b>			<b>11722.21</b>		<b>9506.28</b>
Difference between Income and Expenditure (2011/12 loss) (*note 10)			<b>-1485.36</b>		<b>-2157.02</b>
<b>ASSETS</b>					
<b>HSBC Deposit account 41653636</b>					
Opening balance, 1st Feb 2011	19346.09			22452.81	
Bank interest	10.19			11.28	
transfer to c/a	-1000.00			-3118.00	
Total and actual balance, 31 Jan 2012	18356.28			19346.09	
<b>HSBC Current account 91645722</b>					
Opening balance, 1st Feb 2011	2768.88			1819.18	
Balance on 1 Feb 2012	2273.33			2768.88	
<b>Total Assets (Cash Funds) at year end</b>	<b>20629.61</b>			<b>22114.97</b>	
Assets at start of year	22114.97			24271.99	
2010/11 loss	1485.36			2157.02	
	<b>20629.61</b>			<b>22114.97</b>	

\* Points to note:

1. Income from both individual and institutional members has reduced again this year.
2. Deposit account interest continues to be disappointing.
3. Improved attendance at meetings, more prompt invoicing, and receipt of payments from previous meetings have led to a welcome increase in meeting income, so we have a surplus this year.

4. Thanks are due to staff at The Great North Museum: Hancock, and the generosity of our speakers for a very reasonably priced conference in 2011. When all the fees have been paid, we should make a small surplus on this event.
5. The Entomology Workshop was held in the NHM, and run by NHM staff. Thanks to them, we were able to make a small surplus. One of the features of our workshops is that they are priced so that anyone can attend – workshops and seminars run by many other organisations appear to charge £150 a day as standard.
6. NatSCA was a sponsor of the Pest Odyssey 2011 Conference. Several NatSCA members attended this successful international meeting.
7. Committee are to be congratulated on reducing their travel expenses, although in many cases it was through being unable to attend meetings.
8. Newsletter costs rose because we produced two newsletters this year, as opposed to one last year. We are investigating alternative printers in an effort to reduce costs and improve print quality.
9. Among the miscellaneous costs are work on the website, and a contribution to the HLF-funded “Skills for the Future” scheme which has enabled training of new natural history curators at Leeds, Manchester and Hereford.
10. The loss of £1485 this year is an improvement on last year’s loss of £2157. Subsidising our meetings through bursaries and supporting training programmes and relevant meetings are appropriate ways of spending our reserves, which are now more in line with Charity Commissioners’ guidelines.

The accounts are based on the bank transactions that took place in 2011-12. Issued cheques that were presented, or income banked, after 31 January are not included.

Tony Irwin 25 February 2012

The Accounts were examined and approved by Steve Garland (Hon. Auditor), 18<sup>th</sup> March 2012

The chair moved that the AGM accept the Treasurers report which was proposed by Kate Andrew and seconded by Louise Bacon. This was carried with no abstentions.

## **8. Membership Secretary’s Report:** Maggie Reilly

Membership numbers have remained roughly static over the last few years with around 220 paying members with a split of around 170 personal members to 50 institutional members. Most members are UK based but we have around 30 members from all over the world.

However 2011 saw a fall off in numbers both for institutional and personal members. Institutional members reduced to 43, a loss of 10 from the previous year total of 53. Some of this loss is due to late payments which have now come in and are too late to be processed for 2011; others have rejoined for 2011 so the loss isn’t as severe as first appears. With personal members the numbers were down to 140. Here several retirements are noted and we thank these members for their support and wish them well in retirement. It is likely numbers are down mostly due to general cuts in the sector and consequent job losses. On the positive side, 26 new/returning members have joined in 2011 – we extend a warm welcome to all. Note that membership records and accounts entries do not always correspond due to dates of receiving subs.

Last year, in an eco-friendly move, I sent out email reminders for sub renewals but found that these did not work very well – they may have been missed or ignored in the welter of emails that assail us all these days. Traditional paper reminders will be sent in future. We would also encourage members to use standing orders to pay subs – this is a mutually convenient arrangement. Electronic bank transfers are also used by members. All we ask is that for these types of payments a clear reference with your name is included on the payment details. We would encourage all members to remain alert to opportunities to recruit for NatSCA. Membership fees remain at the very reasonable rates of £15.00 for personal subs and £30.00 for institu-

tional subs. A reduced rate of £10.00 is available to unwaged members. Some glitches arose with group emailings earlier in the year due to unannounced changes by Glasgow University in the group emailing system - apologies to members who may not have received messages or may have had multiple copies of messages.

## **9. Editorial & Website Report:** Jan Freedman

Issue 22 was sent to the printers on 18<sup>th</sup> March. It is now fully peer reviewed and all articles apart from seminar write ups will be reviewed. Thank you to all the authors and all the reviewers for their assistance in getting the articles to a high standard.

The next issue will be out in September, and will include write ups of all the talks at this years conference, as well as other articles.

The NatSCA journal is for every member, so if you think of a topic or subject that hasn't been covered, please contact the Editor and they will try to find an author to write the article.

NatSCA has also created a grant opportunity for NatSCA members, the Bill Petit Memorial Grant. Details are on the NatSCA website ([www.natsca.info](http://www.natsca.info)) and members can apply for the grant to help with their collections, which can be anything from conservation to helping fund researchers to come and look at their collections. The first grant has gone to Ipswich and Colchester Museums Service to carry out work on their taxidermy specimens. They will be writing the project up for the NatSCA journal. The Bill Petit Grant provides on project a year, with a grant of up to £2000. Please look at the website for more information, or contact a member of the committee if you would like to talk about a potential project.

## **10. Natural Science Conservation Report:** Simon Moore

This year has been my second year as a freelancer in natural sciences conservation and the year has again, been fortunately busy.

The Nuts & Bolts day at Newcastle last year was a great success, even if there were rather too many topics to squeeze into the allotted time and the talks rattled along a little too swiftly and I offer apologies to those who had to move rather quickly! The day was experimental, as I outlined at the beginning, just touching on various aspects of the large subject of Natural Sciences specimen conservation and the general feedback was very positive.

Ownership of the book *Care & Conservation of Natural History Collections* has now been passed to NatSCA and should be available to view on the website. In time it will be updated by several of the authors, including Simon Moore.

The ICON leaflets were completed and agreed upon but I have still not had the final result or even seen a proof, even though it has been over 6 months since they were sent off having been finally edited by Simon Moore and Shulla Jacques. Paul Brown is keeping 'tabs' on this.

We have also paid for a subscription to ICON (Institute for Conservation).

## **11. The seminar programme.** Simon Moore

Insect day at the NHM: Tours, talks and demonstrations. Many thanks go to Theresa Howard (Collections Storage), Adrian Hine (data-basing), Malcolm Kerley (pinning beetles and lepidopterans), Armando Mendez from Botany who talked on Integrated Pest Management; Alessandro Giusti & Beulah Garner (conserving pinned insects suffering from verdigris, and David Notton (spirit Collections). Erica MacAlister & Kim Goodger demonstrated specimen digitisation (imaging & data label capture) and Paul Brown on microscope slide preparation and conservation. We had thirty participants from many local and national

museums across the UK and two from the national Trust for Scotland! The course was very well received and we were over subscribed so we will run the course again in the near future, maybe in 2014.

Botany day at Cardiff, Vicky Purewal: Cardiff Botany day had 12 participants and was over subscribed so that they plan to run the same course very soon at Liverpool with Donna Young.

'Natural Sciences & the Law', David Gelsthorpe: at Manchester Museum on 8th February 2013 for the next 'Natural Science Collections and the Law' day. Clare Brown is working on getting a programme and some speakers and will try not to restrict it to taxidermy this time. If anyone has any suggestions for topics/speakers then please let her know.

Osseous and keratinaceous workshop at the Horniman Museum in October/November 2012.

Jan Freedman would like to organise a Mineralogy seminar: Mineralogy course (venue & date TBC) Monica Price of the Oxford course could be approached.

A possible course on Mammal Skins (London, Summer 2013). At planning stage.

The fluid preservation course in December at the Horniman Museum was very successful with some of the attendees being part-funded by NatSCA.

Simon Moore is running another fluid preservation course hosted by UCL at the Royal Free Hospital (Belsize Park) in mid-May or June. Plus there should be another at the Horniman Museum in the winter of this year (November/December).

Conservation in natural sciences still continues to move onwards and as the discipline is becoming more recognised in other countries, the all-too valuable knowledge sharing and expertise continues to spread even wider each year. The NH-COLL. Natural history problems forum has been busier than ever this year but the Cons. Dist. List has had rather less NH-related enquiries than before.

Each year more students and professional interns are being encouraged to qualify in Natural Sciences and numbers are slightly down since last year. To try and encourage and help conservators, collection managers and would-be/student conservators, I am also still running courses in fluid preservation, taxidermy cleaning, taxidermy case conservation and/or restoration, entomology and herbarium specimen repair. As funding seems to run lower each year in the UK, I am doing more of these in France either hosted by the INP (Institut National du Patrimoine) or OCIM (Office de Coopération et d'Information Muséales). Keep looking on JISC mail.

## 12. Election of officers & ordinary members of NatSCA committee

Below are the nominees for NatSCA committee posts to serve from 2012 to 2014 except the treasurer, who will serve from 2011 to 2014, which have reached the secretary.

The membership secretary has checked to see that those proposed, those proposing and those seconding are all present members of NatSCA.

<b>1. Editor 12-14</b>	<b>Jan Freedman</b>	<b>Plymouth Museums</b>
<b>Proposed: Simon Moore</b>	<b>seconded: Claire Mellish</b>	
<b>2. Membership Sec 12-14</b>	<b>Maggie Reilly</b>	<b>Glasgow University</b>
<b>Proposed: Paul A Brown</b>	<b>seconded: Claire Mellish</b>	
<b>3. Conservation 12-14</b>	<b>Simon Moore</b>	<b>Freelance</b>
<b>Proposed: Julian Carter</b>	<b>seconded: Nigel Larkin</b>	
<b>4. OM 12-14</b>	<b>Nicola Newton</b>	<b>Freelance</b>
<b>Proposed: Jack Ashby</b>	<b>seconded: Simon Moore</b>	
<b>5. OM 12-14</b>	<b>David Notton</b>	<b>NHM, London</b>
<b>Proposed: Jan Freedman</b>	<b>seconded: Paul A Brown</b>	
<b>6. OM 12-14</b>	<b>Claire Mellish</b>	<b>NHM, London</b>
<b>Proposed: Roberto Portela Miguez</b>	<b>seconded: Paul A Brown</b>	
<b>7. OM 12-14</b>	<b>Kate Andrew</b>	<b>Hereford Museums</b>

<b>Proposed: Simon Moore</b>	<b>seconded: Claire Mellish</b>
<b>8. OM 12-14</b>	<b>Donna Young Liverpool Museums</b>
<b>Proposed: Maggie Reilly</b>	<b>seconded: Paul A Brown</b>
<b>9. OM 12-14</b>	<b>Holly Morgenroth Exeter Museum</b>
<b>Proposed: Tony Irwin</b>	<b>seconded: Jan Freedman</b>

As there are vacant posts and candidates to fill them, no election is required. If there are no objections to the candidates, can we accept and elect the listed people en block onto committee to serve for three years for the chair and secretary and two years for other committee members. Proposed: Kate Andrew & Sec-  
 onded: Jack Ashby

**FROM THE NatSCA CONSTITUTION.....**

**6 Honorary Officers.**

*At the annual general meeting of the Charity the members shall elect from amongst themselves a chairman, a secretary and a treasurer, who shall hold office for a period of 3 years from the conclusion of that meeting and shall be eligible for immediate re-election.*

**7 Executive Committee.**

*(1) The Executive Committee shall consist of not less than 9 members nor more than 20 members being:*

*(b) not less than 6 and not more than 12 members elected at the annual general meeting who shall hold office from the conclusion of that meeting;*

*(2) The Executive Committee may in addition appoint not more than 5 co-opted members*

*(3) Ordinary members of the Executive Committee shall serve for 2 years and retire from office at the end of the second annual general meeting after the date on which they were elected to office, but are immediately eligible for re-election.*

**Still In Post are :**

10	Treasurer 10-13	Tony Irwin	Norwich Museums
11.	Chair 11-14	Clare Brown	Leeds Museums
12.	Secretary 11-14	Paul Brown	NHM, London
13.	OM 11-13	Jack Ashby	Grant Museum, UCL
14.	OM 11-13	Paolo Viscardi	Horniman Museum
15.	OM 11-13	Miranda Lowe	NHM, London
16.	OM 11-13	Angela Smith	Gloucester Museums
17.	OM 11-13	Roberto Portela Miguez	NHM, London
18.	OM 11-13	Vicki Purewal	NMGW, Cardiff
19.	OM 11-13	David Gelsthorpe	Manchester Museum
20.	OM 11-13	Beulah Garner	NHM, London
Ex officio:			
	SPNHC rep	Clare Valentine	NHM, London

**13. Any Other Business**

**14. Vote of thanks:** Paolo Viscardi

I wish to formally thank the committee for the hard work they have done over the last year; the organisers of the Conference, Jack Ashby, Jo Hatton and myself and the management, admin and catering staff of the Grant Museum (UCL) and the Horniman Museum all those who have contributed with talks and demonstrations for the conference.

**15. Close**

## **A review of the NatSCA Conference 2012, 'Use it or Lose it'**

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The 2012 annual conference of the Natural Sciences Collections Association (NatSCA) took place over 29<sup>th</sup> and 30<sup>th</sup> March in London. The theme of the conference this year was 'Use It or Lose It', and many of the talks focused on the importance of collections for research and the use of museum objects for teaching. Split over two venues; the delightful Horniman Museum and the wonderfully re-developed Grant Museum, it was a great opportunity to learn new things, chat to some interesting people, and eat some great food. It's fair to say I had high-expectations of what I would like to get out of the conference; but it's also fair to say that these expectations were exceeded greatly and I already can't wait for next year's extravaganza.

Thursday began in glorious fashion with a blue sky filled with the great promise about what the day could bring. Following some introductions given by our hosts, Jack Ashby and Paolo Viscardi; and a brief overview of recent developments at the Horniman by director Janet Vitmayer; we were treated to an interesting look at young children's experiences in natural history museums by PhD student Elee Kirk. Her innovative use of digital cameras helped to remove some pre-conceptions I held about children only liking shiny, charismatic objects. However, some ideas, like the child's love of scary things, seemed to forever remain eternal.

Roberto Portela Miguez and Oliver Crimmen from the Natural History Museum were next to speak. They gave an interesting talk about both the challenges faced and the benefits gained from acquiring a charismatic yet expensive specimen like the Giant Squid. This creature has become an iconic specimen at the Natural History Museum, being the focus of tours, school group talks, and the media.

After a coffee break, Jack Ashby from the Grant Museum gave a talk about a university museum providing worth to their institution and using the collection for wider public and academic needs such as art projects; which are also important in generating funding. He also discussed some recent additions to the Grant such as QRator, an innovative use of social media to respond to visitor questions.

Following Jack, Mary Spencer Jones from the NHM gave a stimulating talk about documenting long term biodiversity changes in Scotland and Tristan da Cunha (an isolated Atlantic outpost) using Bryzoans. Mary's talk highlighted the importance of data associated with historical collections, and how this is invaluable for future research.

Finally, Liz Knight and Esther Amis-Hughes from Leeds Museums and Galleries provided some great entertainment as well as a serious message about using the collection in outreach with the local community and creating 'the wow factor' in your audience engagement. This talk, as with previous ones, demonstrated new and innovative methods of using our collections to reach the public.

Following lunch and the annual AGM, a group of us got the bus to Crystal Palace. There we were met by Dr Joe Cain, head of the Department of Science and Technology Studies at UCL, who gave us a talk and tour about Crystal Palace and the dinosaurs. What a sight the original glass house designed by Joseph Paxton would've been! But the 300 metre long glass house and the fountains as tall as the stadium lights which can now be found there would still have been no match for Benjamin Waterhouse-Hawkins' brilliant prehistoric creations. What a treat it would've been to behold the water powering the fountains recede and reveal the monstrous beasts in all their glory (fig. 1). It's ironic that Waterhouse-Hawkins was commissioned to fill an otherwise uninteresting part of the park; now they are the definite stars of the show! They were made out of cement and looked every inch the 'dinosaurs of old'; like a living monument to past palaeontological endeavours.



**Fig. 1.** Crystal Palace Dinosaurs (photo courtesy of Rachel Jennings).

Following Joe’s great tour we headed to the Grant Museum for a drinks reception where we networked amongst some of the Grant Museum’s finest specimens (fig.2). The conference meal at the Indian restaurant, Chutney’s, provided a great banquet of vegetarian food.

The second day of the conference was held in the main building at University College, London (UCL). We were welcomed by Sally MacDonal, Director of UCL Museums and Public Engagement, who stressed the importance of using a collection.

Jan Freedman from Plymouth City Museum and Art Gallery was the first speaker giving us a detailed look at the problems overcome and achievements of acquiring a large collection of spirit preserved specimens from the Marine Biological Association in Plymouth. The project focused on understanding what was held in the collection, and identifying specimens for transfer to other museums where they would be used more.



**Fig. 2.** Following the meal we were all as stuffed as this Pufferfish (Photographed at the Grant Museum).

Ed Baker from the NHM gave a futuristic look at natural sciences and the web; Ed’s key note to take away was “if it’s not online it doesn’t exist!”. Ed was able to show us how even incomplete data is better than nothing and I will definitely investigate the use of scratchpad in the future.

Paolo Viscardi, in Hannah Russ’s absence, discussed reviewing collections for HE teaching. I was particularly taken by ‘skelecycle’ (reusing skeletons to use in teaching) and the pros and cons of de-accessioning items to universities were they can be used more regularly.

Following a coffee break, Rosalind Duhs and Leonie Hannan put us in the mind of a student engaging with object based learning to show the importance and benefits of using collections for this purpose. Finally, Sally Colvin from the Museums Association gave us a timely update on funding issues and what’s available to apply for via the MA.

Following a nice lunch in the UCL courtyard; the delegates split into groups for guided tours of the Petrie Archaeological Museum and the Welcome Trust.



**Fig. 3.** Ancient Egyptian stela slabs (Photographed at the Petrie Archaeological Museum).

We then took part in a workshop at the Grant Museum on the collections review which took place at the Grant recently. It was discovered the Grant had double the number of items in the collection than had previously been thought. This was a useful tool for actually finding out what are in our store rooms.

I left the conference with more enthusiasm for a career in natural history curation than I had when I arrived. Despite the cuts, if you have the determination then this is definitely a fascinating and rewarding sector to work in. I was made to feel welcome; met some wonderful people; and learned a great deal. I left hoping I would remain part of the NatSCA community for many years to come.

## **The Giant Squid, *Architeuthis dux* Steenstrup, 1857 (Mollusca: Cephalopoda): The Making of an Iconic Specimen**

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### **Abstract**

In 2004 the Natural History Museum, London (NHM) acquired an 8.62m long specimen of the giant squid *Architeuthis dux* Steenstrup, 1857. Complete giant squid are rare in museum collections and the chance to obtain a live-caught specimen with the potential for molecular analysis was an amazing opportunity. Also it was, and still is, the largest fluid preserved specimen at the NHM and although the preservation and storage presented numerous challenges, the squid's public appeal as well as its scientific value has exceeded all expectations. I aim to show here the importance of such a specimen for the Museum collection, the difficulties met and overcome in all stages of its curation, as well as the numerous ways in which the squid has been used. These include such areas as education, the arts, exhibition, fund raising and public outreach, and its importance for the cephalopod research community.

### **Introducing Archie**

The giant squid, named 'Archie' by the British press, was caught as part of a bottom trawl by the Falkland registered trawler John Cheek, on 15 March 2004 at a depth of 220m, 15.6km (9.7 miles) north west of Port Stephens Settlement, and about 2km offshore. The captain of the ship donated the specimen to the Falkland Islands Government Fisheries Department, who in turn donated it to the Museum with the stipulation that it be put on public display.

The specimen was frozen and then shipped to the NHM where it was kept in a freezer for six months, while museum staff and cephalopod researchers from around the world were consulted about the best methods and techniques available for the preservation of such a large deep-sea squid. As the specimen was still frozen, several tissue samples were taken for future molecular analysis. After considerable discussion I decided to go for the tried and tested method of fixation in 10% formol-saline solution and then preservation in 4% formol-saline solution (Lincoln & Sheals, 1979; O'Shea, 2003).

Before the fixation process, the specimen needed to be defrosted for four days, and during this time the specimen was closely monitored and ice packs were added when needed to stop the delicate arms and tentacles from rotting before the denser mantle and head regions had fully defrosted.

It was only when defrosting was complete that the specimen was measured in its entirety; at 8.62m, this *Architeuthis* is one of the largest, most complete, specimens in a museum collection (fig. 1). It was confirmed that Archie was, in fact, female and further measurements and photographs were taken for research purposes. The specimen was then injected with approximately 15 litres of 10% formol-saline solution and placed, extended, in a specially constructed fixing tank where it remained for eight weeks to allow for full uptake of the fixative. It was subsequently transferred to a 9m long display tank and kept in 4% formol-saline. The display tank was situated in the basement store, or Tank Room as it is more commonly known, in the Darwin Centre Spirit Building which houses the Museum's fluid preserved collections.

The Tank Room was chosen as a location for the squid as the room offered formalin-monitoring equipment along with an air ventilation system to help detect and control the environment in case of a formalin leak or spillage. Guided public tours are taken through this room several times a day, so, in line with the acquisition agreement, the specimen is on public display without being in one of the Museum's exhibition galleries, which would have required extensive modification and building work if it was to house such a large quantity of formalin. The tank was designed and constructed in consultation with *Casco Ltd.* who produce the tanks for Damien Hirst's formalin preserved art pieces, so that the specimen could be viewed by the public while on permanent display. Casco were chosen because it was the only company who could guarantee a tank containing formalin for a 50-year period and could show that the tank was strong enough to withstand



**Fig. 1.** Measuring and imaging the specimen.

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any damage that could occur to such a display specimen. The tank was designed with large lid panels, sealed with silicon sealant to prevent escape of formalin vapour, which can be easily removed to allow access for research or conservation work.

#### **Why is Archie such an important specimen?**

Giant squid are found in all the world's oceans (Roper, 1998; Ellis, 1998) and although not believed to be rare in nature (Ellis, 1998), it was only in 2004 that scientists were able to image a live giant squid in the wild (Kubodera & Mori, 2005). Since giant squid are thought to spend most of their lives at depths of 300-1000+ meters (Roper 1998), and the majority of specimens are recovered from sperm whale stomach contents or are from individuals that have washed up on beaches (Roper & Boss, 1982; Clarke, 1996), complete museum specimens are rare. Prior to Archie, the NHM collection contained no complete squid but comprised around 50 partial specimens (mostly from stomach contents) including one that had washed up on a Scarborough beach in 1964. While these have been useful for some distribution/morphological studies they

provide limited opportunities for some modern scientific investigations, for example, before 2004 the NHM did not have any *Architeuthis dux* material suitable for DNA analysis. By storing tissue in  $-80^{\circ}\text{C}$  freezers in the Molecular Collection Facility and in 100% ethanol in the general collections the Museum is now able to provide easy access over the long term to samples that can be used for molecular studies. Lastly the sheer size of this species, *Architeuthis dux* are thought to reach up to 14m length for females and up to 10m for males (O'Shea & Bolstad, 2008); having such a charismatic and awe-inspiring specimen was a great chance to entice new audiences into the Museum.

### Difficulties

This is the largest specimen ever to be preserved in fluid at the NHM and provided the curatorial staff with several challenges. The first difficulty that the department faced was whether we should accept the specimen since it was donated with the stipulation that it be put on public display. After discussing this among colleagues and senior management, we felt that the benefit as a scientific resource and the potential for the specimen to become a visitor attraction outweighed the cost and challenges of putting the specimen on public display. It was also difficult to balance the priorities of the Science Group together with those of Front of House and Public Engagement. The research and curatorial staff were adamant that while the squid was indeed a huge visitor attraction its primary function was as a research specimen. This impacted on how and where the specimen was stored and also how the public could view it. We also were challenged to maintain appropriate health and safety standards at all stages of the fixation and preservation process since formalin is a hazardous chemical. Staff wore protective clothing and respirators and worked in 15 minute shifts, to reduce such risks. The logistics of planning such a large operation were very complicated, and organising deliveries, staff time and restricting access to areas of the Museum (including some public areas) required detailed planning and close collaboration with a wide range of people and departments. There was also a large cost to the project in staff time, materials, equipment, chemicals and the tank itself. To make sure that I achieved my aims within budget but to a high scientific, aesthetic and health and safety standard meant keeping a close eye on all aspects of costing, timings and budgets.

### Scientific uses

The major scientific value has been the availability of tissue samples for molecular analysis which have been sent out to research institutions across the world. A sample that was sent to Dr. Tom Gilbert at the University of Copenhagen was used in a recent phylogeography and population mitogenetics study for an MSc project by Inger Winkelmann (Winkelmann, 2011). In the past it has been suggested that there have been up to 21 species of giant squid (Clarke 1966), however many descriptions were based on poorly preserved specimens and collection locality data (Roper, 1998; Ellis, 1998). More recent works have suggested that there are either three (Nesis, 1982) or one (Roeleveld, 2000) globally distributed species. Using a single marker from mitochondrial-DNA, Winkelmann's study strongly suggests that the family Architeuthidae consists of one pan-global species of giant squid, *Architeuthis dux*. The species show unusually low levels of mitochondrial nucleotide diversity suggesting that in the past there has been a population bottleneck or, alternatively, sudden population inflation. Also the data shows a lack of discernable population structure, with no difference between populations from regions as far apart as Florida and Japan. This is typical of a highly migratory species, and given the fact that previous isotope studies suggested that adult *Architeuthis dux* do not travel great distances (Guerra et. al., 2010) it is most probable that this migration is through a pelagic paralarval stage that disperses via the global thermohaline circulation, sometimes known as the Great Ocean Conveyor.

Specimen capture data from a live caught individual also adds to the growing number of precise distribution and depth data available for analysis, especially important when so many of the known specimens are recovered from stomach contents or found washed up. A further unforeseen benefit following the acquisition, was that correspondence and collaboration with fisheries staff at the Falkland Islands Government Fisheries Department has increased, leading to the donation of further cephalopods to the NHM including newly described type material.

### Archie in the Media

When the specimen was first displayed in the Tank Room (fig. 2) it attracted immediate interest from worldwide media. In the weeks immediately after the opening there were five pieces of TV coverage, eight pieces of radio coverage, 38 pieces of print coverage (with a combined circulation of over 13 million readers) and 20 pieces of web-news coverage. The specimen also featured in the BBC television programme *Museum of Life* when a partial colossal squid specimen, *Mesonychoteuthis hamiltoni* Robson, 1925, was added to the display tank in 2006. Media attention is ongoing.

### Public engagement

Archie has been used in a variety of public engagement programmes to promote NHM science to a wide and diverse audience. Visitors can see the specimen by joining a daily behind the scenes spirit collection tour. The squid has also been the subject of talks and tours including the *Nature Live* programme, a daily show which allows the audience to listen to, and ask questions of, museum scientists; talks and tours for Museum members; external scientific societies; corporate/ fundraising events; and families at the *Dinosaurs* children's sleepover events. Archie was also highlighted in the Museum's 2010 *Deep* exhibition and the online video of the preservation process remains the NHM's most watched video, with over 182,165 views to date (NHM, 2006).



**Fig. 2.** Archie on display in the Tank Room of the Darwin Centre. © This image is copyright of the Natural History Museum, London.

### Educational uses

The giant squid is a great starting point for talking to students about a range of topics including specimen preservation, the importance of museum collections, NHM research, adaptation to habitat, taxonomy and behaviour. With the inspiration of the giant squid, students become interested and engaged with the learning process and more complex ideas can then be further explored. Curators at the NHM have used the giant squid as a tool in teaching programmes and workshops with primary, secondary and university students. This includes our A-level taxonomy days and physiology/dissection workshops. To support these learning opportunities, the Museum learning team commissioned a life size fabric model of the squid. This has allowed the anatomy and physiology of a squid to be easily demonstrated (and indeed the model can be handled by students) to a large school group in any area of the Museum, not just the Tank Room. Currently the model is used in the primary school *Variety Show* workshop as well as *Nature Live* talks, *Dinosaurs* and other family/educational events.

### Arts and humanities

Archie has also provided inspiration for people in the field of arts and humanities. The specimen has been depicted by artists using various media, for example: Alice Shirley from Central St. Martins College of Art drew the specimen life-size in squid ink; Clara Drummond from The Prince's Drawing School who exhibited her work in *galleriBOX* Gallery in Iceland; and Sophie Wiltshire from the Royal College of Art whose

graduate show featured the giant squid painted on ceramic tiles. The specimen was also celebrated in the poem *Squiddity* by Abigail Curtis a Lecturer at York University (Curtis, 2012) and was the central character in the novel *Kraken* by China Miéville (Miéville, 2010).

### In the future

I hope that in the future, Archie will continue to be used to generate new scientific knowledge and to increase public understanding of the natural world and the role of museums in science. Some possible projects include:

- Further DNA analysis for taxonomic/population studies
- Removal of beak/statoliths for study
- Preparing a mould of the beak and making casts for teaching/exhibition

### Conclusions

After successfully completing the preservation and display of Archie, assisting a variety of end-users across varied projects and developing a range of programmes and themes around the specimen, much has been learnt about the preparation and making of an iconic museum specimen. Firstly, when considering accepting and displaying specimens it is good not to limit options for display, research or outreach purposes as it is hard to predict fully how the specimens might be used. When planning such a project, taking account of other peoples' points of view (e.g. curation, learning, exhibition) helped to maximise the wider benefits. Such donations may be unexpected but time must be taken to prepare and seek advice so that no opportunities are overlooked. In addition, although such acquisitions can be costly in terms of money and staff time, the resulting outputs and profile-raising can be wide-ranging and far exceed what was initially expected. Even though a specimen may not be new it can always be presented in new ways to help put across differing messages and ideas that may be highlighted in upcoming exhibitions or events. It is also not necessary for a specimen to be large or rare to be iconic. Such a specimen needs to have a 'wow factor' or to be displayed in such a way that it catches the attention and allows the viewer to be drawn in and engage with the item and any themes/ideas around it. Lastly, try to make the most of opportunities, foster links and build relationships with donors and sister organisations as iconic specimens can come from the most unexpected sources.

### Acknowledgements

I would like to thank the curatorial staff and volunteers of the NHM Zoological department who assisted me with the planning, preservation and display of Archie. Special mention must go to Oliver Crimmen, James Maclaime and Roberto Portela Miguez who worked extra hours on several occasions to make sure that everything progressed on time and to plan. I would also like to thank Oliver Crimmen and Roberto Portela Miguez for giving this talk at the NatSCA 2012 conference when I was unable to attend.

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## **How Museums can Support Higher Education: Engaging Universities with Museums**

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### **Abstract**

Building on the experience of working in a university museum, here I discuss what is currently happening in universities that may provide opportunities for museums to build links and provide services. There can be many benefits for non-university museums to engage in such work, from tapping into to sources of income to the increased profile to be generated from being involved in ground-breaking research. Instead of focusing on museum collections as the resource to be shared, most of the activities described instead highlight the value of sharing spaces and expertise with universities. Museums stand to gain by collaborating with universities in these areas of their work: excellence in teaching, impact and public engagement, innovation, the student experience and Outreach / Access / Widening Participation.

### **Background**

Like institutions the world over, UCL Museums have been working hard to limit the effects of current financial hardships. University museums are effectively being squeezed from both sides – the Higher Education sector has less money, and the museum sector has less money. In short, this means that university museum managers should never forget that at any given moment someone in a university's senior management could well be wondering whether the value added by its museums is worth more than the actual tangible income that could be generated if they converted all the museum spaces to medical research labs.

With pressures on university resources growing, university museums must do all they can to prove their worth to their governing institutions. With this in mind, I aim to explain a selection of the strategies and programmes that we at the Grant Museum have put in place to try and meet the needs of our institution, UCL, with a hope of being considered a key part in delivering the University's varied agendas. What I hope to communicate is that the agendas that we are working towards could be met by non-university museums.

It has always been known that natural sciences museum collections can be used by academic researchers, mostly zoologists and palaeontologists wanting access for morphometric analysis or to understand population changes over recent history. This kind of academic access is commonplace in many museums and will not be the focus of this paper – there are already strong relationships between museum staff and academics in this field. Most would consider it the bread and butter of academic-museum interactions, agreeing that procedures should be in place to make access as easy as possible, and as efficiently as they can.

Instead of discussing specimen-based research, I will be highlighting some of the issues that are extremely big business at universities at present which with varying degrees of imagination can easily be delivered by museums. Where necessary, I will try to explain exactly why a museum might want to help universities to deliver their strategies, if the overlap with museum agendas isn't obvious.

The strength and value of museum collections does not need to be highlighted. However, while it's easy to rely on objects as being at the centre of any offer for collaboration, it's crucial to remember that the professional expertise of museum staff is normally very different to the expertise of potential partners. It is certainly not just the spaces and collections themselves that should be considered in an audit of value, but also the staff. For example, museum staff are experts in how to run events, develop audiences, design exhibitions, and teach with objects, as well as curation, which can be all highly valued by modern universities.

### **Excellence in Teaching**

UCL Museums have been gathering data which show what students get out of learning with objects. Key

findings have been that 67% of students think object-based learning is a more effective way of learning than listening to a lecture or talk. Students emphasised the way object based learning improved their understanding of subject-specific knowledge; was interactive, hands-on and visual; and was an engaging and inspiring way of learning (Hannan, 2012).

University Museums are not as common as they once were. For example over the past thirty years other London universities disbanded their zoology collections, and they came under the care of the Grant Museum. We are now the last university zoology museum in London. Universities local to other museums may well not have their own teaching collections. It is easy to make the argument that zoology can't be properly taught without access to specimens – and museums can certainly contact lecturers and offer access.

Real value is to be had in looking beyond the obvious academic links. “Key Skills” or “Transferable Skills” are a big part of the modern university agenda, in equipping graduates for a life in employment after university, and object-based learning is an excellent way of delivering them. Communication, observation and team-working skills were consistently identified as having been developed through object based learning (Hannan, 2012).

In the Grant Museum, as well as teaching biologists and geologists we look well beyond these obvious links and have considered which other disciplines could make use of our collections, expertise and spaces. We have built strong links with art schools in London and huge proportions of our Higher Education classes are in art. We've also attracted classes who study jewellery making – they look at the metal mounts our specimens are built on; architects who look at the structural complexities of animal skeletons and dancers from the Royal Academy of Dramatic Art to understand from real skeletons how to make playing the role of an animal more realistic with respect to how they actually move. The key message is don't be restricted to scientists when thinking about how to generate teaching bookings.

### **Impact and Public Engagement**

When academics bid to research councils for money to do research, today they have to demonstrate that their work has some implications beyond academia. For some this is very easy – for those researching new drugs the “impact” is that x many lives are saved each year. Others may influence industry and result in reducing costs for a particular sector or generate income from patents or licences. Where museums come in is that one pathway to impact is “cultural enrichment, including improved public engagement with science and research” (National Co-ordinating Centre for Public Engagement, 2009).

This means that there are thousands of academics out there looking for a way to engage the public with their work, and with a limited idea of how to do so. If museums latch on to this, they can provide a way for their visitors to experience cutting-edge research, potentially play a role in shaping it, and get content for free for exhibitions and events. Museums are already successful at drawing people in. Everyday visitors, event participants and schools can be shared with colleagues across our universities.

Given that public engagement and the impact agenda are of such a high priority today, actual guaranteed access to an established audience should not be forgotten lightly, nor should how it is achieved. Museums can provide this access to academic colleagues.

In addition to hands-on object-based themed events for families in holidays and at weekends, the Grant Museum runs one of the largest programmes of informal natural history events for adults in London. These take place in the evenings at least once a fortnight and are delivered in a range of formats. Each term all events revolve around a single theme, which facilitates their marketing as a package. For example spring 2012 term was “Humanimals Season” – exploring the ways in which human and animal worlds interact. Other successful themes have included Cryptozoology Season and Naughty Nature Season.

Around these topics a variety of events are programmed, which range in format from traditional lecture-style presentations, panel discussions, balloon debates, treasure hunts, panel-games, object-based workshops and film nights. All of these events rely on academics coming in as speakers or panellists. We train them up and get the top-level experts for our audiences, in return they get access to our audiences for their impact requirements, and they don't expect to be paid. Beyond UCL, research academics speaking at events at Wellcome Collection have used the events as evidence of impact-related activities for their funding councils (Jopsom, 2012). Likewise public engagement staff at the Natural History Museum work with scientists

to tailor their pathways to impact to their research and how that might best be communicated to different audiences, including inclusion in their Nature Live programme of scientist-led events (Modinou, 2012).

Aside from events, the main area of impact the Grant Museum works heavily with is exhibitions. All of our temporary exhibitions are co-curated by university academics aiming to deliver impact. In spring 2012 *Art by Animals* was an installation of paintings by gorillas, chimps, orangs and elephants, co-curated with art academics, which doubled our visitor figures. What the university gets out of it is a platform for its academics to engage with an established public audience, and a reputation for high quality accessible events, managed and marketed by experts in event programming and science communication.

To make the events and exhibitions a success we must ensure high attendance, and this is done by ensuring themes have a wide appeal – not just biologically-minded people. Whilst all of our themes have their basis in the life sciences, particularly natural history, we tackle the topics from many angles, bringing in academics from across the disciplines, including the history of science, engineering, astrophysics, geography and the arts.

An example from outside of UCL is the Manchester Museum's recent *Breed: The British & their Dogs* exhibition, which was developed with academics in the University of Manchester's Centre for the History of Science, Technology and Medicine, with AHRC funding (University of Manchester, 2012).

### **Generating income from Impact activities**

Museums must ensure that their costs – in terms of staff time and materials, which for exhibitions can be huge – are costed into the research funding bid at the earliest stage. It's hard if the academics contact the museum having secured their research money with little forethought for the actual costs. UCL Museums have produced a document which acts as a guide for academics considering funding bids. It outlines the kinds of activities which the museums can support, and the approximate associated costs the museums seek funding for (UCL Museums, 2012).

### **Innovation – excellence in research**

Here I will discuss the way museums can be involved in research aside from traditional specimen-based research. Instead of considering the objects to be the asset in use, we consider the museum venue and its visitors as something to sell to academics.

As with impact, many researchers need a public to test things on. We at UCL Museums have built strong links with academics in the field of digital humanities, both at UCL and beyond. Our partnerships involve the academics conceiving of an innovative method of audience engagement, and they need somewhere to test it as an experiment. We provide the museum expertise and the Petrie dish – we put experimental products in our galleries so that academics can test them on our willing visitors.

To these ends we have embraced a philosophy of being a venue for experimental practices and innovation for universities (see MacDonald and Ashby, 2011). As an example how we have treated the museum as a research venue, we have in gallery a ground-breaking method of public engagement that was developed with dual goals. For us – to allow our visitors to contribute their opinions to how museums like ours should practice, and the role of science in society today; for our partners – the UCL Centre for Advanced Spatial Analysis and UCL Centre for Digital Humanities – the chance to run a research programme concerning how museum visitors engage with digital social interactives and how audiences behave around such technology.

To these ends, we are only the second museum in my knowledge to employ iPads permanently in displays. Each iPad asks visitors to answer questions to which we want to know their thoughts. These change periodically. At present, our questions include “Should human and animal remains be treated differently in museums like ours”, “Should scientists shy away from studying differences between the races” and “What makes an animal British”. Visitors can respond on the iPads themselves, on their own smart phones by scanning a QR code, or at home on their computers. Evaluation is still underway, but anecdotally the project seems to be a great success and has been shortlisted for a number of awards. It is called QRator.

On similar lines The Science Museum, with funding from the Wellcome Trust, used visitors to their *Lotto-lab* as subjects in experiments into human perception, providing the researchers with scientific data at the same time as engaging their visitors in active research (Science Museum, 2011).

Involvement in such enterprises can raise income from research councils in the same way as Impact-related work, but the benefits go far beyond this. The chief of these include an enhanced experience for visitors, and an improved profile in the sector. The *New Media Consortium Horizon Report: 2011 Museum Edition* (Johnson, Adams and Witchey, 2011) cited QRator as being four to five years ahead of “the adoption horizon” for the sector as a whole, which has generated a great deal of interest for the Museum.

### Student experience

Since tuition fees became significant, and even more so since the £9000 fees were on the table, universities have working very hard to ensure that students are happy and feel they are getting good value for money. The Grant Museum links to this agenda in many ways, particularly in making sure that the teaching is excellent by pushing object-based learning, and attracting students to our events, but a big way for other museums to tap into this, and get a lot out of it, is through volunteering.

Many museums will rely on volunteers to fulfil their needs to some degree. If they chose to work with university students it is worth noting that every university is likely to have a volunteering services unit which supports its students in finding and completing volunteering opportunities. The Grant Museum uses a lot of volunteers in our learning and curatorial work, and they all come from university. If other museums are looking for subject-enthusiasts or keen events volunteers then it is worth contacting the local university volunteering services staff, as they will have great infrastructure in place to provide support. There are drawbacks of working student volunteers – largely their lack of availability in exam and holiday time, but the Grant Museum has benefitted from their work a great deal.

### Outreach / Access

As part of an agenda variously known as Outreach, Access or Widening Participation, all universities have to put a lot of effort – running into the millions of pounds – into attracting students from non-traditional higher education families. Museums can play a major role in fulfilling this goal. It is likely that each university will have a major programme in place – called the Access Agreement since the £9000 tuition fees were introduced – which museums could take advantage of.

The programmes may include Saturday schools and summer schools for 14 to 17 year olds – an audience that is tricky to get into museums – that will be looking for things to do with their students. The Grant Museum provides workshops for things like this, and there is money available to do so. There is potential growing for museums to tap into this, taking advantage of the universities’ growing expertise in recruiting such audiences, and being paid as part of the arrangement.

### Summary

In summary I hope I have conveyed that, aside from traditional collections-based teaching and research, the other standard practices of modern museums – from events and exhibitions to volunteering, schools and interactive displays, can be tweaked to be of benefit to universities. I doubt it will be the main kind of interaction or partnership in most museums, but it can be a very beneficial area of work, and one that both generates income and fulfils shared agendas from both sectors.

### Acknowledgements

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## **Undertaking an Effective Review of Natural History Collections**

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### **Abstract**

Understanding what museums have in their collections is vital to ensure that collections are used, researched and engaged with to their fullest potential. This paper outlines a detailed review of a large spirit collection at Plymouth City Museum and Art Gallery (PCMAG), with funding from the Museums Association *Effective Collections* programme. Different review methods are discussed including reviews that can be adapted for specific projects. PCMAG's review is discussed in detail with examples and a stage by stage process. The review resulted in the discovery of two type specimens, two co-types and several scientifically and historically important specimens. 1241 specimens have been highlighted for transfer to other museums. Transferring the specimens has enabled the curatorial staff to focus on conservation and research for the specimens retained at PCMAG.

### **The need for collection reviews**

Museums across the world hold unique and amazing collections which have inspired visitors of all ages for over 100 years to visit their local museum (Asma, 2001). Only a small percentage of collections are on display at any one time, with the remaining in museum store rooms. Local authority museums may have natural history collections that can hold hundreds of thousands of specimens, and the national museums have collections numbering the millions. The numbers of specimens are awesome, but do museums know what they have and can they make the most of their collections?

In 2005, the Museums Association published the *Collections for the Future* report assessing how collections are used. The report found that many collections are underused, not very well understood and could potentially be more mobile (Wilkinson, 2005). To ensure more use of collections, three areas were highlighted; greater engagement using the collections; developing museum collections; and staffing in museums (Wilkinson, 2005). Developing museum collections has been high on the agenda for many museums as a result of this report, along with the subsequent publication of the Disposal Toolkit (MA, 2008a).

The term disposal can be defined as the full de-accessioning of an object through transfer, return to original donor, sale, or physical destruction. If disposal is carried out with disregard of current guidelines, it can have a very negative impact with the public (e.g. BBC, 2006; 2010; Guardian, 2006; Liverpool Echo, 2012). This subject has been the focus of debate across the museum sector (for further discussion see Davies, 2012). Disposal can be viewed as a method of rationalising existing collections in a way which is beneficial to the museum and the public. Through well-planned collection review projects, resulting disposals allow more focus, resources and use of the collections which remain in the museum (NMDC, 2003). Collection reviews additionally assist in understanding what gaps there might be in current collections, allowing focused development of future collection acquisition policies (Knell, 2004).

### **Costs of collections**

There are costs associated with holding collections. It has been estimated that around 38% of a museum's operational costs are needed to retain objects in the collections (Lord, *et al.*, 1989). This percentage includes the curatorial work carried out on the objects (i.e. documentation, conservation, research, auditing) and the security (i.e. staffing, security systems, etc). Intangible costs increase this percentage to around 70% of a museum's annual budget (electricity, heating, administration, space, etc) (Lord *et al.*, 1989). These costs are of a greater concern when collections are not well used or understood (NMDC, 2003).

Museum store rooms have finite space and museums are continually growing their collections through new acquisitions (Merriman, 2007). The large number of objects in museum collections makes it difficult to review them as a whole. Small focused review projects examining parts of a collection to determine their

significance can highlight new information, and new uses, and can also result in rationalisation of the collections (Merriman, 2007).

### Collection reviews

Several museums have developed new mechanisms to develop their collections to enhance their understanding of what they hold, and, in some cases, question why they are retaining it. One of the first serious attempts to review museum collections was a large project carried out in Australia aimed to determine the significance of collections and heritage objects. The *Significance* model uses four primary criteria, termed 'degree of significance', for the curator to examine the value of collections and individual objects; *historic, artistic or aesthetic, scientific or research potential, and social or spiritual* (HCC, 2001). Each degree of significance is evaluated against four more criteria; *provenance, rarity or representiveness, condition or completeness, interpretive capacity* (HCC, 2001). By examining objects closely looking at the relevance and *significance* allows the curator to understand and use their collections in new ways.

Glasgow Museums undertook a review focused on one area of their collections. A collections significance report was carried out for over 5000 art and social history objects (Hayes, 2008). The review demonstrated that these objects should be retained in the collections because they were significant to the heritage of the local area (Hayes, 2008). Significance of collections or individual objects may be common knowledge to current curators, so the benefit of these types of reviews is to assist with knowledge management for future staff. The review additionally highlights to the public what the museum holds and why, and are important appendices for funding applications.

University College, London (UCL) Museums carried out a complete review of their entire collections in 2007 (Dunn & Das, 2009). This large review examined the historical significance, potential for use and research, condition, security and documentation of all the objects in the UCL collections (Dunn & Das, 2009). A new and simple assessment tool was developed, the *UCL rubric*, which graded different assessment criteria against a review table. The assessment criteria included storage, security, environmental conditions, housing material, documentation, ownership, teaching, research, public engagement, historical connection to UCL, and the objects uniqueness (Dunn & Das, 2009). The *UCL Collections Review Toolkit* can be used and adapted to fit specific museum projects for any museum. The UCL review has enabled the curatorial staff to manage their collections in a more strategic way. Assessing the completed review table has created a better understanding of what is in the collections, identifies parts of the collections for future development and funding applications, and allows the collections to be the focus of teaching and research, and identifies priorities for documentation, storage and conservation needs (Dunn & Das, 2009).

Renaissance East Midlands developed a similar toolkit to the UCL toolkit and the Australian *Significance* model (MLA, 2010). The model uses a grid to determine the collections importance in a structured way, which is subsequently used to aid planning for future collections projects, use and interpretation (MLA, 2010). As well as identifying the significance of collections, and highlighting potential disposals, the review method can also demonstrate gaps in the collections where future collecting programmes can be focused.

The *New Light on Old Bones* project aimed to develop collections in two small museums in the North West (Chalk *et al.*, 2011). Subject specialists looked at the two natural history collections without a specialist curator and discovered links between the museums, with new stories and histories behind the specimens (Chalk *et al.*, 2011). Reviewers with the subject knowledge provide the opportunity for new information to be discovered, and empower the collections staff with new knowledge and confidence on how to use the collections to their full potential.

A large project in the North West, reviewed over 150,000 objects across 24 different museums (Cooper, 2011). This large review included different collection areas and subject specialist reviewers completed a thorough assessment across the sites. Five of the museums had natural history collections, and the reviewers identified several potential future partnership projects between these museums (Cooper, 2011). As was demonstrated with the *New Light on Old Bones* project, small local authority museums often have non-subject specialist curators and very limited resources. By discovering what museums have, increases partnership work between museums, which benefits the collections, the staff, and ultimately the museums themselves and the services they can offer (Cooper, 2011).

The Royal Albert Memorial Museum (RAMM), Exeter is currently undertaking a review of their entire collections. This review is using information from the museum database to examine the collections in greater

detail. Different collection areas (e.g.: Lepidoptera) are searched and the results constitute one review area. The curators subsequently go through each collection area with set questions to find out more about the collections' importance, documentation level, research potential, public engagement opportunities and historical significance (Gulliver, 2012, pers comm.). The review aims to discover more about the objects they hold and how they can be enjoyed by future generations (RAMM, 2012).

The models which have been developed can be adapted for a museum's own specific review project. The reader is advised to look at the different models outlined above in greater detail and determine the one that would be most beneficial to their own project. This paper further outlines the review method used by Plymouth City Museum and Art Gallery (PCMAG), adapted from the *UCL Collections Toolkit*, to review a large spirit collection.

### **An effective review**

As a result of the findings in the *Collections for the Future* report, the Museums Association established the *Effective Collections* programme providing an opportunity for museums to apply for grants to develop their collections by understanding what they hold (Cross, 2009). The main aims of the two grant schemes were to assist in reviewing the collections with expert help and increase use through loans and disposal (Cross, 2009). Two strands of funding were open to applications:

- **The Main Fund:** Applicants could apply for up to £10,000 to review their collections to enhance their use.
- **Special Project Fund:** Grants of up to £25,000 could be applied for certain projects to increase loans and transfers.

In January 2009 PCMAG was successful in the Main Fund Application to undertake a complete review of the spirit preserved collection with the following aims:

- Increase skills for curatorial staff (none had a background in marine biology).
- Work with specialist reviewers to assess the collection and make recommendations.
- Improve physical access to the collections.
- Promote the collections to marine science organisations in Plymouth.
- Assess the collection in line with PCMAG's Acquisition and Disposal Policy and highlight specimens for potential disposal.

The funding provided support for developing and implementing the project. A small proportion of the grant was allocated to a project coach who assisted with the work plan and ensuring the goals were achievable and on target. The remainder of the grant was towards:

- £200 - skill sharing visits to Natural History Museum and Oxford University Museum of Natural History.
- £800 - reviewer travel and accommodation expenses, and time
- £2500 - conservation of specimens
- £500 - developing education resources
- £500 - chemical disposal
- £1500 – developing packaging for safe transport of specimens for future loans.
- £2000 – transport costs for transfers

### **The Old Spirit Collection**

PCMAG opened in 1910 for the inspiration and education for the people of Plymouth. As well as many other zoological specimens, the museum amassed approximately 500 spirit preserved specimens prior to opening (Fothergill, 2006, pers comm.). This collection is referred to as the 'old spirit collection' and mainly contains marine specimens in square battery jars for display purpose, which were prepared by the Marine Biological Association (MBA). The old spirit collection includes a number of foreign specimens such as reptiles, amphibians and some beautiful dissections prepared by the Czech naturalist Václav Frič in the late 1800s. In July 2000, PCMAG received a large transfer of over 5,000 spirit preserved specimens from the MBA.

### The Marine Biological Association of the United Kingdom

The late 1800s saw many naturalists concerned about the lack of research into the seas and the fish stocks (Southward & Roberts, 1989). This led to a need for an organisation to focus on the study of living marine animals and their physiology as well as researching the fish populations in the seas (Southward & Roberts, 1989). In 1884, the Royal Society committee announced the foundation of the Marine Biological Association (MBA, 1887). Although Thomas Henry Huxley saw no threat to fish stocks in the oceans, he was later persuaded to support the new Association and was elected the first president (Bibby, 1959; Desmond, 1997; Varley, 2003). The new building was built on Plymouth Hoe, and the MBA opened in 1888 (MBA, 1888).

In 1887 a public appeal was made for books and periodicals to support the scientists and the research at the MBA (Southward & Roberts, 1989). Founded, in 1887, and opened in 1888, the National Marine Biological Library (NMBL) holds runs of periodicals, scientific reports, and scientific books. Important historical archives are held at the NMBL which includes material relating to historical scientific expeditions, along with correspondence, notes and illustrations from ex-MBA staff.

The MBA continues to research all aspects of marine life from fish biology to plankton distribution. Since the opening of the MBA, scientists have been preserving many of the specimens they have been researching, and in 100 years the MBA amassed a collection of over 5,000 specimens (fig. 1). This includes specimens from trawls, expeditions, individual researchers and specimens cited in scientific publications. The majority of the collection was amassed to create an encyclopaedic collection of the fauna from around the Plymouth coast known and published as the Plymouth Marine Fauna (MBA, 1904; 1931; 1957).



**Fig. 1.** The type collection of the fauna and flora at the MBA Laboratory, Plymouth. Image reproduced with permission from the MBA archive collection.

### A big transfer

The large spirit collection had been stored off-site from the main MBA building since the early 1990s (Nobel, 2012, pers comm.). Several attempted break-ins and vandalism on the stores, forced the MBA council to find new accommodation for the collection (MBA, 1996). With no available space in the main

MBA building, the MBA and PCMAG discussed the full transfer of the spirit collection to the museum, which was agreed in 2000.

Many jars which were identified by the MBA as not historically or scientifically important were disposed of in a skip (Mavin, 2000). Staff at PCMAG rescued some of these specimens resulting in the transfer including several specimens with unclear origin, poor preservation and little obvious data (Fothergill, 2006, pers comm.). These specimens were partly rescued as re-usable ground glass jars, but also as potential equivalents to the specimens already in the museum's collections (originally sourced from the MBA in the late 1800s and early 1900s). Where specimens or jars were thought to have further potential, and due to the important history of the MBA spirit collection known by PCMAG staff, it was decided to retain as much of the original collection as possible until further research could be carried out. Accompanying the collection were related archive material and library books, which were moved to the NMBL (Mavin, 2000).

The jars were transferred to PCMAG with the original old glass-door wooden cabinets, with glass doors. The cabinets were dirty, and mouldy, with broken locks and broken glass panels. These cabinets proved impractical to allow easy use of the collections. New shelving was purchased to allow easier access, with deep red Gratnell trays to hold the jars (fig. 2). Gratnell trays were chosen as they will contain any leaking fluid and specimens can be easily reached and viewed by taking out the whole tray, rather than having to remove layers of jars to reach a specimen at the back of the shelf. During the refurbishment of the store, all the specimens were removed and displayed in a temporary exhibition *In a Pickle*. This provided the opportunity to carry out basic documentation on all the specimens. The entire collection was accessioned, photographed, recorded, cleaned and returned to the new shelving in taxonomic order.



**Fig. 2.** Above, the old wooden cabinets holding the spirit specimens. Right, the new open shelving with red Gratnell trays.



### The review

A four stage process was undertaken to complete the review from beginning to end (figs 3, 4, 6 & 7). Stages 2-4 were developed as a result of the reviewers recommendations. The flow charts can be used as guidance for a museum to create similar processes based on their own review results.

PCMAG sought two reviewers to go through the entire spirit collections; a Professor of Marine Biology and a Collections Manger of Zoology at a national museum. Two reviewers were chosen to combine expertise and knowledge allowing the review to be as comprehensive as possible. The professor had a wealth of knowledge about the local scientists and fauna in Plymouth and the collections manager understood the aims and needs of the museum.

The reviewers were booked in together for two full days with the collection. They each received a project brief, outlining the aims of the review to; identify the scientific value of the specimens; assess the subcollections and their relevance to Plymouth; identify potential loans or transfers and submit a written report with recommendations (for full brief see Appendix 1.)

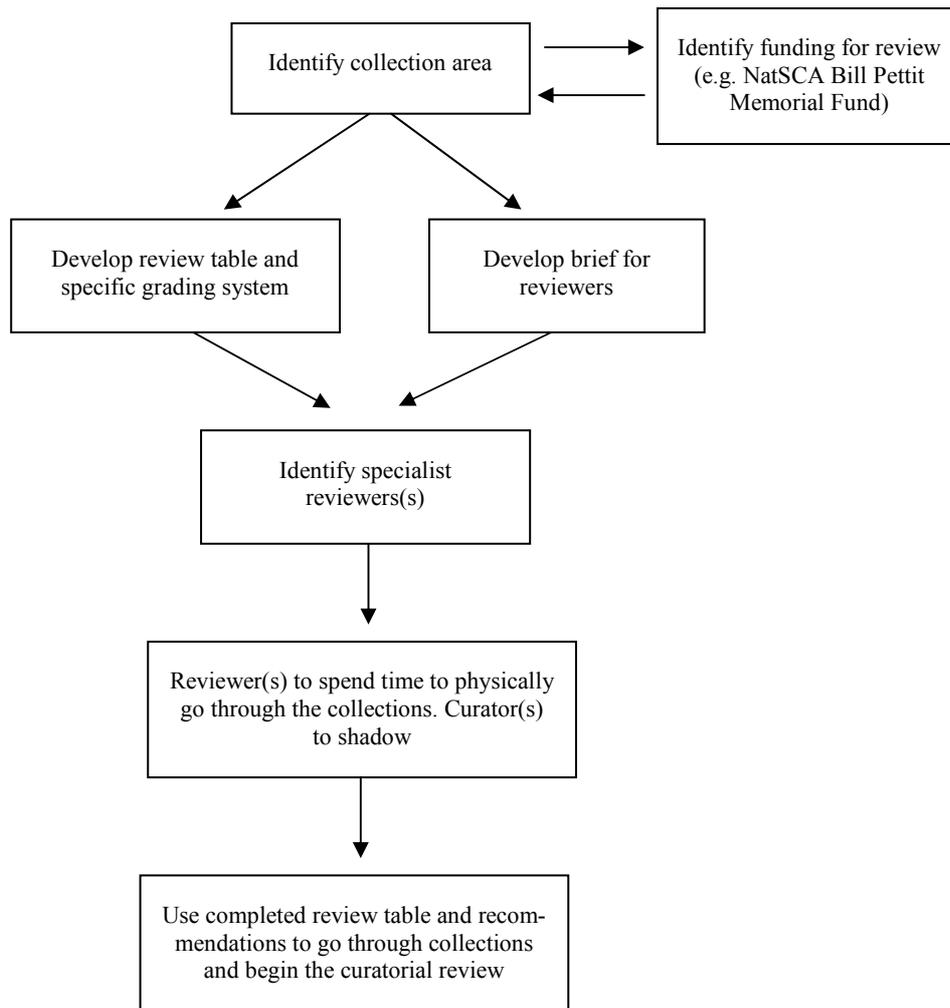


Fig. 3. Stage 1 of the review process highlighting steps needed to prepare for the reviewers.

**PCMAG review**

Using the *UCL Collections Review Toolkit* as a template, PCMAG developed a review table and grading system to fit this project. The review table was designed to allow the reviewers to assess several criteria relating specifically to the spirit preserved collections. The criteria examined were the jar and content condition, the documentation information, the potential use (research, teaching, public engagement), and the significance (historical, rarity, distribution and relevance to Plymouth). These criteria were chosen to assist in determining the significance of the specimens to Plymouth and their potential use for PCMAG (for example review table see Appendix 2.)

A pre-set grading score was written for each criterion to allow the reviewers to assess what PCMAG wanted to learn about the collection (Table 1). The review table was completed by the reviewers choosing one jar in the tray and grading this against the criteria. There were additional fields for notes on the review table to add extra information about other jars in the tray they were assessing.

	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
<b>Potential use: public engage- ment</b>	No use	Specimen not visible	Difficult to use (complex information required to interpret)	OK visual impact (reasonable size or able to magnify) AND/OR easy to interpret	Good visual impact AND easy to interpret (common species, relevant to Plymouth, unusual story etc)

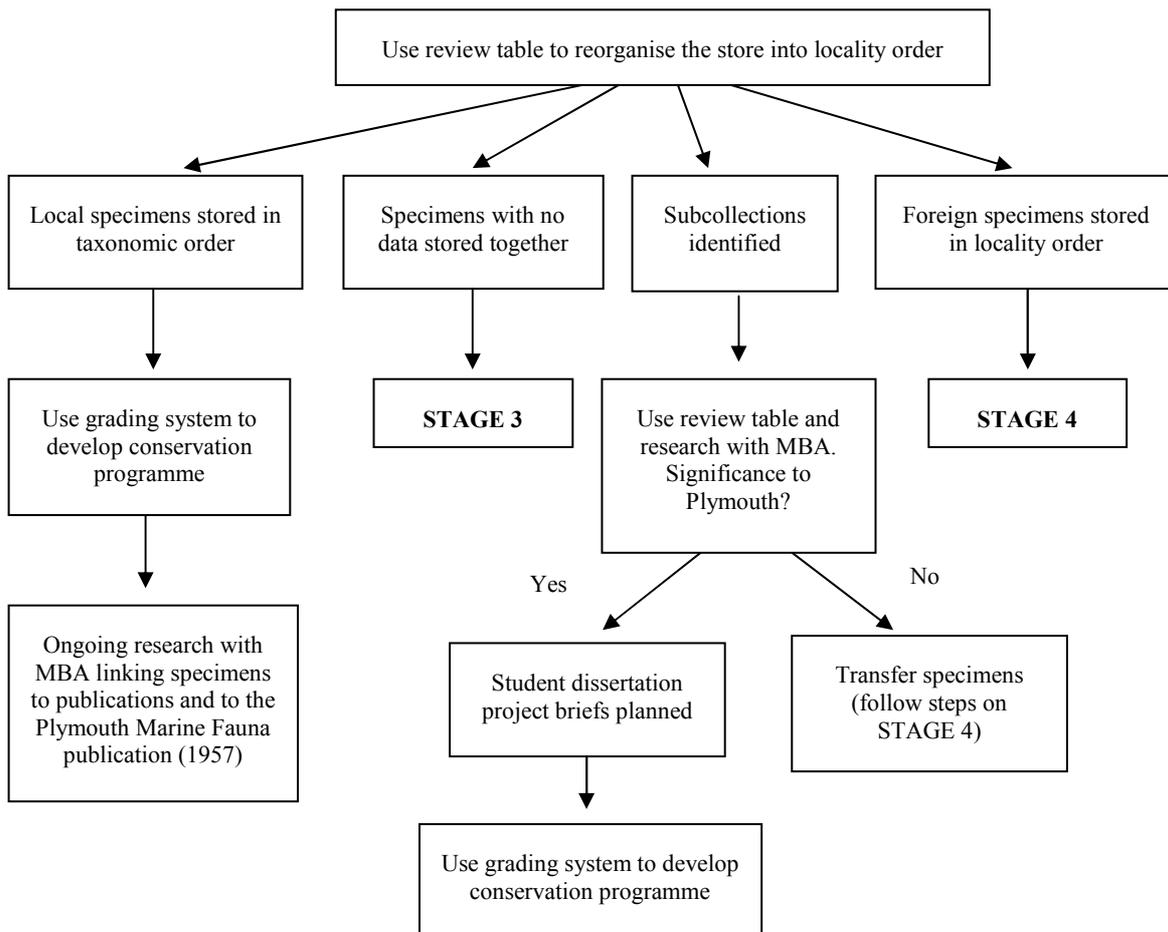
**Table 1.** An example of the pre-set grading score for public engagement. The full grading scores can be seen in Appendix 3.

**Review recommendations**

Although the reviewers were from different professional backgrounds, the written report and final recommendations from the review were similar:

- PCMAG to highlight the specimens stored in formalin
- Highlighted several important specimens in need of immediate remedial conservation
- Reorganise the collection into locality order to see what was from where
- Dispose of specimens with no data and transfer specimens beyond the local area

The completed table and recommendations provided the information to implement Stage 2 of the review process (fig. 4).



**Fig. 4.** Stage 2 of the review process. The recommendations highlighted the need to reorganise the store into locality order. This allowed for the specimens without data to be stored together.

**Reorganising the store**

Each jar was checked and reorganised into locality order. More than half of the specimens were from Plymouth and these were stored together in taxonomic order. Specimens from other localities included Cornwall, the North Sea, France, Chile and India. The review table highlighted several specimens in need of conservation and a conservation programme was developed.

Unknown in the collections previously, the review discovered the type specimens of *Amalosoma eddystonense* (Stephen, 1956) and *Hyperia tauriformis* (Bate & Westwood, 1869) and the co-types of the sea squirts, *Polycitor searli* (Knott, 1952) and *Lissoclinum cupuliferum* (Knott, 1952). *A. eddystonense*, *P. searli*, and *L. cupuliferum* were highlighted by the review and have been subsequently conserved (fig. 5).



**Fig. 5.** The type specimen of *Amalosoma eddystonense* (Stephen, 1956) and the co-types *Polycitor searli* (Knott, 1952) and *Lissoclinum cupuliferum* (Knott, 1952) as discovered in the review (top row). Remedial conservation work carried out on the specimens has ensured their future preservation (bottom row).

The reorganisation of the collection allowed the subcollections to be stored together, which were originally dispersed throughout the store. A conservation programme has been developed for the subcollections as a result of the review table. The table additionally highlighted that all of the subcollections will benefit from further research, and project briefs for student dissertations have been developed as a result.

The subcollections include:

- Bay of Biscay (77 jars)
- Challenger (1970s Exp.) (69 jars)
- Crawshay Fauna of the English Channel (183 jars)
- H.M.S. Research (15 jars)
- Holt and Brown Medusae Collection (61 jars)
- Kitching's Gully (367 jars)
- Marie Lebour Mollusc Collection (81 jars)
- Norman Arthur Holmes Echinoderm Collection (170 jars)
- S. S. Huxley (6 jars)
- S. S. Salpa (8 jars)
- S. T. Albatros (26 jars)
- S. T. Myra (1 jar)
- S. T. Plover (2 jars)
- S. T. Shamrock (2 jars)
- Trawler Prince (3 jars)
- Zoological Station, Naples (15 jars)

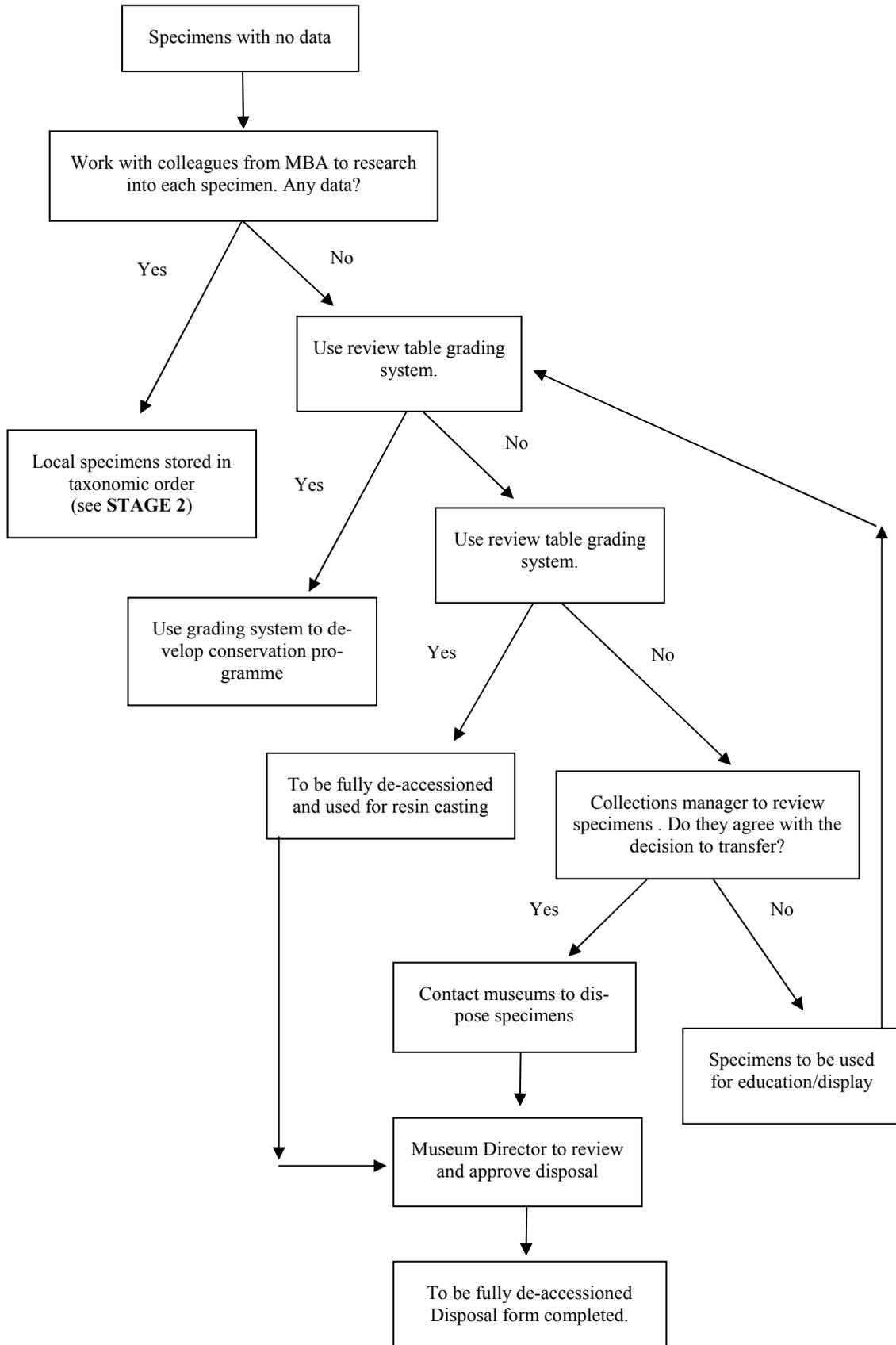
Approximately 500 jars with no associated data were stored together. These specimens were highlighted for disposal; through transfer or for education use by developing resin casts (Stage 3 of the review, fig. 6).

#### **Assessing potential disposals**

Before disposing of any specimens, it is recommended to review the selected disposal as outlined in the Code of Ethics (MA, 2008b) and the Disposal Toolkit (MA, 2008a). PCMAG contacted staff at the MBA and the NMBL for additional support from local marine science experts to examine the specimens highlighted for disposal. The reviewers included the ex-curator of the MBA spirit collection at the MBA, two colleagues from the NMBL, and two fish experts working at the MBA. These additional external reviewers were approached to examine the potential disposals; they had the knowledge of the history of the MBA, were able link the handwriting in the jars to historical collectors, and two were collectors of some of the specimens in the collection.

Within the trays labeled 'dispose' there were approximately 200 jars with 'Plymouth Marine Laboratory' labels followed by a species name written in pencil with no other information in the jar (fig. 5). In the early 1970s, a placement student had been carrying out remedial conservation on many of the specimens. They added new labels to each of the jars, but disposed of the original labels (Southward, 2012, pers comm.). However, The MBA published a list of the known species found off the waters of Plymouth (MBA, 1904; 1931; 1957). To supplement the publications, the MBA had been attempting to complete a full reference collection of the marine species off Plymouth (Southward, 2012, pers comm.). This collection was referred to by the MBA as the 'Type specimen collection of marine fauna' (Mavin, 2000). These were not type specimens in the usual sense; they were figured and cited specimens of the Plymouth Marine Fauna (MBA, 1904; 1931; 1957). It was recommended to check the species in each of the jars against the Plymouth Marine Fauna (MBA, 1957); if the species was listed, it is more than likely to have been collected from the Plymouth area (Southward, 2012, pers comm.).

Of the remaining jars highlighted for disposal, 87, which contained specimens in good condition not requiring a large amount of conservation work, were removed and stored together with the aim of being used for display and loans to other museums. 17 jars were removed and stored together for education use (examples of different marine Phyla to be set in resin for a secondary school for pupils to see up close). The specimens for display and education were checked by the independent five reviewers to verify the decision.



**Fig. 6.** Stage 3 of the review process, outlining the steps taken towards disposal of specimens with no data.

### Disposals

103 jars were identified for disposal all of which had no associated data and were in very poor condition. The Disposal Toolkit recommends the appropriate steps to be taken for undertaking any disposal, in the following order (MA, 2008a):

1. Offer as a gift or transfer
2. Return to the donor
3. Sale to another museum
4. Transfer outside the public domain
5. Sale outside the public domain
6. Recycle the item
7. Destruction of the item

Each method is not without its problems if it is not carried out ethically. Transfer of specimens to another museum is the most ethical method of disposal. This method moves specimens to museums where they are more relevant to their collections and local community. In 2011, two taxidermy collections which were held at the Botanic Gardens Museum, Merseyside were considered for disposal by Sefton Council (Atkinson, 2011). Although there was a keen interest by Liverpool Museums to take parts of the collection, the specimens were transferred to the British Historical Taxidermy Society Charitable Trust (Formby Times, 2012; Liverpool Echo, 2012). The process of this transfer neglected to advertise to the museum sector as a whole and did not seek professional advice throughout the process (Merriman, 2012).

The method of disposal which can cause national media coverage is the sale of collections. The sale of an LS Lowry Painting at Bury Museum and Art Gallery for £1.4 million was to assist with budget deficits within the council in 2006 and resulted in the museums' expulsion from the Museums Association (MA, 2006). This story was covered in national news (BBC 2006; Guardian, 2006). A large collection of taxidermy was put up for auction by Northampton Borough Council (BBC, 2010). Although a catalogue for the auction was published, the author is unaware of the outcome of the sale (BHT, 2011).

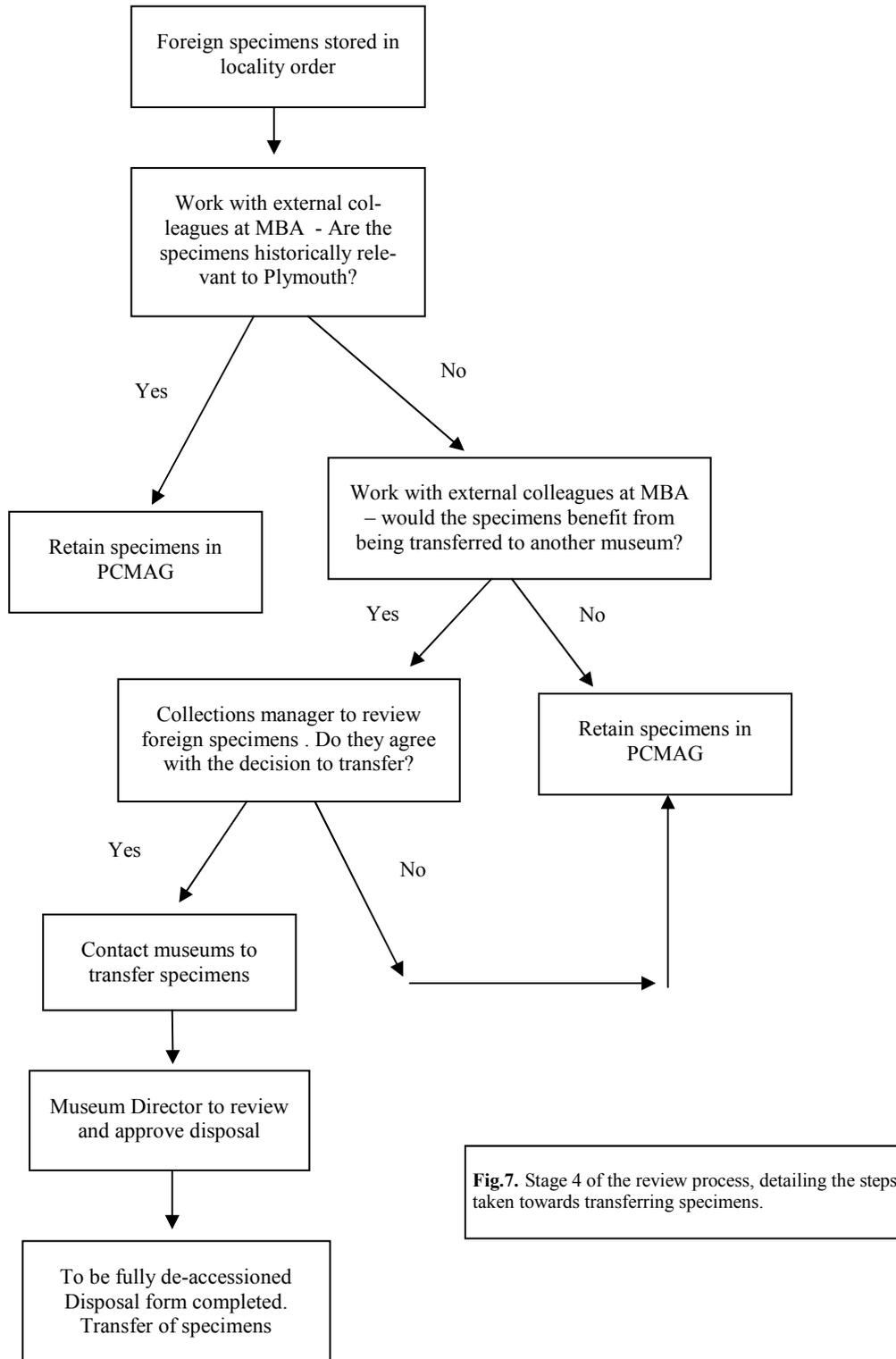
PCMAG sought to dispose of the items through gift or transfer (fig. 7). The reviewers from the MBA and the NMBL examined each jar and all independently agreed that these specimens were suitable for disposal. The collections manager at PCMAG approved the selected specimens. The research carried out on the specimens by the curator and the reviewers involved searching old archives to find handwriting matches, log book records from trawls around the period and checking any species data with the Plymouth Marine Fauna (MBA, 1957). The selected jars for disposal had very little data with them, and often no label at all. The research carried out by the expert reviewers from the MBA covered all known avenues, outlined above. There may never be enough research into a specimen, but there is a point when the curator can make an informed decision with assistance from outside experts. All disposals are presented to the museum director for final approval.

The MA website *Find an Object* holds a database of objects which museums are offering for disposal (see MA, 2012). The group of 103 jars were listed on the database on 31 October 2011. A note was also posted on the NatSCA JISC mail offering the disposals to interested museums. Cambridge University showed an interest in the 20 battery jars. The National Museum Wales, Cardiff agreed to take the remaining 83 jars.

### Transfers

The preservation of specimens for future generations is one of the key functions of a museum. If specimens are not being used and would benefit by being transfer to another museum, this should be considered (NMDC, 2003). The reorganisation of the spirit collection highlighted specimens which are outside of the PCMAG's current collecting policy and may benefit from being transferred (PCMAG, 2012). Due to their provenance, these specimens are unlikely to be used to their fullest potential, so transfer to another museum ensures that they will be used (NMDC, 2003). The following localities were highlighted for transfer to museums where the local community will benefit:

- Bristol Channel (2 jars)
- Essex (3 jars)
- International localities (228 jars)
- Norwich and the North Sea (26 jars)
- Scotland (52 jars)



**Fig.7.** Stage 4 of the review process, detailing the steps taken towards transferring specimens.

Stage 4 of the review process is shown above, in fig. 7. The five expert reviewers from the MBA thoroughly checked each specimen and carried out research into the collectors. They independently agreed that these specimens would be used more if transferred to another museum. Not all specimens from international localities were transferred; due to their historical and scientific importance, and relevance to Plymouth, the reviewers recommended that the specimens from the Zoological Station Naples, and the Terra Nova Expedition, 1910, should be retained in PCMAG’s collections.

Full details of specimens which were disposed of have been recorded, including photographs of the jars and transcriptions of any information on the labels. The database has been updated with the image and any additional information and a copy of the Disposal Form attached to the specimen record. This information is important for future enquiries and future curators to understand what has been transferred to where.

It is important to ensure museums are aware of what they are disposing and to seek independent expert advice before disposing of items. Within the collection were 829 microscope slides from the MBA, which were highlighted for transfer to an interested museum. After consultation with colleagues at the NMBL, it was decided that the microscope slides would benefit from being transferred back to the MBA. Without consultation, this large microscope slide collection could have been transferred to another museum removing the local significance of the collection.

### Summary

Collection reviews generate a greater understanding of the significance of objects in the stores. A collection may be large with only a small percentage of it being used or understood. Undertaking a review discovers new information about objects and provides the confidence to rationalise collections where necessary.

Using the methods outlined above, the review of the spirit collections at PCMAG has resulted in several positive outcomes. Subject specialist reviewers have enabled the curatorial staff to learn valuable information about the species, the collectors and the localities; resulting in new contacts and research projects with colleagues at the MBA and NMBL. As well as discovering historically important specimens, previously lost type and co-type specimens have been found. Most importantly, PCMAG now know what is held in the collections and can develop future projects with this new knowledge.

Examining other museum review methods is important to see which one is best suited for your project. Using the *UCL Collection Review Toolkit* worked for PCMAG to assess several criteria and grade these. The short timescale of the reviewers prevented individual jars to be examined. However, the benefit of the expert reviewers was their enthusiasm for the collections, and they did make numerous additional notes regarding other jars in the tray, even though they were only grading one jar.

The completed review table clearly illustrated specimens with poor documentation, little teaching and display potential and no significance to Plymouth. Planning the different review stages allowed specimens to be critically checked before transferring them to another museum. Several specimens were noted by the reviewers as not suitable for disposal (e.g. the microscope slides, and specimens from the Zoological Station Naples, and the Terra Nova Expedition, 1910).

Undertaking disposals requires understanding of the objects and their significance to the museum. Collection review projects increase the knowledge about the objects and provide the curator with confidence to determine potential disposals. The Museums Association *Disposal Toolkit* should be followed when carrying out disposals. All disposals in this project were checked by five external experts from the MBA, the collections manager and finally the director of PCMAG.

Transferring specimens which have no significance to the museum ensures that resources are spent on developing, promoting and using the collection which remains. The receiving museum benefits by adding new specimens to their collections which have a greater significance to their museum and their local community.

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**Appendix 1.** Excerpt from a Brief to two specialist reviewers to assess the spirit preserved collections.

#### **Collection Review: Plymouth Marine Fauna Collection** **Plymouth City Museum and Art Gallery (PCMAG)**

#### **Scope of work:**

1. Review the current content, condition, potential use and significance of the Plymouth Marine Fauna collection held at Plymouth City Museum & Art Gallery according to the attached “collections review framework”.
2. Produce & submit a report, with clear recommendations, based on collection content, and focusing on sub-collections or series within the main collection and its significance to Plymouth.
3. To complete the review & submit the written report by January 2011 as part of a funding agreement (through Museums Association: Effective Collections programme).
4. Submit a single invoice for the work carried out. To include: travel, accommodation, subsistence and time.

#### **Background details**

The collection comprises approx 4000 jars which contain single or multiple specimens preserved in formalin solution (approx 1000 jars) and 70% IMS (approx 3000 jars).

A vast majority of the Marine Fauna collection was donated to PCMAG in 2000, from the Marine Biological Association (MBA). The collection was transferred as part of a ‘rescue’ process, and included a number of specimens of unclear origin, poor preservation and little obvious data.

Sub-collections transferred to PCMAG, as part of this process, included specimens from the Irish Sea, Naples and specific scientific surveys.

The MBA hold detailed records on parts of the collection (i.e. sub-collections within the main collection). This can be researched at a future date, if a sub-collection is highlighted for disposal/transfer.

**Details of the work to be undertaken**

Plymouth City Museum & Art Gallery will provide access to:

- appropriate reference material
- specimens & any necessary equipment
- images of specimens if required
- museum’s collection database
- additional assistance (staff & volunteers)
- personal protective equipment (PPE)
- spill kits
- appropriate risk assessments

The “assessor” will be expected to:

- Spend 2 days reviewing the Plymouth Marine Fauna Collection: assessing condition, potential for use and relevance to Plymouth according to the attached “collections review framework”.
- Produce a written report with recommendations including:
  - o 3 key target series/groups that require urgent conservation
  - o 3 key series/groups that would benefit from disposal (i.e. transfer to other more relevant museums, use of specimens for educational purpose, or actual physical disposal).
- Provide clear reasons for their recommendations
- Carry out the work in confidence
- Comply with directions of the museum staff in relation to health & safety at work
- Provide the written report in 2000-2003 MSWord format (one printed version, and one electronic version)
- Submit and invoice once the report has been completed for payment

**Points of contact:**

Project lead: [name] XXXXX XXXXX  
 [position] XXXXX XXXXX  
 Issues: Access / Financial / Contractual / Background Information  
 Contact details: [email] XXXXXXXXXXXX  
 [tel] XXXXXXXXXXXX

[name] XXXXX XXXXX  
 [position] XXXXX XXXXX  
 Issues: Health & Safety / Logistical & Financial Support  
 Contact details: [email] XXXXXXXXXXXX  
 [tel] XXXXXXXXXXXX

**Appendix 2.** The review table used for the review of the entire spirit preserved collections at PCMAG.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Collection:						Store name:									
2	Assessor:						Bay:									
3	Date:															
4	Audit ID	Tray / unit	no. of specimens	content condition	jar condition	documentation: id label	documentation: collection data	documentation: additional info	potential use: teaching	potential use: research	potential use: public engagement	significance: historical	significance: rarity	significance: distribution	relevance to Plymouth	Notes
5																
6																
7																
8																
9																
10																
11																
12																

**Appendix 3.** The grading system developed for the review. This review has been adapted from the UCL review toolkit to fit the specific need of this project.

(The *UCL Collections Review Toolkit* is available at [www.ucl.ac.uk/museums/research/review](http://www.ucl.ac.uk/museums/research/review))

	<b>Grade 0</b>	<b>Grade 1</b>	<b>Grade 2</b>	<b>Grade 3</b>	<b>Grade 4</b>
<b>CONTENT Condition</b>	Small amount of fluid remaining and/or mould	Dehydrated specimen	Visible lipids and/or darkened fluid and/or specimen > ½ out of fluid	Discoloured fluid and/or specimen ≤1/3 out of fluid	Clear fluid Covering specimen
<b>JAR Condition</b>	Broken and/or unsuitable (inappropriate jar, wrong size, loose lid)	Degraded and/or rotted lid	Dirty and/or degraded seal and/or poor seal	OK condition	GOOD condition
<b>Documentation: ID Label</b>	No label	Family or Order name ONLY	Genus name ONLY	Binomial name and/or common name	Binomial name and common name
<b>Documentation: collection data</b>	No data	Reference code to locality OR survey OR broad locality (i.e. Naples, Plymouth, Irish Sea)	Detailed locality	Detailed locality and Collection date or named collector	Collection date AND detailed locality AND named collector
<b>Documentation: additional info</b>	No data		Method of collection		Habitat data AND/OR depth of collection
<b>Potential use: teaching</b>	Should not be used	Not relevant to teaching programmes	Relevant to teaching programme (some interpretation & background needed)	Part of curriculum/teaching programme	Multiple specimens (allowing extraction) AND part of curriculum/teaching programme
<b>Potential use: research</b>	No use	Limited number of specimens	Multiple specimens OR part of larger series or survey	Multiple specimens AND part of larger series or survey	Multiple specimens AND active research field AND part of larger series or survey
<b>Potential use: public engagement</b>	No use	Specimen not visible	Difficult to use (complex information required to interpret)	OK visual impact (reasonable size or able to magnify) AND/OR easy to interpret	Good visual impact AND easy to interpret (common species, relevant to Plymouth, unusual story etc)
<b>Significance: historical</b>	None known	Little historic significance	Known & published survey OR collector	Known & published survey AND collector	SIGNIFICANT Known & published survey AND collector
<b>Significance: rarity</b>	Common in UK		Red data list species		Type specimen
<b>Significance: distribution</b>	World wide	Northern Europe	UK	South West	Plymouth
<b>Relevance: to Plymouth</b>	Not specifically relevant	Collected by MBA staff	Collected in or around Plymouth	Collected by important local scientist	Collected AND studied in Plymouth

## The Digitisation of Kew's Directors' Correspondence Collection

**Katherine Harrington**  
Project Digitiser

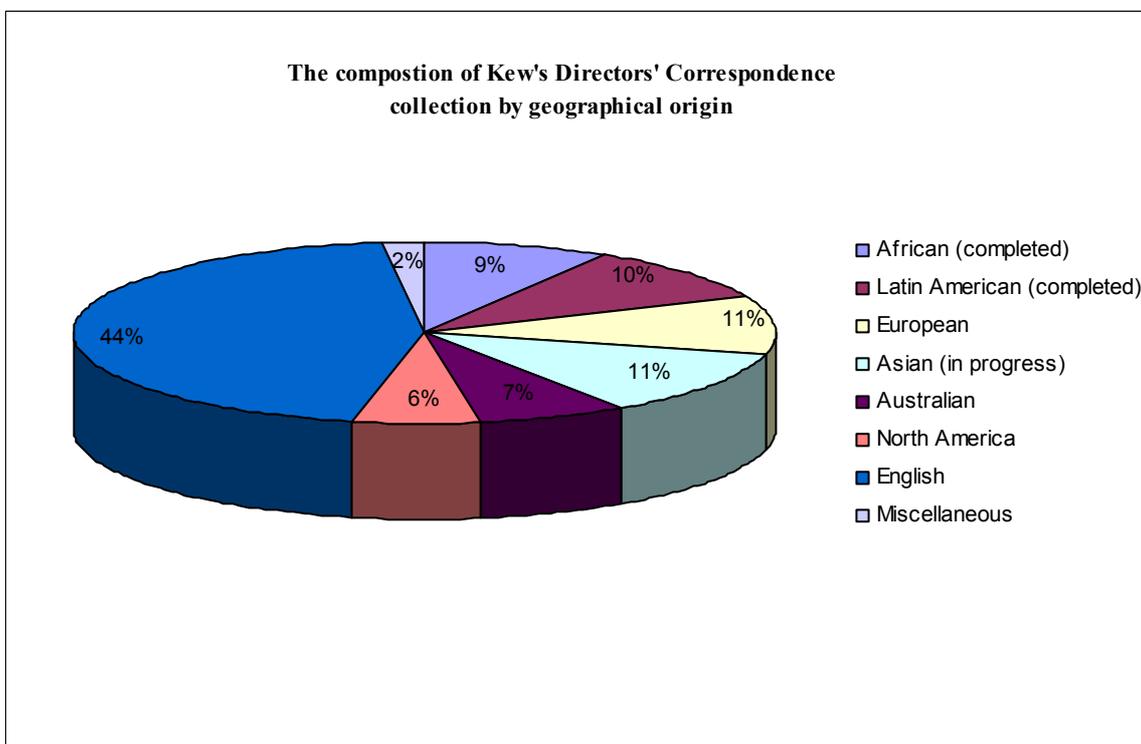
Herbarium, Library, Art & Archives Directorate, The Royal Botanic Gardens, Kew  
Richmond, Surrey, TW9 3AE, UK  
Email: k.harrington@kew.org

### Abstract

This article is a brief summary of an ongoing project at The Royal Botanic Gardens, Kew to digitise a large collection of historic correspondence contained within our archive. The project team comprises four full time staff; team leader Helen Hartley and three project digitisers; Charlotte Rowley, Virginia Mills and myself. In this article the scope of the collection will be discussed and the aims for digitisation explained. Our methodology will be presented and some example correspondence highlighted. Some tips for those embarking on a digitisation project will be provided as well as methods for project promotion. Through this project we hope to increase access to a vital source of historic data and bring the exciting stories behind our botanical collections to a larger audience.

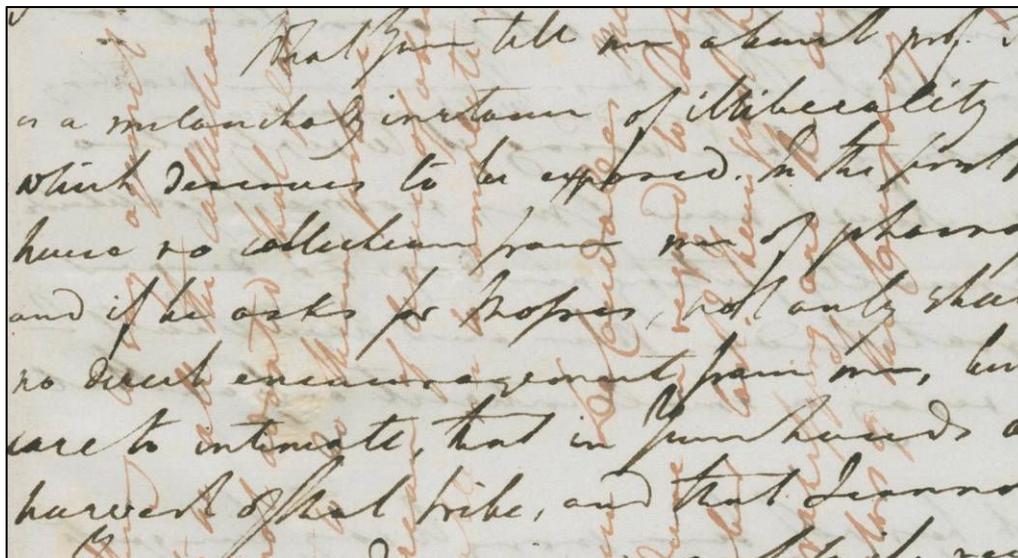
### Scope of the collection

The Royal Botanic Gardens, Kew, contains the World's largest collection of living plants, it also acts as a repository for over seven million herbarium specimens and holds one of the most important botanical reference sources in the world: its library, art and archives, containing more than half a million items. One of the largest and most important archive collections at Kew is the Directors' Correspondence (DC). The DC consists of 218 volumes of correspondence to the Directors and senior staff of Kew dating from the 1840's to the 1930's, as well as correspondence received by Kew's first Director, Sir William Jackson Hooker, prior to 1841 whilst Regius Professor of Botany at Glasgow University. The collection is arranged geographically (fig. 1) and then alphabetically by author.



**Fig. 1.** The geographical origins of the DC collection.

Although primarily a collection of letters the DC also contains postcards, reports, illustrations, photographs, memorandums, press cuttings, maps and even the occasional pressed plant specimen. Letters can range from a single postcard to fifty-page travel accounts. Sometimes the handwriting can be a struggle to read (fig. 2).



**Fig. 2.** Paper scarcity in the early Nineteenth Century often led authors to cross-write letters to maximize space. Detail of a letter from Nathaniel Wallich to Sir William Jackson Hooker (Wallich, 1830). Copyright RBG Kew.

The collection is a unique resource which highlights the important role played by Kew not only in furthering Nineteenth and early Twentieth Century scientific investigation, but also in contributing to the growth and development of the British Empire. It offers a window into the development of botany as a science and into the lives of botanists, natural historians, chemists, artists, politicians, lords and ladies, gardeners, horticulturalists and members of the general public. The subjects discussed and the information contained within each letter vary enormously: from the mundane to the extraordinary (Kellett, 1846) from the scientific to the anecdotal (Fawcett, 1887), from plant taxonomy to encounters with vampire bats (Hostmann, 1841)! The collection also informs our knowledge of the construction of Kew's dried (herbarium) and living plant collections, as well as its collections of books, archive materials and items of economic botany.

Digitisation of the collection was initiated in 2004 as part of the African Plants Initiative (API), a collaboration of over 50 institutions in Africa, Europe and the US, to build a comprehensive online research tool bringing together scholarly resources relating to African plants. On completion of the API (7635 letters digitised), the project continued with the Latin American Plants Initiative which was completed in 2010 (7415 letters digitised). The team is currently digitising the Asian DC as part of the Global Plants Initiative with 26 volumes of letters due to be digitised by Oct 2012. Running alongside the digitisation of the DC is the imaging and databasing of Kew's type specimens, which are made available online (JSTOR, 2011).

### **Aims of digitisation**

The aim of this digitisation project is to allow global access to this exciting resource by unlocking the data it contains. By placing material online, researchers from across the globe can access these resources remotely. Handling of the original documents will be required less frequently, helping to reduce wear and tear. A searchable summary of each letter, limited to 350 words, is produced alongside the digital images. This allows the letters to be searched for specific authors, locations, plants, gardens, people, *et cetera*. Prior to this project the DC was indexed only by author, making it somewhat more impenetrable for research. It is hoped that opening up the collection through digitisation will help to reveal historic networks of botanical collection and exchange, as well as the role of Kew over different geographical areas and timescales. Archive materials like the DC are also important sources of historic plant distribution information and can help to underpin studies of current species occurrence.

**Methodology**

The first step in the digitisation process is the preparation of each volume by Kew's preservation team. The DC was originally bound in leather volumes in which the letters were vulnerable to ink migration and tearing (fig. 3). These volumes are broken down and each fascicule separated, repaired where necessary, and replaced into an acid free fascicule from which it can be reversibly removed and easily consulted with minimal handling (fig. 4).



**Fig. 3.** Clockwise from left: the original leather bound DC volumes; detail of edge wear due to binding; detail of different paper types and inks adjacent to each other whilst bound. Copyright RBG Kew.



**Fig. 4.** Rehousing of the DC in acid free boxes with supported fascicules. Copyright RBG Kew.

Each volume is indexed and catalogued through a database constructed in *Microsoft Access*. At this stage each letter is given a unique identification number allowing us to track its progress throughout the digitisation process. The letters are imaged using either flat bed scanners (*EPSON 10000XL*) or a digital camera (*Cambo* camera with a 56mp, *Leaf Aptus-II 10 AFD* digital back). Images are edited in *Adobe Photoshop* and include a ruler for scale and a colour chart for colour standardisation (fig. 5). A quality check is carried out on every tenth image to examine the focus and lighting against defined standards. High quality 300 dpi (dots per inch) TIFF images are produced and stored on external hard drives.



**Fig. 5.** A typical digitised letter from James Alexander Gammie to Sir Joseph Dalton Hooker; from Darjeeling, India, 1877 (Gammie, 1877). Copyright RBG Kew.

A metadata summary of each letter is then produced. In the caption for each letter we record: the author, recipient, address, country of origin and date. We read each letter and summarise its contents recording the key points such as people names, plant names, locations, and publications. Aside from consulting our own archive materials, such as Kew's collection of biographical pamphlets, several websites have proved invaluable in producing accurate metadata:

- For scientific plant names the International Plant Names Index (IPNI, 2012) and Tropicos (Tropicos, 2012)
- For localities, the Falling Rain Global Gazetteer (Falling Rain, 1996) and Getty Vocabularies (TGN, 2000)
- The Ships List (The Ships List, 1997) for boat and vessel names
- The Harvard Botanists Database (Harvard University Botanists Database, 2012)
- The Oxford Dictionary of National Biography (ODNB, 2004)

A number of digitised Colonial records have also proved useful as well as digitised newspaper collections.

The images and metadata are finally uploaded to Kew's image storage system and exported to JSTOR for upload to the JSTOR Plant Science website (JSTOR, 2011). The website has a 'viewer' tool allowing users to zoom in to reveal very high levels of detail.

**An example from the Asian DC - Augustine Henry**

Digitisation of the collection has enabled us to link together items from Kew's various collections. An exciting recent example of this is a display mounted in the Library Reading Room at Kew which brought together for the first time correspondence, archive material, illustrations and items of economic botany relating to Augustine Henry (b.1857 – d.1930) (fig. 6). Henry was an amateur botanist whose correspondence with Kew led to the despatch of tens of thousands of plant specimens from China and Taiwan, and to the discovery of 1,338 new species (O'Brien 2011a). In the words of Ernest Henry Wilson Henry "acquainted a sceptical world of the rich floral wealth of interior China" (Wilson, 1925).

In 1882 Henry was assigned to Yichang (then Ichang), China as a customs official (O'Brien, 2011b). He became interested in the plant-derived medicines that passed through his customs house and made early collecting excursions into the Yichang Mountains and along the Yangtze River into Sichuan. As well as medicinal plants Henry was engaged by plants of economic value, including the varnish or Chinese lacquer tree, *Rhus verniciflua* (*Toxicodendron vernicifluum*) whose sap is used as a high quality varnish. Henry sent seeds of the varnish tree with one of his first letters to Kew hoping it would be of interest as an economic product (Henry, 1885). At a later date Henry sent examples of the tools used by local cultivators to harvest the varnish: a knife to make an incision in the trunk and mussel shells, which were inserted into the tree to collect the sap (Henry, 1889). We were able to exhibit these tools alongside other items of economic botany and Henry's letters.



**Fig. 6.** Part of a reading room display related to A. Henry depicting (left) rhizomes in small baskets and roots of *Coptis teeta* in a glass jar with a letter discussing the plants cultivation, and (right) an illustration of *Lilium henryi* from Curtis' Botanical Magazine, 1891. Copyright RBG Kew.

In his early correspondence Henry is self effacing, tentative and eager for advice (Henry, 1885). He could not have imagined the excitement his first collection would cause at Kew. When it was received the Keeper of the herbarium would declare it to be 'one of the most important ever received from the interior of China' (Oliver, c.1885). By 1897 Henry had amassed, in his own words, a: "gigantic [collection], almost unmanageable [in] size. Possibly 1000 species, 10,000 specimens" (Henry, 1897a).

As well as employing local plant collectors, Henry made plant hunting expeditions himself, particularly in the areas around Mengzi in Yunnan Province where he was based from 1896 – 1898 (O'Brien, 2011b). His passion for botany is apparent in his letters and he hints at sadness when witnessing deforestation (Henry 1897a). Henry explored many 'wild and extensive woods' – home to exotic plants as well as bears, boar, deer and leopards (Henry, 1897b). He was also a linguist, fluent in Chinese and quick to learn other languages and converse with the local people wherever he was posted, compiling lists of the Chinese names for plants (Henry, 1887). His letters also display a wider interest in the cultures he encountered, in particular the Yi (then known as the Lolo) people of Western China (Henry, 1896). So far we have digitised over 100 letters from Henry which help to enliven the many herbarium specimens he sent back to England (Kew has over 2260 digitised herbarium specimens presented by Henry, including over 880 types (fig. 7)). Henry is just a single example of the sort of characters we encounter throughout the DC and his varied interests and detailed letters demonstrate the usefulness and breadth of the collection.



**Fig. 7.** Type specimen of *Geranium henryi* from A. Henry, Hupeh, 1889, Kew specimen: K000729353. Copyright RBG Kew.

### Lessons learned

From the digitisation of such a large collection of material we have learned a number of valuable lessons, which we hope will be applicable to other institutions regardless of size or resources.

- *Number crunch:* It's very useful to obtain accurate estimates of the number of items in a collection as well as estimates of how long the digitisation process will take. Be sure to account for all the time it takes to digitise an item, including locating and retrieving your specimen. When we introduced a new piece of equipment (a digital camera) we trialled it to generate accurate time estimates for photography, allowing us to set achievable targets.
- *Detailed standards:* Prepare detailed standards for both images and their associated metadata. For example our metadata caption is always standardised to the same format.
- *Quality assurance (QA):* Checking that all of your digitised assets are of a high standard is very important, especially when working on large collections and the time taken for this should be incorporated into estimates from the outset. For example we QA 10% of our images and all metadata. Checks are also in place to ensure the right metadata is attached to right image.
- *Feedback:* One of the difficulties of summarising the DC is the legibility of the handwriting. In some instances author indexes were included in the original bound volumes, but this is not always the case and deciphering signatures can prove tricky, so too can finding obscure place names. In instances where we are uncertain of an exact name or locality we insert '[?]' into the metadata summary. When the digitised letters appear on the JSTOR Plant Science website there is a comments section for each letter so that users can raise a query or correct a question mark for us. This provides invaluable feedback, improving our overall accuracy.
- *Sustainability:* As with all digital projects it is vital to think about the long term sustainability of the digitised output. With this in mind backups are kept of all images. These will be transferred in future to new storage media to avoid technological redundancy and loss of information.

### Promotion

Alongside digitisation of the collection we have been keen to promote the collection and since 2010 have been producing articles for Kew's staff magazine, VISTA. Changes to Kew's website in 2011 enabled us to take part in the Library, Art and Archives blog (Royal Botanic Gardens, Kew, 2009). In blog articles we have been able to highlight recent topics encountered in the correspondence and link to other useful information sources and stories. Some recent blog topics include: the unfortunate story of Richard Oldham (b.1837 – d.1864), a gardener sent out to collect plants by Kew in China and Japan who succumbed to dysentery at the age of just 27; the use of *Cerbera tanghin* (= *C. manghas*) as a poison ordeal for the judgement of crimes or accusations of sorcery in Madagascar; and descriptions by various botanical enthusiasts of Mount Kangchenjunga, in the Himalayas. In June 2012 we created a Twitter account enabling us to share fun quotes from the letters and give real time updates to our followers such as 'on this day' links to digitised material. We have found this a valuable promotional tool as it brings us into direct contact with organisations and people who might be interested in the information we hold. We have also used Twitter (Royal Botanic Gardens, Kew, 2012) to advertise our blog posts and to ask for help from our followers: such as identifying mystery words and signatures. Finally members of the team have presented seminars both within and outside Kew, highlighting some of our favourite topics and characters from the collection. All of this we hope will encourage researchers and other interested parties to delve into the correspondence, making new links within and beyond Kew's collections.

### Possible future research

When I began working with the DC team I considered that the primary sort of data we would be uncovering would be historic data on plant distribution, which would have relevance today in underpinning studies of species occurrence. This is most certainly the case, but I have been amazed by the breadth of information contained within the letters and wish to draw attention to some of the other topics for which the collection would be a valuable source of information:

- *Biographical case studies*: In some instances we have hundreds of letters from single individuals providing very detailed information on their scientific (and non-scientific) exploits across the globe. If you wish to search the JSTOR Plant Science website for letters from or to a particular author (and not all the letters which mention a particular person), carry out an 'advanced search' and insert the name of the author into the 'title' box.
- *Plant and agriculture case studies*: Many letters discuss the introduction, transmission and cultivation across the Empire of crop species grown as sources of rubber, cinchona, cocoa, ramie, opium, indigo, tea, and coffee.
- *Institutional histories*: The DC contains decade's worth of correspondence from different staff working for the same institution; key examples are the Calcutta and Singapore Botanic Gardens.
- *Reception of scientific theories*: e.g. Darwinism.
- *Colonial Governance and the politics of Empire*
- *The relationships between collectors/explorers and native peoples*
- *Family history*

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**Collection Moves at Leicestershire Museums’ Natural Life Collections:  
Practical Hints and the Importance of Volunteers**

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**Abstract**

The move of the Botany and Geology Collections between Leicestershire County Council and Leicester City Council in 2010 is described and some of the problems and opportunities that arose are illustrated. Following the move, the two parts of the Leicestershire Museum Service Herbarium (Herb. LSR) have been reunited, and it now contains over 120,000 botanical specimens. Substantial environmental improvements have been made to the Natural Life Collections that have had positive effects both on curation and volunteering.

**Background**

In 1997, Leicester City Council was created as a unitary authority from Leicestershire County Council following Local Government Reorganisation. The museum collections that were held by the previous single council were divided by agreement between the two new councils. The Botany Collection was largely split taxonomically, and the Geology Collection by locality (Table 1) between the two new councils. Library books and journals were similarly divided.

	<b>Leicester City Council Museum Service</b>	<b>Leicestershire County Council Museum Service</b>
<b>Botany</b>	‘Higher plants’ (ferns, conifers and flowering plants; c. 50,000 specimens); a carpological (seed) collection; a wood collection; wax and wood plant models; plant collecting and herbarium apparatus; prints, illustrations and photographs; record sheets and cards; historical correspondence; history sheets.	‘Lower plants’ (algae, fungi, lichens, bryophytes and slime moulds; c. 50,000 specimens); a representative selection of ‘higher plants’ from the UK; relevant correspondence and history sheets.
<b>Geology</b>	British and world rocks, Leicestershire minerals and selected British and world minerals, meteorites falling on Leicestershire and world wide, trace fossils, invertebrate and plant fossils of Leicestershire, Mesozoic vertebrate fossils of the Midlands (including types), vertebrate fossils of British and World provenance.	Leicestershire lithology collection, petrology reference collection, core samples, fossil handling collection, comparative and educational collection of common minerals, the Frank Ince collection of local rocks and minerals.

**Table 1.** Location of the Botany and Geology Collections in 1997.

In 2009, some key staff retired, but financial constraints precluded the appointment of a specialist botany curator by Leicester City Council and a specialist geology curator by Leicestershire County Council. So, a Strategic Collections Review was made by both councils which recommended that the Botany and Geology Collections should be re-united. The Botany Collection was to be held by Leicestershire County Council’s Museum Service (LCCM) and curated by a specialist botany curator, and the Geology Collection by Leicester City Council Museum Service (LCMS) and curated by a specialist geology curator. A project began in

earliest in March 2010 to move the two collections, with a December 2010 deadline and was a joint venture between the two councils. This paper describes the facilities (buildings/stores/post-move arrangement of collections etc.) of Leicestershire County Council's Museum Service alone, focussing on the Botany Collection.

### **Internal Collection Moves**

The LCCM Geology Collection was housed on the ground floor of Leicestershire County Council's Collections Resources Centre (CRC), and the LCCM Botany Collection was housed on the mezzanine floor of the same building next to the Working Life Collection. As it would have been impractical to split the Botany Collection between the two floors, it was decided to move the Working Life Collection from the mezzanine to the ground floor, to the space vacated when the Geology Collection moved out. The space created by the move of the Working Life Collection would allow the Natural Life Collection (Botany and Zoology Collections) to be reorganised, as the existing siting and configuration of entomological and botanical cabinets allowed pockets of stagnant air to develop in the Natural Life Collection area which made it difficult to maintain an optimal temperature of 20°C and humidity of 40% (Bridson & Forman 1999a).

### **Strategy adopted**

Moving each collection in series (i.e. completing each move before starting the next one) was considered very risky, as there were several crucial time-dependent stages that, if delayed, would impact on the completion date. For example, a long time gap between the LCCM Geology Collection's departure and the LCMS Botany Collection's arrival would be needed to move the Working Life Collection, but, the working life move could not over-run and delay the botany move, as it was being done by a commercial company. So, it was decided to move the three collections, or prepare them for moving, in phases over several months, rather than move them all at once. This approach needed more management and more planning, but had fewer risks, lower costs and there was more time to move objects, which was more acceptable to both volunteers and staff. The *PRINCE2* method (OGC, 2009), a process-based approach to project management that provides an easily tailored and scaleable method for all types of project, was used to manage the move. Application of *PRINCE2* methods enabled dependencies and critical points and dates to be identified, risks to be identified and mitigating actions planned, tasks to be defined and allocated to staff and volunteers, and monitoring to take place to ensure timely completion. A risk assessment for each task identified was done in advance using UK Government guidelines (HSE, 2012). Considerable assistance was provided by Leicestershire County Council's Museum Service's volunteers.

### **Communication plan**

A 'Collections Move Newsletter' was emailed to all staff likely to be affected every three months, to inform staff of the dates of moves, restrictions to access, changes to the building layout, noisy days, and details of work completed. This was particularly important for off-site staff who used the store's facilities occasionally, and may not have been able to obtain access. Staff members commented that it was useful to know when disruptions were likely, as they could plan their own work around them well in advance, and could raise access or use issues, enabling the early resolution of potential conflicts.

### **The LCCM Geology Collection**

Before the collection could be moved out, some preliminary tasks were necessary that needed the expert advice of Grace Deeks (Conservation Manager, Leicestershire County Council). The quantity of materials involved in these one-off tasks was small, but potentially hazardous, so there was little benefit to volunteers or to the Museum Service in training them, so they did not assist with these tasks.

1. Unstable specimens of pyrites were packed into polyethylene boxes (Stewart Ltd., Croydon) with loose dry silica gel to stabilise them.
2. Records showed that three radioactive specimens were present within the main collection. They had been tested for emissions by an external contractor in 2006, and the emission rates had been found to be low (1.0, 1.5 and 50.0  $\mu\text{Sv/hr}$ ). As radioactive materials present risks for staff, volunteers and contractors (Freedman, 2012), and labelling of the main collection had not been completed, it was essential to locate these specimens. They were found to be adequately labelled on the outside of containers, but inadequately packed in plastic vials or boxes. So, they were each placed within a sealable plastic bag to minimise release of particulates, placed within a box filled with acid-free tissue to minimise movement during transport, then placed in a large plastic container (Stewart Ltd., Croydon) filled with granular expanded polystyrene packing material and labelled as a radioactive hazard. In this way, exposure to radioactivity was reduced by maximising the distance from the source to the user.

3. Specimens of toxic minerals (containing mainly arsenic, antimony, nickel and lead compounds), some weighing several kilos, were packed into sealed boxes with much granular expanded polystyrene packing material and acid-free tissue, as appropriate, by staff wearing lab coats, disposable gloves and masks to reduce inhalation or ingestion risk, and marked clearly on the outside as toxic (Freedman, 2012).

The collection of 114 borehole core samples and their associated documentation were accepted for curation by the British Geological Survey (BGS, Keyworth, Nottinghamshire) on the basis that they would reserve the right to return or dispose of any samples that were not localised, or that were inferior to material already held in the BGS's core collection. Cores were stored in cardboard or wooden boxes and were moved by staff from the BGS.

Volunteers from all the different collections teams and staff from the Leicester City Museum Service were trained to pack and stabilise rocks and minerals by Mark Evans (Senior Curator, Natural Sciences, LCMS). The minerals, fossil learning, petrology reference and Leicestershire lithology collections were stored loose in cardboard boxes, which were packed to reduce movement and possible damage during transport using bubble wrap and acid free tissue as appropriate for each box of samples. Before being wrapped in acid-free tissue or bubble-wrap (depending on the size, shape and composition of the specimen), data from the specimen itself, or on an accompanying card, was entered into a *Microsoft Excel* spreadsheet which was used to produce the catalogue to accompany the exit forms. By the end of May 2010, the cores had been transferred to the British Geological Survey store and, during the next three months, volunteers and staff from both LCCM and LCMS packed and catalogued 10,815 items and 107 boxes comprising:

- 1,749 igneous and volcanic rocks
- 1,163 sedimentary and metamorphic rocks
- 2,396 minerals
- 279 fossils
- 370 numbered items and 56 boxes of unnumbered items in the Frank Ince collection
- 4,818 specimens of local rocks (Leicestershire lithology collection)
- 51 boxes of teaching materials
- 40 miscellaneous items (ranging from large 3-dimensional maps to mammoth tusks)

Although this work was repetitive, and volunteers could easily have declined to do it, communicating the Service's vision and encouraging volunteers to see the future, helped to maintain their enthusiasm even when, as they sometimes remarked, there was "...another box of grey rocks to pack". Because of budget constraints, the stabilised specimens and boxes were transferred to the LCMS Store using in-house transport. The van driver was briefed about the nature of the radioactive contents and was reassured that they posed no risk. No special route was planned in view of the low risk to the public. The non-radioactive materials were securely packed in shallow layers on the floor of the van so as to not exceed the vehicle's maximum laden weight. As the cores and boxes were packed and moved, they released space on shelving and roller racking, allowing the transfer of the Working Life Collection from the mezzanine floor. The mineral collection was stored in 28 custom-built metal racks and cabinets that had been supplied by *Polstore Storage Systems* (Guildford, Surrey). These needed their specialist expertise for dismantling, removal and re-erection at the LCMS Collections Store, Leicester. This was a substantial cost (about 25% of the total budget) and the task was completed during early August, 2010. A small collection of Geology books was catalogued by LCCM volunteers and transferred to LCMS using in-house transport.

#### **The LCMS Botany Collection**

An assessment of the collection showed that the wax models and some cones were extremely fragile, so were carefully packed to reduce movement, with acid-free tissues and transported separately. The remainder of the materials was housed in cabinets or was loose in cardboard boxes. The herbarium cabinets had metal drawers rather than shelves, in which herbarium folders, sealed in plastic bags, were stored.

Some of the herbarium sheets had been stamped to show that the plant materials had been treated with mercuric chloride, which produces vapour that is toxic by inhalation (Oyarzun *et al.*, 2007). As these sheets were loose inside folders, removal would have released the gas, or possibly generated an aerosol that might pose a health risk. As a computer catalogue of the herbarium specimens had already been made, only the number of separate sheets in each folder was counted and entered onto an electronic spreadsheet that was

used to produce the catalogue to accompany the exit forms. The material was sorted and marked either for freezing (biological materials) or direct transfer to the store (pamphlets, card indexes and other paper- or card-based materials, illustrations, photographs), before incorporation into the store collection. The unfrozen items were sealed into plastic bags stored in boxes on racks in the main collection, and were removed for cleaning and pest-checking over the next year, but none was found to be infested by pests such as book-lice or silverfish.

Volunteers and staff from both Museum Services helped to pack each drawer with bubble-wrap wedges to minimise transverse motion during transport. They also helped to pack 188 boxes of loose materials, seeds and cones, models, prints, card indexes and computer records for safe transport by encasing items or padding boxes with bubble wrap. Each box, or group of small boxes, was placed in a large polyethylene bag and sealed. This work was completed over a two-week period in July, 2010. History files were part separated into botany and zoology, but most had to be separated by inspection and photocopied when botanical and zoological specimens were present together. They were housed in two fire-proof safes, also transferred to Leicestershire Museum Service. A critical step in the Botany collection move was quickly identified: botany cabinets were housed in the basement of New Walk Museum Leicester and needed to be moved to ground floor level. The Museum has a lift serving these two floors, and stairs for use when it is out of service. Replacement of the wide Victorian staircase in the 1970s with narrower, modern stairs only just gave sufficient space to enable a cabinet to be carried safely around the turns of the staircase. If the lift was out of service on the day, the cabinets would have to be carried, which would require more removers, increase the cost, delay the start of freezing and reduce freezing time available. The fire safes also depended on the lift, so would have to be moved at a later date, further increasing costs.

#### **Controlled drugs**

The collection contained six herbarium specimens of *Cannabis sativa*, but plant material of the genus *Cannabis* is a Class B controlled drug (HMO, 1971,2001). The herbarium specimens could only be moved, if Leicester City Council upgraded its licence to supply the material and if Leicestershire County Council obtained a licence to possess it. In 2010, the Home Office introduced charges for a new licence of £3,133, and an annual renewal charge of £326. The cost of the licence could not be justified for six specimens, so it was decided that they should remain with the LCMS.

#### **Decontamination of the botanical material**

The material to be transferred was very dirty and had not been condition-checked for at least a decade, so decontamination was a priority. The most successful method of decontaminating herbarium material from temperate climates is by freezing to at least -18 °C for 2 days to kill all stages of the life cycle of the major pest, the biscuit, or drug-store, beetle, *Stegobium paniceum* (Bridson & Forman, 1999; Eisenman, 2005). If the presence of different or additional pests is suspected, then other techniques are required. Repeating the freezing cycle, after it has been left at room or ambient temperature for a few days, to allow eggs to hatch has been much used in the past (Bridson & Forman, 1999b), but a literature review by Florian (1997) showed that a longer freezing period was as effective, and possibly less damaging to the material, so she recommended freezing it at -20°C -30°C for 3 days (see also, IPMG 2008). Longer freezing was advocated by several authors and institutions e.g., Strang (1997) recommended freezing below -20°C for 7 days as a minimum, Calabrese (2005) recommended -20°C to -29°C for 2-5 days, the Royal Botanic Garden Melbourne, Australia (2012) recommend -23°C for 7 days. The Natural History Museum, London (2012) recommends a cycle of 1 week freezing to -30°C for 3 days, then slowly raising the temperature to ambient, a technique that was used in the recent move of the Botany Collection (Brown, 2010).

In view of the literature researched, a freeze-thaw cycle was ruled out, and freezing for a longer period was selected, although freezing to -30°C was ruled out on grounds of the cost of the freezer. Given the quantity of material to be frozen (51 cabinets and 160 boxes of loose material), one or more large industrial freezers with an air circulation fan would be needed. However, only a single-phase 240 V power supply and domestic plug sockets were available at the CRC: the absence of a 3-phase supply and 16 A bayonet connectors, commonly used in industry, precluded the use of certain types of commercially available freezer. Taking all these factors into account, it was decided to freeze for 10 days at -25°C with 2 days chill-time and 2 days thaw time (although it was discovered that ambient still had not quite been reached after 2 days thawing). The method chosen was informed by reference to literature and helpful advice, but determined by the power supply and the type of power connectors available at the CRC, the volume of material to be frozen and the cost of freezer hire. The cabinets and boxes were frozen in two industrial freezers that were erected in situ on the store car park by *Elliott Kitchens* (Gaddesby, Leicestershire) (fig. 1). The freezers arrived two days

early, both to ensure correct operation, and to determine freezing and defrosting times by test-freezing a few items. During commissioning, it was found that some 30 m extension leads were needed which had to be custom-made on site, further justifying the test period.



**Fig. 1.** Freezers on the Collections Resources Centre car park. Image © Leicestershire County Council.

As moving the bagged herbarium folders from their cabinets and freezing them separately would require preparation time and shelving in the cold room, the cabinets of biological materials were frozen unpacked to simplify procedures and minimise hire costs. To provide air circulation, cabinets were placed on wooden pallets obtained from a local bakery, and their doors were removed before freezing. The loose boxes of objects were sealed in plastic bags before freezing, and stacked in the freezers. The freezers had to have sufficient space both to allow cold air to penetrate the cabinets and boxes, and to allow staff movement when packing and unpacking the freezers. It was important to consider the location of the freezers on the store car park to avoid restricting access, yet provide sufficient space for loading and unloading from the removal lorry, and to ensure that they were waterproof, as they would be sited outside unprotected.

#### **Insurance cover**

The removal company's insurance covered the items during the move, but the Council's insurance did not cover the material whilst in the freezers, as they were sited on the car park in front of the store, with only site perimeter fencing, night flood lighting and the supplied lockable door handles for security. It was not possible to purchase additional cover, so, the freezers were sited so that their doors faced each other to reduce visibility from the road and possible damage or theft. This was unsuitable and undesirable, but there was no viable alternative.

#### **The LCMS Botany Library**

Further division of the library books was needed to enable LCMS to retain books on gardening for one of their museums, and natural history books dealing with general topics e.g., ecology, genetics and insect pests. Staff from LCMS produced a catalogue of 1,665 books and journals in the library which were packed into crates one week before removal day. Although some library shelves were offered free from Leicester City Council as a result of the closure of the Central Lending Library, they were very large and bulky and could not be dismantled for removal. Some new shelves were purchased to complement the existing shelving. Re-organising the store permitted longer runs of shelves, and it was possible to create three more bays of shelving by reconfiguring the existing metal shelving (fig. 2).

The books, journals and other materials not retained by LCMS were packed into crates delivered by Pickfords Removers 7 days before the move to LCCM, which had to be returned within 14 days. The library shelving had to be purchased and in place before the crates were returned: another critical step. At the

same time, the opportunity to re-organise the library to improve access was taken: books and journals were separated and are now stored in different parts of the store, and books were organised on shelves according to the Dewey decimal system by a volunteer. Rare volumes were stored in a fire-proof safe. Duplicate volumes were offered to local universities and museums, and then nationally via the NatSCA mailing list. Parts and runs were taken by National Museums, Liverpool and Bracken Hall Museum, Bradford.



**Fig. 2.** Library shelves before the move showing poor access (left) and after showing improved access (right). Image © Leicestershire County Council.

**Moving the Botany Collection and Library**

Selecting the removal day (23 September 2010) needed co-ordination and agreement between the City and County Council Museum Services’ staff and the removal company, Pickfords, as mid-September was a holiday period. Another critical step was identified: the internal collection move had to be completed before the Botany Collection arrived, although there was a contingency period of two weeks while the material was being frozen. Material that was not being frozen was placed *in situ*, while the cabinets and boxes were loaded into the freezers, and the move was completed in about 7 hours. After a 48-hour defrosting period, the cabinets were moved to marked positions in the store (fig. 3) and the exteriors cleaned by volunteers.



**Fig. 3.** Botany cabinets in position in the store. Image © Leicestershire County Council.

**Protected species**

The collection contained specimens of eleven taxa, the possession of which is regulated by The Conservation (Natural Habitats, &c.) Regulations (2010), Schedule 5, European Protected Species of Plant (DEFRA, 2010). These were: *Gentianella anglica* (Pugsley) E.F. Warb., *Apium repens* (Jacq.) Lag., *Apium nodiflo-*

*rum x repens*, *Liparis loeselii* (L.) Rich., *Najas flexilis* (Willd.) Rostk. & Schmidt, *Rumex rupestris* Le Gall, *Spiranthes aestivalis* (Poir.) Rich., *Saxifraga hirculus* L., *Trichomanes speciosum* Willd., *Cypripedium calceolus* L. and *Luronium natans* (L.) Raf. As none of the species in Annex 5 were present in the existing LCCM Botany Collection, a licence to possess these specimens was obtained from the Government's regulatory authority, Natural England after transfer to LCCM. The wood collection was inspected and it was found to contain no specimens regulated by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), an international agreement between governments that came into force in 1975 (UNEP-WCMC, 2005).

#### Data transfers

All relevant computer files were transferred between the councils. Object records are maintained using the *MIMSY XG* computer application (Selago Design Inc., Ottawa). As no new specimens had been added to Herb. LSR since disaggregation, merging data records was (mercifully) not needed.



**Fig. 4.** Hills cabinets stacked three high. Image © Leicestershire County Council.

#### Re-organising the Natural Life Collection

While the botany material was freezing, opportunity was taken to re-organise the Natural Life collections area to make use of the space released by the move of the Working Life Collection. Because of space shortage, Hills cabinets had been stored three and four high (fig. 4), which reduced access, was a safety issue and made the work areas dark. The remainder of the Natural Life collection was stored on racks in such a way as to maximise space, but which reduced air flow, allowing pockets of hot and cold air to accumulate. The fluctuations in both temperature and humidity were a serious concern, both to the health of the collections, and to the long-term stability of the Hills cabinets. The cramped conditions also made it difficult to show visitors around the store (fig. 5) and did not show the collections favourably. The collections were re-organised so that Hills cabinets were only two high, and the materials on racking were moved to new, lower racks in another part of the store. To accommodate the new material in boxes in the Botany Collections, eight double herbarium cabinets (*CD Sheet Metal*, Kent) were put into position before the Botany Collection move, and which were used to store material held in a variety of cardboard and wooden boxes.

#### Project summary

Some valuable lessons were learnt, which may guide other curators who have to plan similar complex collection moves. During the geology collection move, it was found that, as some orders were high value, authorisation was needed by senior management, which created a bottle-neck, so orders need to be placed as early as possible. Volunteers' experience of *Excel* varied greatly and they mistyped some item numbers, although their errors reduced with experience. It was found best to pair inexperienced with experienced volunteers to create an opportunity for knowledge exchange, and to monitor them closely initially. During the botany collection move, it was found that some items in the collection came to light after removal plans had been made, so a contingency plan was required. Compliance with the relevant legislative requirement, writing risk assessments for all tasks and the provision of insurance cover needed time, so need to be considered early in the project.



**Fig. 5.** Cramped conditions during a 'Behind the Scenes' visit.  
Image © Leicestershire County Council.

There were four main outcomes of the project which had positive benefits for the Museum Service.

1. *Early completion.* The adoption of the *PRINCE2* method allowed the project to be finished nearly ten weeks before the dead-line, releasing staff time. Volunteers were crucial to the success of this project. Without their hard work and dedication, the project would not have been completed either on time or within budget the budget of £15,000.
2. *Environmental improvements.* The store has better lighting, more space and better access: more work-spaces have been created following the re-organisation. Now that the stacked cabinets and shelving no longer impede free air circulation nor create stagnant air pockets, the humidity and temperature fluctuations recorded over the years have been reduced and the collections and cabinets are much less at risk from environmental damage (fig. 6).
3. *Increased interest in volunteering.* Store tours following the moves produced a very positive response from the public, several of whom expressed an interest in volunteering. Some members of local natural history societies have also indicated that they wish to volunteer solely as a result of the improvements to the collections and the working environment.
4. *Conservation improvements.* Seven months after freezing, there was no recorded evidence of pest damage or infestation in the collections. A new regime of regular freezing is now in place to ensure that the collection's pest-free state is maintained.



**Fig. 6.** The Natural Life Collections after the move showing environmental improvements.  
Image © Leicestershire County Council.

## Conclusions

- Plan: use *PRINCE2*, or a similar method, to break the task down into manageable components.
- Identify the critical step(s); they may not be where you expect them to be!
- Changes to the plan are inevitable; *PRINCE2* provides a method to evaluate their effects on the project timeframe and costs.
- Communicate changes and critical dates; think how changes to the store will affect other Curators, their volunteers, buildings and collections access.
- Consider what your options are, if insurance is unobtainable. Are you prepared to take the risk involved?
- Look for opportunities to...improve storage, create space and improve access.
- Use staff experience. Don't be afraid to ask!
- Volunteers were keen to help. Just communicate your vision.

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## **Reflexive Displays: Interpreting Taxidermy Practice**

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### **Abstract**

This article explores reflexive approaches to interpreting natural science collections with particular reference to the making of natural science taxidermy specimens. Through an investigation into the natural science displays of a number of recently redeveloped museums, this article draws attention to some of the ways in which museums are currently interpreting taxidermy practice. These approaches are often nuanced and subtle, and using case study museums as examples, this paper aims to explore some of the ways in which museums may develop or further integrate reflexive displays into current or future exhibitions. The case studies featured in this article have been chosen primarily because they have recently been redeveloped, and therefore their displays may be considered to be indicative of contemporary trends in museology.

### **Introduction**

The aim of this article is to draw attention to additional or alternative ways in which taxidermy specimens may be used in natural science galleries or elsewhere in museums. This topic is approached with a view to broaden the scope for audience engagement with natural science collections, and underscore their value in the ever shifting landscape of museum object interpretation.

Today taxidermy continues to be used by many museums to interpret scientific ideas and concepts. Most prevalent is the display of taxidermy to represent discrete species, for example, to illustrate animal characteristics and exemplify evolutionary adaptations. Indeed, as a medium of representation, taxidermy is most suited to these applications. However, over the last decade the redevelopment of various museum natural science galleries has evidenced a heightened focus on interpreting taxidermied specimens through socio-cultural and socio-historical narratives. One example is the new natural science gallery at Manchester Museum entitled '*Living Worlds*' which opened in 2011. In the new gallery, taxidermy is used to communicate ideas about the different relationships between humans and non-human species alongside other, more conventional scientific themes. *Living Worlds* reveals an interdisciplinary approach to the presentation of ideas about nature and the natural world by transgressing the traditional disciplinary boundaries more commonly associated with the natural sciences (The University of Manchester, 2011) (fig. 1).

Compared to a more traditional model of a natural science gallery, it may be fair to say that Manchester's approach is progressive, perhaps even radical. However, the approach employed by Manchester is reflective of a wider shift taking place in twenty-first century museums whereby visitor 'experience' is fast becoming the predominant economy of museums (Dudley, 2010; Black, 2012). As the development of information technology has progressively outmoded more traditional and didactic approaches to interpreting collections, attentions have been turned to how museum services can be differentiated from other information sources and leisure/learning experiences. Compounded with the necessity to justify public funding and the value of museums to society, these factors have encouraged institutions to become more reflective about what museums are and what they do (Black, 2005). It is within this context that this article seeks to expand on reflexive displays in relation to the making of specimens in contemporary museums.

### **Reflexivity?**

Reflexivity might be described as reflecting upon past and present museological practices, and responding to those practices by interpreting them for audiences through public exhibitions and displays. With this (admittedly) working definition in mind, there is evidence to suggest that UK museums are already affording the interpretation of certain areas of museology increased importance within their galleries. For instance, through displays concerning and questioning the principals and rationale behind collecting, classification, conservation and other key museum practices. One subtle example can be found in the Darwin Centre at the Natural History Museum, where a display entitled 'Sorting into groups' works not only to describe

what classification is, but also to problematise the practice via the following statement: ‘There are many ways to organise things. But while there are no correct or incorrect ways of classifying them, some are more useful than others’ (excerpt quoted from a text panel located within the Darwin Centre, NHM, London). Through this statement audiences are prompted not only to think about the ways in which museums classify, but having been informed that there is no right or wrong way to do so, they are also invited to challenge the notion of classification and its functions in light of its inherent subjectivity.



**Fig. 1.** ‘Experience’ case featured in *Living Worlds*, The Manchester Museum (2011).  
© Ant Clausen and The Manchester Museum.

It could be argued that interpretation of this kind is becoming increasingly commonplace in UK museums, particularly in recently redeveloped institutions. However, although there has been a gradual rise in reflexive displays concerning the philosophies and principles behind topics such as classification and collecting, this seems to be less so of practices relating to the production or preparation of museum natural science specimens. Specifically, and in relation to taxidermy, the journey that an organic, once sentient life-form takes to become a product of the material culture of science (Alberti, 2008). Therefore, the remainder of this article will extend this line of enquiry to the interpretation of natural science objects, and to taxidermy and taxidermy practice in particular. For brevity this paper focuses on the interpretation of taxidermy practice, however it should be noted that the same may also be applied to other types of specimens and preservation techniques such as dried or wet preparations for example.

What might it mean to be reflexive in the presentation, display and interpretation of museum taxidermy mounts? As a starting point, one could begin with semantics. The words ‘animal’, ‘object’, ‘mount’ and ‘specimen’ are used interchangeably throughout this article, as they often are in discussions concerning the natural sciences. Yet, tensions resonate between these words as they do not all refer to, or equal, the same thing. Indeed, in some contexts ‘object’ may figure as the binary opposite of ‘animal’. Moreover, a ‘specimen’ is often interpreted as an embodied set of objective scientific data, yet a ‘mount’ is a model, a work of artifice subject to the agency of the taxidermist who created it. Indeed, in talking about taxidermy, it is easy to be provocative when considering its materiality and hybrid nature/culture status (Marvin, 2006; Poliquin, 2008; Alberti, 2011). Yet, it could be argued that the liminal status of taxidermy is precisely what makes it so interesting to visitors, and therefore ripe for exploration as a means of widening opportunities for audiences to engage with natural science collections.

### Museum displays: some observations

Visitors know that taxidermied animals are not the same as living (or dead) animals. As curators are all too aware, when observing visitors observing taxidermy, it soon becomes apparent that the same questions about taxidermied animals arise time and time again. Moreover, museum staff are well accustomed to hearing questions such as ‘is it real?’ and ‘what are its eyes made of?’ when working in natural science galleries. It could be argued that the persistent recurrence of such queries is indicative of an area of untapped potential that natural science departments could capitalise on. The popularity of the recent ‘*Polly Morgan – Live and Stuffing*’ event held as part of Museums at Night 2012 at the University of Liverpool’s Victoria Gallery & Museum, is suggestive of the general public wanting to know more about the making of taxidermy specimens. (Notably, although more commonly associated with the fine art world, on the night, Morgan’s final work was a starling mounted in a natural pose).

There is evidence to suggest that some museums are beginning to express an awareness of a need to answer the types of questions visitors ask about museum taxidermy. For instance, in the natural science gallery of the redeveloped Leeds City Museum, the questions: ‘Why do you have all this stuffed stuff?’ and ‘How do you stuff something?’ are addressed by a modestly sized text panel situated near the gallery entrance (extract from a text panel in *Life on Earth*, Leeds City Museum). The panel summarises the taxidermy process in two sentences: ‘To stuff something you must remove the skin and then place it over a model of the animal’s insides. The eyes are made from glass’. In the absence of further imagery to interpret these ideas, it could be argued that the processes described may remain quite abstract in the mind of the visitor. Although it should be recognised that the imaging of taxidermic processes should be undertaken with due consideration of twenty-first century sensibilities, it is likely that such abstracted ideas or concepts will provoke more questions than they answer. This, of course, could be interpreted as a positive or negative outcome, depending on how motivated the visitor is to follow up their trip with further self directed study.

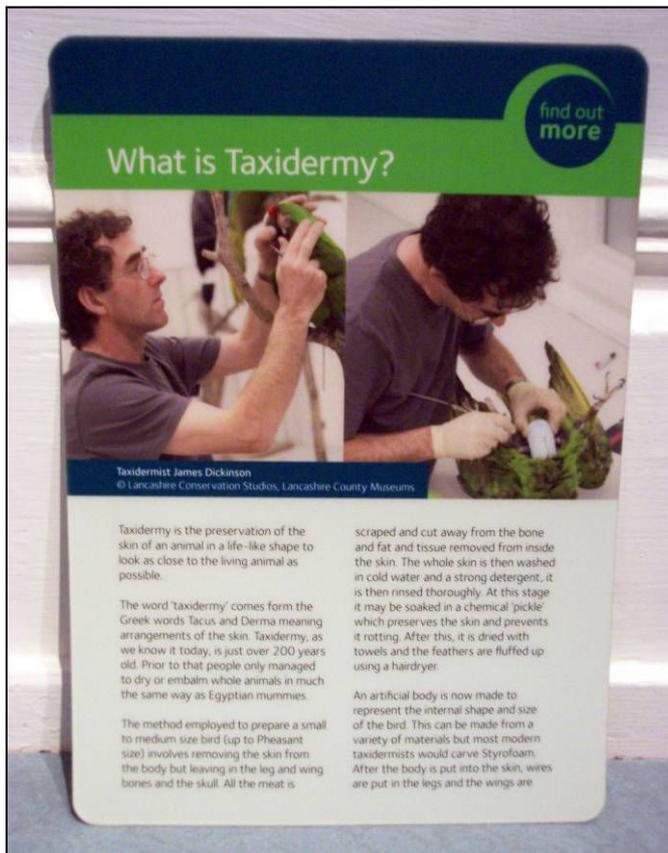
Also located within Leeds natural science gallery are a series of A4 sized ‘*Find out More*’ cards, one of which addresses taxidermy practice in much more detail than the aforementioned text panel (fig. 2).

The information on the laminated card combines text and images and interprets the complexities of the taxidermy process in a concise manner. The taxidermist pictured on the card worked on a number of mounts featured in the gallery. Therefore, there is a direct relationship between the information on offer, and some of the taxidermy mounts currently displayed within the gallery space. Although information is made available to audiences concerning the role of the taxidermist in the making of museum specimens, along with a view of the completed mount itself, what is omitted is the relationship between the two; the *work*. A narrative to this end could enliven and make visible extant networks between practice, people and objects.

At Weston Park Museum, Sheffield, there is little mention of taxidermy practice in the public displays. Rather, information is presented in A4 ring binders for visitors to interrogate if they wish to do so. Within these folders a range of issues are explored through questions like: ‘Where did all the museum’s animals come from?’, ‘With what do taxidermists stuff animals?’ and ‘Hunting today’ (extracts from *Find out more* folders located in *What on Earth!* and *Arctic World*, at Weston Park Museum, Sheffield). Through this information the Museum touches on some of the ethical and political issues bound up with natural science collections, particularly in relation to specimen acquisition, in both contemporary and historical contexts. While it is significant that museums such as Weston Park are reflecting on the social and cultural mechanisms that brought museum collections into being, it is also important to note that in these instances the information is presented in files and folders, and as such, may be viewed as supplementary or somehow of lesser importance by visitors. This is an interesting phenomenon, since as many visitor assistants would attest, some of the most frequent questions visitors ask about taxidermy relate not only the themes that mounts are being used to interpret, but also to the provenance, construction and materiality of the objects themselves. Audiences and the things that they would like to find out are in constant flux. This can be accommodated, in part, by audience consultations, a number of which were undertaken during the redevelopment of Weston Park. However, the case in point serves to re-sensitise the ongoing debate over agency, authorship and who decides what ideas and tropes are given precedence over others in public galleries.

At Leeds City Museum and the Great North Museum: Hancock (GNM:H), Newcastle, there are instances where the labels of specimens on permanent display are suggestive of the subjective hand of the taxidermist. For instance, at Leeds a taxidermied tiger is described as being of a ‘slightly strange and over-sized shape [...] due to its time as a rug’ (extract from a text panel in *Life on Earth*, Leeds City Museum). While at the GNM:H, a taxidermied wombat is characterised as a ‘strange creature’ on account of it being

mounted up erroneously on its hind legs: ‘Wombats move around on all four legs, but the taxidermist had never seen a wombat before, so he didn’t know this’ (extract from a text panel in *Explore!*, GNM:H). These fragments of information are suggestive of the role that taxidermists play in the making of museum specimens, along with some of the issues and challenges that the relationship between animal, museum and craftsperson can give rise to. However, these thought provoking, yet nuanced comments consistently resist full disclosure as to what taxidermy is, how and why it is performed, and perhaps most importantly, why it features so heavily in contemporary museums.



**Fig. 2.** ‘Find out More’ card in *Life on Earth*, Leeds City Museum featuring James Dickinson (2011).  
© Leeds City Museum.

### **Interpreting taxidermy practice: A realistic goal for museums?**

The aim in identifying some of the areas where the aforementioned museums are beginning to interpret the making of museum specimens has not been to critically analyse. Rather, through these examples, this paper has sought to identify and characterise the types of areas in museum galleries where reflexive interpretation could be integrated, or is beginning to emerge and could be developed.

Changing and updating displays is an expensive and time consuming activity, and therefore it is understandable that some museums may shy away from interpreting potentially contentious topics such as taxidermy practice in their permanent displays. However, as long as museums continue to use and display taxidermied animals, visitors will ask questions of them. Therefore, if dealt with in a sensitive manner, interpreting the making of museum specimens could provide considerable scope for enabling visitors to engage and explore the history and cultural structures behind the natural sciences, and the making of museum collections more broadly (Alberti, 2008). Giving greater exposure to some of the ‘behind the scenes’ activities that inform the content of natural science galleries, in the back rooms of museums and elsewhere, could serve not only to demystify the transformative process of specimen preparation, but also provide an alternative platform for explaining the value of specimens and collections. In addition, interpreting the work behind the making of specimens could also serve to promote museological and scientific careers to younger audiences.

In an era where the protection of species and their habitats remains at the forefront of the natural science agenda, interpreting taxidermy practice could also figure as an ideal opportunity to reflect on past practices, particularly in regard to specimen acquisition, and to dispel any myths or misguided conceptions that may persist about museum practice today. Displays interpreting these topics could act as springboards for broader discussions about the relationship between humans and nature. For instance, how and why the relationship has evolved over time, why the protection and promotion of biodiversity is so important, and perhaps most critically, how individuals can play a part in its preservation. These are well established themes, but what is significant is that the routes taken to arrive at them, are different from those of more conventional scientific approaches which can be difficult for some audiences to engage with.

Undoubtedly, there are pragmatic limitations as to how many topics can be addressed within a museum gallery, and a variety of stipulations continue to impact upon gallery content, privileging specific areas of provision over others. However, by interpreting museum objects along with museum practice itself, curators can open up a variety of new and alternative avenues of engagement for audiences, not least by relaying more explicitly the role and therefore importance of museums and their collections to society, both now and in the future. Consultations between museum staff and museum visitors could define the direction of such projects opening up opportunities for interdisciplinary displays (and/or associated projects). These could bring curatorial staff from different departments into collaboration, for example, drawing connections between art, science and social history. Collaborations of this nature, (particularly uniting art and science) may also enable museums to tap into alternative or additional sources of funding.

Finally, it may be worth emphasising a point that curators are already well aware of, but is worth reiterating here, that the types of narratives that accompany specimens on their journey from nature to museum culture, can be some of the most interesting, entertaining and thought provoking. By extending the interpretation of natural science collections beyond scientific tropes to include museum practice, audiences can partake in the stories that help unravel the making of museum objects. Stories which, in at the present time, remain largely undiscovered and underexplored by many museum visitors.

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## **Fly on the Wall: A new insect gallery for the Royal Albert Memorial Museum & Art Gallery**

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### **Abstract**

As part of a multi-million pound redevelopment RAMM has a brand new gallery dedicated to its beautiful and scientifically valuable insect collections. The development of the gallery and techniques used to display these fragile creatures is described as well as some insect-related highlights from RAMM's ethnographic and costume collections.

### **Introduction**

When Prince Albert died in 1861 Sir Stafford Northcote, a Devon MP and one of the Secretaries for the Great Exhibition, proposed that a memorial to Albert should be erected in Exeter. The Devon and Exeter Albert Memorial Museum opened in 1868 and later became known as the Royal Albert Memorial Museum (RAMM). Over the years RAMM has had numerous alterations and additions but in December 2007 RAMM closed its doors to undergo a multimillion pound redevelopment funded by Exeter City Council and the Heritage Lottery Fund. It aimed to merge modern architecture with John Hayward's 1861 gothic design. Ralph Appelbaum Associates (RAA) were appointed as Lead Exhibition Designers to work with the collections team to develop a highly integrated strategy for the new Museum which would give a much broader and larger audience deeper access to RAMM's collections. RAMM reopened to the public in December 2011 and successfully fought off hot competition from museums around the country to win the Art Fund Prize and the title of 'Museum of the Year 2012'. The redevelopment has taken 10 years from conception to completion.

### **Previously at RAMM**

The displays in the old natural history galleries contained large dioramas of taxidermy mammals and Victorian cases of birds and beasts arranged largely geographically. The insects however, were conspicuous by their absence – the 'Butterfly Corridor' on the ground floor was the only area where insects were on display (fig. 1). This area was essentially a view into one of the museum's stores where the exotic butterfly cabinets were kept, along with a variety of taxidermy and skeletons. Drawers from this collection were selected for display at the front of the viewing area and the selection was changed from time to time. Whilst one visitor described the Butterfly Corridor as showing the '*brilliance of lovely, old, mysterious museum galleries*', it did not show off the collections to their full extent, nor was it a suitable, environmentally controlled space for such important collections. The redevelopment sought to address both of these problems and it was this collection of exotic butterflies that inspired the creation of a gallery dedicated to the insects that has come to be known as 'Fly on the Wall'. It was decided that the exotic butterflies should be the focal point of this gallery.

### **The Exotic Butterflies**

Although the Museum opened in 1868 but the first record of any exotic butterflies being received was not until 21 April 1904 when a number of West African butterflies were presented by a Doctor Grey. Over the next few years several more donations were made. In December 1930 a donation of 56 butterflies was made by a man who would, over the next 30 years, have an incredible impact on RAMM's insect collections. His name was Major Arthur Bertie Gay.

Originally the tropical butterflies were on open public display in one of the natural history galleries – the public were free to browse through the various cabinets they were kept in at their leisure but c. 1936 the collections were removed from public areas for their safekeeping. Sadly, it is doubtful if any of the earliest specimens still survive in the collections. Today RAMM has over 43,000 exotic butterflies stored in 34 30-drawer cabinets. Each and every drawer has been conserved by the conservation team before being placed

in the new purpose built on-site storage area known as *More in Store*. This collection does not contain moths, or specimens collected in the UK; these are kept at RAMM's new propose-built off-site store known as the Ark (this new storage facility was a crucial part of the redevelopment).



**Fig. 1.** The Butterfly Corridor. Image courtesy of Anthony Roach.

#### **With thanks to past curators**

RAMM's exotic butterfly collection contains a wide diversity of species and varieties, and hence is one of the finest in any regional museum in the UK. This is largely thanks to the dedication and generosity of two past curators: Major Arthur Bertie Gay, the man who donated 56 tropical butterflies to the museum in 1930, and Anthony Adams. Major Gay was born in 1896 to Major General Sir Arthur William Gay of Lapford, near Exeter. He served with the Royal Artillery during the First and Second World Wars and was well decorated for his service. Gay was a keen natural historian, whose encyclopaedic knowledge of butterflies and birds from all over the world earned him a position at RAMM as an assistant curator in 1936 with direct responsibility for all the natural history collections. He worked in this post for over 20 years. One of Gay's first duties as Assistant Curator was to organise the many separate collections of exotic butterflies into a single consolidated collection using a copy of *The Macrolepidoptera of the World* (Seitz, 1924).

Gay was a man of independent means who purchased from his own pocket a considerable number of rare specimens for the collections, as well as 14 of the cabinets they are stored in today. In addition to forming his own collections, Gay was responsible for obtaining specimens and collections from many other naturalists, including GK Hebbert, LD Symington, Dr RV Solley, Capt GC Woodward and F Blanchford, and thousands of specimens from the Trustees of the British Museum (now the Natural History Museum, London). At one time the collection contained 27 type specimens and 34 co-types. However, it was considered that, with one exception, that these scientifically very important specimens should be transferred to the Natural History Museum, London. Major Gay had presented 27 of these co-types to RAMM himself. Major Gay died at the age of 63 on 17 March 1959 at The Royal Devon and Exeter Hospital. He had no living relatives, and the money left to the Museum in his will was used to purchase further cabinets to house the consolidated collection. It came to the attention of Anthony Adams, the then Curator of Natural History, that Gay's grave did not have a headstone. Upset by this neglect of such a worthy man, Adams paid for the headstone. Adams continued Gay's work and by 1976 all the major collections including Blanchford and Woodward had been consolidated.



**Fig. 2.** The author laying out insect specimens prior to installation.  
© 2012 Royal Albert Memorial Museum & Art Gallery, Exeter City Council.

### Redisplaying RAMM: *Fly on the Wall*

The room which now houses the *Fly on the Wall* gallery was once office space. RAA's vision was that the gallery should be dedicated to RAMM's impressive collection of non-British butterflies and moths as they are 'among the most majestic of insects. Their vivid colours and striking patterns are mesmerising both in nature and in museum collections. Transient, fluttering and fragile, or adept flying machines, these wonderful creatures are one of the highlights of RAMM's natural history collections' (RAA Design Report, 2004) RAA worked with RAMM's curators to decide on other themes within the gallery such that the exotic butterflies were one of six main topics that the gallery would address. The remaining five include:

- Insect anatomy: what is it that defines an insect? What makes them different from other arthropods? What makes a beetle different from a bug?
- Insect lifecycles: an exploration into the process of metamorphosis and what makes it so extraordinary.
- How insects live, survive and function.
- Insects and people.
- Insect sounds.

Once RAA and curators had chosen specimens and designed the gallery, the next decision was how to mount the 550 insects that had been selected for display. Pinned insects are easy to display when mounted on something soft such as *Plastazote* or paper-covered cork, but it was decided that we would use frosted *Perspex* in the new cases – something pins cannot simply be pushed into. To assist with ideas on how to mount the specimens, RAMM's technical team visited the Darwin Centre at Natural History Museum, London, to seek inspiration from their new displays. The butterflies in the Darwin Centre had been mounted on drilled and polished *Perspex* rods, the large beetles have been fixed to *Perspex* plates using bent rods of the same material to act as claws and prevent swivel. This is an elegant solution as the mounts are barely noticeable, but it took the NHM team six months to prepare these displays. The displays they created are beautiful, and importantly (and miraculously) dust free, but six months was a luxury that we did not have.

An ingenious solution involving a *Dremel* electric drill, some pliers and hypodermic needles was developed by the technical staff at RAMM (fig. 3). Hypodermic needles, just like entomological pins, come in a range of different widths which allowed Adrian to select one into which the pin would fit snugly and securely but without damaging it. He then used the *Dremel* and with a special attachment to drill perfectly straight holes into the *Perspex* back board. The hypodermic needles were then glued into these holes, and the pins pushed into the needles. If the insect was lopsided and prone to swivel, or in the case of the female Queen Alexandra's Birdwing butterfly very heavy, the needle could be crimped to make sure that the pin stayed securely

in place. This clever method means that the specimens can be dismantled from the display without damage to their original pins, yet mounting the insects on the board was not simply a case of drilling a series of holes in a straight line. Adrian had to make careful measurements for each one and adjust the position of the hole according to the position of the pin and size of the insect. The other benefit of using the needles as opposed to just drilling holes was that the height of the insect above the board could also be easily adjusted by shortening the needle. The work took six weeks to complete.



**Fig 3.** Adrian preparing insect mounts.  
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### Animal Hospital

Some of the insects in the collections are approaching one hundred years old and as they age they become increasingly brittle. And even with the most care in the world, mishaps occur: wings come off, bodies break and legs go missing. Andrew Hughes, Senior Conservator at RAMM, had to conserve and repair several specimens before they went on display. One of the most common problems was loose or detached wings caused by the vacuum effect when entomological drawer lids are taken off. Repairs were made using methylcellulose which is the main constituent in many wallpaper pastes. It is a weak adhesive that is water soluble so if in the future we decide to reverse the repairs this is easily done. Where body parts required extra support, Andrew used Japanese tissue to reinforce weak areas. In some cases body parts had been missing for some time. Some were not noticeable without close inspection; others such as the leg of a large cockroach were very obvious (fig. 4). Andrew used tissue paper, methyl cellulose and acrylic paint to create a false limb which is barely noticeable. Each specimen that was conserved was assigned an individual lab number, photographed and the treatment recorded on lab cards. The lab number was added to the specimen label and collections databased allowing the lab card to be digitised and added to the collections database at a later date.



**Fig. 4.** Cockroach with new right hind leg.  
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### The gallery opens...

After much hard work and attention to detail the *Fly on the Wall* gallery opened on December 14<sup>th</sup> 2012 and has since received in excess of 280,000 visitors (fig. 5). It is particularly popular with school parties and art students, but has also received much attention from community groups and providers such as Age UK and Magic Carpet which is a Charity that works with vulnerable adults. However, it is the visitors themselves which pose the greatest threat to the collections on display. The vibration caused as the public, particularly large school groups, moving through the gallery has the potential to damage the fragile specimens, but not a single limb or antenna has become detached in the nine months that we have been open!



**Fig 5.** Fly on the Wall gallery completed. © 2012 Royal Albert Memorial Museum & Art Gallery, Exeter City Council.

Other threats to the insects are much easier to manage. The gallery lights are ‘cold’, a maximum of 50 lux and emit zero UV light and the blinds at the windows are required to reduce the natural light entering the gallery. The cases, expertly constructed by the Benbow Group, allow less than 40% of the air in the case to be exchanged with the surrounding environment. This not only reduces the temperature and humidity flux within the cases but indicates that the cases are suitably sealed that variegated carpet beetle and other museum pests cannot enter. All the specimens were frozen prior to their installation to ensure that they were not already harbouring any collection-hungry larvae. Although there is no environmental control in this gallery, sensors inside and outside the cases have shown the conditions to be stable. Thus these specimens, which form an integral part of RAMM’s historic collections are as protected from damage as we can make them. As a result there are no plans at present to replace specimens in the displays as this would be a very time consuming process.

There was not enough space to write a label for each and every insect, so with the help of volunteers, placement students and RAMM’s Digital Media Officer we are creating various solutions to this problem; including a handbook to the gallery and QR codes that link to relevant pages on the RAMM website. Both will use information from our collections database and photographs of the actual specimens on display.

### Insects for the observant

Visitors to RAMM may notice other insect-related objects in the new galleries, particularly from the ethnography collections. Among these are some dance rattles from modern day Swaziland. They are made from the cocoons of the enormous African moon moth (*Argema mimosae* Boisduval, 1847) (fig. 6). These rattles are known as emafahlwane. They were made in the late 20<sup>th</sup> Century and are worn around the ankle by girls, women and tangoma (spiritual healers both male and female) when dancing. The cocoons have been fixed to hand-made sisal string and neatly backed with fabric. Goatskin was used prior to imported European material.



**Fig 6.** Emafahlawane (dance rattles) from modern Swaziland made from the cocoons of the African moon moth.  
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Iridescent beetle elytra (hard cases that protect a beetle’s flight wings, most often of the jewel beetle family Buprestidae) have frequently been used as decoration in jewellery and costume. The Victorians were particularly keen on them; only last year the National Trust completed the restoration work on a piece of costume from their collections. This stunning beetle-wing dress was worn by Victorian actress Ellen Terry when she played Lady Macbeth in 1888 and is now back on display at Ellen Terry’s former home of Smallhythe Place in Kent. The silk and beetle wing bag which is now on display in RAMM’s *Finders Keepers?* gallery (Fig 7) was made a few years before Ellen’s fabulous dress in about 1850. Many high quality pieces embroidered with beetle-wing cases were produced in India. They went on to influence decorative fashions in Europe. Objects from the ethnographic collections also incorporate beetle wings. One of the rarest is a ceremonial apron (tayo-cunchi) that would have been worn at initiation ceremonies. It dates to the late 19<sup>th</sup> century and possibly comes from Yanomamo, Venezuela. It is made with bird wing-bones, seeds, monkey’s teeth and has a beetle wing case fringe at the bottom. Called ‘*Mother of the Sun*’, beetle wings are still used by many Caribe-speaking and Tukano peoples for sound and visual effect.



**Fig. 7.** Silk and beetle wing bag.  
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The natural history galleries underwent extensive changes during the redevelopment. Whilst some of the large animals such as the rhino have returned to the stores, the redevelopment has given the opportunity to showcase many of the collections that were previously hidden from public view. Ingenious display solutions from RAMM’s technical team have ensured that these attractive and scientifically valuable specimens are safeguarded even when on public view. The new gallery and other insect related objects in the museum are already popular with school children and artists and it is anticipated that they will be the subject of talks, tours and workshops in the coming years.

**Acknowledgments**

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**Useful contacts for the project**

Benbow Group: [www.benbow-interiors.co.uk](http://www.benbow-interiors.co.uk)  
Dremmel: [www.dremmel.com](http://www.dremmel.com)

## **Restoration of a 19<sup>th</sup> Century Materia Medica Chest and Contents**

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### **Abstract**

The conservation challenges of a deteriorated 19th century Materia Medica chest are described. The restoration procedures devised allowed the chest to be restored to a condition where it is now suitable for display in exhibitions and events.

### **Introduction**

In 2010, Leicestershire Museums Service acquired a 19<sup>th</sup> century Materia Medica chest that had belonged to Rev. D.P. Murray, a priest of the Dominican Order, who worked as a missionary in South Africa during the early years of the twentieth century, before returning to England in 1937. He was an active lepidopterist and botanist, and a short biography appears in the Flora of Leicestershire (Primavesi & Evans, 1988). The chest had been donated to Leicester City Museum Service on his death in 1967, along with a collection of objects that included his herbarium of 1,860 sheets and some entomological specimens. It is not known when Murray acquired the chest, whether he used its contents in his work or whether he acquired it because of his interest in botany.

Materia medica chests were used as a learning tool for students of pharmacy and medicine during the 19th century, although the term has been in use from the period of the Roman Empire. The identification of drugs of animal, vegetable or mineral sources was part of their qualifying examination. The students needed to identify drugs macro- and microscopically, so the specimens would have been numbered, and a list of contents supplied.

Murray's chest was made by Wyley's & Company, a firm of "wholesale and export druggists and manufacturing chemists", based in Coventry, that was established in 1750 and active until the early twentieth century. The box is labelled, "Wyleys & Company, Coventry & London" which was in use by the company from 1891 to 1921. As the specimens were labelled, the date of the chest could no later than 1900, when specimens were housed in cardboard boxes. So the box most likely dates from the period 1891-1900.

Following its transfer to Leicestershire Museums in 2010, it was discovered that the chest and its contents had not been well treated or stored in the past, and required specialist conservation to restore its contents before it could be used in public displays (fig. 1, and fig. 2).

### **The Chest and its Contents**

The chest consists of a wooden case containing four drawers, each with square or rectangular compartments made from cardboard and paper, and a glass cover. Of the 204 compartments, 183 (90%) still had their contents, which consisted of a large variety of medicinal herbs (leaves, seeds, twigs, fruits, bark, wood, lichens, seaweed), animal parts, resins, gums, chemical reagents, preparative materials and oils (Table 1), nearly all of which were labelled. The labels would probably have been cut from a book of labels and glued to the relevant bottle or compartment, but it is unknown whether the labels were attached by Murray himself. Some items are contemporary food flavourings e.g., star anise, nutmeg and vanilla, whereas others are, or contain poisons, toxins or items that are now classified as dangerous drugs by the U.K. Government, although no materials in the latter category remained.



**Fig. 1.** Chest before (left) and after (right) restoration.

Drawer	Compartments	Items Present	General Description of Contents
1	60	54	Loose seeds, fruits and berries; phials of seeds, powders, reagents oils
2	48	46	Loose barks of various kinds, berries, roots, resins
3	48	37	Lichens, seaweeds, fungi, resin blocks, preparative materials
4	48	46	Seeds, roots, bark, resins

**Table 1.** Composition of Drawers

**Conservation Challenges**

The chest was frozen for 7 days at -40°C before treatment to kill any insect pests and fungal spores. Inspection of the structure and contents of the chest revealed the following types of damage .

- Mechanical damage (Fig. 2). One outer case panel was loose, one drawer had broken glass, and many of the paper compartments were split and/or loose. Shaking had mixed the contents of some compartments, and leakage of contents from phials with broken or poorly fitting cork stoppers had both stained one drawer with (now encrusted) resins and oils, and had caused some cork stoppers to stick fast.
- Heat damage. Some gums and resins had melted, congealed and stuck to the linings.



**Fig. 2.** Mechanical damage to glass and mixed materials. Fragmentation of Barbados Aloes. Leakage from phials.

- Damage by biological agents (Figs. 3-5).  
**Fungi** There was fungal growth on most plant material, with sometimes substantial decay, some light fungus growth on phial corks, and often varying degrees of fungal damage to card compartments and paper linings.  
**Insects** Insect damage of materials had produced quantities of frass, with pupae present in some compartments that were badly damaged. Oil-rich seeds, e.g., *Ricinus sp.*, *Croton sp.*, *Areca sp.*, *Cannabis sp.* etc. were preferentially attacked, often with only husks remaining. Red sandalwood had been comminuted making it difficult to separate out.



**Fig. 3.** Fungal and insect damage to paper and card compartments.



**Fig. 4.** Fungal damage to plant materials and cardboard.



**Fig. 5.** Insect damage and frass (left) and insect pupa (right).

An inventory of the chest’s contents showed that it contained poisons, toxins and animal parts. Also, there were missing items, missing or misspelt labels e.g., Ellateria Cardamomum for *Elettaria cardamomum*, or labels that used ‘long forgotten’ names for materials.

The often substantial fungal surface growth on hard and woody materials suggests that the chest was stored in an environment with high humidity for a relatively long period of time. The presence of a moderately large number of insect pupae (about 30 in all the drawers) suggests that most of the material had been stored unprotected.

### Conservation Procedures

Each item was removed and placed into labelled polythene bags before inspection and treatment. The insect frass and unrecoverable plant debris was emptied and the compartments cleaned with a soft brush and micro-vacuum cleaner. Debris lodged between the wooden sides of tray and the card compartments was removed using a stiff brush. Pupae were removed with forceps. The cleaned card and paper compartments were repaired with acid-free, neutral, conservation grade PVA adhesive (Lineco, Holyoak, USA), using folding clips and stiffeners/tensioners made from Plastazote to hold them in place, which greatly increased their strength.

Labels and loose paper were reapplied using PVA glue, but some had deteriorated and could not be read, whereas others fragmented when removed or moved. Some loose labels were easy to reunite with unlabelled items e.g., *Cera flava*, but others were more difficult e.g., *Punica granatum* was found with *Rhamnus frangula* bark close by.

Items were cleaned with a soft brush and microvacuum, but those showing surface sporulation of fungi, especially where extensive, were cleaned in a fume hood to contain spore dispersal. Heavily infested hard tissues or robust items were placed in glass universal containers and gently agitated with distilled water to remove spores resistant to brushing, then left to dry and re-brushed to remove remaining spores (Fig. 6). Items were returned whole, or were placed in small Melinex envelopes for display, depending on their fragility. One item, *Cucumis colocynthis*, disintegrated when brushed lightly, but all other items remained intact, although cleaning often revealed holes and channels created by insect larvae.



Fig. 6. *Podophyllum* root before (left) and after (right) cleaning.

Broken corks were repaired using PVA which also served as a seal to prevent future leakage of the contents. The chest was sprayed with Constrain (Historyonics, Cardiff), a pH-neutral, water-based insecticide predominantly for woodworm, and the sheet of broken glass was removed and replaced with a sheet of 2mm thick acrylic Perspex (The One Stop Plastic Shop, Melton Mowbray).

### Labels and Labelling

The plant names on the labels were often misspelt, so were checked against the on-line database 'The Plant List' (see <http://www.theplantlist.org/>) for synonyms and current names. In most cases, checking resolved identification, but where the name was equivocal, inspection of the contents was required. For example, an item labelled *Cassia lanceolata* could be *Cassia lanceolata* Link, which is a synonym for *Senna sophera* var. *sophera* (L.) Roxb., or *Cassia lanceolata* Pers. which is a synonym for *Chamaecrista desvauxii* var. *mollissima* (Benth.) H.S.Irwin & Barneby. The item was clearly the former, by morphology. Similarly, in drawer three, the label 'ditto serratifolia' and 'ditto crenatula' were found to refer not to *Garcinia* sp. (on

their left) but to *Baronia* sp. (on their right). Some labels required research before they could be re-united with their material, e.g., 'Tinnevelly' was found to refer to Tinnevelly Senna which is also known as Egyptian Senna, Tinnevelly Senna, East Indian Senna or the French 'séné de la palthe'.

#### The Result of Conservation Treatment

After cleaning, 183/204 (89.7%) of the compartments had contents that could be used for display (Fig. 7). Although it was impossible to recover some items, e.g., '*Taraxacum Dens-leonis*' which had been completely destroyed by insects, many others were cleaned and returned to a state suitable for display. Indeed, the remains of some items e.g., Areca Nut, could be used to demonstrate the effect of insects on oily seeds and the need for effective conservation. Strengthening the card and paper compartments increased the stability of each drawer, but further treatment with insecticide was not considered necessary following freezing. Despite its unpromising initial appearance, the chest is now suitable for use in exhibitions and events to illustrate both the role of plants in human health, as well as the conservation process and the importance of appropriate conservation.



**Fig. 7.** Drawer 4 before restoration (top) and after restoration (bottom) showing repaired compartments, cleaned materials and Melinex envelopes.

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**NatSCA AGM 2013**

**Natural Science Collections: Policy and Practice**

**The Yorkshire Museum, York**

**Thursday 28th February & 1st March 2013**

The conference will look at how collection policies, reviews and legislation are effecting natural science collections in the UK, including current practice in the curation and care of collections.

**Two day cost:**

NatSCA members £85 (non-members £100)

Early Bird booking before 11th January 2013 £75 (non-members £90)

**One day cost:**

NatSCA members £50 (non-members £60)

Early Bird booking before 11th January 2013 £40 (non-members £50)

**Deadline for bookings is 8th February 2013**

For booking form, please contact:

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NR2 3PH

For further information on the conference, please contact:

Isla Gladstone - Isla.Gladstone@ymt.org.uk

Or

Donna Young - donna.young@liverpoolmuseums.org.uk

## Natural Science Collections and the Law

A seminar on some of the legislation that affects natural science collections.

### The Manchester Museum

8th February 2013

This day will cover the basics of the laws covering natural science collections, their ownership and use. It is structured so that seminar attendees will be able to spend time questioning the speakers on wildlife and endangered species law as well as hearing presentations on the current state of affairs.

The day comprises of three talks with Q&A sessions (presentation titles TBC):

**CITES legislation** - a speaker from the Joint Nature Conservation Committee (Scientific Authority for Animals for CITES in the UK)

**Bird Eggs** - Douglas Russell, Curator of Birds' Eggs and Nests, NHM

**Wildlife and Countryside Act** - Nigel Shelton, Senior Specialist - Wildlife Regulation, Natural England

For further information please contact Clare Brown: [clare@lbrown.eu](mailto:clare@lbrown.eu)

To book a place on this course please contact Tony Irwin:  
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