http://www.natsca.org

NatSCA News

Title: Completely Rethinking the Organisation of Natural History Museums: A Taxonomically Arranged National Collection

Author(s): Mark Carnall

Source: Carnall, M. (2011). Completely Rethinking the Organisation of Natural History Museums: A Taxonomically Arranged National Collection. *NatSCA News*, *Issue 21*, 65 - 71.

URL: http://www.natsca.org/article/103

NatSCA supports open access publication as part of its mission is to promote and support natural science collections. NatSCA uses the Creative Commons Attribution License (CCAL) http://creativecommons.org/licenses/by/2.5/ for all works we publish. Under CCAL authors retain ownership of the copyright for their article, but authors allow anyone to download, reuse, reprint, modify, distribute, and/or copy articles in NatSCA publications, so long as the original authors and source are cited.

Completely Rethinking the Organisation of Natural History Museums: A taxonomically Arranged National Collection

Mark Carnall

Grant Museum of Zoology
Rockerfeller Building, 21 University Street, UCL, London, WC1E 6DE

Email: m.carnall@ucl.ac.uk

Abstract

This paper looks at an alternative way of organising all of the natural history collections in the United Kingdom. Currently, almost every museum manages very diverse collections of biological and geological material. Unlike other types of museums, natural history museums often hold the same or similar selections of specimens across many institutions which could be reorganised nationally by taxonomic group. The advantages and disadvantages as well as the practical consideration of implementing such a new system are examined as a way of efficiently caring for natural history material across museums.

Introduction

The inspiration to write this paper came from seeing some of the most amazing natural history specimens on countless tours of stored collections in museums around the UK. In the last year alone I have seen fantastically preserved palaeontological specimens, specimens collected by Charles Darwin and Captain Robert Scott, various extinct birds including a beautiful moa skeleton, rooms and rooms filled with meticulously prepared herbarium specimens and entire whale skeletons. That natural history museums hold such inspiring material is unsurprising but what is surprising and slightly saddening is that this material is only accessible to people privileged enough to be allowed personal tours of stores, normally by the curators themselves. Tours are not normally made available to the wider public or in some cases not even to the wider professional scientific community. A well-worn cliché is that curator led tours of tucked away stores are more inspiring and engaging than the carefully arranged, labelled public galleries. Obviously, for reasons of security, staff time and logistics, tours of storerooms are rarely regular museum events but the sad fact remains that often some of the most amazing natural history material languishes in store rooms and is only ever viewed by a handful of researchers and the occasional gaggle of curators on a conference tour. This can be for a variety of reasons some of which may be; curators are often over stretched and may not have the time to pay attention to specimens that fall outside of areas of their professional specialism, specimens might not necessarily fit into the display remit for the particular museum, there may not even be a natural history curator on staff or specimens may be held in storage because they are the only example of a taxon within the museum and the risk of displaying the specimen is considered too high. This last reason certainly seems to be the main foundation of the extinct bird cupboard that virtually every natural history museum seems to have.

It was at dinner at the last NatSCA AGM following a tour of the stores of the Great North Museum: Hancock that this facet of stored collections struck me. Entomology curators had missed seeing an apparently important insect collection in the store because they had been on one of the other tours run at the same time. Furthermore, none of them were aware that such a collection existed at Newcastle. Therefore, there is a collection of important specimens in store at the Great North Museum Hancock that is not publicly available, is not listed on the web and has not been publicised to the specialist audience who may be able to make the best of the collection. This is through no fault of the curators; every museum has overlooked areas of collections which are low priority for that specific museum to fully document and curate but which may be internationally or nationally important. This led to thought about how natural history museums can better organise themselves nationally so that the most can be made of all the collections, short of employing armies of documentation assistants and scanners to fully catalogue collections and disseminate the important information about specimens to relevant researchers and curators.

Part of the problem stems from the fact that unlike most other kinds of museums, every single natural history museum has a near identical remit, to inform the public about biodiversity and natural history and as a consequence every natural history museum has much the same material albeit the extent and diversity of varying with size. This is certainly the case for displayed material as can be demonstrated with Natural His-

tory Museum Bingo! (Fig. 1). These overlapping remits and a history of 'stamp collecting' means that there is a great deal of duplication of collections that occurs in natural history museums resulting in already stretched staff having to deal with hundreds of thousands of different objects types in as many different taxa. A small survey sent to the NatSCA JISCmail list of the ratio of full time equivalent collections care and management staff to objects showed that for the nineteen museums that responded there is on average one collections care and management post for every quarter of a million objects. Of the six University collections that replied, the ratio was one member of staff to 260000 objects and for local authority museums the ratio was one to just under 250000 objects. A number of respondents were keen to point out that other responsibilities took time away from hands-on object work including managing staff, other administration, front of house work, public engagement and curating other collections. Given that every individual object can demand tens of hours of research, cataloguing, digitising, displaying and conservation and it is easy to see that 'over stretched' may be sorely understating the situation.

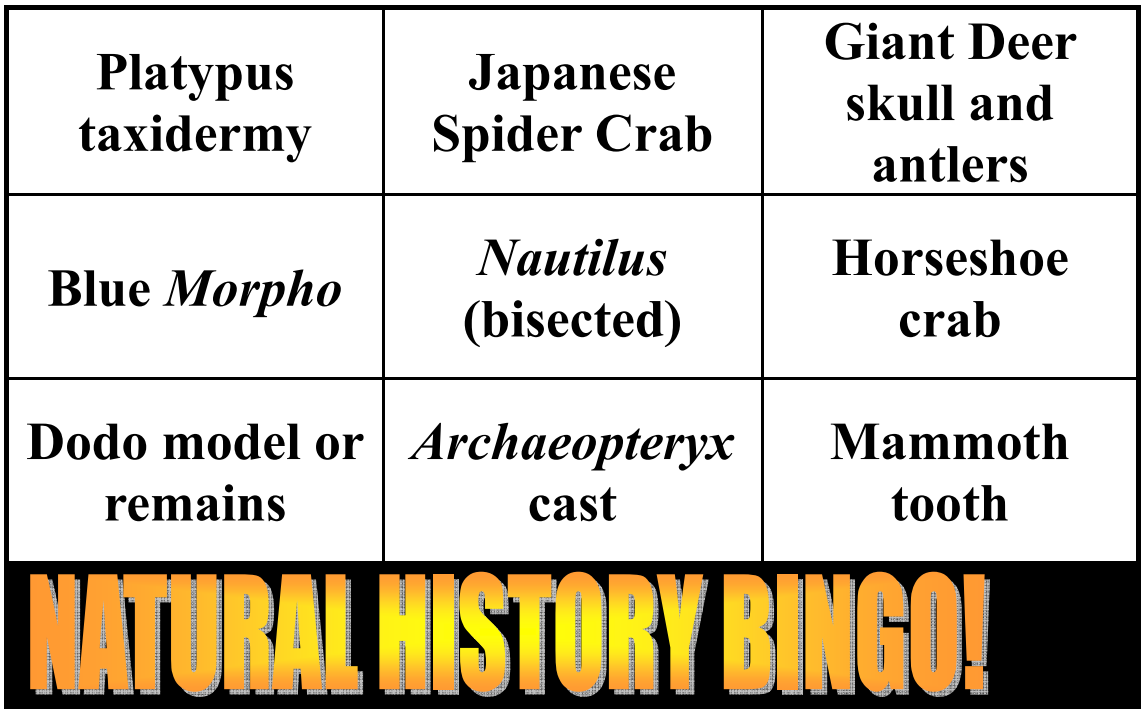

Fig. 1. Natural History Museum Bingo! A fun game to play in natural history museums highlighting how many museums display the same kinds of material. Expanded versions should include a *Megatherium* mounted in the classic tree holding position and the trilobite *Calymene* which seem to be ubiquitous.

This paper will explore a thought experiment about how natural history museums might reorganise themselves nationally to work more efficiently and strategically to preserve material and provide better access to objects in their collective care. This could be achievable if natural history museums reduced the amount of overlap in their work by putting the nation's stored collections together and then dividing the material up taxonomically across museums. Each museum would keep their displays but redistribute the stored collections taxonomically so instead of the Grant Museum storing specimens from virtually every taxonomic group of animals, the finite storage space would instead be used to house one or two taxonomic groups so perhaps, all the nation's Badgers (*Meles meles)* or Hog deer (*Axis porcinus*) or hoolock gibbons (*Hoolock* spp.) would end up in the Grant Museum and so on with museums across the country. A further level of complexity would be to taxonomically rearrange the collections in museums and also to arrange the collections geographically so that neighbouring museums would hold taxonomically related material, tracing a transect up the United Kingdom would follow a taxonomic order. This would bring a series of advantages over the current historically *ad hoc* system as well as a number of potential disadvantages as outlined below.

ADVANTAGES TO TAXONOMICALLY REARRANGING STORAGE

Efficiency/ specialisation

Although the occasional headline of a chance discovery of hitherto unknown important material being discovered in a museum cupboard or drawer makes for a nice story, these incidents can be seen as testament to how museums still struggle with identifying and organising the material they are charged with caring for. Perhaps the foremost advantage of a taxonomic arrangement of natural history museums is that there would be a great deal more efficiency in the curatorship and use of natural history material. Curators of small museums would no longer have to have an unfeasible working knowledge of millions of different groups of organisms but could specialise within smaller taxonomic groups. Access to expertise has been improved by the internet but has not been as revolutionary as it could be. Access to up to date references is still restricted behind pay walls and practical information is still hard to find if present at all. There is a much reduced need for specialisation in the professional sense because there are many networks of professionals available to help but this is redundant if curators never "get around" to working through swathes of the collection. Curators of large museums with separate taxonomic departments could focus on subfamily and species level groups rather than order and family level groups. Furthermore, museums arranged taxonomically would be much better placed to deal with the research community and make much better use of existing collections. For example, a researcher looking for hyena (Hyaenidae) specimens in the UK would, if they were performing an exhaustive search have to independently contact over 200 different museums and collections (or once through networks like NatSCA however, these kinds of enquiries are rare and not every institution is represented). If upon receiving the enquiry, each of the relevant museum staff then took approximately an hour to search for material and answer the enquiry that is roughly 25 working days of the sector's time absorbed in one enquiry. Assuming a quarter of those enquiries necessitated a visit the researcher then has to spend weeks and months travelling the country to access material and further museum staff time and resources is used up with each museum providing access to the material, printing out the relevant forms, going over handling guidelines etc. In reality, from discussions with visiting researchers, this tends to result in researchers reducing the scope of their research visits to one or two of the biggest collections thus limiting the potential quality of the data set and leading to 40 or so missed research opportunities. Under a taxonomic system, the researcher would only have to visit one or two museum stores (admittedly missing those specimens on display across the country) and be assured of a near 100% sampling of the relevant material held nationally. Furthermore, the curators of the hyena material would have more time to focus on curating the material leading to a better quality of information surrounding the specimens.

Online access

Online access to collections would also be greatly facilitated by a taxonomic approach. Currently not many natural history museums and collections in the UK have online databases and to the author's knowledge none provide 100% coverage of the material they hold. Despite initial hopes for digitisation of collections, online access has not quite delivered democratic access to collections for everyone. Online databases that do exist are necessarily full of errors, each uses virtually unique taxonomies (Carnall 2010), they tend to be academically exclusive and often are only useful internally or at best to the research communities that the museums already serve. With a taxonomic arrangement, online databases would no longer have to be so detailed, a list of the high-level taxa that the museums holds would suffice to initiate an email to a curator and museums could instead produce online resources that outstrip Wikipedia in terms of comprehensive information for the wider interested audience. As anyone who has tried to use the web to identify material will testify, finding hard evidence and information of any depth is difficult on the web, particularly with natural history. With resources freed from endeavouring to represent all taxonomic groups, museums could produce web sites and photographic archives detailing very specific information about the types of animals they hold. It does not make sense for each museum to try to compete with online behemoths like Wikipedia to detail the natural history of every organism. With a much smaller focus the museum of salamanders (Caudata) could produce unmatched illustrated and authoritative resources on the habitats, anatomy, pathology, physiology and diversity of the group.

There are a plethora of web portals that offer assistance in the identification and listing of material often incorporating social media elements but the problem with these is that there are thousands of them and typically their success flourishes and dies with the cycles of research funding. A glimpse at this list of Scratchpads part of an EU and NERC funded project to bring researchers together to publish taxonomic lists is both confusing, erratically arranged and as can be seen from the numbers of views on some of the portals not particularly effective (http://scratchpads.eu/scratchpads). 13 alternative informatics portals are listed on the Scratchpad website and many have overlapping or identical remits. When curators at natural history

museums struggle to catalogue and manage the collections they are responsible for, expecting them to then upload data to dozens of separate transient websites is unrealistic. By comparison a new project from colleagues at the Helmholtz centre at the Humboldt University of Berlin has brought together the entire nation's university scientific museums and collections under one portal (http://www.universitaetssammlungen.de/). Every university scientific collection that has or ever existed is listed with comprehensive histories of the collections and the people associated with the collections and the collections are indexed by discipline. Work continues on the project to add object by object information, the database for scientific models is live but the feat is impressive considering that the database is the work of a handful of people not associated with museums and that Germany does not have any administrative organisations analogous to the Department for Culture, Media and Sport, the Museums Libraries and Archives Council, Collections Trust or subject specialist networks.

Flexibility

Rearranging natural history museums would allow a much greater degree of flexibility in terms of the material that is loaned to other museums and scientific institutions as well as the quality of displays and practical sessions in museums across the country. Various recent initiatives from a range of museum organisations have begun to look at making object loans easier including the Smarter Loans Group at the Museums Association (Kendall 2011) and the Bizot Group stating a declaration on museum loans which was subsequently adopted by the University Museums Group (University Museums Group 2010). Nevertheless museum loans are still unavoidably risk-averse but at the moment, the level of risk being assessed is with respect to individual museum collections. For example, if a museum only has one taxidermy orangutan (Pongo sp.) that happens to be on display, a loan of that specimen will not only leave a gap in the displays for the duration of the loan but would also be of relatively higher risk than to a museum that has twenty or thirty such specimens. This is especially the case for specimens which are difficult to replace should they be damaged or destroyed. A museum that stored all of the orangutans in the nation would be much better placed to loan material that would otherwise sit in a store room as well as assess the national importance of such a specimen when considering a loan. Additionally, international loans can be more easily facilitated as the intricacies of CITES permits and other legislation is much easier to administrate if curators have smaller groups to familiarise themselves with. Museum displays up and down the country would also benefit because curators would no longer have to draw on material within their specific collections to construct displays and teaching sessions but have significantly more choice of material with a much-improved culture of loaning material with a better picture of the extent of the national quality and representation of taxonomic groups. Another slight financial benefit would be that natural history museums would be better placed to service film companies and documentary makers looking to source illustrative material without researchers having to speculatively phone twenty museums first.

Storage

Currently, many museums compromise on the provision of preventative conservation within storerooms because, to varying extents, different materials are often stored within the same space requiring that environmental conditions are maintained at sub-optimal levels for specific material types. Although taxonomically rearranging stored collections will still present similar problems, there is capacity to improve conditions for large parts of collections. In particular, the museums that store vertebrates and plants will no longer have to accommodate the specific standards for dry entomology specimens that take up many storerooms. Conversely, the issues with storing gigantic whale specimens will be restricted to one or two museums rather than every museum having to have space for one or two large and awkward shaped specimens. County by county statistics for antler impalement would drop; curators will no longer have to deal with taxidermy hair, scales and feathers within the same storeroom and whichever museum ends up looking after bats would need only one or two drawers at the most for fossil material. In a stroke (well, see logistic considerations under disadvantages) by merely organising material by taxonomy and adjusting storeroom air conditioning and humidity accordingly the average suitability of conditions for the preservation of museum specimens would improve.

Significance

Unlike other kinds of museums, natural history museums are harder to 'sell' in terms of their global significance and importance. Archaeological museums have the hook that the material is 'unique' and evidence of human history. Art collections demonstrate changes in cultural taste over time; give us an insight into modern human history and the progress of artistic techniques from scratches on cave walls through to purposefully stacked piles of bricks. Social history museums tell the stories of the struggles of the past and the shaping of communities. All too frequently, natural history museums can be seen as throwbacks and collec-

tions of rocks, plants and animals that can readily be replenished or reproduced. Even though, especially now, natural history museums hold material that is increasingly a record of a natural world that no longer exists. Every natural historian knows that every single specimen represents billions of years' worth of history and cannot, unlike archaeological artefacts and works on paper, be physically reconstructed or artificed yet natural history museums still have relatively poor standing when compared to the rest of the sector. Museologically, natural history museums remain relatively unchanged since the 19th Century and perspectives from the natural history sector aren't forthcoming or marginalised in the museum press. Politically, they do not have the level of support that other museums have locally or nationally as evidenced by the closure of many natural history collections, and the uncontrolled commercial market in illicit natural history material. This is partly because natural history is a hard sell to those in government despite being the most popular with museum visitors. Of the hundred or so MLA designated collections in England, less than 10% are natural history collections (Museums Libraries and Archives, 2011). Of those collections designated most are deemed significant due to associations with renowned naturalists rather than the biological significance of collections although these two facets aren't mutually exclusive. The issues that natural history collections raise are complex, academic and especially with respect to climate change and widespread extinction very poorly explored and depressing to boot. Rearranging stored collections taxonomically would make it easier to demonstrate the significance of natural history collections and the importance of subject specialist curators in terms that are easier to understand to non-specialists. By default, the museum that houses all of the seahorse (*Hippocampus* spp.) specimens will hold the biggest, smallest, rarest, oldest and youngest specimens and include specimens collected by eminent scientists in the past as well as the central repository for new collected material. Such a collection would be of vital importance to biodiversity records globally as well as *the* national collection of those particular taxa. Because museum staff will be better equipped to curate a set collection of a small group, further important discoveries about specimens will be made further justifying the significance of collections. Within taxonomic groups the history of natural history artisanship could be better explored and demonstrated. With a chronological series of stuffed dog specimens or slide mounted sponge spicules it is easier to reconstruct the history of techniques used to prepare specimens, histories which until recently were almost completely unexplored. Very little, for example, is published on how different preservation techniques and materials change the morphology of specimens and organic structures yet morphometric work continues apace without reference to possible post-mortem deformities. It is true that this significance exists today across national collections; however, this innate significance of collections is much harder to express clearly when justifying the existence and staffing of museums is often assessed on much smaller scales. Furthermore, it will be much harder to cut positions in an already stretched sector when that position holds responsibility for national access to a discrete group of organisms.

Comparative anatomy

There is no doubt that currently there are thousands of foxes and badgers misidentified as dogs in natural history collections as well as gorillas filed as chimps and orang-utans, males mistaken for females and mimetic flies misplaced with wasps. To a specialist, the above differences between organisms may seem like obvious differences; however, to a botanist or geologist looking after zoological collections these differences may not be obvious. Similarly, a vertebrate zoologist might be hard pressed to tell a *Dalmanitina* from a *Kloucekia* or pure allochemical sediment from an orthochemical one. This is where the forgotten science of comparative anatomy could help to improve information about specimens and even facilitate the discovery of new intrataxon anatomical differences. Trying to identify material from a narrow selection of comparative material is limiting but with collections organised taxonomically it will be much easier to make reliable comparative identifications as well as having a much smaller group of organisms to work with. The geological and zoological record would also be improved with the potential for discovering specimens that fall outside of published morphologies and described geographical and chronological ranges This information is much harder to discern looking at one specimen in isolation or by having to keep abreast of the latest thought on a variety of biological groups.

Bridging the ancient and the modern

Lastly, a taxonomic redistribution of stored collections enables a better understanding of the relationships between palaeobiological and modern species. Presently there still exist many divisions between work undertaken on fossil specimens, work on archaeological remains and work on modern specimens. There are some workers who work across geological time but there is a tendency for biologists to pay lip service to fossil taxa and for palaeobiologists to work without reference to recent work on modern material. Each discipline has their own professional organisations, separate museums and, as anyone who has worked on fossil and recent groups of birds, horses or humans will know, completely separate frameworks for classifying and categorising material. There are standards available for taxonomic and other information that could be

mined and delivered across the web but as highlighted above there's little consistency across disciplines and the cautious and slow nature of systematic work doesn't meet the day to day demands of systematic collections organisation. Where classifications frameworks have been bought in by museums, they are often a snapshot of a working system that quickly become outdated because they aren't dynamically updated. Furthermore, perhaps an artefact of where funding can be found is that many available systems are comprehensive for extant vertebrates and families of insects but inconsistent for all other groups. By simply grouping modern and ancient taxonomically related groups together, research on relationships between organisms would be a lot easier. As mentioned above, busy researchers may not even think to contact geological museums as well as zoological and botanical museums but if all the material is in the same place it makes it much easier to extend research on ancient material with reference to modern material and research on modern material to consider extinct relatives. Furthermore, taxonomically arranged reference collections would make identification of fragmented and deformed palaeobiological and archaeobiological material much easier rather than just classifying every miscellaneous bone as fish in palaeobiology or horse in archaeology.

DISADVANTAGES TO TAXONOMICALLY REARRANGING STORAGE

There are a number of disadvantages to a taxonomic system of museum-stored collections but for brevity, some of the more obvious ones are briefly considered here. Chiefly, it would be illegal to break up material in many collections. In England, it is law that material does not permanently leave national collections and there will be countless smaller collections which cannot be broken up because of conditions on bequests, donations and founding statutes. A comprehensive survey on the use of stored collection in a variety of museums and collections will no doubt show that the majority of stored collections just aren't used with anywhere near the intensity that requires museums to hold regional collections with possible exceptions of butterfly and bird collections. Aside from the legality, the logistics of rearranging the nation's museums would require decades of work, to define the scope and extent of each taxonomic group, to calculate how much will fit in each museum storage area and orchestrating the physical logistics of transporting millions of specimens. The same process would then have to be undertaken with all of the associated archive material, with virtually every museum requiring copies of every accession register, catalogues and other archival material. Composite fossil specimens, seascapes in spirits and dioramas which have a number of different taxa present within 'one' specimen raise a number of problems, should the specimen be broken up if possible? Alternatively, should the largest or most significant specimen dictate where the specimen should go? Another consideration would be that disasters would be worse than they currently are as a fire or flood could destroy the entire collection of a taxonomic group, excluding material that is on display in museums elsewhere. A counter point to this argument is that a disaster at a large museum would destroy many type specimens across taxa in one go. Moreover valuable material like rhino horn, precious minerals and ivory could be stored in appropriately high security areas rather than every museum having to have expensive strong rooms and other super high secure facilities. Although it happens with decreasing frequency, major taxonomic revisions would require one museum losing material and another museum having to accommodate a new taxonomic group. It may not make sense to break up geological collections, personal collections and local collections as they may be of more use as a unit than separated into their components. Palaeobiologists looking at specific horizons would have to travel to every individual museum with material within the strata they are interested in. Organising rock collections according to their rock type is less useful than the existing situation partly because they are of superior use with associated fossil material and partly because there is a large degree of subjectivity in deciding whether a sandstone is a very lithic greywacke or a slightly matrixy subgreywacke. A survey of the range of enquiries and use of natural history collections would establish to what extent subcollections are used as a whole unit (i.e. geographically or by collector) against research on individual elements (taxonomically). There is also a risk that museums could lose links with the local community, and donors may baulk at discovering that material they collected locally is to travel to a far-flung museum. Similarly, donors may be less than pleased to discover that donated material is destined to linger in stores and barely get used rather than contribute data to a national collection. Lastly, one unfortunate museum would end up with all the material that we currently store in all of **those** boxes, drawers and cupboards labelled 'misc.', 'mixed' and 'to be identified', which as documentation improves would slowly become empty at best or filled with useless by definition material at worst.

Conclusion

This paper began as a relatively simple thought experiment into rethinking the way that natural history museums operate with some consideration for whether museums could or should work towards this arrangement. The benefits to the above arrangement are that collections would be more effectively and efficiently

stored, organised, used and advocated. If natural history museums were to move in this direction then a museum wide survey would need to be undertaken to assess the long term benefits and whether these will every outweigh the initial cost of reorganisation. If it was found that a taxonomic system was beneficial then a multilateral agreement between hundreds of museums and thousands of different stakeholders would be required. The new system would only be most effective if all parties agreed to the arrangement described. This would require changing the law for national museums and such an arrangement may be fundamentally opposed by the founding doctrines of many smaller museums which may make such musings unattainable in the first instance. In the meantime it appears that the fractured nature of natural history collections has not been greatly improved by virtual access and subject specialist expertise as was anticipated leaving objects, museum professionals, and as has been seen with the recession, entire museums at risk.

References

Carnall, M. A. 2010. Google Me a Penguin: Natural History Collections and the Web. *NatSCA News* 19: 60-64.

Datenbank Universitätsmuseen und -sammlungen in Deutschland http://www.universitaetssammlungen.de/ Accessed 2011.

Kendall, G. 2011. Smarter Loans Group Finalises key Principles http://www.museumsassociation.org/news/05052011-smarter-loans-key-principles Accessed 2011.

Museums Libraries and Archives. 20011. *Designated Collections*. http://www.mla.gov.uk/what/raising_standards/~/media/Files/pdf/2011/designation/Designation_List. Accessed 2011.

University Museums Group. 2010. Life Without Air Conditioning. http://www.umg.org.uk/2010/12/17/life-without-air-conditioning/ Accessed 2011.