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## **Living Specimens in England's Natural History Museums: Frequency, Use and Legislation**

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### **Abstract**

Living displays feature prominently in many of England's natural history museums, but what do they add to exhibits? We first take a closer look at the current living displays of three prominent museums: the Oxford University Museum of Natural History, Liverpool World Museum and Horniman Museum, then report the results of a questionnaire taking a more systematic look at the frequency and nature of current live animal displays in our natural history museums as well as curators' perceptions of the benefits (or disadvantages) of their inclusion. Results suggest a variety of attitudes towards living displays and learning outcomes a focus of justifications. Curators also note a number of practical challenges to maintaining living collections and interesting issues are raised with regards to legislation governing living animal collections within museums.

### **Introduction**

To commemorate the 200th birthday of Charles Darwin and the 150th anniversary of Darwin's publication of *On the Origin of Species*, the Natural History Museum in London held a special exhibition titled 'Darwin: Big Idea, Big Exhibition'. The exhibit was filled with artefacts and mementos of Darwin's life and expeditions, including Darwin's own specimens and notebooks, as well as modern perspectives on the significance of evolutionary theory. Nestled among these specimens and anecdotes of Darwin's journeys were two living specimens, housed in large glass terrariums that were not unlike the glass cabinets containing other mementos and artefacts from the voyage.

The two animals were 'Charlie', a green iguana, *Iguana iguana* (Linnaeus, 1758) and an unnamed Argentine horned frog, *Ceratophrys ornata* (Bell, 1843). Both are species that are extremely common in the pet trade, and which hold rather tenuous links to Darwin himself. While the non-living specimens on display and journal pages were items that passed through the very hands of Darwin, neither living animal was descended from an animal that had interacted with the celebrated naturalist. Yet both of these living displays occupied central positions within the exhibit and featured prominently in the press release advertising the exhibit (NHM, 2008a), with 'Charlie' even appearing as the very first image in a slideshow on the official website of the exhibition (NHM, 2008b).

As I perused the exhibition, I wondered what incorporating these living displays added to the exhibition. But where I had my doubts, others celebrated the presence of real, live animals:

"What an exhibition can do that is not done better in any other medium is to show *real things*. The closest this one come to giving an idea of what it was like to be Darwin the field naturalist is to be found in two glass cases: one is inhabited by a rather sinister grey spotted pudding of a horned frog the other by a most green iguana. A small sample, but *seeing these live animals makes you realize that no image on screen or on paper can match them.*" (Campbell, 2009, my emphasis)

Campbell's comments suggest that encountering these live animals heightened the visitor's experience, delivering a level of realism that cannot be accomplished by their non-living counterparts. For me, the presence of these living displays in the exhibit raised a number of interesting questions about their lives in glass cases. Did other visitors react to these living creatures in the same way Campbell had? How can and should live animal displays be used to enhance and compliment a museum's non-living exhibits? While natural history museums are typically collections of non-living plants and animals, we have another word for collections of live animals, zoos. This then begs the question, how does including living animals blur the distinction between zoo and museum? What might their inclusion achieve?

### Living Animal Display Case Studies

A first step to understanding the use and role of living displays in natural history museums is to explore the frequency of live animal exhibits across our nation's museums and to find out more about the motivations and barriers (both practical and legislative) to housing living animals within the museum. To begin to understand the use of living displays by natural history museums, I contacted three prominent English natural history museums that permanently house living specimens alongside non-living natural history collections (the Oxford University Museum of Natural History, Liverpool World Museum and Horniman Museum) to discuss their use of living animal displays. In this section, I will introduce these museums and describe their use of living specimen displays, offering a brief profile of their collections and sharing their curator's perspectives on the role and impact of these living displays.

#### Oxford University Museum of Natural History, Oxford

At the Oxford University Museum of Natural History, the first floor Hope Entomology gallery includes both non-living and living invertebrate displays. Live creatures such as the Madagascar hissing cockroaches, *Gromphadorhina portentosa* (Schaum, 1853), depicted in Fig. 2 are situated beside displays of non-living specimens, including preserved specimens and models, which are organized according to their taxonomy in the vertical display cases and by topics or themes in the flat display cases.

Live specimens are a relatively new introduction at the Oxford museum, where they have only been used in handling sessions for about 10 years. Sarah Lloyd, the museum's education officer, writes that the live arthropod displays are excellent for engaging visitors and extremely useful for illustrating aspects of behaviour that are not readily evident in the more static non-living displays (2009; Aw, 2012). By presenting living displays, the museum also opens a dialogue about their behind the scenes work, allowing museum staff to discuss the work of entomologists at the museum and university, who use a combination of living and preserved specimens in their research.

Lloyd (2009) adds that the living specimens are made more meaningful by the surrounding non-living displays. By presenting living specimens alongside preserved ones, Lloyd argues that the museum situates these specimens in a framework of taxonomy and systematics (2009). The living exhibits are illustrations of the principles and characters described in the taxonomically organized family descriptions. This framework contrasts with the context of similar displays in a zoo environment, where messages are primarily focused on conservation rather than classification.



**Fig. 1:** 'Charlie' the green iguana featured prominently in the Natural History Museum's exhibition 'Darwin: Big Idea, Big Exhibition'. This photo of Charlie was the first image on the museum's slideshow of the exhibition (NHM, 2008b).



**Fig. 2:** Cases housing living invertebrates are interspersed between non-living displays at the Oxford University Museum of Natural History’s entomology gallery.

**World Museum, Liverpool**

At the World Museum in Liverpool, living animal displays make up a more substantial and integral part of the museum, accounting for a far greater proportion of the museum’s exhibition space. The World Museum is home to an entire Natural World wing that includes two dedicated living animal galleries, a ‘Bug House’ and aquarium, in addition to a Natural History Centre, and separate Zoology and Botany galleries. Across the Natural History wing, nearly 10% of the World Museum’s natural history displays include live animals.

These living displays are extremely popular with visitors. Mike Graham, curator of both the living displays and the natural history collection says, “Visitors are more attracted to live animals, especially when we use them in conjunction with the [non-living] collections” (2009). And this attraction is nothing new to the museum. Living animals were first introduced to the museum (then known as the Derby museum) in 1857 through the installation of the aquarium. Following the addition of which, the museum witnessed a vast increase in visitors.

‘During the year, several Aquaria, both salt and fresh water, have been established in the Museum, and have proved of very great interest to the visitors; indeed there is good reason to suppose that it is mainly to the new additions to the Museum that the number of visitors has been so much in advance of previous years’ (Library and Museum Committee Minutes November 1855-September 1858, 5, cited by Graham, 2009).



**Fig. 3:** A demonstrator holds a crab. Photograph by Leila Romaya and Paul McCann via the National Museums Liverpool (2011).



**Fig. 4:** A close encounter with a meerkat at the World Museum during National Science Week. Photo by Gavin Trafford (Liverpool Echo, 2011).

Today, the Natural World wing attempts to bring all aspects of the Natural History wing together, to communicate the overarching message that individuals and species do not occur individually, but together in ecosystems. Likewise, the museum itself strives to integrate its displays into a broader learning environment, working closely with school groups, families and the national curriculum to incorporate demonstrations with live animals to explain the nature of their unique adaptations and environments.

**The Horniman Museum, London**



**Fig. 5:** The Horniman Museum's Natural History Gallery viewed from the first floor as reproduced from Horniman Museum (2011a).

The Horniman museum was founded by tea trader, Frederick Horniman, in the hope of creating a place for the people of London to use for recreation, instruction and enjoyment. Living displays feature prominently at the museum and help the museum achieve all of these aims. The Horniman Museum in London houses both a natural history collection and an aquarium. As at the World Museum in Liverpool, living specimens have played a prominent role in the museum throughout its history as well as today. At the Horniman, living specimens have been incorporated into the museum's displays for over 100 years, dating back at least to the opening of the museum at its current location (the Charles Harrison Townsend building) in 1901.



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**Fig. 6:** The aquarium at the Horniman Museum. Photo courtesy of the Horniman Museum (2011b).

The Horniman’s few hundred aquarium specimens and ‘Nature Base’ animals are dwarfed by the nearly 4,000 natural history specimens on display, but nonetheless feature prominently in the museum. In fact, according to the head of development and marketing at the museum, Marcus Pugh, the aquarium is the most popular wing of the museum, with 82% of all visitors frequenting this section. The Natural History gallery, which includes the Nature Base attracts 64% of all visitors (Pugh, 2009).



**Fig. 7:** A child explores a fox specimen at the Horniman Museum’s Nature Base. Photo as reproduced from News Shopper (2009).

According to the Keeper of Natural History, Joanne Hatton, the living displays provide both “education and enjoyment, both [of which] contribute to achieving our mission of inspiring and engaging wonder and stimulating interest in nature and the environment both from a local but also a global perspective” (2009). Hatton adds that housing both living and non-living displays in the museums allows the two display types to complement and enhance each other. For while live displays can introduce aspects of behaviour that cannot easily be replicated in non living displays, they do not always foster the same opportunities for up close and personal encounters as taxidermy. Indeed, at the Nature Base corner, the famous Horniman beetles were

nowhere to be found and I was told by an apologetic member of staff that the beetles unfortunately “took Sundays off” by hiding; and only the very luckiest of visitors manage to catch a glimpse of the cryptic and secretive harvest mice. In contrast, the natural history museum’s collection of exquisitely dissected preserved collections offer cross sections and images of anatomy and development one could never glimpse in life and are always prominently visible to visitors.

### **Conclusions**

All of the curators working with live animal displays in these three museums conveyed extremely positive sentiments towards their living displays, describing their inclusion as enhancing the museum experience and providing meaningful encounters for museum visitors. Likewise, the living displays are also extremely popular at all three locations. Despite varying histories of life across the museums, all three institutions pointed to similar benefits of housing both living and non-living exhibits together and all three institutions cite education as the primary reason for holding live animal collections (Graham, 2009; Hatton, 2009; Lloyd, 2009).

### **Living Animal Display Questionnaire**

Discussions with the curators at the above institutions begins to offer some insight into living animal displays, but to better understand the role of living displays across natural history museums, I wanted to take a more structured look at our museums and their displays by issuing a questionnaire about the use of live animals in the museum and get a better sense of the prevalence of living displays across the country. The following questionnaire attempts to get a glimpse of the frequency of live animal displays across natural history museums and to discover more about both the positive and negative aspects of museums housing living animals as well as investigate the practicalities and legislation concerning life within the museum.

### **Methods**

#### ***Participants***

To better understand how widespread living animal displays are in English Natural History Museums, I designed a questionnaire (see Appendix 2 or <http://216.75.9.33/questionnaire>) to find out more about both the displays museums currently house as well as their attitudes toward living displays and their motivations for and against housing live animals in the museum. I identified 25 museums with Natural History collections (see Appendix 1).

#### ***Distribution***

Questionnaires were distributed to curators through an email sent directly to the curator (where a direct email addresses were provided) or addressed to the natural history curator via the general enquiries desk. My message introduced myself and the project and contained a hyperlink to an online questionnaire, which could be supplemented by a paper copy and self-addressed stamped envelope by request.

#### ***Results***

Of the 25 museums contacted, only 10 responded. Nine of these institutions responded electronically and one museum responded by post. The responding institutions are marked with an asterisk in Appendix 1.

#### ***Frequency of Living Displays***

Of the 10 responding museums, 5 held live animal displays at the time of responding and all of these living displays were maintained alongside non-living exhibits (i.e. in the same gallery). Of those institutions which did not house living displays at the time of responding, all 5 reported having done so in the past.

This raises a serious concern when considering this data. It is quite surprising that all of the responding museums currently or had previously held living displays. The introductory email to the questionnaire clearly requested responses from all museums whether or not they had ever housed living displays. It is unclear whether the present result of all museums having experience with housing live animals is an artefact of response bias, or actually representative of natural history museums across the country.

#### ***Types of Living Displays***

Of the living animals on display, terrestrial invertebrates were the most frequently housed. These were present in 4 of the 5 museums (Table 1).

Aquatic Invertebrates	1
Terrestrial Invertebrates	4
Aquatic Vertebrates	1
Reptiles & Amphibians	1
Birds	0
Mammals	1

**Table 1:** Museums reporting housing these taxa among their current living displays. A total of 5 responding museums housed live animals, thus all but one had terrestrial invertebrates among their living displays.

Interestingly, none of the museums housed any living birds. Among museums which housed live animals at the time of responding, the mean number of live animal displays was 8.5 (range: 1 to 19) with a mean number of 30.3 species (range: 1-151). The number of individual animals ranged widely from 40 to the thousands for many institutions. The count of individuals was highly skewed by the inclusion of large colonies of social insect, with many institutions housing bee and ant colonies.

**Justification and Motives**

Education was seen as a primary reason for including living displays and was cited as the most important reason for including live animals by three of the five institutions. However, two institutions instead regarded entertainment as the most important feature of living displays. Interactivity was seen as the second most important benefit of these displays by three curators. Other reasons cited included engagement, conservation and use in the museum’s outreach programmes.

Five of the museums had previously housed live animals, but no longer did so. Their reasons for not continuing to house live animals were primarily related to the maintenance of the animals, with many unable to afford the time and money associated with maintaining the displays and providing care for the animals. The curator of the Booth Museum reported many challenges in maintaining a freshwater aquarium and went so far as to say that their living fish display was therefore deemed ‘inappropriate for a museum’.

Interestingly, one institution, the Potteries Museum in Stoke-on-Trent, described an alternative way of providing encounters with live animals. As the museum was unable to afford the high maintenance costs of living specimens, they outsourced activities involving living specimens to external companies for events during school holidays. These companies provide hands-on interaction with a wide array of species and cater to school groups, museums, care homes, and a wide range of events. For more details about these animal handling companies, see *Animals in Hands* (2011) and *ZooLab* (2011). Although these companies emphasize the educational aspect of their encounters, including themed lesson plans and ties to the national curriculum, these handling sessions were seen by the museum staff to be more entertaining than educational experiences.

**Animal Care**

Primary care of living specimens was attributed mainly to curators with no specialist animal care training. In museums where bees were housed, these colonies were maintained with assistance from local bee keepers; only the Horniman Aquarium described use of specialist animal care staff. Although the Nottingham Natural History Museum’s Museum Assistants created a rota system by forming an ‘Insect Team’ to care for the animals, animal care was not a primary duty for any of these assistants.

**Acquisition and Exchange**

In response to questions about the origin of their animals, the majority cited sourcing specimens from captive breeders. The three institutions which housed bee colonies had acquired their colonies from local bee keepers. Petting zoos and safari parks were also cited as sources of live animals. Only the Horniman aquarium referenced programmes to exchange animals with other institutions and only 2 of the 5 museums reported that their living animals were part of captive breeding programs.

**Funding Care**

Specimens were financially supported from a wide range of sources. Most museums did not have funding specifically for the living displays and relied on funds taken from the museum’s maintenance budget, specific museum departments, or the council’s revenue budgets. However, some museums reported that provisioning for the displays was provided by the Higher Education Funding Council for England (HEFCE), a



Heritage Lottery Fund (HLF) grant and funding from the Department for Culture, Media and Sport (DCMS).

### ***Regulation and Legislation***

Two of the museums reported being regulated by the Department for Environment, Food and Rural Affairs (DEFRA) under the Zoo Licensing Act (1981). The other three museums reported that their collections were unregulated.

### ***Discussion***

Although only 10 of the 25 contacted institutions completed the questionnaire, their responses capture some of the important benefits and drawbacks to keeping living animals in the museum. Some curators expressed strong positive views about living displays, while others expressed disapproval, dismissing living displays as minimally educational entertainment. Interestingly, several curators of institutions which both did and did not house living specimens pointed to their educational value, which raises interesting questions about the difference between living and nonliving specimens in achieving learning outcomes.

### ***General Discussion***

Taking together the case studies and feedback from the questionnaire, we can begin to understand some of the perceived benefits and barriers to housing living animal displays within natural history museums. The importance of living displays as tools in learning and education are repeatedly cited as motivations for including these displays and may reflect the renewed focus on learning and inspiration in museums (as demonstrated by a number of new initiatives by museum governing bodies including, Inspiring Learning for All by the Museum, Libraries and Archives Council in 2004 and outlining of Generic Learning Outcomes by the Research Council of Museums and Galleries). But what evidence do we have for the role of living animal displays in learning and education?

### ***Live Animals in Education***

Although little research has been published on learning outcomes of live animal encounters, the few studies that have been conducted do suggest that interacting with living creatures may facilitate learning. The mere presence of living displays in the classroom has been shown to stimulate a greater degree of interest and curiosity in students; and this curiosity in turn influences attitudes towards learning and achievement (Saunders and Young, 1985); and students who had interacted with live animals show statistically greater changes in their attitudes toward these creatures than students who interacted with preserved specimens of the same species (Sherwood, Rallis and Stone, 1989).

Within a zoo or museum context, living and preserved specimens do stimulate broadly similar conversations among visitors, but as one might expect, comments about the behaviour of animals occurred with greater frequency in the zoo than museum (Tunncliffe, 1995, 1996a, 1996b; Tunncliffe, Lucas and Osborne, 1997). Although living specimens were not present in the museum, Tunncliffe's research suggests that bringing live animals together with static specimens of the same or contrasting species with salient non-living displays might enhance learning by both attracting visitors and directing their attention to some of the less-evident, but interesting animal characteristics, they might otherwise overlook and providing an opportunity for visitors to observe the behaviour of the animals as well (Tunncliffe, Lucas and Osborne, 1997). Our natural history museums would be in an ideal position to showcase living and non-living specimens together and this type of facilitation of learning by situating living and nonliving displays together does appear to occur in many of the responding institutions.

### ***Legislation Governing Live Animal Displays***

Although many practical issues regarding the care of living animal displays were raised, few curators expressed awareness of the legislation governing such exhibits. Responses to the final questionnaire item regarding legislation were very interesting. The fact that only three of the 5 museums which reported holding live animal collections are regulated is quite a surprise, as the living specimens housed by museums seem quite clearly to fall under the category of 'zoo' according to the Zoo Licensing Act (1981). The act requires institutions not only to provision all of their animals with suitable environments with highest standards of animal husbandry, but also to participate in conservation measures and actively promote public education. In addition to these requirements, more specific guidelines can be found in DEFRA's Standards of Modern Zoo Practice (DEFRA, 2004).

The act, though issued by DEFRA leaves implementation and regulation in the hands of local authorities and regulation consists of inspections which include, but are not limited to visits from inspectors and veterinarians. However, the efficacy and consistency of such enforcement has fallen under question and DEFRA has recently commissioned ADAS to conduct a thorough review of the implementation of the Act by local authorities (DEFRA, 2011).

The fact that three of the museums described their living collections as unregulated is surprising when one explores the text of the act, as the living displays of the museum seem to fall unambiguously into the document's definition of a zoo. DEFRA's Zoo Licensing Act 1981 defines a 'zoo' as:

“an establishment where wild animals (as defined by section 21) are kept for exhibition to the public otherwise than for the purpose of a circus (as so defined) and otherwise than in a pet shop (as so defined)”. (1.2)

This definition is further clarified in Section 21:

“‘animals’ means animals of the classes Mammalia, Aves, Reptilia, Amphibia, Pisces and Insecta and any other multi cellular organism that is not a plant or a fungus and  
 ‘wild animals’ means animals not normally domesticated in Great Britain;  
 ‘circus’ means a place where animals are kept or introduced wholly or mainly for the purpose of performing tricks or manoeuvres at that place;  
 ‘pet shop’ means premises for whose keeping as a pet shop a licence is in force, or is required, under the Pet Animals Act 1951.” (21.1)

By these definitions, any living displays housed in museums would be classed as a 'zoo'. The legislation applies to any zoo “to which members of the public have access, with or without charge for admission, on seven days or more in any period of twelve consecutive months” (1.2A). This again is a category into which almost all museums would fall. More detailed interpretation of section 1.2 of the Zoo Licensing Act have also been outlined by the Zoo Forum (2006), but these too, clearly point to any living specimens in the museum as to be classified under the heading 'zoo'. Thus it seems rather surprising that not all of the museum's living collections were reported as DEFRA regulated. However, ultimately, according to DEFRA Zoos Policy member Margaret Finn, the classification of an institution as a 'zoo' falls upon the local authorities (Finn, 2011).

Discussions with curators of natural history museums housing living animal displays and a questionnaire issued to natural history collections across England have generated a number of interesting questions regarding the use of living animal displays in the museum context. Unfortunately, given the small number of responding museums, and the fact that all of the responding museums currently or had previously housed live animals, it seems likely that the questionnaire has suffered from a considerable response bias, making it difficult to make generalizations beyond the responding institutions. However, it is also possible that these responses do reflect the situation of the non-responding museums. Nonetheless, the results presented here, taken together with curators' comments begin to show us the role of living displays from a curator's perspective and begin to paint a picture of the frequency and use of living displays across the country. It would be fascinating to accomplish a more comprehensive review of current practices and see how these figures and attitudes compare to those in other countries and explore the visitor's perspective on these displays, as the present discussions explore only the curatorial perspective. The relationship between living animal displays and their nonliving surrounds is also an area ripe for further research as the ways in which such displays are integrated and interpreted will certainly influence their effectiveness in achieving learning outcomes and attractive audiences.

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**Appendix 1: List of English Natural History Museums contacted and responding to the questionnaire. Institutions marked with an asterisk are those which responded to the questionnaire.**

Bagshaw Museum, Batley

Booth Museum of Natural History, Brighton\*

Bristol City Museum and Art Gallery, Bristol

Buxton Museum & Art Gallery, Buxton

Charnwood Museum, Loughborough, Leicestershire\*

Chelmsford Museum, Chelmsford\*

Cole Museum of Zoology, Reading

Dorman Museum, Linthorpe

Hancock Museum, Newcastle upon Tyne

Horniman Museum, London\*

Ipswich Museum, Ipswich

Kendal Museum, Kendal

Lapworth Museum of Geology, University of Birmingham, Edgbaston

Manchester Museum, Manchester\*

Museum of Lancashire, Lancashire

Natural History Museum, London

Natural History Museum at Tring, Tring

Oxford University Museum of Natural History, Oxford\*

Potteries Museum & Art Gallery, Stoke-on-Trent\*

Royal Cornwall Museum, Truro

Tolson Museum, Huddersfield\*

University Museum of Zoology Cambridge, University of Cambridge, Cambridge

Wollaton Hall Natural History Museum, Nottingham\*

World Museum Liverpool, Liverpool

Yorkshire Museum, York\*

\*denote museums that responded to the curator questionnaire found in Appendix 2

**Appendix 2: Living Animal Display Questionnaire in paper form. The online version can be viewed at <http://216.75.9.93/questionnaire>.**

### Live Displays in UK Zoos and Museums

Name:

Institution:

Position:

Does your institutions house live animals as parts of its displays?

- Yes
- No (if no, please skip to question 11)

Are these housed alongside non-living exhibits (i.e. in the same room/gallery space)?

- Yes
- No

What types of live animals do your living displays include? (Check all that apply)

- Aquatic Invertebrates (e.g. crustaceans)
- Terrestrial Invertebrates (e.g. insects, arachnids)
- Aquatic Vertebrates (e.g. fish)
- Reptiles/Amphibians
- Birds
- Mammals

How many living displays does your exhibit include?

- Exhibits
- Species
- Individuals

Who take primary responsibility for the care and husbandry of these animals?

Are these animals part of captive breeding programmes?

- Yes
- No

How/from where were specimens acquired?

How are your living specimens financially supported? (e.g. adoption scheme/sponsorship, admission fees, etc)

Who regulates the living conditions and care of these specimens? (e.g. UK Home Office, AZA)

What do you consider to be the primary role of living specimen exhibits? (Please rank all that apply)

- Education
- Conservation
- Entertainment
- Interactivity
- Outreach
- Other

If your institution does not house live specimens, has it does so in the past? Describe any reasons you/your institution would or would not include living displays in your exhibits.