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Is there a viable future for herbaria in British Museums?

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In one word the answer is yes.

I arrived at this conclusion after studying six herbaria in Britain, ranging in size from two thousand specimens that could be accommodated on two shelves of a cupboard to collections approaching three quarters of a million specimens and requiring considerably more shelving. A variety of museums containing herbarium collections were visited for the purposes of this study: local authority: Bolton Museum and Archive and Southend Museums Service; university: Manchester Museum; national provincial: World Museum Liverpool; independent: Haslemere Educational Museum, and of course my own place of work, the Royal Horticultural Society's herbarium at Wisley.

What prompted me to investigate herbaria in British museums? One reason was that, although I work in a herbarium, the RHS is not strictly a museum and I was curious to see how herbaria were accommodated and used in the context of a museum. Were they visible? Were they active? Were they acknowledged within the museum itself? Were they in jeopardy and from what sources?

Nymphaea 'Director G.T. Moore'. (Image Copyright RHS Herbarium)

Another factor which spurred my curiosity was a seeming lack of coverage in the museums' press regarding herbaria in British museums. It is almost a subject without a literature. As long ago as 1954 Harry Stansfield, the then Keeper of Botany at Liverpool Public Museums, referred to herbaria as the 'Cinderella of the natural sciences collections' (Stansfield, 1954), and it has been stated that botany 'occupies in general a very subordinate position in British museums' (Hyde, 1945). My aim is to show that Cinderella deserves to go to the ball. As Linnaeus said, 'A herbarium is better than any illustration; every botanist should make one' (Staflen, 1971).

The fact that herbaria are not intended for display sets them apart from other museum objects in the most obvious of ways. Leander Wolstenholme (2006) more recently commented in *NatSCA News* on the difficulties of displaying the 'undisplayable.' His conclusions were supported in a subsequent article by Julia Tanner (2006). This lack of visibility was one of the concerns raised by the 1987 *Biological Collections UK* report, which also highlighted historical neglect, a lack of curatorial expertise and public unawareness as threats facing the herbarium (Williams 1987). The second part of this paper will look at the various ways in which the selected museums have tackled these challenges.

But before looking at the current state of herbaria in British museums, I would like to start by attempting a definition of the term 'herbarium'; this will be followed by a brief history of herbaria. According to the Oxford English Dictionary, a herbarium is 'a collection of dried plants systematically arranged. Also a book or case contrived for keeping such a collection; the room or building in which it is kept' (Simposon and Weiner, 1989). The original and highly appropriate name for a herbarium was *hortus siccus*, a dried garden. A herbarium, therefore, is a collection of dried, pressed plants, mounted on paper, on loose sheets or in a bound volume and which may be systematically arranged.

What function does the herbarium perform? Traditionally herbaria performed a reference function, as they still do today. They provided the catalogue and identity of the flora of an area and were and still are used to write field guides or manuals to aide in the identification of plants. For example, the Holmesdale Natural History Society has collections made by J.A. Brewer, including many plants cited in his *Flora of Reigate* (1856) and *Flora of Surrey* (1863). Thus the herbarium is an archive that supports the science of plant taxonomy, that is the science that finds, describes, classifies, identifies, and names plants.

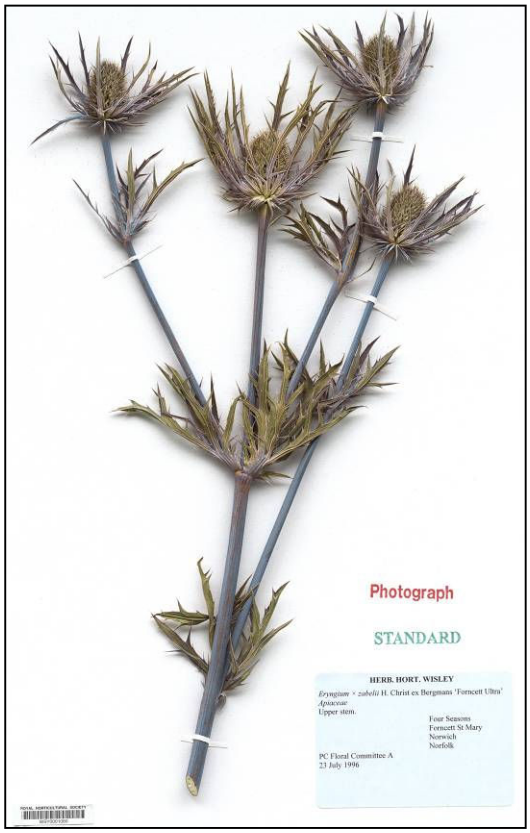
Callistemon rigidus. (Image Copyright RHS Herbarium)

In addition to its traditional role as a reference tool for botanists, the herbarium is increasingly being used by historians, artists, and garden designers. For example, garden designer Lizzie Tulip has been researching the herbarium of Florence Nightingale, the Stovin herbarium, at Middlesbrough Museums & Galleries to coincide with the centenary of Florence Nightingale's death in 2010[1].

Past

Herbaria have been in existence for hundreds of years. The first herbarium is reputedly to be that of the Italian naturalist, Professor Luca Ghini (1490-1556), who was the first director of the botanical garden at Pisa. He is reported to have collected three hundred specimens and preserved them on paper for the purpose of identification. Ghini introduced 'probably for the first time the technique of pressing and drying plants which could then be attached to cards and filed as a source of reference more reliable than an illustration' (Keller, 1972). Thus botanical study could now be conducted all the year round by consulting a collection of dried plants. Ghini also established the practice of field trips as a standard part of the students' training.

In 1530s Italy, at places like Pisa and Padua, it is medicine that is the driving force behind the establishment of herbarium collections; students were taught about the healing properties of plants, animals, and minerals. Unsurprisingly then, the greatest sixteenth century herbalists were physicians. Thus we find the business of self-preservation, and the preservation of the natural world, intimately bound up.



Nomenclatural Standard for *Eryngium x zabelii* 'Forncett Ultra' (Image copyright RHS Herbarium).

In England the Apothecaries Act of 1815 required all medical students to take an examination in herbal knowledge if they wished to practice as licensed practitioners. Not only were botanists and medical practitioners collecting and amassing their own private herbaria, but people from all walks of life, from local worthies to factory workers, were keen to get out and collect plant specimens for their own herbaria. For example, the wealthy businessmen Charles Bailey and Cosmo Melvill, as well as Leopold Hartly Grindon, who was a working class man, all ultimately came to donate their collections to the Manchester Museum.

The mid nineteenth century also saw an explosion in the formation of local botanical societies, which were the origins of many herbaria found in museums today. All the museums in this study were founded in the nineteenth century. Many local floras were also published in the nineteenth century, and Webb and Colman's *Flora Hertfordiensis* of 1848 was described by Dony as being 'as much verse as botany'[2]. This comment evokes the 1870's herbarium collection of a Miss Lightfoot, which is housed at Haslemere Educational Museum, and in which every pressed plant is accompanied by a poem (Fig. 1.).

Fig. 1. A page from the herbarium of Miss Lightfoot (1870's) (Image reproduced courtesy of Haslemere Museum).

It must be admitted that not everybody has been enthusiastic about herbaria: in the twentieth century the esteemed C.D. Darlington, Professor of Botany at Oxford, believed that herbarium specimens should be burned!

Present

After this rather brief and selective tour of the past I would like to return to the present. I found museums and their curators who cared for their collections and indeed were devoted to them. I have chosen three broad themes to illustrate the various ways in which herbaria are playing an active role in the life of the contemporary museum. The themes chosen are: scientific function; display; new developments.

Scientific Function

There was plenty of evidence that the herbaria in this study retained a scientific function.
This was certainly the case at the Royal Horticultural Society's Garden at Wisley which houses a collection of approximately eighty thousand specimens. In 1964 the Council of the RHS decided to formalise the remit of the RHS Herbarium by declaring it to be a dedicated horticultural herbarium. As one of the world's few specialist horticultural herbaria, Wisley is a vital horticultural reference tool for both RHS botanists (who use it daily) and visiting researchers (Fig 2).

Fig. 2. RHS Herbarium, at Wisley (Image copyright RHS Herbarium).

Despite being small, compared with Kew's six to seven million specimens, Wisley does have an international reputation, especially when it comes to the practice of maintaining nomenclatural standards[3]. These are the equivalent of type specimens, but for named cultivars (cultivated varieties). A nomenclatural standard is the herbarium specimen or illustration of a cultivar which forms a permanent record of the distinguishing characteristics of that cultivar (Fig. 3). Whilst the concept of standard specimens was first proposed in 1959 it was only in 1998 that the practice of designating standards really took off as far as the RHS was concerned with the appointment of one full-time member of staff dedicated to this research project. The RHS Herbarium is the world's foremost institution in this respect. The herbarium has nearly 5,000 nomenclatural standards (Fig. 4).

Another traditional function of the herbarium is that of supporting the publication of a local flora. Botany staff have been working on an updated Wisley Flora to be published in 2010 to mark the centenary of the first Wisley Flora. Voucher specimens have been collected.

Fig. 3. Nomenclatural standard for *Delphinium* (David Mannion). Image Copyright RHS Herbarium.

Fig. 4. Standard portfolio for *Lavandula angustifolia*, 'Hidcote'. The herbarium specimen is the nomenclatural standard. Information on the label give the name, description, location and date of collection.
Supporting information on the portfolio includes; a photographic transparency showing form and colour, features lost when the plant is pressed; first place of publication, in this instance a nursery catalogue and other supporting literature. All standard specimens are put in green-edged folders. (Image copyright RHS Herbarium)

The herbarium at Southend Museums Service is small, comprising some two thousand specimens. There is no dedicated botanist as such but the Museums & Galleries Manager, John Skinner, is a trained botanist, and as he proudly told me David Bellamy was his lecturer at Durham University. The focus of this collection is local (Essex) flora. It is this curator's interest that keeps the Southend herbarium alive and vibrant. He is also a keen lichenologist and mycologist and as such the museum has a good collection of these. The Museums and Galleries Manager has good relationships with the vice county recorder and local botanists who contribute to the herbarium (Figs. 5, 6). The earliest herbarium specimens date to the 1820s and are formed from the collection of Christopher Parsons (1807-1882), a gentleman farmer, who recorded all the common plants of his time. Many of these three hundred and sixty-nine specimens are now agricultural rarities and are of significance for their historical interest such as *Agrostemma githago* corn cockle. The museum has a recreation of a Victorian naturalist's study loosely based on Christopher Parsons (Figs. 7, 8)

Fig. 5. *Colutea* arborescens collected by John Skinner, Southend Museums Service (Image reproduced with permission by John Skinner, Southend Museums Service).

Fig. 6. Recently collected lichens from Southend Museums Service (Image reproduced with permission by John Skinner, Southend Museums Service).

Fig. 7. *Agrostemma githago* - corn cockle, collected by Christopher Parsons, 1825. (Image reproduced with permission by John Skinner, Southend Museums Service)

Fig. 8. A Victorian Naturalist study, Central Museum, Southend. (Image reproduced with permission by John Skinner, Southend Museums Service).

Display

When visited all of the museums studied had herbarium specimens on display in the public galleries. For example, at Manchester herbarium specimens collected in the nineteenth century from Lindow Common were used in 'Lindow Man: A Bog Body Exhibition'. These included sphagnum moss, *Sphagnum cuspidatum* and bog rosemary, *Andromeda polifolia.*

At Bolton Museum the natural history galleries were peppered with invitations to the public to visit the herbarium. Incidentally Bolton Museum's first curator was William Midgeley, who made his first pressing at the precocious age of four.

An interesting and unusual feature at Haslemere Educational Museum is the presence of a flower table, which features numerous examples of living plants. This occupies a prominent position opposite the reception desk, and has been a feature of the museum since 1893 (Figs. 9, 10).

New Developments

All of the museums visited found that artists were being inspired by the herbarium collections. As the editor of *Museum Practice*, Javier Pes (2007) comments, 'Artists' interventions are all the rage, especially in non-art museums.'

A novel and imaginative way in which the work of the herbarium has been brought to a wider audience has been through the appointment of an artist in residence in the Liverpool Botanical Collection. Jyll Bradley's appointment has been made possible by Liverpool's status as European Capital of Culture in 2008.

Bradley's work is, as she states, 'often concerned with 'worlds' that are going through difficult periods of self-reflection. These are places and institutions which superficially seem outmoded, but which in fact are very much alive, albeit desirous of re-invention' (Bradley, 2008). The Fragrant Project, as the artist entitles her on-going work with plants, is interdisciplinary, mixed media and site specific (*Ibid*). Bradley sees Liverpool's botanical history as one of dispersal, given that the collections (herbarium, library and garden) have been dispersed and are now in three separate locations. The artist felt that the herbarium was the dried memory of the original garden. She perceived that through herbarium specimens a direct link to the past may be established via connections made with human handwriting and the plant. Each sheet is a story waiting to be told[4].

Fig. 9. The early twentieth century flower table, Haslemere Museum,, A Victorian Naturalist study, Central Museum, Southend. (Image reproduced with permission by Haslemere Museums Service).

Fig. 9. The flower table at Haslemere Museum. (Image reproduced with permission by Haslemere Museums Service).

There is no doubt that Bradley's work has raised the profile of the collections at Liverpool[5]. People are now forming links between the dried and living gardens: for the very first time gardeners from the Liverpool Corporation have been to the herbarium. A major product of the residency was the show garden, 'Mr Roscoe's Garden', which won a silver medal at the Royal Horticultural Society's Chelsea Flower Show in 2008 (Fig. 11). The garden celebrated the life and work of William Roscoe, founder of Liverpool's botanic garden, and the plants came from the Liverpool Botanic Gardens collection. Several herbarium specimens were also included in the display. After leaving Chelsea, the garden gained yet a wider audience by touring to the Bluecoat (an art gallery in Liverpool), and then the Tatton and Southport flower shows.

Fig. 11. Mr Roscoe's Garden, RHS Chelsea Flower Show, 2008.. (Image copyright, RHS shows).

The culmination of Bradley's work was the publication of a book on her research, and also an installation entitled, 'The Botanic Garden' held at the Walker Art Gallery, Liverpool (Fig. 12). This installation consisted of five large panoramic images, the recreation of a virtual garden. One of the images shows herbarium staff preparing herbarium specimens. The artist likens the images to gardens of the mind (*Ibid*).

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Manchester Museum has had a research programme with Arts Council funding for artists, the Alchemy Project, which has given artists access to the museum's and university's collections, 'placing particular emphasis on the articulation of research and the creation of new work' (Bond, 2008). As Leander Wolstenholme (2008) says, 'We have more artists coming in than we do botanical researchers.' This was demonstrated by the fact that on the day I visited two artists were working with the collections, but no scientists.

One of these artists was Gaenor Deacon (Fig. 13). In addition to pencil drawings of herbarium specimens selected by the curator, she also wrote a blog about her activities in the herbarium. She tells how she stood outside the herbarium on the Oxford Road, taking photographs and handed out hand made invitations to the

munity one step further by physically presenting the public with an invitation to the herbarium. Perhaps I am fulfilling the collecting process by collecting people to visit the herbarium.' Sadly, she found that the term herbarium was not understood, and that people simply did not know what it was or what it did. Although nobody took up the offer of visiting the herbarium at such short notice the herbarium is certainly accessible and welcomes visitors (Fig. 14.).

Fig. 12. *The Botanic* Garden, The Herbarium, World Liverpool Museum. Assistant Curator, Wendy Atkinson, and Colelctions Manager Donna Young, make a pressing of *Cymbidium.* (Image reproduced with permission).

Fig. 13. *Helleborus* foetidus drawn by Gaenor Deacon, August 2008. . (Image courtesy of Rebecca Chesney).

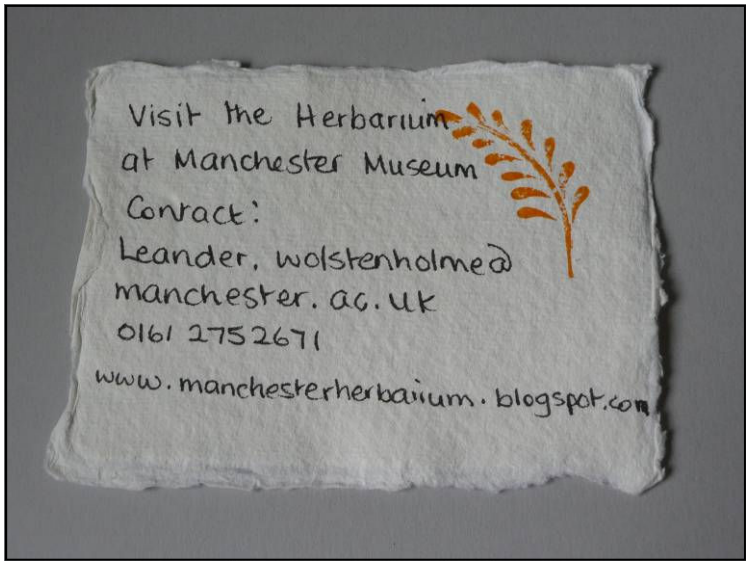

Fig. 14. Handmade invitation by Gaenor Deacon, to the herbarium, Manchester Museum.. (Image reproduced with permission by Gaenor Deacon).

Patricia Francis at Bolton Museum finds informal learning sessions involving groups with no botanical knowledge or notion of what a herbarium is to be an effective way of promoting the herbarium. She finds that in these sessions it is helpful to approach the subject of collections from a social history perspective i.e. the people behind the collections and the times in which they lived, rather than from a purely plant perspective (Fig. 15). For example, a herbarium specimen is rendered far more interesting if we learn that it was collected by a local shoemaker; where and how did he live, and what happened to him?

Fig. 15. Using the herbarium at Bolton Museums & Archives (Image reproduced with permission by Bolton Museums & Archives).

A further development is the significance herbaria can play in the study and observation of climate change. As the Keeper of the Herbarium at the British Museum (Natural History) has recently said:

> 'We used to think of British botany as something that was pretty much done and dusted, but now with climate change these [herbarium specimens] are becoming incredibly important. Among other things they offer an invaluable time series. You can mine them for flowering cycles, carbon content, density of stomata on leaves which changes according to the amount of CO2 in the air - all of that.' (Adams, 2008)

As Miller-Rushing *et al* (2006) concluded, 'Analysis of such collections [herbaria] should dramatically increase our understanding of how climate change affects biological systems at many previously unexamined localities and for a wide range of species.' A plant flowering significantly earlier or later than in the past might well point to climate change but this change can only be observed if there is a record of the past. For example Karen Robbirt, comments that the estimated 2.5 billion herbaria specimens worldwide is 'a largely untapped resource at present, but one which may prove invaluable to conservation science' (Robbirt, Roberts and Davy, 2008). Robbirt's PhD study 'aims to evaluate the long-term changes in flowering time over a period of more than 200 hundred years for a range of species of British orchid, based on more than 2000 herbarium records'[6]. So far analysis of such herbarium data is suggesting that some orchids are flowering significantly earlier[7]. With ever-increasing concerns about the effects of climate change the role of the herbarium has never been more relevant (Fig. 16).

Of course effective acquisitions policies are crucial if herbaria are to continue recording environmental change. Several of the museums visited had labyrinthine acquisition policies, making additions to the collections extremely difficult. This is obviously a concern.

Attitudes towards specimen collection are still ambivalent, being seen both as quaintly old-fashioned and destructive. However, as Clive Stace (2001) reassures, 'only a small part of the plant is needed for diagnostic purposes, and rarely are underground parts essential.' Herbarium specimens provide a vital record of plant identity and distribution over a period of time, and act a bit like an electronic tag in the modern criminal justice system: what is the plant, where has it been, and where is it now.

The military orchid (*Orchis militaris*) is a good example of the importance of curating herbarium specimens (Fig. 17). It was recorded in old floras as occurring in Kent but the majority of modern floras dismissed these records as misidentified lady orchids. However, the Bolton herbarium has a specimen of this rare plant from Kent, what turns out to be the first Kent record, spotted by Patricia and verified by Francis Rose. It dates from 1836 and is a Joseph Woods specimen. 'Checking identifications and distribution data against museum collections', Pettitt (1994) argues, 'is essential for groups that present difficulty in identification.'

Fig. 16. Herbarium specimen of *Orchis mascula*, held at the Royal Botanic Gardens, Kew. Collector R. Graham, 1839. (Image Copyright, the Board of Trustees of the Royal Botanic Gardens, Kew. Image reproduced with permission).

Fig. 17. *Orchis militaris*, the military orchid at Bolton Museums & Archives (Reproduced with permission by Bolton Museums & Archives)

The use of information technology and the digitisation of samples to provide online information is a development which can surely only become more prominent in the future.
The Botanical Collection Managers Group which represents herbaria for UK and Ireland uses virtual volunteers to record entire herbarium collections of herbaria in museums and universities by entering data from labels on digital images of specimens posted onto a website. A pilot scheme was run by the herbarium at Manchester Museum. To date, over thirty-seven thousand herbarium sheets have been transcribed online. Suzanne Keene puts it succinctly in her presentation 'Collections; Treasure or Trash':

> 'the most important development is making available online a complete inventory of what a museum holds. This is fundamental to letting the public know what the museum holds, on their behalf, and to many or most of the other uses of collections.' (Keene, 2008, in Treasure or Trash?)

All six institutions recognised the increasing importance of the internet as a tool for promoting and enhancing collections. Suzanne Keene again: 'The most common request from users (including museum professionals themselves, organising exhibition, loans, etc.) was for collections information, preferably an object-by-object catalogue, to be available online. By far the most users would prefer to find out what was in collections via online listing or catalogues' (Keene, 2008. Collections for the people.).

Visitors to Bolton Museum's website have been encouraged to submit records of their own observations of local flora and fauna which will help in the conservation of a species or site. The internet can also play a vital role in bringing to the public all collections which are not normally on display, in this instance the herbarium.

Future

So is there a viable future for herbaria in British museums? On the evidence presented the answer is a resounding yes.

All the museums investigated are using innovative and imaginative ways to promote their respective herbaria and bring their botanical collections to a wider audience. Looking at the social history behind a herbarium specimen has proved a good way of getting people interested, and perhaps rendered the subject of the *hortus siccus* (dried garden) a little less dry. Stimulating the natural curiosity of children is a challenge which the museums in this study have also met; this is obviously a prerequisite for the viable future of anything, including herbaria in British museums. Both Bolton and Haslemere museums use imaginative ways to involve children. At Bolton primary school children conducted an ecological project in which they examined the Thomas Greenlees collection (Fig. 18). This project won the National 2007 Rolls-Royce Science Prize. At Haslemere a more hands-on approach was adopted involving garden backpacks containing a flower identification sheet and magnifying glass. he internet is also proving an increasingly valuable tool, enabling the public not only to access the herbarium collections, but also to interact with them in ways such as cataloguing. The internet may well be the solution to the problem of 'displaying the undisplayable'; it is certainly bringing the contents of the herbarium to a wider audience.

Fig. 18. Patricia Francis, Curator of Natural Sciences showing how botany can work with children, in this example, using the Thomas Greenless Collection. (Reproduced with permission by Bolton Museums & Archives)

What has become clear is that, in the future, herbaria must provide more than they did in the past. As the *Collections for the Future* report insists, 'Museums must take steps to ensure that more of their collections are used'[8]. Their traditional role as a reference tool, vital though that still is, is no longer enough by itself. Museums have recognised this and are in a superbly strong position to bring the role of the herbarium to a wider public and by doing so ensure a viable future.

Acknowledgements
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Footnotes

[1] 'This early herbarium should be of major interest to those who study the history of garden plant introductions as many of her [Florence Nightingale's] specimens come direct from the nurseries that were at the forefront of developing suitable strains from wild plants brought into the country by the great plant collectors of the day.' K. Sedman, Senior Curator - Middlesbrough Museums & Galleries, e-mail to RHS Herbarium, 10 June 2008.

[2] J.G. Dony, 'The place of the local flora in the study for the British flora' in *Progress in the Study of British Flora. Being the Report of the Conference held in 1956 by The Botanical Society of the British Isles*, ed. J.E. Lousley (London: The Botanical Society of the British Isles, 1957), 30-39, (p.30). See also D.E. Allen, *The Naturalist in Britain. A Social History*, p. 75 where he lists several books of the 'many thousands that gushed forth from presses … and were selling in their thousands.' Examples given include: Will Cock's *Flora Poetica*, Mrs Mey's *Moral of Flowers* and Miss Twamley's *The Romance of Nature.*

[3] For more information on nomenclatural standards see, D.M. Miller & S.R. Grayer, 'Setting the standard for cultivated plants', *The New Plantsman*, 8:2 (June 2001), 112-126.

[4] J. Bradley, artist, conversation with author, 5 September 2008. She write in her book, *Lilium arboricola*, 'the worlds first known tree-dwelling lily', discovered by Frank Kingdom Ward in Burma on a Liverpool sponsored plant hunting expedition in 1953. It 'caused a sensation and flowered in only two places in England – in Liverpool and at RHS Wisley, being lost to cultivation…It has never been seen since and the only image I have found of it is of the Liverpool flower.' J. Bradley, *Mr Roscoe's Garden*, no page number. The pressing, held in the Natural History Museum, London, was made by the plant hunter's wife, Jean, whom the artist went and visited and showed her the image.

[5] This is an unintended byproduct on the artist's part. The artist's aim was 'to make really good art'. J. Bradley, conversation with author, 5 September 2008.

[6] *Ibid*. Specimens from the herbarium at the Royal Botanic Gardens, Kew, are being consulted for this study.

[7] *Ibid*. See also A. J. Miller-Rushing, *et al.* 'Photographs and herbarium specimens as tools to document phonological changes in response to global warming', p1667. ' In England, plants are flowering as much as a month earlier than they did 50 [years] ago.'

[8] Museums Association, *Making Collections Effective* (London, Museums Association, 2007. p.18. This is a far cry from Professor Weiss addressing to the Museum's Association in 1892, who emphatically stated that 'the herbarium…is not instructed to the uninitiated – that is to the general public.' F. E. Weiss 'The organisation of a botanical museum,' in *Museums Association Report of the Proceedings with the papers read at the Third Annual General Meeting hel in Manchester, July 5, 6, &7, 1892.* ed E. Howarth & H. M. Platnauer. Museums Association. p.29.

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