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The Use of Collections for Biological Recording

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Abstract

Biological collections in regional museums have formed the bedrock of historic understanding of the environment, and were the basis for the development of biological recording as a discipline. Over the last 20 or more years, this relationship has tended to break down, with disastrous consequences for collections, and serious implications for the quality of biodiversity data. It is time everyone recognised the supportive roles of collections for biological recording and biodiversity data, and that collections managers and senior staff and policy makers responsible for museums worked towards gaining resources from outside to support these vital functions.

Background

Biological recording has become a major industry over the last 20 or more years, since the National Federation for Biological Recording (NFBR) was founded to promote it, in 1986. The reasons why the NFBR needed to come into existence stem from the perceptions by the then largely museum-based biological records operations, staffed often as a part-time Cinderella exercise alongside other more 'normal' museum curatorial work. Unfortunately without more formal recognition and support essential information about the natural environment was failing to be properly used.

The result has unfortunately been the almost-complete divorce of museum biology departments (if they still exist) from mainstream biological recording, firstly through the formation of stand-alone local records centres, and more recently through the development of complex biodiversity data systems, such as the National Biodiversity Network. While the infrastructure of recording has blossomed, relatively speaking, its roots in the scientifically-based world of collections have withered.

Some of the consequences of this can be seen in the often-repeated mantras of some of the less well-informed official users of biodiversity data:

- "Only records collected in the last 5 years are of any use"
- "We can only conserve what we know is still there"
- "We know all we need to know with a current NVC survey"

For those who understand the business of biological recording, and the need to support information with properly-researched data, collected with care, these kinds of statement are ludicrously unrealistic, and fail to fully comprehend the complexities of the natural world.

An example from the coal face

As an example, I will take my own experience of producing a '*Flora*' of my home county, Hertfordshire, published in 2009. What began as a 'project' under the auspices of the local museum service in 1987, this progressed for its first 3 years as a side-activity of the Museum Natural History Department, then staffed by two people. With cut-backs in 1990, my job moved from the Museum Service to the newly-established Local Records Centre, operated by the County Council (with a 'partnership'). The data being collected became mainstream information for the LRC to use, but the demands of supplying other data and information, managing existing and incoming data etc. meant that running a largely 'amateur' volunteer-based Flora Project was very much low priority, so that, gradually, support was withdrawn. At the same time the LRC, initially operated alongside the Museum (but not part of it managerially) later moved to administrative offices of the County Council. All direct links with the 30,000 herbarium specimens, library and laboratory facilities, microscopes etc. were severed. It became a totally volunteer-based exercise, luckily still resourced enough from private means to enable specimens to be verified and good quality literature to be accessible.

The '*Flora*' has enabled changes in the County's plant communities to be objectively assessed against an earlier survey. It has provided the LRC (and its users) with a baseline against which they can validate new data and make judgements about planning and land use decisions. But, while these are valued outputs (by some at least), who has any idea of the real needs for supporting the quality of the data it presents?

Just to re-cap what these 'resources' (to use the jargon) might include:

- Historic photographs (especially well-localised and documented ones depicting habitat detail).
- The baseline understanding of our vegetation gained from historic literature (earlier *floras*, reports of field meetings etc.), often not available outside good quality libraries maintained over long periods of time.
- Early (especially large-scale) maps, again only generally available from local studies offices or museums.
- Archives of field naturalists' notes and site lists, some of which may be very detailed indeed, and almost certainly not published anywhere. Hertfordshire is fortunate to have a good store of these.
- Not to mention herbaria, of course!

Using these astutely has led to 'discoveries' of supposedly 'lost' species, as anyone will recognise who has done their homework in this way. The mass of detail that can be sifted from these historical records also leads to an in-depth understanding of the nature of the ecology of a local area, because its species communities can be tracked over time.

The outputs from all this background work are then presented to users in what may appear to be pretty bald 'factoids': tables of 'lost' or 'declining' species for example, which aim to focus the mind of users on where the problems really lie, and which 'habitats' may be most threatened. These historic data, therefore, contrary to the 'received wisdom' of those who only believe in the here and now of data collection, have been vital for:

- identifying potential surviving localities (Fig. 1)
- providing a baseline against which changing populations can be measured
- understanding changes in the nature of natural communities
- understanding the impacts of our use of land
- documenting environmental shifts, e.g. climate change

Where do Museum collections fit in this?

Museum biologists know all this already, but the world out there doesn't. So, let us just go through the roles that museum natural science collections play in relation to biodiversity data and information at least. Quite apart from aesthetic, educative or intrinsic scientific importance (e.g. species types), most good natural science collections could carry out most if not all of the following functions:

- They contain original specimens, and can therefore confirm identifications.
- If taxonomy has changed since they were collected, we can confirm what they now are considered to be, thereby validating data.
- They can substantiate recorders' reputations for other records, which also acts as a source of data validation.
- They provide insights into taxonomic and scientific thinking at the time they were collected, which is a window on our understanding of the natural world and how this changes over time.
- If well-documented, they can provide greater detail on habitats and localities than published records, which are almost always, inevitably, a much-condensed piece of much larger quantities of information (Fig. 2).
- They can provide associated information that illuminates the nature of habitat, e.g. as a result of collection commentary
- They can provide chemical data on their source environment, either directly from the plant specimen, or from attached soil etc.
- Their DNA can be examined against modern samples, thereby giving a perspective on the stability or otherwise of populations over time.
- They are a cultural record of the natural science of their time, which has value for other disciplines beyond biodiversity, and which may be attractive for potential users we may not have thought about.

However, despite all this, natural history collections are under threat!

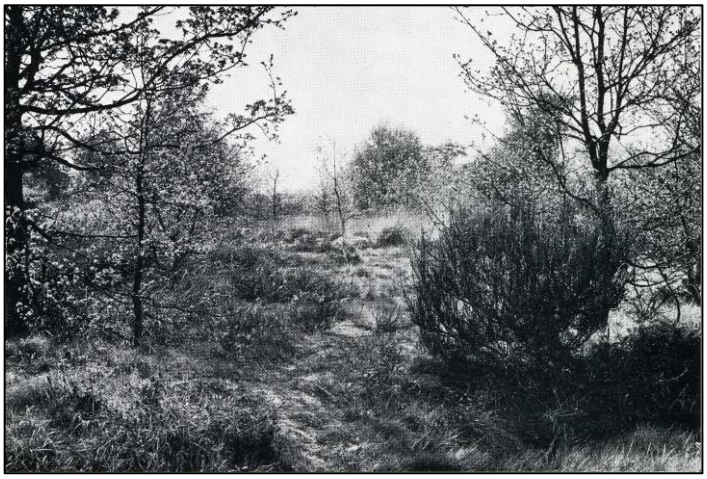
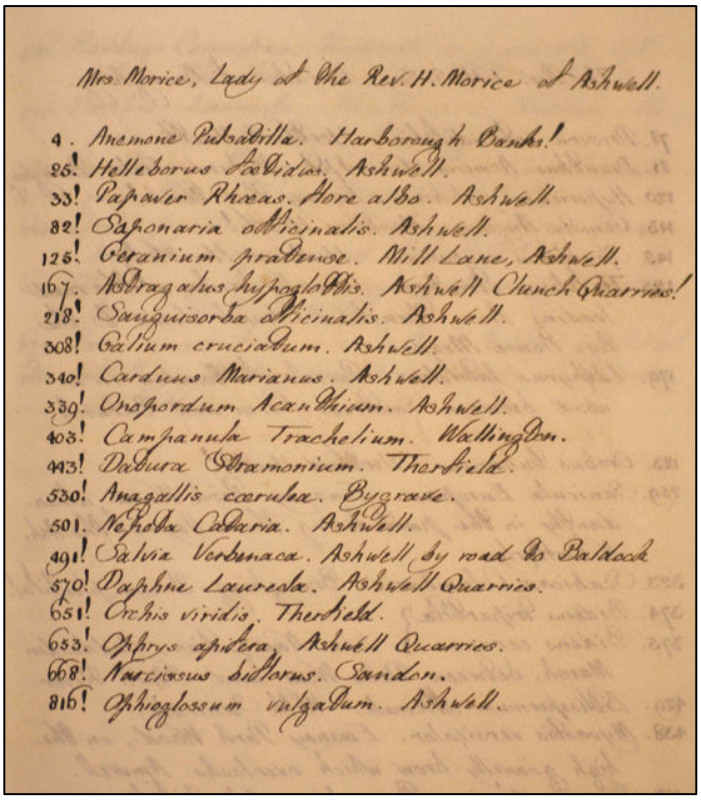


Fig. 1. Old photographs in collections can be a vital resource to highlight changing habitats.



Mrs. Morice, Lady of the Rev. H. Morice of Ashwell.

4. Anemone Pulsatilla. Harborough Banks!
25! Helleborus foetidus. Ashwell.
33! Papaver Rhoeas. flore albo. Ashwell.
82! Saponaria officinalis. Ashwell.
125! Geranium pratense. Mill Lane, Ashwell.
167. Astragalus hypoglottis. Ashwell Church Quarries!
218! Sanguisorba officinalis. Ashwell.
308! Galium cruciatum. Ashwell.
340! Carduus Marianus. Ashwell.
339! Onopordum Acanthium. Ashwell.
403! Campanula Trachelium. Wallington.
443! Datura Stramonium. Therfield.
530! Anagallis coerulea. Bygrave.
501. Nepeta Cataria. Ashwell.
491! Salvia Verbenaca. Ashwell by road to Baldock
570! Daphne Laureola. Ashwell Quarries.
651! Orchis viridis. Therfield.
653! Ophrys apifera. Ashwell Quarries.
668! Narcissus biflorus. Sandon.
816! Ophioglossum vulgatum. Ashwell.

Fig. 2. Archives of naturalists field records are a vital source of historic data for underpinning studies of current species occurrences.

The funding conundrum

So, how do we enhance the standing of biological collections in museums and ensure that potential funding sources are properly tapped to support them?

From thinking about the list of uses above, a number of things strike us as important for us to take notice of and act upon:

1. ***Documenting and publicising collections***
   If people don't know what collections contain, they cannot make use of them adequately without a lot of hard work. More importantly, from the point of view of those supposed to be funding the maintenance of these collections, they are unaware of their value (Fig. 3). Publicising them, drawing attention to potential uses of collections etc., is therefore highly important.

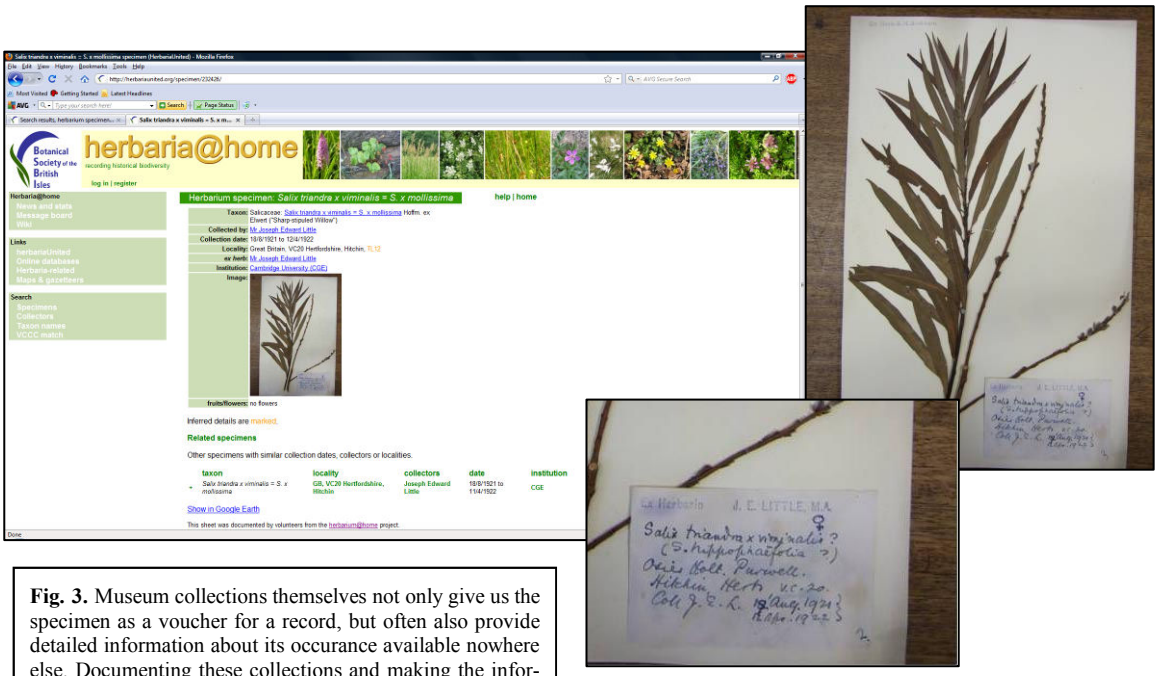


Fig. 3. Museum collections themselves not only give us the specimen as a voucher for a record, but often also provide detailed information about its occurance available nowhere else. Documenting these collections and making the information available (as above) can be vital for biodiversity data interpretation.

2. ***Integrating specimen data with third party records***
   The detail of specimen identification and validation in collections is potentially some of their most important potential contribution to third party users of biodiversity data, because specimen information acts as a validation of species records. Ensuring the existence of voucher information of this kind is integrated into biodiversity data holdings helps to raise the profile of collections and ensure their maintenance.

3. ***Making data from collections available on-line (e.g. the NBN)***
   Making ancillary details associated with specimens available in a way that enables the information to be integrated with other data from elsewhere is also often vital. For example, specimen data can be supplied directly to users through the National Biodiversity Network (and onwards to the Global Biodiversity Information Facility). By doing this, the information held by these collections becomes part of the global pool of biodiversity data, enhancing (and safeguarding) the collections themselves as a result through being a kind of 'shop-window' for what the museum holds.

4. ***Establishing links with biodiversity organisations***
   The example I gave at the beginning of a biodiversity recording project losing touch with collections and related resources demonstrates the weakness this introduces into the process of supporting the collections (not to mention the threat this poses for the biological recording process itself). Many Museums have experienced a decline after biological recording has been taken away, simply because this link was not seen as what it should have been – a vital mutually-enhancing role for the collections as a foundation for the recording activity, not just in terms of the collections themselves, but also the educative function they perform for new recruits, and the outreach opportunities they offer. Making sure these links are recognised and enhanced gives an opportunity for seeking funding to support the collections themselves. Getting involved formally with outside bodies may open up opportunities to gain supporting funding as a result.

5. ***Setting up protocols with others for record validation***
   Not only might we gain recognition of the value of collections through links with biodiversity organisations and their activities, but in some cases there may be opportunities for more formal support. To benefit from these, collections would have to be both well-documented and fully accessible to start with. However, as an active resource, their role could be formally recognised by key biodiversity data users, through reciprocal protocols, for example with a local records centre, or even with larger local authority or other public departments. While museums tend to be seen as a branch of 'entertainment' so often, their real value in these areas will be neglected, because they do not attract funding from outside. Steps need to be taken to go beyond this.

6. ***Exploring management agreements for survey vouchers***
   Essentially this is similar to 5, but could bring in funding from different potential sources, such as professional organisations involved in survey and assessment, especially if the role of collections becomes more formally recognised in these processes.

Summary

Essentially, the message is, therefore, that collections managers in museums need to think what their collections are really potentially usable for, beyond traditional display and demonstration. The opportunities are there, but will need to be worked at in order to be tapped. With the concern being expressed currently about the quality of much biodiversity data, because of lack of the right resources, or the inadequate abilities of many involved to carry out identifications, museum collections are potentially in a good position to rise to this challenge and offer their services – at a reasonable price!