Mobile Museum
Economic botany in circulation

Working Paper 1

The Economic Botany Collection at Kew: Analysis of Accessions Data

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The Economic Botany Collection at Kew: Analysis of Accessions Data

1. Introduction

This is the first Working Paper of the Mobile Museum research project, an AHRC-funded collaborative project between Royal Holloway, University of London (RHUL), and the Royal Botanic Gardens, Kew (RBGK). The focus of the project is Kew's Museum of Economic Botany and its successor, the Economic Botany Collection (EBC), and the thousands of objects it received from all parts of the world, a considerable proportion of which were subsequently redistributed by the museum to other museums, botanic gardens and schools during the nineteenth and twentieth centuries. In Working Paper 1 we consider patterns in the accession of objects into the collection from its foundation in 1847 to the present day, derived from data in the so-called "entry books". Working Paper 2 will consider the flow of objects out of Kew, drawing on the "objects distributed" books and other archives at Kew and elsewhere. Later Working Papers will explore various aspects of the circulation and use of these objects, including object pedagogy and school museums (Working Paper 3), international museum networks (Working Paper 4) and object trajectories (Working Paper 5).

At the broadest level, Working Paper 1 aims to provide an overview of the changing pattern of accessions into the EBC over time. Following a brief summary of the project and its research questions (section 2), the paper describes the key sources and methods used for this preliminary analysis, highlighting the challenges and questions they pose (section 3). The central section of the paper presents the data in tabular and graphic formats, and provides a broad analysis of the patterns they show (section 4). In this section we plot the overall frequency of accessions into the collection from 1847 to 2016, we map the evolving pattern in terms of source regions, we consider patterns in the type of donor and the type of object donated, we provide an overview of the most frequently named individual donors and we explore two case studies of two leading donors. In the conclusion, we provide a summary of key findings and identify some more general conceptual points for further consideration. As well as providing a baseline survey of accessions into the EBC, the paper seeks to identify potentially fruitful lines of inquiry on the basis of the data presented which will be of use in the selection of objects, donors and recipients for in-depth case studies.

2. Context: the Mobile Museum Project

"The Mobile Museum: Economic Botany in Circulation" is a 3-year, AHRC-funded, collaborative research project between Royal Holloway and the Royal Botanic Gardens, Kew which runs from January 2017 to December 2019. The overarching aim of the project is to map the circulation of economic botany specimens and artefacts between Kew and other institutions in the 19th and 20th centuries. This focus on circulation aims to situate accounts of acquisition, which dominate many histories of museum collections, in a broader context. The project thus seeks to

integrate an understanding of both accessions and dispersals in order to produce a broader picture of the circulation of objects and the networks through which they circulated. Over the course of the project we will be gathering, analysing and synthesising data from a number of key museums and botanic gardens in the UK and overseas in order to trace objects redistributed from Kew, and in doing so, we hope to discover new meanings, connections and relationships.

Our thinking on the Mobile Museum project has been shaped by two themes in the recent historical literature on museums and collections: firstly, its longstanding concern with networks and secondly, its growing interest in questions of circulation and mobility. The ways in which collections both depend on and reinforce social and institutional networks have been the focus of many recent museum histories, notably in the context of ethnographic collections. Here, it has become conventional to consider the museum as a node in an evolving network, "a set of connections between people and objects that … extend over time and through space."[2] As in other contexts, therefore, the role of institutional and individual networks is a key theme in the history of the Museum of Economic Botany at Kew.[3] Alongside this emphasis on networks is a growing interest in the forms of circulation and mobility (of things, people and ideas) that suggests a more explicitly spatial focus. In the Mobile Museum project we are as concerned with the flows of things, people and ideas out of Kew as we are in accessions into Kew: indeed it is the circulation of the collections that is the focus of the project rather than the museum *per se*. Here the specific nature of the Kew complex and its association with a particular model of circulation and exchange will be a key theme.

The project is organised around six distinct research questions, as follows:

1. By what means and through what channels did economic botany specimens and artefacts circulate between museums in the nineteenth and twentieth centuries?

2. What were the principal international networks of exchange connecting Kew and overseas museums, and how did they operate?

3. Are there significant differences between the patterns and processes of exchange between Kew and museums in Australia, the United States and Europe?

4. What role did Kew play in the circulation of specimens and artefacts to UK museums, especially in the development of ethnographic collections such as at the Pitt Rivers Museum and the British Museum?

[2] Chris Gosden & Frances Larson, *Knowing Things: Exploring the Collections at the Pitt Rivers Museum 1884-1945* (Oxford: Oxford University Press, 2007), 1-6. See also Judith M. Hill, "Cultures and Networks of Collecting: Henry Wellcome's Collection," PhD thesis, Royal Holloway, University of London, 2004.

[3] On the history of the Kew Museum, see Caroline Cornish, "Curating Science in an Age of Empire: Kew's Museum of Economic Botany" (PhD thesis, University of London, 2013).

5. What role did objects dispersed from the Kew Museum collection play within educational policy and the pedagogy of nature study in nineteenth- and twentieth-century Britain?

6. How can the historical study of the mobility of artefacts contribute to better understanding of the role of economic botany collections in the past and the present?

Whilst this Working Paper touches on all of the above, it sheds light particularly on the first and second of these questions.

3. Sources & Methods

3.1 EBC Entry Books

The "entry books" that provide the core data for this paper are the hand-written accession registers of the former museum and current EBC. There are ten volumes in total (1847-1855; 1855-1861; 1861-1879; 1879-1881; 1881-1895; 1896-1924; 1924-1974; 1974-1986; 1987-2006; and the current volume, commencing in 2007). These volumes are kept in an office adjacent to the Economic Botany Collection store in the Sir Joseph Banks Building (hereafter referred to as the Banks Building), as they are working documents, frequently consulted and updated by collections staff.

The method of entering accessions has varied relatively little since 1847. Comparative examples of entries are given below (Figures 1 and 3).

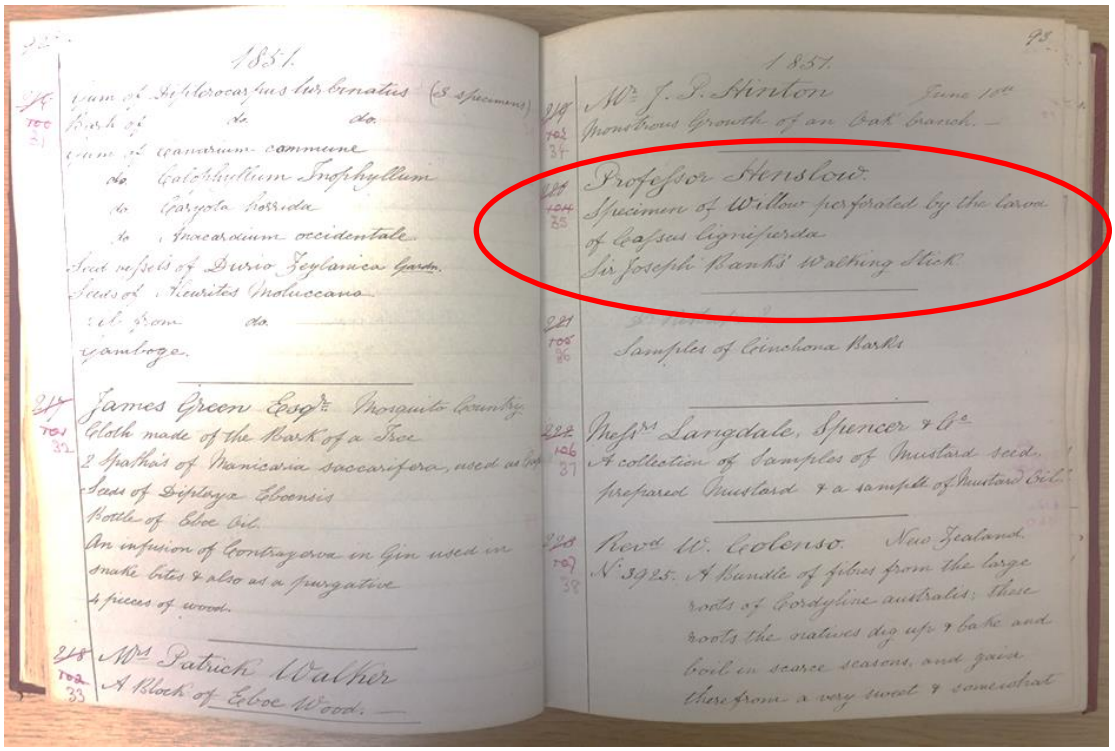


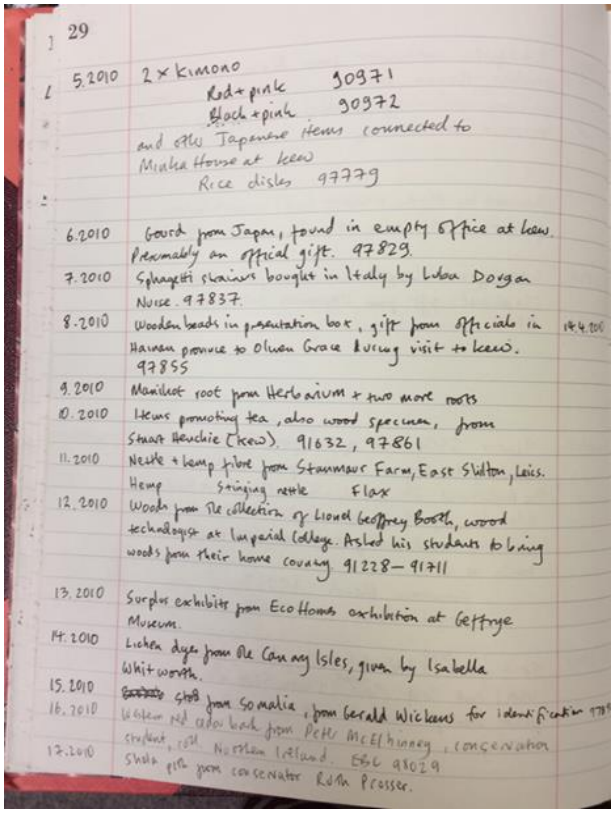
Figure 1. Pages from the 1847-1855 Entry Book, (pp. 92-93). Henslow's donation of Joseph Banks's walking stick is highlighted.

The entry books typically record details of the donor's name, the date of accession, and a brief description of the object(s). The brevity or otherwise of the description depends on the amount of contextual information provided by the donor, which is frequently reproduced verbatim from the letter accompanying the donation, as can be seen in the entry for the Reverend William Colenso on page 93 of the 1847-1855 Entry Book (Figure 1). The numbering system used runs within each year and again refers to the accessioning event as a whole, not to individual objects within it. So the first accession of, say, 1851 is 1.1851, the second 2.1851, and so on, and this number is used as the identifier of all objects accessioned on this one event, on the label as well as in the register (Figure 2).[4]

Figure 2. Entry book numbering system: this fibre specimen was accessioned as part of the 155th accessioning event of 1908.

As Figure 3 suggests, the accessioning convention established in 1847 has persisted to the present day, with the amount of data provided still directly related to contextual information supplied by the donor, albeit with more detail entered onto the EBC database introduced in 1987 (see below). The amount of detail in entries continues to vary as much between entries in any given year as it does over the life-span of the collection.

[4] This was a variation on a standard practice in museum accession registers in the 19th century which has in some cases continued to the present.


29

5.2010 2 x kimono
Red + pink 90971
Black + pink 90972
and other Japanese items connected to
Miaka House at Kew
Rice dishes 97779

6.2010 Gourd from Japan, found in empty office at Kew. Presumably an official gift. 97829.

7.2010 Spaghetti strainers bought in Italy by Libba Dorgan Nurse. 97837.

8.2010 Wooden beads in presentation box, gift from officials in Hainan province to Olwen Grace during visit to Kew. 97855

9.2010 Manihot root from Herbarium + two more roots

10.2010 Items promoting tea, also wood specimen, from Stuart Heuchie (Kew). 91632, 97861

11.2010 Nettle + hemp fibre from Stanmour Farm, East Shilton, Leics.
Hemp Stinging nettle Flax

12.2010 Woods from the collection of Lionel Geoffrey Booth, wood technologist at Imperial College. Asked his students to bring woods from their home country 91228–91711

13.2010 Surplus exhibits from Eco Homes exhibition at Geffrye Museum.

14.2010 Lichen dyes from the Canary Isles, given by Isabella Whitworth.

15.2010 Stool from Somalia, from Gerald Wickens for identification

16.2010 Western red cedar bark from Peter McElhinney, conservation student, coll. Northern Ireland. EBC 98029

17.2010 Shoes gift from conservator Ruth Prosser.

Figure 3. Page from the current Entry Book (2007-)

3.2 EBC Database

The EBC electronic database was introduced in 1987, in order to catalogue the collection prior to its transfer to the Banks Building. Details of objects in the recently-closed museum were entered, and any notes, numbers or other references attached to the object were captured on the electronic record. It was at this point that the EBC catalogue numbers were assigned to individual objects. The databased catalogue has been continuously updated since that time. The EBC database uses specially adapted software, with overall structure and fields based on those used for Kew herbarium specimens with additional fields, relating to plant or object use, added for the EBC. For these uses and for geographic classification, the Taxonomic Databases Working Group (TDWG) standard was adopted (now known as Biodiversity Information Standards). The taxonomic system still used in the EBC, and which was in use in the Kew Herbarium until 2009, is the Bentham and Hooker system. Cataloguing by botanical family is a straightforward procedure for herbarium sheets, which are highly standardised units of collection, or, as Bruno Latour would have it, "immutable and combinable mobiles."[5] However, in the case of a collection which contains heterogeneous objects ranging from a calyx to a canoe, it presents additional challenges. Objects composed of multiple plant materials, objects of unknown botanic origins, even non-botanical objects (such as silks or wax fruits), all have to be reduced to a representation of, at the very least,

[5] Bruno Latour, *Science in Action: How to Follow Scientists and Engineers through Society* (Cambridge, MA: Harvard University Press, 1987), 227 *et seq*.

a single plant family, in order to be assimilated into the collection. The entry for the walking stick donated by Darwin's Cambridge tutor John Stevens Henslow in 1851 (entry number 35.1851 in the 1847-1855 Entry Book) exemplifies this process (Figure 3). Here a walking stick said once to have been owned by Sir Joseph Banks becomes, simply, a specimen of the *Poaceae* or grasses family. An object which might otherwise be understood, in the spaces of other collections, as an historically unique artefact with an almost tangible aura,[6] is designated, in the EBC, as a representation of the genus, *Saccharum*, or more specifically as a product of that plant group.

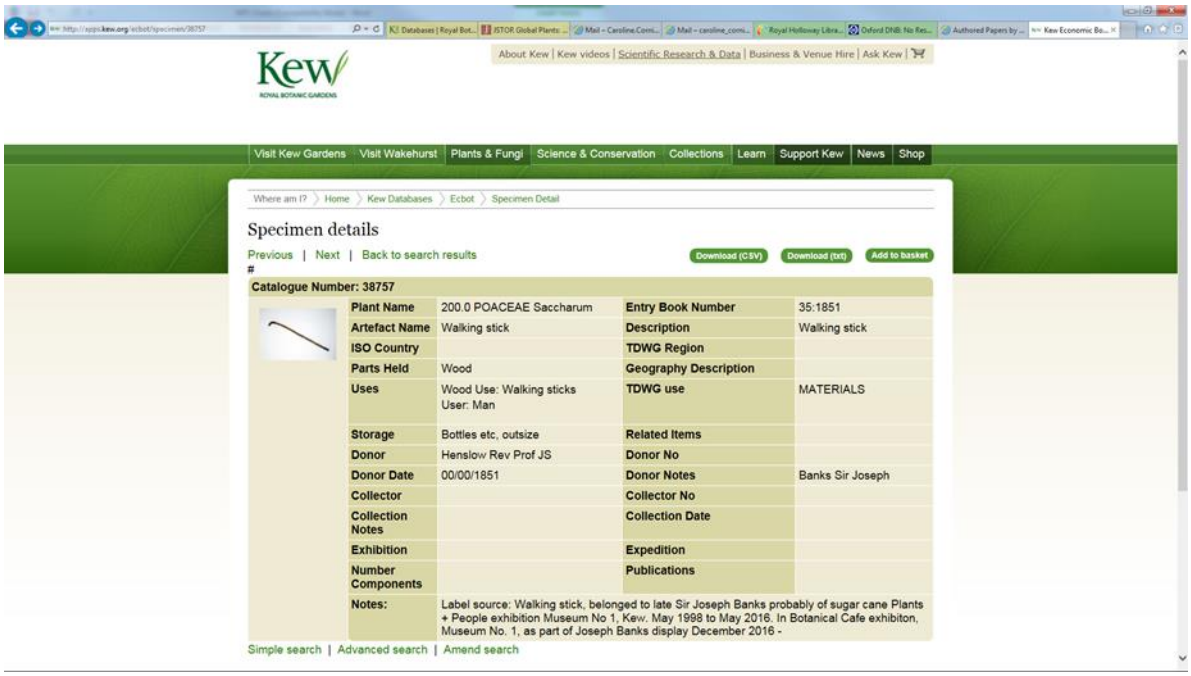


Figure 3. Online interface for the EBC database, showing the record for the walking stick in Figure 1.

A catalogue, databased or otherwise, presents an inventory of the collection at a single moment in time. It makes available information about the collection as it exists at that moment, rather than providing an historically continuous picture of the collection as it has evolved over its lifetime. Specifically, in its present form the Economic Botany database does not provide comprehensive information about the significant number of objects which once entered the collection but were subsequently de-accessioned at some point in its history. The enhancement of the database to include some of these dispersed objects is a key objective of the Mobile Museum project. At a later stage of the project, data on de-accessions from the collection will be reconstituted from various sources, including a set of registers ("Objects Distributed" books), marginal annotations in the entry books, archival sources at Kew (including Directors' Correspondence, correspondence with schools and annual reports) and the accession registers of other museum collections. De-accessioned objects will be the focus of Working Paper 2.

[6] Laurel Thatcher Ulrich, et al, *Tangible Things: Making History through Objects* (Oxford: Oxford University Press, 2015).

3.3 Methods

For the purposes of this paper, accessions data from the entry books consisting of dates, donor names and object descriptions were transcribed into an Excel spreadsheet. These entries were then coded on the basis of three further variables: the source region of objects, types of donor, and types of object. It should be emphasised here that the fundamental unit of this database (and therefore of the following analysis) is the "accessions event" rather than the individual specimen or artefact. The number of objects accessioned in each event varies considerably: indeed, it is not uncommon for entries to refer to a batch of objects (for example, "a selection of articles made of Gutta Percha," or, "a collection of New Zealand woods contained in 34 packages"), sometimes with the tantalising words "see list" alongside.[7] Some of these lists have been located—unsorted— in the Kew archives, and it is intended that, during the course of the project, a reconciliation exercise be conducted between these and the entry books.[8] The practice of bulk accessioning– in which materials are grouped together rather than documented individually – is more commonly associated with collections in natural history and archaeological museums than with their counterparts in anthropology or fine art.[9] Moreover, accessions from world's fairs – a major source of materials for the collection - typically consisted of large quantities of diverse objects, and were similarly often batch-accessioned in the first instance. As a practice, this reflects both the nature of the materials and the methods of managing them. This has implications for the ways in which the collection has been used in the past and its potential re-uses today (we return to this in conclusion). While estimates of volumetric data at the level of objects may be made, the following analysis of spatial and temporal patterns is based mainly on the accessions event not the individual object, and therefore measures the frequency of particular accession types.

4. Results

4.1 Total accessions

Chart 1 shows the trend in the number of accessions on an annual basis from 1847 to 2016, and in the form of a 10-year moving average from 1851 to 2011. The annual series makes visible the impact of particular events, both external and internal to Kew, including government policies, expeditions, colonial annexation, scientific prerogatives, technological developments, and the workings of the "exhibitionary complex," as well as changes in the internal organisation and mission of the Royal Botanic Gardens, Kew.[10] The single largest peak in this phase, in 1857, reflects the confluence of a number of significant developments. External events generating accessions include Livingstone's first Zambezi Expedition (1852-56) and

[7] Royal Botanic Gardens, Kew (RBGK), EBC, Entry Book 1847-55, 54.1848, p. 20; Entry Book 1881-95, 181.1881, p. 12.

[8] RBGK Archives, QX 92-053.

[9] "SPECTRUM 4.0," Collections Trust, accessed May 7, 2017, http://collectionstrust.org.uk/spectrum/.

[10] Tony Bennett, *The Birth of the Museum* (London: Routledge, 1996).

Baikie's first Niger Expedition (1854-56). 1857 was also a fruitful year for William Hooker's working relationships with industrialists, with frequent accessions from rubber manufacturer Charles Macintosh and pharmaceutical manufacturer Daniel Hanbury. Events internal to Kew also had a role to play in the shape of the accessions curve. 1857 was the year in which Museum No. 1 opened, and there was a flurry in the accessioning of objects which had been hitherto cluttering the Orangery, the Herbarium and even the sheds.[11]

The incidence of international exhibitions has a particularly visible impact on the annual pulse of acquisitions. Peaks in 1851, 1910, and 1924, for example, are indicative of accessioning activity immediately after the closure of the Great Exhibition, the Japan-British Exhibition and the British Empire Exhibition respectively. Like the South Kensington Museum,[12] Kew's Museum of Economic Botany functioned as both donor and recipient as far as international exhibitions were concerned. By the second half of the twentieth century, in contrast, peaks in the series were most commonly related to plant collecting expeditions undertaken by Kew's own botanists. Troughs, like peaks, can also be attributed to specific internal and external factors. The impacts of the First and Second World Wars (1914-18 and 1939-45) are clearly reflected in Chart 1, as are the closures of Museums 3 and 2 in 1958 and 1960.[14]

Underlying trends in the history of accessions to the collection are apparent from the 10-year moving average also shown in Chart 1. On the basis of this series, four key phases may be identified: from 1847 to 1914, during what might be termed the **formative phase** in the life of the collection, accessioning was at its highest levels. This was the era of high empire, when Kew was working with the Colonial and India Offices to improve plant productivity across the British Empire. Joseph Hooker expressed it thus: "Kew has become the botanical centre of the work and literally carries on all economic and scientific botanical work of the Empire, under the direction of the various departments of the State."[15] The curve from 1882 to 1900 represents the advent of William Thiselton-Dyer, first as Assistant Director, and from 1885 as Director. This period saw large-scale investigations into rubber and fibres, a more intense involvement with colonial botanic gardens and stations, and the rise of colonial departments of agriculture, all engaged in dialogue with Kew. The phase reached its symbolic apogee when Thiselton-Dyer was appointed botanical adviser to the Secretary of State for the Colonies in 1902, confirming Kew's pre-eminent status.[16] Subsequently the Imperial Institute, opened in 1893,

[11] Cornish, "Curating Science," 113.

[12] Felix Driver & Sonia Ashmore, ""The mobile museum: collecting and circulating Indian textiles in Victorian Britain," *Victorian Studies* 52 (2010): 353-385.

[14] Cornish, "Curating Science," 376.

[15] RBGK Archives, Kew Administration, 1864-1925, JD Hooker to the Office of Works, 'Memorandum relative to the requirements of Kew Gardens,' 1881, f. 36. See also Richard Drayton, *Nature's Government: Science, Imperial Britain and the 'Improvement' of the World* (New Haven: Yale University Press, 2000), 170-220.

[16] Drayton, 262.

would later assume much of the work previously undertaken by the Royal Botanic Gardens.[17]

There was still active collecting at the Kew Museum in the **second phase**, from 1915 to 1937, albeit at somewhat lower levels. In 1917 Kew Gardens were still considered by some as "the botanical metropolis of the world."[18] Richard Drayton, however, argues that Kew's scientific empire reached its zenith in the earlier formative phase under Thiselton-Dyer, "the last Director to hold in his own hands so many threads of scientific life and imperial policy."[19] According to this interpretation, David Prain, who took up the directorship in 1905, managed what was, in effect, a holding operation at Kew, and Kew's imperial role during his tenure was threatened not only by the rise of the Imperial Institute but also by a "proliferation" of other agencies such as the Empire Cotton Growing Committee, and by the increasing desire for autonomy from overseas departments of agriculture, which in turn received encouragement from Whitehall. Arthur Hill, who succeeded Prain in 1922, has been described as "the last of Kew's directors motivated by an imperial mission,"[20] though this must be understood in the broader context of the "remarkable co-ordination of science in the inter-war era."[21] Another new agency of empire, the Empire Marketing Board, actually came to Kew's aid in 1927, when it funded the position of an economic botanist with a budget for overseas travel. The first occupant of this post was Hugh Charles Sampson, and the EBC benefitted greatly from the collections he made on his journeying, illustrated by the fact that he ranks at number thirty-two amongst the top EBC collectors.

The curve of the series over the **third phase**, from 1938 to 1968, is a direct reflection of the impact of war and post-war decline at the Kew Museum and the eventual closure of Museums 2 and 3.[22] Other relevant factors include the loss of the museum's research function in 1966, and the abolition of the post of Economic Botanist at Kew in 1967. At this point, much of the museum's former research work passed to the Mycology Section at the Kew Herbarium or to the Tropical Products Institute, a government agency which rose from the ashes of the Imperial Institute, and was under the management of the Department of Scientific and Industrial Research. During this post-war period, however, there were nonetheless

[17] Ray Desmond, *The History of the Royal Botanic Gardens, Kew* (RBGK: Kew Publishing, 2007), 259-266. For the Imperial Institute see John M. Mackenzie, "The Imperial Institute," in *Propaganda and Empire: The Manipulation of British Public Opinion, 1880-1960* (Manchester: Manchester University Press, 2000; and Michael Worboys, "The Imperial Institute: the state and the development of the natural resources of the Colonial Empire, 1887-1923," in *Imperialism and the Natural World*, ed. J. M. Mackenzie (Manchester: Manchester University Press, 1990), 164-186; Drayton, 267.

[18] Lord Bryce, House of Lords Debates, 10 July 1917, cited in Desmond, *History of Kew*, 274.

[19] Drayton, 267.

[20] Desmond, *History of Kew*, 267-279.

[21] Drayton, 267.

[22] Cornish, "Curating Science," 113.

positive new developments at Kew which affected the museum and these are described in more detail below (see Section 4.2).

By the 1970s, when a **fourth phase** is evident, objects were increasingly being channelled to the EBC via the Kew Herbarium. This shift coincided with the advent of a new post-imperial role for Kew when, according to newly-acknowledged international imperatives regarding biodiversity and environmental sustainability, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1973 and the Convention on Biological Diversity (CBD) in 1993, Kew began to organise and fund its own plant-collecting and data-gathering expeditions undertaken by Kew's own botanists.[23] Other accessions during the 1980s and 1990s included transfers from the Jodrell Laboratory and the Economic and Conservation Section (ECOS). These transfers represented in part a response to the new storage facility offered by the Banks Building, which opened as the Centre for Economic Botany (CEB) in 1990. The Banks Building now houses all Kew's wood collections, including those previously held for plant anatomy purposes at the Jodrell Laboratory. Over this period the EBC has also developed its own collecting strategy, particularly in response to the re-emergence of interest in natural raw materials and ingredients witnessed since the mid-1980s, and also in conjunction with Kent University's MSc programme in Ethnobotany, on which EBC curators have taught since 1998.[24] And during the last twenty years, partly as a result of a conscious decision by the curator to extend access to the collection to researchers from the arts and humanities, and partly through networking with museums in a range of sectors (through, for example, the Museum Ethnographers' Group and the London Museums of Health and Medicine), active collecting continues on the EBC across a range of object categories, particularly textiles, materia medica, and woods. One group of specimens which deserve special mention here are the Chinese materia medica which arose out of the Chinese Medicinal Plants Authentication Centre (CMPAC) opened in 2000.

4.2 Source Regions

Chart 2a shows trends in the geographical source of accessions into the EBC between 1851 and 2011, using a 10-year moving average; Chart 2b displays this series in relative terms. The geographical regions used in these charts are based on the TDWG standard, adapted to suit particular areas of interest to the project. What is immediately apparent is the geographical breadth of the collection, with all major world regions represented. Kew's global reach has survived and thrived through a number of differing political contexts. During the colonial era, Kew officers were embedded in global networks of collecting and exchange. Kew's scope thus extended beyond British overseas possessions and protectorates to encompass, quite literally, the whole world. These well-established acquisition

[23] Desmond, *History of Kew*, 297.

[24] "MSc Ethnobotany," University of Kent, accessed May 8, 2017, https://www.kent.ac.uk/sac/studying/programmes/pgt/MSc/msc_ethnobotany_kew.html

networks have been of continuing importance in post-colonial times, notably in the context of Commonwealth, and increasingly in the context of global scientific co-operation which is now seen as vital to protecting biodiversity and increasing food security.

For the period as a whole, the single largest source region is the **UK and Ireland**. This serves as a reminder that while Kew was collecting on a global scale, its remit also included home territories. Interest in the museum was strong from its inception: as William Hooker noted in 1846, "It is curious to see how rapidly interesting vegetable products are coming into our garden, now it is known we are to have a Museum."[25] During the nineteenth century, the museum was the beneficiary of donations from a variety of domestic sources, including museum curators, manufacturers, commodity brokers, nurseries and seed merchants. The largest nurseries sent their own collectors to little-known regions, and some brought back artefacts for Kew: the name of Veitch thus looms large in the entry books.[26] Objects were also donated by a wide variety of museums, including the Pitt Rivers Museum, the South Kensington Museum, the Museum of Practical Geology, and museums of applied science at Glasgow, Edinburgh and Dublin. This diversity extended to the range of specialist departments submitting objects: within the British Museum, for example, these included not only botany but also zoology, ethnography, and the library. In its early years, especially, the Museum also received donations from private collectors: names such as the Reverend Charles Evans, John Hogg, and the Reverend Edward B. Bagshaw are recorded in 1860, and in 1880 we see one of the many donations made by "Miss [Eleanor] Ormerod," entomologist (see 5.2, iii] *Hidden histories of donation*, for more details), and by Scottish naturalist, Eliza Brightwen. Kew Directors and other employees also donated objects: in 1860, for example, 26 of the 200 accessions were from the gardens, with a further six from various members of the Hooker family. This pattern continued with the arrival of William Thiselton-Dyer and his subsequent marriage into the Hooker dynasty.

Accessions from Britain and Ireland maintained in the twentieth century, with a notable peak in 1910 when the home countries accounted for one-third of all accessions. The key reason was the opening of Museum No. 4, the Museum of British Forestry, in that year. The role of British landowners in supplying woods and tools for the new museum is described below (Section 4.3) Wood merchants were also major donors, with companies such as Stenning & Sons, Sadd & Sons, John Eede Butt & Sons, R. Groom & Sons, and Dawson & Company among those listed. The development of forestry research in the UK is reflected in subsequent donations by the Forest Products Research Laboratory in Princes Risborough (founded 1923) and the Imperial Forestry Institute (now part of the Department of Plant Sciences, University of Oxford) which was to be a steady donor of woods to

[25] Letter from William Hooker to Dawson Turner, 22 October 1846; RBGK Archives, WJH/2/10, f.67

[26] For more on Veitch collectors in China see Erik Mueggler, *The Paper Road: Archive and Experience in the Botanical Exploration of West China and Tibet* (Oakland, CA: University of California Press, 2011).

the EBC over the twentieth century. Finally, Kew staff members have continued to be active donors, reflecting their own collecting within the UK and their role as intermediaries through which objects from commercial sources find their way into EBC.

Amongst overseas source regions, **Africa** accounts for the greatest number of accessions across the history of the collection. Accessions over the period 1870 to 1914 coincide with the "scramble for Africa" and the extension of British territorial interests, first in West Africa and then in the East of the continent. Exploration preceding and during this period (notably Livingstone's expeditions on the Zambezi and Baikie on the Niger) generated additions to the Kew collections. Moreover, with the establishment of colonial rule, further additions were supplied by scientists attached to government agencies, settlers, commercial entities, and missionaries.[27] As Thiselton-Dyer eloquently expressed it, "I cannot control the expansion of the Kew Herbarium because I cannot control the expansion of the Empire. The scientific investigation of new territories follows their accretion."[28]

Africa continued to be an important source region in the era of decolonisation. Changes in the institutional context of collecting were already underway from the 1930s when, under the direction of Arthur Hill and with grant funding from the Empire Marketing Board, Kew had been gradually becoming less reliant on expeditions organised by other bodies such as the Admiralty and the Royal Geographical Society, and had started to take charge of its own collecting programme. Kew's collecting activity in Africa since 1945 has been driven by practical commitments and strategic interests. At the practical level, Kew undertook the task of producing two large regional floras – *Flora of Tropical East Africa* and *Flora Zambesiaca*, and the revision of *Useful Plants of Tropical East Africa*. The collecting required to compile these flora yielded rewards for the EBC as well as the Herbarium, indeed, the *Flora Zambesiaca* is still incomplete and collecting continues. Strategically, countries such as Zimbabwe have been included in the Survey of Economic Plants for Arid and Semi-Arid Lands (SEPASAL), established in 1983, whilst more recently, Guinea, Cameroon, Mozambique and Uganda have been surveyed as part of a broader programme to identify and map Tropical Important Plant Areas (TIPAs) in a number of world regions. To this end, Kew has committed to support local partners in protecting important native species and habitats from extinction.[29] The factors behind the threat of extinction are rooted in colonial histories and geographies of plantation cropping and mining, and the large-scale habitat clearance that accompanied these.[30] Madagascar, for

[27] Helen Tilley, *Africa as a living laboratory: Empire, development, and the problem of scientific knowledge, 1870-1950* (Chicago IL: University of Chicago Press, 2011).

[28] William Thiselton-Dyer, letter to Office of Works, 7 Jan 1899, cited in Desmond, *History of Kew*, 257.

[29] "Tropical Important Plant Areas," Royal Botanic Gardens, Kew, accessed May 9, 2017, http://www.kew.org/science/who-we-are-and-what-we-do/strategic-outputs-2020/tropical-important-plant-areas.

[30] Martin Cheek, e-mail message to author, May 8, 2017.

example, is home to many endemic plant species under threat of extinction, and has been a site of renewed interest for Kew scientists since the 1990s.[31]
The combined territories of **South and Central America** account for a significant proportion of accessions to Kew over the period as a whole, a proportion which has risen in recent decades. This, too, is indicative of a series of Kew-led expeditions to the region. Prior to 1945, Kew's access to much of the continent was restricted by Britain's relatively weak colonial presence, with individual explorers such as Richard Spruce donating a significant number of objects to the collection. Between 1849 and 1865, Spruce objects were accessioned on 42 separate occasions, each one consisting of large quantities of botanical and ethnographic material.[32] The EBC nineteenth-century South American collections also owe much to the efforts of Everard im Thurn, curator of the British Guiana Museum at Demerara, and to George Jenman, Government Botanist and superintendent of the Botanical Gardens in British Guiana from 1879 to 1902. Jenman ranks in the twentieth position in the EBC league of frequent donors, sending objects on 38 occasions during this period.[33] All of these collectors were enabled to travel freely and botanise due to the network of British merchants and missionaries living in the context of the "informal empire" which existed between Britain and South America in the post-independence nineteenth century. It has been said that "Britain and Latin America appeared to be made for each other" at this time, with Britain's mature industrial economy able to supply the newly independent countries of South America with manufactured imports whilst, in the post-independence era (after 1820) Latin America, was no longer obliged to trade only with Spain, was able to meet the growing demand in Britain for food and raw materials.[34]

For much of its history, with the exception of British Guyana and the Amazon region, the Kew Museum was generally reliant on other institutions, such as the Smithsonian, for material from South America; and large numbers of South American cinchona specimens were donated by the Pharmaceutical Society of Great Britain in 1904.However, collecting in Brazil resurged in the 1980s and 1990s. This was due in part to the appointment, in 1988, of Ghillean Prance as director, dubbed "the world's leading authority on the flora of Brazil's Amazon forests." By this stage, approximately two thirds of Kew's funding came from the Department of the Environment, Food and Rural Affairs (DEFRA), but Kew was now obliged to source the remaining third of its budget through external funding streams, sponsorship and commercial activities, and this percentage was set to rise in subsequent decades.[35] In 1990 Kew announced its participation in the *Plantas do Nordeste*

[31] Desmond, *History of Kew*, 302.

[32] Of these, 259 objects from Spruce still reside in the EBC.

[33] Im Thurn, who was in post as curator from 1877 to 1882 is number 73, appearing as a donor on 17 separate occasions in the entry books. For more on both collectors see Sara Albuquerque, "Exploring Tropical Nature in British Guiana: RBG Kew's Collections Revisited," PhD thesis, Birkbeck College, University of London, 2013.

[34] Victor Bulmer-Thomas, "British Trade with Latin America in the Nineteenth and Twentieth Centuries," University of London, Institute of Latin American Studies, *Occasional Papers* No. 19 (1998): pp. 1-22.

[35] Desmond, *History of Kew,* 296-297.

project, a survey of the ecosystem of North East Brazil, co-funded by the UK Department for International Development, the Brazilian Government and Kew itself.[36] Another area of South America represented in the data is Bolivia, which now forms part of the TIPAs project.[37]

Collections from **South Asia**, including the present-day countries of India, Sri Lanka, Bangladesh and Pakistan, reflect Kew's interest in British India before Indian independence in 1947. While this was more substantially reflected in the herbarium, which acquired Nathaniel Wallich's collection for the East India Company via the Linnean Society in 1913, nevertheless economic botany objects also entered Kew from various sources, including the Himalayan travels of Joseph Hooker himself (1848-51). Kew's capacity to collect Indian objects increased significantly with the foundation of the India Office in 1858, with which Kew worked closely. The cinchona project, commencing in India in the 1860s, yielded massive returns for the Economic Botany Collection. Another key moment for the collection was the 1880s, which saw the transfer of the vast plant collections of the former India Museum to Kew (in 1880) and the establishment of the Botanical Survey of India and its collection at the Indian Museum in Calcutta.[38]

Other Asia (which includes the territories covered by all other present-day countries, including Burma which was formerly part of British India) has become more significant as a source of acquisitions since 1945. Accessions of Chinese origin date back to Robert Fortune, who was collecting for Kew as early as the 1840s, when, after China's defeat in the First Opium War, the British occupied Hong Kong and gained access to five coastal ports in the Treaty of Nanking (1842). The number of treaty ports rose after the Second Opium War, and with Westerners now at liberty to set up commercial and diplomatic outposts in inland China, the period of "informal empire" had truly arrived.[39] Accessions to Kew during the second half of the nineteenth century reflect these events, in particular Augustine Henry's collecting activities whilst employed by the Imperial Maritime Customs Service in Shanghai, and British Consulates in a number of Chinese cities.[40] In more recent times accessions from China have been greatly augmented through the collecting of the CMPAC and (since 2004) through Kew's partnership with the Chinese Academy of Sciences. Indonesia, too, figures more significantly in the post-war

[36] Desmond, *History of Kew,* 306.

[37] "Tropical Important Plant Areas in Bolivia," RBGK, accessed May 8, 2017, http://www.kew.org/science/projects/tropical-important-plant-areas-in-bolivia.

[38] Ray Desmond, *The India Museum 1801-1879*. Vol. 1. (London: HMSO, 1982); S. Chakravarti (ed.), *The Indian Museum 1814-1914* (Kolkata: Indian Museum, 2004) (1st edition 1914).

[39] Fa-Ti Fan, *British Naturalists in Qing China: Science, Empire and Cultural Encounter* (Boston: Harvard University Press, 2003), 61-90.

[40] For Henry's prodigious contributions see, for example, Entry Book 1881-95, 69.1886, p. 193; 77.1886, p. 194; 52.1887, p. 255; 86.1887, p. 262; 111.1887, p. 267; 131.1887, p. 270; 28.1888, p. 291; 51.1888, p. 295; 69.1888, p. 299; 147.1888, p. 314; 36.1889, p. 324 ; 37.1889, p. 325; 64.1889, p. 330; 71.1889, p. 331; 85.1889, p. 333; 128.1889, p. 340; 141.1889, p. 343; 10.1890, p. 347; 32.1891, p. 385; 138.1892, p. 456; 59.1894, pp. 530-33; 23.1895, p. 559; 49.1895, p. 565; 54.1895, p. 567; 76.1895, p. 571. For various British Consulates in China see, for example, Entry Book 1881-95, 9.1882, p. 16; 11.1889, p. 320; 63.1892, p. 440; 98.1892, p. 447; 125.1893, p. 490; 12.1894, p. 516.

data, particularly the regions of Irian Jaya, Kalimantan and Indonesian New Guinea, formerly part of the Dutch East Indies. These areas also form a significant part of Kew's research into tropical forests.

Like Africa, **Australasia and the Pacific** have maintained a consistent presence throughout the history of EBC accessions. In the nineteenth century Australia was a major source of woods for the collection, many received after the closure of international exhibitions, such as the London International Exhibition of 1862.[41] The single most important donor to the EBC, Ferdinand von Mueller, was Government Botanist to the Australian State of Victoria from 1853 to 1896, and in addition Superintendent of the Royal Botanic Gardens, Melbourne from 1857 to 1873 (details of his contribution are given below). In the 1970s, Australian woods continued to provide large and significant accessions, in particular those donated by CSIRO, the Commonwealth Scientific and Industrial Research Organisation, which is the federal government agency for scientific research in Australia.

Other world regions account for a smaller but continuing presence in the collection. The significance of the **Caribbean** as a source region has declined with the passing of British control since the Second World War. As Wayne Modest has argued, with the exception of Kew, collectors from Hans Sloane onwards tended to look on the Caribbean as a 'realm of nature (and not culture)' and this has determined collecting practices there and the representation of Caribbean peoples in museums at home and abroad. The Kew Museum's interest in the material culture of the African diaspora in Jamaica and elsewhere was due largely to its interest in economic botany, rather than to any interest in the contemporary ethnography of the region.[42] On taking up the Kew directorship in 1841, William Hooker was keen to build Kew's Caribbean collections, and, with the Duke of Northumberland, co-appointed William Purdie to collect in the region in 1843. Joseph Hooker also had interests in the Caribbean flora, and accelerated the flow of plants further.[43] A real increase occurred with the appointment of Daniel Morris as Director of Public Gardens and Plantations in Jamaica in 1879. On the basis of his major agricultural achievements there, he was appointed Assistant Director at Kew in 1886, no doubt deepening Kew's connections to the Caribbean. He remained an active donor when, in 1898, he was appointed Imperial Commissioner to the West Indian Agricultural Department. And donations continued after 1908 when he became Scientific Advisor in Tropical Agriculture to the Colonial Office. Indeed, he is the seventh most frequent among named donors to the EBC with donations spanning the period from 1880 to 1920. Furthermore, it was Morris who encouraged John Hinchley Hart to exchange specimens with Kew in 1880, thus providing the EBC with its second most frequent donor (see below). Under Morris, Jamaica became a hub for botanic stations in the Caribbean, namely, Barbados, Grenada, St Lucia, St

[41] Cornish, "Curating Science," 351-366.

[42] Wayne Modest, "We Have Always Been Modern: Museums, Collections, and Modernity in the Caribbean," *Museum Anthropology* 35 (2012): 85-96.

[43] Desmond, *History of Kew*, 264.

Vincent, Dominica, Montserrat, St Kitts, and Antigua, and these islands, too, contributed to the EBC.

Other Europe (i.e. continental Europe beyond the UK and Ireland), accounts for a small though diverse selection of objects in the EBC**.** They include accessions from well-established institutions such as the Jardin des Plantes and Muséum d'Histoire Naturelle in Paris, beginning in 1860, the same year in which exchanges were made with Friedrich Miquel at the University of Utrecht. Examples of other European networks can be seen in 1870 with accessions from Charles Leurssen of Leipzig Botanic Garden, Edvard Anderson of the botanic garden at Stockholm University, and in 1872 the Berlin Botanic Garden, an association which has been resumed in more recent decades. In 1890 one of many exchanges made with botanist Odoardo Beccari in Italy is recorded, providing a good example of the way such networks arose and developed. Early in his career, Beccari had spent time at Kew Gardens learning the art of plant collecting, and during that time he met Charles Darwin, the Hookers, and James Brooke. Other donations, such as those in 1890 from a number of French business enterprises (including C. Prevet & Co, producers of dried vegetables, Vilmorin-Andrieux & Co, seed merchants and Jean Dufourg of St-Jean-de-Luz, from whom the museum purchased a walking stick) reflect the role of international exhibitions in fostering exchanges between scientific and commercial organisations. Europe remained a source region for a small number of donations throughout the twentieth century, and in relative terms has accounted for a greater proportion of accessions since 2000 (Chart 2b).

North America has supplied a small but steady stream of objects over the course of the museum's history, some facilitated through colonial agencies such as the Canadian High Commission in London and the Department of Agriculture in Ottawa. This was how Kew came to possess a totem pole from British Columbia in 1898, collected by Charles Newcombe.[44] Newcombe subsequently became a key figure in early twentieth-century North American accessions, and his botanical and ethnographic collecting for the Kew Museum continued until his death in 1924. Within the United States, leading botanists such as Asa Gray were prominent amongst donors. Gray is first recorded in the entry books in 1848. He had become acquainted with William Hooker in 1839 when visiting Glasgow University. Years later, in 1877, Joseph Hooker was to accompany Gray on a botanical expedition to the American West, and this trip provided further specimens for the Museum of Economic Botany. Gray's last donation to the Kew Museum, accessioned in 1886, came just two years before his death. Through Gray, Kew's North American collecting networks were extended further: connections were thus brokered with Gray's Harvard colleague, Charles Sprague Sargent and, in Missouri, with George Engelmann. Likewise, Kew's relationship with the Smithsonian Institution was also aided and abetted by fact-finding visits from Smithsonian museum men and

[44] Caroline Cornish. "'Useful and Curious': A Totem Pole at Kew's Timber Museum," *Journal of Museum Ethnography* 25 (2012): 138-151.

botanists from its fellow institution, the United States Department of Agriculture (USDA). Secretary Joseph Henry, on a trip to Europe in 1870, visited Kew's gardens and museum and pledged to Joseph Hooker to "contribute in any way, through the influence of the Smithsonian Institution, to their riches."[45] However, little was exchanged over the next decade and it was not until the advent of Spencer Fullerton Baird as Secretary in 1878 that a more intense phase of museum exchange began.

Expeditions and exhibitions provided further channels for economic botany material to reach Kew. In 1857 the first specimens and artefacts arrived (via collector Eugene Bourgeau) from Palliser's British North American Expedition to Western Canada. In 1859 geologist Charles Lyell donated objects originally collected in the course of work for the British North American Boundary Commission, and, as has already been observed, Joseph's Hooker's own 1877 trip to Western America further augmented the American collections. Exhibitions meanwhile were responsible for more substantial donations. For example, the New Brunswick, Vancouver Island, British Columbia and Canadian Courts transferred major wood collections to Kew after the London International Exhibition of 1862. And as late as 1925, the British Empire Exhibition at Wembley provided the opportunity for accessions from the Canadian and Newfoundland Courts.

Many of these networks were sustained well into the twentieth century. Kew's continuing interests in forestry were reflected in contributions from the Canadian Forestry Corps and Forest Products Laboratories of Canada in the 1920s, the Arnold Arboretum at Harvard on numerous occasions, the Pacific Lumber Company (1926), and Yale University's School of Forestry (1938). From the 1970s onwards new universities joined the roster of donors, including large botanical collections from the field research of American botanists such as Robert Godfrey and James Triplett of Florida State University in 1969, and woods from the University of Wisconsin in 1975. Furthermore, in the 1980s and 1990s Kew's engagement with SEPASAL led to exchanges with the University of Arizona.

In the above account of the geography of accessions, we have emphasised the variety of channels through which objects actually entered the collection and the effect of changes in institutional policies on this – hence, for example, the increasing impact of Kew-led expeditions, especially in Africa, South America and parts of Asia in the post-war era. This pattern was reinforced by the Morton Agreement of 1961, in which the herbaria at Kew and the Natural History Museum were each given responsibility for vascular plants in specific geographic regions, in an attempt to avoid duplication of effort (Figure 4). Thenceforth Asia, South America and Australasia (including Polynesia) and much of Africa (with the exception of NW Africa, parts of West Africa and Angola) became the concern of the Kew Herbarium. Complicating this arrangement was a systematic dimension to the

[45] Letter from Baird to Joseph Hooker; from Charing Cross Hotel, London, 31 August 1870; RBGK Archives, DC197, f. 419a.

agreement, by which the Natural History Museum took primary responsibility for algae, lichens and bryophytes, and Kew assumed charge of fungi and gymnosperms. In the wake of this agreement, transfers of material already acquired (some dating back to the 1930s) were made from the Kew herbarium into the economic botany collection, notably in 1968-70. These included specimens from regions no longer within Kew's core remit (such as seeds collected in West Africa by T. Lloyd Williams and J. Pirie in 1936)[46] and regions firmly within Kew's domain (such as Charles Jeffrey's collections from his 1962 Seychelles trip, accessioned in 1968).[47]

4.3 Types of object

Chart 3a shows variations in the type of objects accessioned into the EBC between 1850 and 2010, at 10-year intervals; Chart 3b displays this in relative terms. While these graphs may suggest possible long-term trends over time, they also mask obvious variations from year to year. In contrast to the time series data in Charts 2a and 2b, these figures are designed to show the composition of the collection at

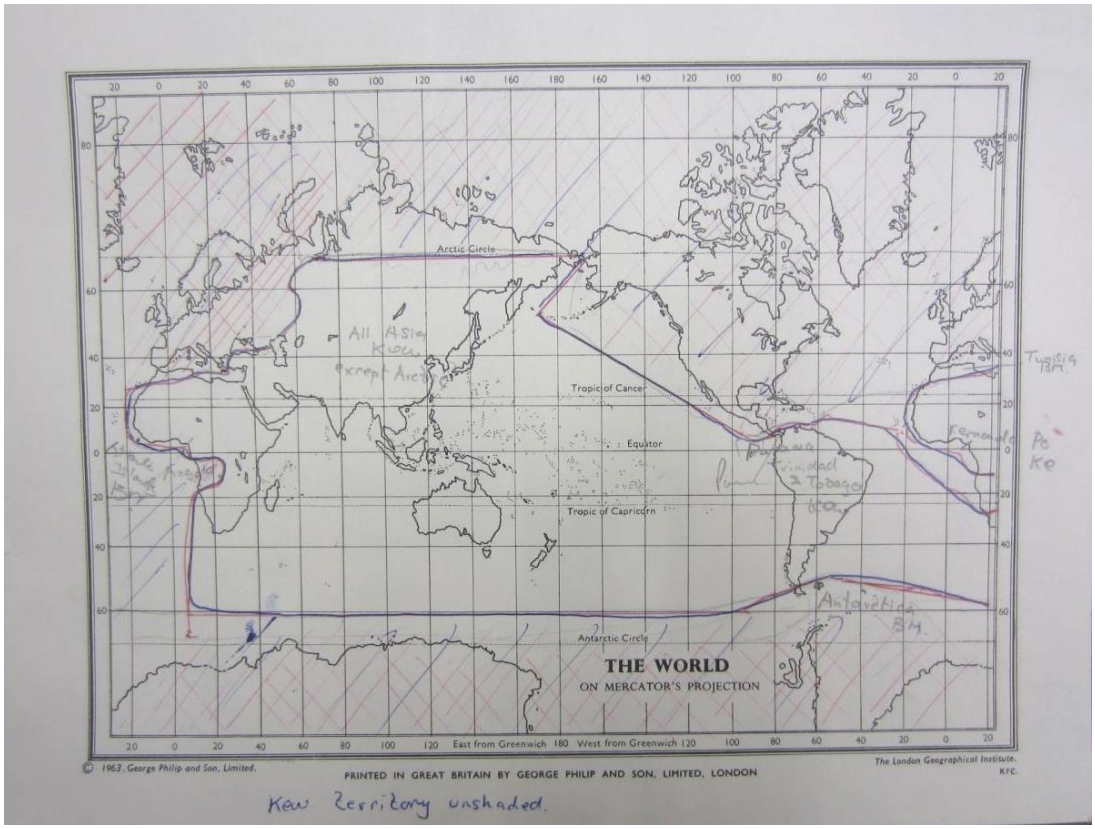


Figure 4. Map illustrating the terms of the Morton Agreement 1861. At the bottom is written "Kew territory unshaded." Source: NHM Archives, QE 1312.

[46] RBGK, EBC, Entry Book 1924-1974, 8.1969, p. 290; 9.1969, p. 291.

[47] RBGK, EBC, Entry Book 1924-1974, 19.1968, p. 283.

regularly-spaced points in its development: they are "snapshots" or "trial trenches."[48] The raw data is presented in Table A. In aggregate, this decennial data constitutes a systematic, non-random, sample amounting to 10% of the total number of accession events.

Underlying this analysis is a coding of accessions data, distinguishing five object types as follows:

- Raw materials (wood): blocks of wood forming part of the Kew wood collection or xylarium
- Raw materials (other): other unprocessed plants or plant parts
- Processed plant products and manufactured objects: including processed fibres, vegetable oils and finished goods
- Ethnographic objects: hand-crafted objects of ethnographic interest
- Images and publications: including illustrations, photographs and portraits.

The first two of these categories are specimens of natural history, accessioned into the EBC on the basis of their potential economic significance: here woods have been separated out because of their numerical significance within the collection and because collectively they are a xylarium, a sub-collection with specific uses and users, particularly wood anatomists. The next two categories are made objects, i.e. examples of plants which have been processed, prepared or manufactured for use: here industrial products have been distinguished from ethnographic objects. The final category, images and publications, consists mainly of photographs and texts illustrating various aspects of economic botany.

In coding the records to produce the data in Table A, it was necessary to devise a means for handling composite accessions, i.e. those accession events which included more than one object type. In these cases, fractions have been used (thus for example where two object types are included, a figure of 0.5 was entered for each) so that the integrity of the underlying data – based on single accessions events – is maintained. It is noticeable that some types of object were in the past more likely to be included in composite accessions: as Table B indicates, this applies particularly to ethnographic artefacts, which were more commonly accessioned along with other kinds of material. The effect on the aggregate patterns shown in the pie chart under Table A, however, is relatively minor.[49]

Woods currently account for approximately one third of objects in the entire EBC, totalling 35,350 objects.[50] From the early years of the collection, raw wood

[48] Gosden & Larson, *Knowing Things*, 12.

[49] An alternative method, whereby composite accessions events were treated as multiple events, was tested to see if it would result in a significantly different pattern in proportions by type: this gave relatively minor differences amounting to no more than one or two percentage points.

[50] Due to the format of the EBC database, it is not possible to calculate precise figures for the proportion of objects by type in the collection as it now exists, except for woods. Estimates for other object types can be made based on adjusted patterns of historical accessions. Note that images and publications no longer form

specimens cut into blocks constituted a significant proportion of accessions. Originally included in the systematic displays of Museum Nos. 1 and 2, they formed the basis of two additional museums: Museum No. 3 (Timber) which opened in 1863, and Museum No. 4 (British Forestry), opened in 1910.[51] Since wood items were often donated as part of large collections, the data here – based on accession events, not individual items – significantly under-represent the actual number of wood specimens received. In 1850, two donations in particular−142 wood specimens from the aptly-named Lieutenant Wood of the Royal Navy, and 200 from the Duke of Northumberland− are noteworthy, partly because they highlight the tendency for wood accessions to consist of large numbers of individual objects (and consequently to be under-represented in the data), and partly because they introduce us to two important networks for the Kew Museum's wood collections in the mid-nineteenth century: the British Navy and Admiralty; and aristocratic landowners.[52] The Duke of Northumberland owned the neighbouring estate to Kew, Syon Park, on the opposite bank of the Thames, and this geographical proximity, as well as a shared interest in horticulture, was the foundation for a long-lasting association which began when Kew was still a royal estate. The alliance was revived in William Hooker's time with Kew and the Duke co-funding plant collector William Purdie, and it continued with plant exchanges and object donations to the EBC over the course of the ensuing three decades.[53]

In the last quarter of the nineteenth century and continuing into the early twentieth, the records reveal that aristocratic and other landed donors accounted for a steadily rising proportion of woods entering the collection. Common interests in horticulture, arboriculture, and garden design and architecture made such donors as the Duke of Richmond, the Earl of Ducie, and their gardeners, rich sources of plant and wood exchanges.[54] Overwhelmingly, however, the majority of wood accessions in the years 1870, 1880, 1890 and 1900 were from colonial donors, including heads of botanic gardens, such as von Mueller in Melbourne, and Ridley in Singapore, colonial governors such as the Honourable Arthur Hamilton Gordon, at this time Governor of Trinidad, and other colonial officials, including John Kirk in Zanzibar and James Spencer Hollings in Montserrat.[55] Collectively they represent the desire to export colonial timbers amidst concerns over the depleted stock of British forests in the closing decades of the nineteenth century.[56]

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part of the collection as these were transferred to other Kew collections (Illustrations, Library, Objets d'Art) when the EBC moved into the Banks Building.

[51] Cornish, "Curating Science," 116.

[52] RBGK, EBC, Museum Entry Book 1847-1855, EBN 1.1850 & EBN 19.1850.

[53] Desmond, *History of Kew*, 36, 195; between 1848 and 1861, 9 donations from the Duke and/or Duchess of Northumberland are recorded.

[54] Entry Book 1879-81, 122.1880, p. 41; Entry Book 1881-95, 112.1890, p. 367

[55] Entry Book 1861-79, 45.1870, p. 260 (Mueller); 57.1870, p. 262 (Ducie); 70.1870, p. 266 (Kirk) Entry Book 1879-81, 26.1880, p. 14 (Hollings), 122.1880, p. 41 (Richmond); Entry Book 1896-1924, 70.1900, p. 144 (Ridley).

[56] See, for example the following parliamentary papers: 1884-85 (287) Report from the Select Committee on Forestry; together with the Proceedings of the Committee, Minutes of Evidence, and Appendix; 1884-85 [C.4376] Canada. Reports on the Forests of Canada. With précis by Dr. Lyons, M.P., of certain papers

The scale and relative significance of raw wood collecting fluctuates somewhat over the series of decennial samples while remaining a feature of accessions throughout the period. Wood accessions surged in 1910, the year of the opening of the British Forestry Museum at Kew. By now the donor base amongst aristocratic estate owners was much broader, including the Earls of Wharncliffe, Darnley, and Derby, and extending to King George V, who donated a wood specimen from the Sandringham Estate. In 1920 the Empire Timber Exhibition brought benefits for the EBC. The arrival in 1930 of C. R. Metcalfe as wood anatomist at the Jodrell Laboratory had more lasting impacts on the wood collection. In 1950 Metcalfe published a two-volume, 1500-page survey entitled *Anatomy of the Dicotyledons*, co-authored by Lawrence Chalk of the Imperial Forestry Institute at the University of Oxford; the woods accumulated for the research were added to the collection.[57]

Forestry institutes continued to be an important source of woods in the inter- and post-war periods. Personal connections between anatomists and senior technicians at Kew and the Forest Products Research Laboratory, Princes Risborough, facilitated exchanges of large numbers of specimens, some of which are reflected in the data for 1930 and 1950. And in 1970 a backlog of accessioning activity resulted in significant contributions from the Imperial Forestry Institute at Oxford, "found in Museum II, February 1970," but presumably a legacy of Metcalfe and Chalk's research.[58] Overseas forestry institutes are also reflected in the 1970 figures, notably the Institut Forestal in Madrid.

This period also saw an increase in the number of wood collections received from field botanists. Notable accessions include woods from East Africa collected by the Oxford University Tanganyika Expedition of 1958 and accessioned in 1960, and in 1970, woods from Uganda collected by B.T. Styles, and from Fiji by Damanu, Bola and Seru for the Council for Scientific and Industrial Research (CSIRO) in Australia. Other herbaria also appear, such as the Leiden Rijksherbarium in 1970 with donations from Western New Guinea. Since the 1980s, wood acquisitions, whilst not in large numbers, have entered the collection from the Jodrell Laboratory, donated by Kew's wood anatomist, Peter Gasson, and a continuing trend in donations from field botanists was also evident in both 1980 and 1991.[59]

The trend in accessions of **other raw materials** reflects the history of experimental projects at Kew, especially those associated with acclimatisation, such as cinchona from the 1860s to 1880s, rubber in the 1870s to 1910s, and sisal in the 1890s and 1910s. The rise and fall of other monocultures, such as palm oil and sugar, are similarly reflected in the accessioning records, as are investigations into

submitted therewith; 1887 (246) Report from the Select Committee on Forestry; together with the proceedings of the committee, minutes of evidence, and appendix.

[57] Charles Metcalfe & Lawrence Chalk, *Anatomy of the Dicotyledons; leaves, stem, and wood in relation to taxonomy, with notes on economic uses*, (Oxford: Clarendon Press, 1950).

[58] RBGK, EBC, Entry Book 1924-74, 3.1970, 347-8.

[59] Caroline Cornish, Peter Gasson & Mark Nesbitt, "The Wood Collection of the Royal Botanic Gardens, Kew," *IAWA Journal* 35 (2014): 85–104.

alternative materials for paper and fibre production, a theme which runs through the nineteenth century and reappears at times of imposed autarky, as during the two world wars.[60] These raw materials constituted a consistently well-represented category in the years to 1930, receiving a significant boost from events such as the 1910 Japan-British Exhibition at Shepherd's Bush, and the numerous expeditions which are discussed in more detail below (Section 4.4).[61] Whilst less significant during and immediately after the Second World War, there is evidence of some "bounce-back" in this category from the 1980s, reflecting renewed interests in natural materials such as raffia, and plants used for tisanes, pot-pourri, and medicines.

Patterns in the accession of **plant products** – processed or semi-processed plant raw materials - have tended to reflect those of raw materials, with the same cash crops driving collecting activity. Typically, economic botany museum displays consisted of a range of objects, from the plant itself, through various stages of processing, and ending in the finished, saleable object. Known as the "illustrative series," these series were often supplied by manufacturing companies, as in 1870 when the chocolate manufacturers J. S. Fry & Sons donated a series of cocoa specimens representing the chocolate production process, and the walking sticks furnished by Henry Howell & Co. in both "blank" and finished form. This twinning of plants and their products extended beyond commercial display into the practice of collectors: thus in 1860 the entry books record William Baikie sending back from his Niger expedition a portion of a spadix and fruits of the *Hyphaene* species, together with rope made of the same plant (collected by Charles Barter who had died the previous year).[62] For the purposes of the present analysis the category of processed plant products has been combined with that of manufactured objects**,** with both defined by the industrial processing of raw materials. Fully manufactured objects were frequently acquired as a result of international exhibitions, or, as in the case of Henry Howell, directly from the manufacturers for whom there was, no doubt, a degree of cultural capital to be accrued from having one's merchandise displayed in a national museum.

Ethnographic objects, as defined here, have formed a small but significant part of the EBC from its beginnings (see Charts 3a-3c). Indeed, the first ethnographic object in the collection predates the museum itself; it was one of "various specimens received from different sources & which had been collected from time to time in the Garden," a doormat, made of *Phormium tenax* (flax) and donated by New Zealand missionary William Colenso in the mid-1840s, which was transferred to the British Museum in 1960.[63] William Hooker and his successors were keen to collect and display objects from various parts of the world, including indigenous

[60] James Wearn, "Seeds of Change: polemobotany in the study of war and culture," *Journal of War & Culture Studies*, 9 (2016), 271-284; Desmond, *History of Kew*, 278-9.

[61] Cornish, "Curating Science," 117.

[62] Entry Book 1855-1861, 2.1860, p. 436.

[63] Entry Book 1847-1855, 2.1847, p. 1.

artefacts, to illustrate the practical applications of plants. In the 1850s colonial residents and travellers were frequent donors of economic botany material, as were expeditions, particularly those of David Livingstone, Alfred Russel Wallace, and Richard Spruce. By the 1880s, with an expansion in colonial museums, we see accessions from Everard im Thurn at the British Guiana Museum, from museums in botanic gardens at Hong Kong, Saharanpur and Coimbra, and from Joseph Henry Maiden at the Sydney Technological Museum in 1890. Donors of ethnographic artefacts at the end of the nineteenth century include missionaries (such as the Reverend R. B. Comins in 1890 and the South American Missionary Society in 1900), an increasing number of anthropologists (such as Alfred Cort Haddon), and professional field collectors (such as Charles Newcombe in British Columbia). The impact of salvage ethnography was felt at Kew as it was elsewhere during this period.[64]

Kew's role in acquiring ethnographic objects diminished during the twentieth century initially as ethnographic museums developed and then as anthropology emerged as a university discipline.[65] As a result of the 1958 Ashby Report, which recommended the immediate closure of Museums 2 and 3, a substantial number of ethnographic artefacts were transferred to other institutions between 1958 and 1961, notably the British Museum, the Pitt Rivers Museum and the Horniman.[66] However, a resurgence of interest in ethnographic objects was experienced from 2000 onwards with the growth of ethnobotany and the EBC's involvement via the University of Kent. The shift is also reflected in the accessions data for 2000 and 2010, indicating that ethnographic acquisitions remain a significant component of collections policy.

Images and publications is a blanket term for a heterogeneous range of objects including botanical illustrations, photographs, portraits and portrait busts, medals, and publications. Unusually for the Kew Museum, these objects were most likely to be purchased, though in administrative terms they were accessioned into the collection in exactly the same way as specimens and plant-based artefacts. Botanical illustrations were often displayed within the museum display cases alongside specimens to show the living plant at all stages of its life cycle, and photographs were used to provide biogeographical context (Figure 5). Models might include models of plant species, for which the preferred medium was wax, as substitutes for plants dried or preserved in spirit, or models demonstrating processes of manufacture, which were made in a range of media, notably wood, papier mâché, and clay.[67] Portraits of famous botanists were displayed in Museum

[64] Caroline Cornish, "Useful and Curious". See also George W. Stocking, *Victorian Anthropology* (New York: The Free Press, 1987).

[65] George W. Stocking (ed.) *Objects and Others: Essays on Museums and Material Culture* (Madison, University of Wisconsin Press, 1985); Stephen Conn, *Museums and American Intellectual Life, 1876-1926* (Chicago, IL: University of Chicago Press, 2000).

[66] Unpublished report, "Report of a Visiting Group to the Royal Botanic Gardens, Kew (Chairman: Sir Eric Ashby) [in March 1957]," Great Britain, Ministry of Agriculture, Fisheries and Food [MAFF] 1958.

[67] Cornish, "Curating Science," 154-69.

No. 1, in a pantheon of sorts of the botanical great and good, and publications were usually periodicals or monographs, the latter sometimes donated by the author. When the EBC was databased and moved to the Banks Building in 1987, photographs, illustrations, portraits, and publications were transferred to the Herbarium, Library, Arts and Archives collections. The models, however, remained with the EBC (with the exception of the Edith Blackman orchid models now on display in the Herbarium) and have survived at Kew where similar interpretative materials have not survived in comparable institutions, as, for example, the Natural History Museum.[68] Further to the redefinition of illustrative material at Kew in 1987, and since models are no longer actively collected, this category of objects does not feature in the data for the years 1991, 2000 and 2010.

Figure 5. Case 67 in Museum No. 2, showing use of botanical illustrations and photographs within the display. Image: Johannes Lotsy, 1902.

4.4 Types of donor

[68] Cornish, "Shared Histories: the collections of the Royal Botanic Garden, Kew and the Natural History Museum (Unpublished report, 2013). Accessed 4/6/2017 at https://www.academia.edu/3726009/Shared_Histories_The_Collections_of_the_Royal_Botanic_Gardens_Kew_and_the_Natural_History_Museum).

Chart 4a shows variations in the type of donor to the EBC between 1850 and 2010, at 10-year intervals; Chart 4b displays this in relative terms. Like the graphs for types of object, these are snapshots rather than time-series. Table C presents the raw data. Overall, as stated above, the aggregate of these decennial snapshots presents a 10% systematic sample of the total accessions over the period 1847 to 2010.

Underlying the following analysis is a coding of accessions data, distinguishing eight donor types as follows:

- Private Collectors
- Expeditions
- Traders & Manufacturers
- Government Departments
- Botanic Gardens
- Museums & Exhibitions
- Other Kew Departments
- Other

The categories used here reflect the principal types of personal, institutional, social and economic networks through which objects moved in and out of the collection, as revealed by previous research on the provenance of objects, notably the woods.[69] However, analysing object accessions by type of donor is complicated by the considerable overlap between these categories, especially in longitudinal terms: a donor such as John Kirk thus appears in the category of "expeditions" for donations associated with his role on the Zambezi Expedition 1858-1863, but moves to that of "government departments" for those connected to his position as Vice Consul and Consul General in Zanzibar from 1867 to 1887. Such is the effect of what has been called "imperial careering."[70] For our purposes, what determines how a given accession is coded is the spatial and temporal context in which the original collecting took place, rather than the name of the collector. This approach also means that where possible, internal transfers within Kew - mainly of materials from the herbarium, as for example in the case of the RBG Kew/Darwinian Buenos Aires Joint Expedition of 1978 – have been coded on the basis of information provided about the original provenance.[71]

Private collectors are evidently a significant group of donors throughout the history of the collection, though in this sample they appear more consistently in the period prior to 1940. The category includes individuals in Britain and around the world, particularly in colonial settlements, who did not derive the greater part of their livelihood from botany; gentleman (and gentlewoman) naturalists both at

[69] Cornish, "Curating Science," 114-16; Cornish, "Useful and Curious," 138-151.

[70] David Lambert and Alan Lester (eds.), *Colonial Lives Across the British Empire: Imperial Careering in the Long Nineteenth Century* (Cambridge: Cambridge University Press, 2006).

[71] RBGK, EBC, Entry Book 1987-2006, 34.1991, p. 19.

home and abroad; and those with significant private collections. Contextual research suggests that material from such individuals entered the collection overwhelmingly through active donation rather than through purchase or bequest. In this respect the pattern of acquisition differs from certain other collections, for example, that found in Hans Sloane's vegetable substances collection, now in the Natural History Museum, whose augmentation by the wholesale purchase of other collections (usually after the death of other collectors) has been identified as a major factor in its growth.[72] Donations by individuals to the EBC continue to be made, for a variety of reasons, though to judge by the decennial record they have been less common since the mid-twentieth century: nonetheless, in 2010 private individuals constituted the largest single category of donor (Table C).

Expeditions account for a significant proportion of accessions, though this is evidently variable depending on the timing of expeditions and the manner of donor behaviour: in this data, a series of small donations (as measured by the basic unit of analysis, the accession event) will count for more than a single bulk donation. In 1850, for example, Richard Spruce's voyages of exploration in the Amazon Basin and Andes accounted for a significant sequence of expedition donations (described above). In 1860 the number again rose, with the expeditions of William Balfour Baikie, David Livingstone, Alfred Russel Wallace, Eugene Bourgeau and Charles Wilford all reflected in the figures. While decennial samples may hide important year-by-year variations, it is likely that the higher proportion of expedition-related donations from 1960 onwards reflects the shift to Kew-led scientific expeditions (see Section 4.2 above).

From the earliest days of the museum, **traders and manufacturers** were a significant source of both material and support for the museum, and this is reflected in the decennial data. Commercial networks provided an important resource for Kew, enabling experiment with industrial processes in the manufacture of paper and other commodities, using plant materials supplied via Kew.[73] After the Second World War, the decline of the museum and the gradual cession of its commercial remit to other institutions is reflected in a lower profile for such donors, though they continue at a lower level to the present day. In 1980 the EBC received seeds from commercial enterprises J. Bibby Agriculture Ltd and the Setterswood Trading Company, tobacco leaves from Tobacco Associates Incorporated, and food products from Rank Hovis McDougal. And as recently as 2010, commercial lacquer artist Veronika Gritsenko donated lacquerware objects from her studio in Myanmar, whilst an Indian tea donation was accessioned from Fortnum & Mason, a company whose first recorded donation to the EBC was in 1855.

[72] In the case of Sloane's collection, posthumous purchases of the collections of Leonard Plukenet, James Petiver and others accounted for a substantial part of the collection: Victoria Pickering, "Putting Nature in a Box: Hans Sloane's 'Vegetable Substances' Collection," PhD Thesis, Queen Mary, University of London, 2017, 55-6, 152.

[73] Desmond, *History of Kew*, 278-79; Hew D. V. Prendergast, "Papyrus, paper and paper making: a view of Kew's economic botany collections." *Curtis's Botanical Magazine*, 19.2 (2002): 126-144., .

Government departments supplied a significant proportion of objects to the collection in its heyday to 1930, and sporadically since then. The category covers a diverse range of institutions in the UK, ranging from the Foreign Office and the Diplomatic Service, the Colonial and India Offices, to the Department of Science and Art (DSA), and the Ministry of Agriculture, as well as in the colonies (though material from the latter might be presented by government departments based in the UK and recorded as such). Analysing accessions from government departments makes clear the range of points at which Kew has intersected with the agencies of government over its continuing history. Under Thiselton-Dyer's directorship from 1885 to 1905, Kew's connections with the machinery of government reached new heights, and the 1890-1910 figures reflect the increased "dependency" of these government departments on Kew's expertise.[74] In the post-colonial era, this category includes many government departments of other nations, former colonies or otherwise.

Botanic gardens have provided a modest but enduring component of accessions into the EBC for most of the collection's life. This reflects Kew's broader historical role as a key node in the national and imperial network of gardens. Up until 1930 Kew fulfilled Lindley's vision as "the centre around which all those minor establishments should be arranged … aiding the mother country in everything that is useful in the vegetable kingdom," and the increased number of agricultural and botanic stations introduced in colonies during the early twentieth century are included in these figures.[75] In the Commonwealth era, while newly-independent nations took charge of these gardens, staffing them with local gardeners and botanists, and extending their own networks to include gardens around the world, they nevertheless maintained existing links with Kew. India is a good example of this: for example, Kew has hosted an Indian Botanical Liaison Officer for many years, to facilitate research between India and the UK.

Chart 4a indicates considerable variation in materials acquired from **museums and international exhibitions**. In general, these decennial samples underestimate the significance of accessions derived from world exhibitions and world's fairs for the simple reason that these were episodic rather than continuous in nature. Furthermore, materials from museums and world exhibitions tended to be accessioned in batches: the number of accession events was relatively low, though the volume of objects might be very high. For example, in 1856 the Kew Museum received 319 objects from the Royal Commissioners for the Great Exhibition of 1851, the details of which cover seventeen pages in the entry book, yet collectively these objects amount to only accession event.[76]

[74] Desmond, *History of Kew*, 260.

[75] Parliamentary Paper 1840 (292), "Botanical Garden (Kew). Copy of the Report made to the Committee appointed by the Lords of the Treasury in January 1838 to inquire into the Management, &c. of the Royal Gardens at Kew," 4.

[76] Entry Book 1855-61, 83.1856, pp. 118-134.

The final specified donor category presented in the charts is **Other Kew Departments**, being mainly the gardens, the herbarium, the Jodrell laboratory, and Kew employees – gardeners, directors and all intervening ranks, not to mention family members.[77] Amongst these, the museum curators continue to play a significant role: many have donated objects collected on their travels and via their networks. The museum's founding collection consisted of William Hooker's personal teaching collection and the tradition continues to the present day, with museum staff figuring regularly in the entry books.

4.5 Named donors

Classifying types of donors gives us some indication of the channels through which objects were acquired, and the networks on which these depended. Given the ubiquity of personal names in the underlying record – even where institutions were the source, a named individual was always identified as the donor in the entry books - it is possible to extend the analysis to the level of individuals. Chart 4c presents data on the top twenty named individual donors over the history of the collection, as measured by the number of distinct accession events in which they are named. Table D shows biographical and occupational data for these individuals. This suggests that three quarters of the names most frequently named as donors in the accessions record were directly linked to agencies of imperial and colonial botany. Such a pattern is to be expected given what we know of the role of institutional networks in the supply of botanical materials to Kew more generally.[78] While the underlying data – based on the accessions event - may underestimate the scale and significance of individual donations to EBC, it provides a working guide to the outcomes of Kew's enduring connections with key individuals. However, it is also important to emphasise that the distribution profile suggested by Chart 4c is not greatly skewed to a handful of people. Indeed, it might be argued that what is striking in the data as whole is the breadth of distribution across a large donor base. The top twenty individuals represented in this chart thus represent only 9% of all accession events. Extending the analysis to all those named in the accessions record on ten or more occasions (165 cases), the data show that collectively these still account for less than 30% of total accessions.

These findings raise further questions about the nature of the relationship between the EBC and individual donors. For example, to what extent were donations simply one-way transactions, or were they part of an enduring relationship involving exchange? What were the affective aspects of relationships between Kew and these donors? Did donations confirm an existing relationship or establish a new one? More particularly, did they precede or follow the establishment of research networks such as those involving the pharmaceuticals manufacturer Daniel Hanbury (donor of cinchona bark specimens) or paper manufacturer Thomas

77 The Herbarium is coded under "Other Kew Departments" only when the original provenance of the material is not given; otherwise Herbarium accessions fall more commonly under "Expeditions."

78 Cornish, "Curating Science," 115-16.

Routledge (donor of samples of bamboo fibre and other materials)? Such questions are matters for further research. Here we look in more detail at the top two donors, Ferdinand von Mueller and John Hinchley Hart, to indicate the ways in which we can further contextualise the accessions data at the level of individual careers. The comparative pattern of their donations to EBC, reflecting their career trajectories in colonial botanical institutions, is summarised in Chart 4d.

Ferdinand von Mueller (1825-1896)

Mueller was one of a number of German scientists who settled in Australia in the middle decades of the nineteenth century. Overseas travel, fulfilling a broadly Humboldtian vision of adventure in the name of science, was a requisite for this generation of naturalists.[79] But there were also economic factors at play. Germany at this time led Europe in producing scientific specialists, indeed German scientists were so numerous at home that they had to seek career opportunities overseas.[80] Berthold Carl Seemann was one such botanist, who moved to England and the Royal Botanic Gardens, Kew in 1844 in order to train as a plant collector, and who, under William Hooker's patronage, was appointed in 1846 as naturalist on the Pacific expedition of HMS *Herald.*[81] The EBC still holds fifty-one objects brought back by Seemann from voyages to Fiji and Latin America. At around the same time that Seemann was setting off for the Pacific, Mueller arrived in Adelaide. He first worked as a pharmacist, then in 1853 he was appointed Government Botanist of the state of Victoria, a position he maintained until his death in 1896. From 1857 to 1873 he was also director of Melbourne's botanic garden. One of his first letters on becoming Government Botanist was to William Hooker, written en route to the Australian Alps on his first collecting trip in his new role.[82] He used the opportunity to ask whether Joseph Hooker or George Bentham, "or another botanist diligent productive, and accomplished like those great learned men," would take on the revision and publication of his manuscripts and the distribution of the corresponding specimens. He also suggested specimen exchanges, and asked to be involved in the writing of an Australian flora, should Hooker be considering preparing one. Thereafter he wrote on a regular monthly basis, continuing correspondence with subsequent Kew directors Joseph Hooker and Thiselton-Dyer. Indeed, the vast majority of his surviving correspondence consists of letters to and from "the Kew triumvirate" of Bentham and the two Hookers (Table E).[83]

[79] R. W. Home, "A botanist for a continent: Ferdinand von Mueller (1825-96)," *Endeavour* 22(1998): 72.

[80] For more on this theme, see Ulrike Kirchberger, "Deutsche Naturwissenschaftler im britischen Empire. Die Erforschung der außereuropäischen Welt im Spannungsfeld zwischen deutschem und britischem Imperialismus," *Historische Zeitschrift*, 271 (2000): 621-660.

[81] G. S. Boulger, 'Seemann, Berthold Carl (1825–1871)', rev. Andrew Grout, *Oxford Dictionary of National Biography*, Oxford University Press, 2004; online edn, Sept 2012 [http://www.oxforddnb.com/view/article/25029, accessed 2 June 2017].

[82] RBGK Archives, Directors' Correspondence (DC) 74, Australia Letters 1851-58, f. 135; letter to William Hooker from Camp on the Darebin Creek, 3 February 1853.

[83] R. W. Home, A. M. Lucas, Sara Maroske, D. M. Sinkora, J. H. Voigt & Monika Wells (eds.), *Regardfully Yours*, *Vol. 2, 1860-1875*, (Bern: Peter Lang, 2002), 49.

Mueller's first donation to the EBC was in July 1857 when he sent fruits of *Eucalyptus*, *Cycas* and *Luffa*, and "a fungus." He subsequently travelled extensively in Australia and organised expeditions further afield, to New Guinea, the Pacific islands, and Antarctica. Like the Hookers at Kew, he expanded the herbarium at Melbourne into a world-class collection through networks of exchange. As Government Botanist, Mueller was equally committed to economic and systematic botany, supporting efforts to produce eucalyptus oil on a commercial scale, and promoting endemic species for their timber, particularly through the medium of international exhibitions, in which he was highly active.[84] Particular interests were plants which were sources of fibres, food, drugs and tannins, and plants dangerous to livestock.

Today the EBC houses a total of 177 objects donated by Mueller directly or via the Melbourne Botanic Garden during his tenure. They range from plant parts — particularly woods, seeds, and fruits — to made objects, both the paraphernalia of settler life, such as wheels, cask-staves, and fork handles — and the material culture of Aboriginal Australians (Figure 6). Indeed, his final donation, on 8 September 1896, just a month before his death, was a section of a necklace of *Musa colosperma* from New Guinea.[85] However, his engagement with anthropology was subservient to his botanical and economic concerns: he was primarily interested in the knowledge which could be gained by observing indigenous usages of plants. He thus wrote of a fruit, "called by the aborigines Gunyang … and of which the natives are passionately fond."[86] More often, though, his correspondence suggests fear of aboriginal peoples, rather than fascination with them. In one letter he cites the "well-known hostility of the natives" as one of the dangers of plant-collecting in Australia;[87] in another, he talks of "the horrible depth, which the Australian autochthones occupy in human culture."[88] As Home argues, his letters demonstrate little sensitivity toward indigenous Australians, and he was certainly not above sending Aboriginal bones of uncertain provenance to overseas museums.[89] However, citing these examples risks over-emphasising his overall interest in aboriginal Australians; overall it is the *lack* of discussion of the subject, particularly at the individual level, that is most telling of his attitude.

[84] Home et al, *Regardfully Yours, Vol. 2*, 15.

[85] RBGK, EBC, Entry Book 1855-1861, 107.1857, p. 211; Entry Book 1896-1924, 101.1896, p. 18. This object is no longer in the collection.

[86] RBGK Archives, DC 74, Australia Letters 1851-58, f. 149; letter to William Hooker from Lake Wellington, Gipps Land, March 1, 1855.

[87] Letter to William Hooker from 'On board the Monarch, off Moreton Bay, 22 July, 1855,' cited in Home et al, *Regardfully Yours, Vol. 1,* 230.

[88] Letter to Rudolph Virchow from Melbourne, 26 October 1887, cited in Home et al, *Regardfully Yours, Vol. 3*, 480-81.

Figure 6. EBC 59889, "Boomerang used by natives about Stirling Sound, W. Australia."

John Hinchley Hart (1847-1911)

Hart's correspondence with Kew directors Joseph Hooker, William Thiselton-Dyer and David Prain, amounting to some 211 letters, dates from August 1880 when, as Superintendent at King's House, Jamaica (the official residence of the Governor-General of Jamaica), he sent, by way of introduction and "with the approval of D. Morris Esq, Director of Public Gardens and Plantations for Jamaica" (and formerly Joseph Hooker's Assistant Director at Kew), a gift of fresh mangoes from the King's House garden.[90] By 1881 Hart was employed as Superintendent of Cinchona Plantations in Jamaica (1881), although his name is linked to only one recorded EBC accession during this period of his career. The most intense period of exchange with Kew came when he was appointed Director of the Botanic Garden of Trinidad in 1887, where he remained until his retirement in 1908.[91] Over the next twenty years, Hart was responsible for no less than 102 separate accessions to the collection, an average of five per year. In many instances he was seeking plant determinations or reports on new plant raw materials, and in exchange for fielding these tasks to the Kew Herbarium and to commodities brokers, such as Hecht, Levis & Kahn of Mincing Lane, the Kew Museum was able to retain the specimens and augment its collections.[92] Hart's particular areas of interest were rubber, which he cultivated at Trinidad's Botanic Garden as part of the colonial rubber project managed from Kew,[93] and cacao, which became a major contributor to the Trinidadian economy.[94] Currently 82 objects donated by Hart survive in the EBC,

[90] RBGK Archives, DC 211, f. 544; letter from J.[John Hinchley] Hart to Sir Joseph Dalton Hooker; from Kings House, [Jamaica], August 7, 1880.

[91] "Hart, John Hinchley (1847-1911)", JSTOR Global Plants, accessed May 11,2017, http://plants.jstor.org/stable/10.5555/al.ap.person.bm000038056?searchUri=si%3D0%26ff%3Dps_repository_name_str__ps_collection_name_str%26fq%3DcHNfdHlwZTooInJlZmVyZW5jZSBzb3VyY2VzIik%253D%26filter%3Dpeople%26so%3Dps_group_by_genus_species%2Basc%26Query%3Djohn%2Bhinchley%2Bhart.

[92] Letter to Thiselton-Dyer, July 12, 1898, cited in Hart et al, *Regardfully Yours, Vol. 3*, ?

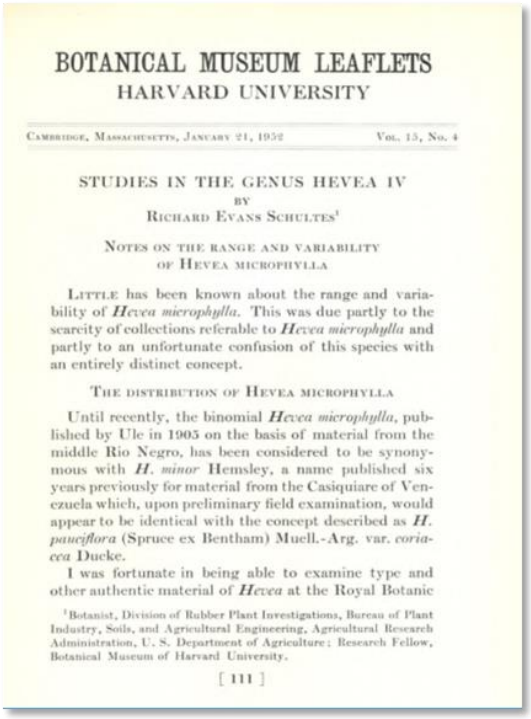
[93] Anon, "Para Rubber. (*Hevea brasiliensis*, Muell. Arg.)," *Bulletin of Miscellaneous Information (Royal Botanic Gardens, Kew)* 142 (1898): 275-276.

[94] Anon, "Ceylon Cocoa," *Bulletin of Miscellaneous Information (Royal Botanic Gardens, Kew)* 44 (1890):170-71; Anon,"Botanical Stations in the West Indies," *Bulletin of Miscellaneous Information (Royal Botanic Gardens, Kew)*, 6 (1887): 1-12.

the majority of which are plant parts or extracts. *Hevea, Vanilla* and *Wissadula* are among the genera of plants represented, collectively sources of foods, fibres, resins and other raw materials (Figure 7). Hart sent no objects which we might describe as "ethnographic" and does not appear to have shared in the salvage ethnography fervour of the late nineteenth-century. His approach to plants was thoroughly economic.

During his directorship of the Botanic Garden of Trinidad Hart published the *Flora of Trinidad* (1887-97) and edited Jenman's book, *The Ferns and Fern Allies of the British West Indies and Guiana,* published in 1909. It was a copy of this book which accompanied the final letter from Hart held in the Kew Directors' Correspondence, sent from his home in Trinidad, and dated 24th January 1910. The letter reveals a long-term relationship of knowledge exchange, in which plants, plant determinations, and publications had formed the currency.[95]

What can we learn by studying the series of accessions associated with Mueller and Hart, as visualised in Chart 4d? Firstly, there are temporal factors to consider.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STUDIES IN THE GENUS HEVEA IV

BY

RICHARD EVANS SCHULTES[1]

NOTES ON THE RANGE AND VARIABILITY OF HEVEA MICROPHYLLA

LITTLE has been known about the range and variability of *Hevea microphylla*. This was due partly to the scarcity of collections referable to *Hevea microphylla* and partly to an unfortunate confusion of this species with an entirely distinct concept.

THE DISTRIBUTION OF HEVEA MICROPHYLLA

Until recently, the binomial *Hevea microphylla*, published by Ule in 1905 on the basis of material from the middle Rio Negro, has been considered to be synonymous with *H. minor* Hemsley, a name published six years previously for material from the Casiquiare of Venezuela which, upon preliminary field examination, would appear to be identical with the concept described as *H. pauciflora* (Spruce ex Bentham) Muell.-Arg. var. *coriacea* Ducke.

I was fortunate in being able to examine type and other authentic material of *Hevea* at the Royal Botanic

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[111]

Figure 7. Botanical specimens and the production of scientific knowledge: EBC 44062, Fruit of *Hevea pauciflora* (Spruce ex Benth.) Muell. Arg. var *coriacea* Ducke, which was donated by Hart in 1899. This specimen was first examined and published by botanist Alphonso Ducke in 1935,[96] and later by botanist Richard Evans Schultes in one of a series of leaflets on *Hevea* for the Botanical Museum at Harvard University.[97]

[95] RBGK Archives, DC 208, ff. 545–546; letter from J.H. [John Hinchley] Hart to Sir David Prain; from Coblentz Avenue, [Port of Spain, Trinidad], January 24, 1910.

[96] Adolpho Ducke, "Revision of the Genus *Hevea* Aubl., mainly the Brazilian species," *Archivos do Instituto de Biologia Vegetal*, 2 (1935): 217-246.

[97] Richard Evans Schultes, "Studies in the Genus *Hevea.* VII," *Botanical Museum Leaflets, Harvard University*, 16 (1953): 21-44.

Mueller was the older of the two men by twenty-two years. He started corresponding with William Hooker early in his career, in 1853, when he was appointed Government Botanist, and his first donations to the Kew Museum date from his appointment as Superintendent of the Melbourne Botanic Garden in 1857. He lived to the age of seventy-one, whereas Hart died in 1911 aged 64. Hart began donating at a later stage in his career; by 1887 he had already held posts as a gardener in Nova Scotia and superintendent of the cinchona plantations in Jamaica.

Secondly there is the issue of professional status. When Mueller became Government Botanist for the State of Victoria, he was seeking acknowledgement and acceptance in global networks of botany, and considered himself of sufficient status to address William Hooker directly. Correspondence, described as "the single most important tool of the imperial scientific endeavour," was later augmented with object exchanges, for Mueller had both the means and the motivation to "barter" with metropolitan scientists like Sir William Hooker, and both parties benefitted from the association.[98] Mueller also had the cultural capital of social status to aid him in this respect, or what Lucas has termed "the currency of honour."[99] Mueller quite literally collected honours and titles, and one which he deemed most important, believing it "would lead to many advantages for me," he received in 1857 when, in exchange for a fee, the title of M.D. was conferred on him by Rostock University in Germany.[100] But there was also an affective dimension to Mueller's relationship with William Hooker; Hooker appears to have been a father-figure to the young botanist, who found himself a long way from home and fraught with huge personal and professional responsibilities.[101]

Hart, on the other hand, did not possess a university degree, and despite earlier communication with Joseph Hooker at Daniel Morris' suggestion, the period of serious correspondence and donating began when he, too, was appointed Director of a botanic garden, in this instance in Trinidad, in 1887. There is, then, here an element of scientific self-fashioning. As Endersby has argued, botany was an established route to social advancement in the nineteenth century; however, in order to address someone of the status of Joseph Hooker, FRS, CB, KCSI, PRS, in person, it was probably wise to wait until one had already experienced a degree of social advancement.[103]

[98] Jim Endersby, *Imperial Nature: Joseph Hooker and the Practices of Victorian Science* (Chicago, IL: University of Chicago Press, 2008), 84-85.

[99] A. M. Lucas, "Specimens and the Currency of Honour: the Museum Trade of Ferdinand von Mueller," *Historical Records of Australian Science*, 24 (2013): 15-39;

[100] Lucas, "Specimens and the Currency of Honour," 18.

[101] Lucas et al, *Regardfully Yours*, *Vol. 2*, 26.

[103] Endersby, *Imperial Nature*, 98. The post-nominals cited here had all been conferred on Hooker by 1873, along with the Founders' Gold Medal of the RGS (1883) and membership of the Royal Netherlands Academy of Arts and Sciences (1885).

The third factor to consider in these two differing patterns of donation is the nature of the projects connecting each donor with Kew. In Mueller's case it took the form of collection-building and publishing projects, most notably the *Flora australiensis*. Although the given author's name is George Bentham, in reality the work was a collaborative exercise with Mueller formally acknowledged on the title page. Over the twenty-year gestation period of the work, Bentham was reliant on Mueller's Australian collections which were loaned to him, but only once Mueller had published them in his own journal, *Fragmenta phytographiae australiae*. As Home suggests, when the collections were returned to Melbourne, they accrued further value as specimens authenticated by a third party specialist,[104] revealing taxonomic control between metropolis and colony to be subject to constant renegotiation. Hart, as outlined, sought different returns on his relationship with Kew, in the form of plant determinations and scientific reports on particular taxa. In addition he was a willing participant in Kew's work on *Hevea* acclimatisation, so it seems appropriate, therefore, that rubber specimens form the single largest plant family in his legacy at the EBC.

5. Conclusions

5.1 Summary and findings

This Working Paper has quantified the main channels through which economic botany specimens and artefacts came to the Kew Museum in the nineteenth and twentieth centuries. On the basis of the accessions data, it has also suggested some of the key institutional networks – imperial, colonial, scientific and economic – which supported these channels. Furthermore, by the use of more detailed examples (as in the individual case studies of Ferdinand von Mueller and John Hinchley Hart), we have been able to explore the shape and significance of these channels from the perspective of individual careers in order to gain a better understanding of collectors' motivations and the nature of their relationships with Kew. Although this paper has been concerned with accessions, it has become clear that these relationships worked in two directions. Looking at patterns of dispersals from Kew (the subject of the next Working Paper) will complete the picture at the level of the collection, making clearer the context in which these relationships operated.

Key findings include the following:

1. There were substantial annual variations in accessions activity over the life of the collection, reflecting the timing of particular events such as expeditions and international exhibitions.
2. Moving average data suggests four phases of accessions activity: a formative phase (1847-1914) during the age of high empire when accessioning was most active; a secondary phase (1915-1937) during the

[104] Home, "Botanist for a continent," 74.

late imperial era when accessions continued, though at lower levels; a third phase (1938-1968), during which two of the museums were closed and when accessioning activity significantly diminished; and a fourth phase (1969-present) when accessions activity revived in line with Kew's new international role in relation to biodiversity, sustainability and ethnobotany.

3. The analysis of source regions indicates the global geographical reach of the Economic Botany Collection, with every continent represented, reflecting to a large extent Kew's imperial role but also including the UK and Europe and extending beyond colonial territories, notably in South America and China.
4. A significant proportion of accessions over the lifetime of the collection consisted of objects originating in the UK, Africa and Asia. Other significant regions include South America, the Caribbean and Australasia. North America, by contrast, is represented at a lower, though relatively stable level. Europe was more crucial to the EBC in the nineteenth century than the twentieth. Temporal variations in the regional composition of accessions to the collections reflect a variety of political, economic and institutional factors.
5. Decennial sample data on object types confirm the significance of both raw materials and processed or manufactured objects for the collection, reflecting the museum's primary function – the investigation and display of the economic properties of plant materials.
6. Ethnographic objects, made using hand tools, constituted a small but significant element of accessions to the collection throughout its history and have been the focus of increased interest in recent years.
7. Decennial sample data on donor types confirm the significance of metropolitan and colonial governments and botanic gardens around the world (including Kew itself) in supplying material to the collection. They also highlight the role of private collectors, manufacturers and traders, and expeditions in providing material for the collection.
8. The most frequently named donors to the collection were individuals directly associated with the agencies of imperial and colonial botany, including botanic gardens and colonial museums.
9. A substantial majority of named individuals associated with accessions to the collection made fewer than ten donations to the collection, suggesting that collecting activity was by no means concentrated on a small number of key individuals.
10. Case studies indicate that relationships between Kew and individual collectors were two-way: donation provides only one side of the story.

In this Working Paper we have examined only one aspect of the circulation of objects. In later Working Papers we will consider dispersals, completing the picture at the level of collections data. This will provide a basis for more detailed study of the international networks and national channels through which the mobility of objects into and out of the collection was managed. Finally, through a series of object trajectories, we will be able to explore these networks at object level.

5.2 Points for further consideration

(i) Disciplinary terms: economic botany, ethnography and the biocultural

For this exercise we have taken seriously the structure and language of the source materials, notably the prioritisation of individual donor names and the descriptions of objects. At the same time we have introduced categories of our own in the analysis of types of object and types of donor, classifying the underlying data according to categories which we believe to be meaningful in historical terms - that is, terms which would have been meaningful to contemporaries as well as to historians. This is a particular challenge in the context of a collection that has such a long history, from 1847 to the present day. During this period, the nature of economic and political institutions has evidently changed dramatically, as have the kinds of science and collection which they support. The term "economic botany" itself, which re-described an older tradition of applied natural history, first appeared in print in the 1830s: and while it has survived to the present day, its uses and meanings have evolved considerably.

In this context, our decision to differentiate "ethnographic" objects from other kinds of manufactured object or industrial product within the collection reflects a recognition that such objects have become of increasing interest to those managing the collection in recent years. The term "ethnographic," used as a descriptor for museum objects, has itself origins in the nineteenth century, of course. Furthermore, although nineteenth-century botanists preferred the term "economic" to describe the kinds of objects that were to be found in museums of economic botany, they would have recognised that such objects were also of interest to the emerging disciplines of ethnology and anthropology. In this context, it is interesting to note that by the early twentieth century, Kew administrators were routinely referring to products such as paper, almost interchangeably it seems, as "economic products" and "cultural products," as, for example in various volumes of Miscellaneous Reports.[105] The term "cultural" here seems to represent a combination of an older use to describe the physical process of cultivation and a newer emphasis on the application of scientific and technical knowledge to material plant resources. The apparent proximity, even equivalence, of the terms "cultural" and "economic" in the way Kew assembled its knowledge about particular plants and regions raises far wider questions about the evolution of the human and natural sciences at this point, as well as questions about the ways in which museum histories have often been written as stories of disciplinary specialisation: the natural history museum goes one way, the ethnographic another. But in cases such as economic botany, a field whose definition depends on the commensurability of natural and cultural knowledge, these kinds of disciplinary histories are insufficient. There are also implications for the history of ethnography insofar as that has been written from the perspective of modern anthropology, a discipline that for much of the twentieth century had an ambivalent attitude to its

[105] For example, MR/79 Arabia. Cultural Products etc**,** *1852 – 1915.*

museological antecedents.[106] In this sense, while endorsing Kirschenblatt-Gimblett's influential proposition that "ethnographic" objects can be defined as "artifacts created by ethnographers when they define, segment, detach, and carry them away,"[107] we would advocate an inclusive and plural approach to the category "ethnographer," especially in the context of museum collections.

Seen from the perspective of conventional museum histories, economic botany collections are intrinsically hybrid, linking natural and cultural knowledges. When the term ethnobotany came into widespread use in the mid-twentieth century, as a way of naming a sub-discipline primarily concerned with indigenous uses of plants, this hybridity was constrained (in the sense that it excluded industrial uses of plants and plant materials not reliant on indigenous knowledge) but not erased. Today, collections once described in terms of economic botany and ethnobotany are increasingly subsumed in a broader category – that of "biocultural collections," a term that inscribes relationships between the natural and cultural at its heart (Chart 5). Insofar as it foregrounds the human uses of nature, such a framework transcends and in some respects challenges widespread museum assumptions about what defines the natural and cultural. Thinking in these terms, we would argue, offers managers of such collections new possibilities for research, engagement and display.[108]

(ii) Institutional practices: between the herbarium and the museum

The co-location of the Museum of Economic Botany and the Herbarium at Kew is of fundamental importance to the history of the EBC. The practice of batch accessioning into the Economic Botany Collection, as we have argued in this paper, reflects its location within a natural history collections complex – a collection of collections – for which the herbarium is arguably the paradigm. On the one hand, this means that accession records are less concerned with the formal or aesthetic qualities of objects than with their classification in botanical terms; on the other, it highlights the properties of materials from which objects are made and, increasingly, the locations from which they were collected. Moreover, from the start the arrangement of specimens in the museum followed the same taxonomic systems as in the herbarium (initially the de Candolle system, succeeded by Bentham and Hooker): in this respect, economic botany at Kew (unlike some of its counterparts elsewhere) aligned itself in its formative period firmly with natural history collections rather than museums of industry and technology. Interestingly, this alignment has faltered in recent years: while the Kew herbarium has recently

[106] Ira Jacknis, "Franz Boas and exhibits: on the limitations of the museum method of anthropology", in George W. Stocking (ed), *Objects and Others: Essays on Museums and Material Culture* (Madison: University of Wisconsin Press, 1985), 75-111.

[107] Barbara Kirschenblatt-Gimblett, *Destination Culture: Tourism, Museums, and Heritage* (Berkeley, CA: University of California Press, 1998) 2.

[108] Jan Salick, Katie Konchar & Mark Nesbitt (eds.), *Curating Biocultural Collections: A Handbook* (RBGK: Kew Publishing, 2014), 1. More generally, see Rodney Harrison, "Beyond 'natural' and 'cultural' heritage: toward an ontological politics of heritage in the Age of the Anthropocene," *Heritage and Society*, 8 (2015): 24-42.

moved to APG III systematics, the EBC remains organised according to the Bentham and Hooker system, in effect an archive of a now obsolete taxonomy. In the era of searchable multi-field databases, this organisation today arguably matters less than it did in the pre-digital era of museum display.

The relationship between the museum and the herbarium has emerged as an important theme in this Working Paper. The analysis of accessions data indicated that the herbarium was itself an important source of material for the EBC, notably in the second half of the twentieth century. At a more general level, the herbarium model shaped the role of the museum as a node in a network of exchange, a theme that will be explored in subsequent Working Papers. Historians of collections, including those at Kew, have become used to thinking of these exchanges in terms of the interdependence between metropolitan figures such as Joseph Hooker and their networks of colonial collectors.[109] In exchange for specimens, colonial residents might expect to benefit directly through the supply of equipment or publications, and indirectly through their connection with metropolitan institutions.[110] However, what needs to be stressed in the case of botanical collections in particular is the role of duplicates, which provided the basic currency through which collections were able to expand the taxonomic and geographic reach of their collections. As Nichols (2016) has argued, the practice of duplicate exchange was extended to ethnological collecting in the nineteenth century, with collectors instructed to acquire multiple objects of the same type.[111]

An example of duplicate collecting from the EBC is provided by two quivers collected by Richard Spruce in the Amazon in 1851 (Figure 8). The quiver retained by Kew (EBC 35161) is currently the subject of revived interest in Spruce and his collections.[112] Originally displayed as an example of the applications of the *Attalea* palm, it was positioned alongside other palms in the taxonomic sequence of the Kew Museum. Only recently has it been considered in more directly cultural terms, in ways that reveal much of the traditional ways of life and values of the Amerindians who made it. A "duplicate" of this object was despatched from Kew in 1888 to the United States National Museum of the Smithsonian Institution in a box "containing a collection of about 190 specimens of vegetable economic products."[113] In Washington, it was accessioned by Otis T. Mason, Curator of Ethnology, and described with its accompanying objects as "ethnological specimens from nine various places." It was subsequently displayed with other artefacts in a new section

[109] Gosden & Larson*, Knowing Things*, 5; Endersby, *Imperial Nature*.
[110] Endersby, *Imperial Nature*, 85.
[111] Catherine A. Nichols, "Exchanging anthropological duplicates at the Smithsonian Institution," *Museum Anthropology*, 39 (2016): 130–46.
[112] The Digital Amazon project, led by William Millikin and Mark Nesbitt at Kew and Luciana Martins at Birkbeck, is seeking to increase access to Spruce's ethnobotanical collections as a resource for environmental change and indigenous knowledge: see http://www.kew.org/science/projects/digital-amazon.
[113] Smithsonian Institution, National Museum of Natural History (NMNH), Office of the Registrar, letter from Daniel Morris to Samuel Pierpoint Langley, April 3, 1888.

called "comparative technology," arranged according to an evolutionary view of human cultures that echoed the displays at the Pitt Rivers Museum.[114]

In the late nineteenth century, the Smithsonian's "synoptic series," showing "progress from the simplest to the most complex, – from rude to perfect," was evident in displays as diverse as food, medicine, textiles and weaponry.[115] Bows, arrows and quivers could be found in the East Hall, now contextualised as works of art and industry in a narrative of progress and evolution.[116] By looking at these similar and related objects in their differing institutional contexts, we can better understand how they came to be signifiers of botanical, economic, ethnobotanical and ethnological ideas and crucially, how they were active agents in the production of scientific knowledge.

Figure 8. Left: EBC 35161 Quiver in the Economic Botany Collection at Kew; right: "duplicate" quiver in the Department of Anthropology Collection at the Smithsonian.

(iii) Hidden histories of donation

Focussing on names most commonly mentioned in the accessions record, as we have in this paper, risks occluding other less visible histories - including the role of lower-status men, women and people of colour in the acquisition of objects. As we have seen, it is the breadth and diversity of the donor base which is truly striking: the large number of names recorded once or twice is indicative of this breadth.

[114] Conn, *Museums and American Intellectual Life,* 89-90.

[115] William J. Rees (ed,), *Visitor's Guide to the Smithsonian Institution and United States National Museum in Washington* (Washington DC: Judd & Detweiler, 1886), 60.

[116] Sally Kohlstedt, "History in a Natural History Museum: George Brown Goode and the Smithsonian Institution," *The Public Historian* 10 (1988): 19-20.

Amongst the less frequently mentioned individuals are people like Eleanor Ormerod, economic entomologist, whose donations extended from 1874-95; Mary Sophia Johnston, geologist, a donor from 1925 to 1954; and Laura Ponsonby, assistant curator of the Museum of Economic Botany, donating between 1977 and 2009 (Figure 9). In the nineteenth and early twentieth centuries, science was a means by which many women achieved forms of self-fashioning, and indeed women were important audiences for associations such as the BAAS.[119]

Figure 9. Female donors to the EBC; from left to right, Eleanor Ormerod, Mary Sophia Johnston* and Laura Ponsonby (right). On the left of the same image is another female donor, Rosemary Angel, Officer-in-Charge of the Museums Division, 1967-85. *Digitised from the Geologists' Association Carreck Archive, reproduced with permission of the British Geological Survey.

Preliminary research has already revealed three individuals of African origin directly connected with the EBC. In May 1890, S.B.A. Macfoy, a wealthy Krio trader in Sierra Leone, donated a sample of tapioca of *Manihot utilissima*.[120] The donation was made on his behalf by Sir Samuel Lewis, also a Krio, and the third Sierra Leonean ever to qualify as a barrister. Lewis had himself donated specimens to the Kew Herbarium in 1870.[121] And in 1900, D. E. Headley, an engineer at the Sir Walter Raleigh Gold Mine in British Guiana, sent seeds of the Coonami tree, used by the Aboriginal Indians in the region to catch fish.[122] (Figure 10)

Such examples indicate the importance of acknowledging the breadth of donor types as evidenced in the archival record. However to pursue this further, it is also necessary to consider the hidden histories which lie behind the naming of particular

[119] Rebekah Higgitt and Charles W. J. Withers, "Science and Sociability: Women as Audience at the British Association for the Advancement of Science, 1831–1901," *Isis* 99 (2008): 1-27.

[120] RBGK, EBC, Entry Book 1881-1895, 55.1890, p. 356; Martin Lynn, "Technology, Trade and 'A Race of Native Capitalists': The Krio Diaspora of West Africa and the Steamship 1852-95," *Journal of African History* 33 (1992): 421-440.

[121] Anon, "List of the collectors whose plants are in the Herbarium of the Royal Botanic Gardens, Kew, to 31st December, 1899," *Bulletin of Miscellaneous Information (Royal Gardens, Kew)*, 1901:1-80; RBGK Archives, DC 184, f. 459, letter from Samuel Lewis to Sir Daniel Morris; from London; 25 February 1889; John D. Hargreaves, 'Lewis, Sir Samuel (1843–1903),' *Oxford Dictionary of National Biography*, Oxford University Press, 2004; online edn, Jan 2008 [http://www.oxforddnb.com/view/article/72676, accessed 16 May 2017].

[122] RBGK Archives, DC 204, f. 284, letter from D.E. Headley to Sir William Thiselton-Dyer, from 9 Hadfield Court, British Guiana [Guyana], September 20, 1900; Peter Fryer, *Staying Power: The History of Black People in Britain* (Edmonton: University of Alberta, 1984), 331n.

individuals in accession records. To name, say, Everard im Thurn as a donor of material from Guyana is essentially an administrative act which has consequences for the ways in which the circulation of objects is mapped. In reality, institutional collectors like im Thurn were themselves reliant on networks of field collectors and intermediaries through which objects came into the orbit of the Economic Botany Collection at Kew.[123] Such subsidiary networks are inevitably more difficult to map from the Kew data alone: it is through case studies of particular object biographies and particular institutions that these shadow networks can be brought into view.

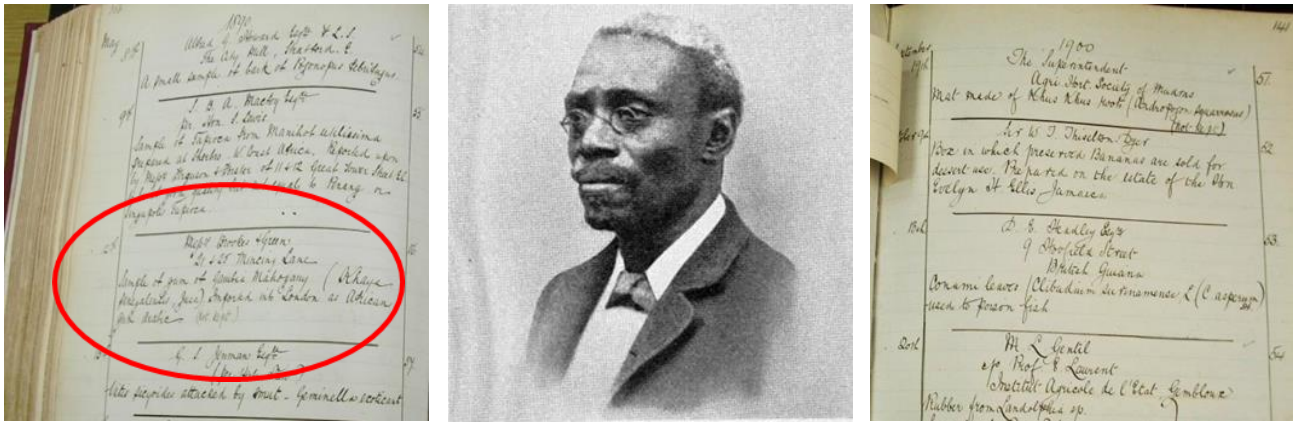

Figure 10. Black history at the Museum of Economic Botany: left to right, accession record of S.B.A. Macfoy's donation, 1890; Sir Samuel Lewis; accession record of David E. Headley donation, 1900.

[123] Albuquerque, "Exploring Tropical Nature in British Guiana".

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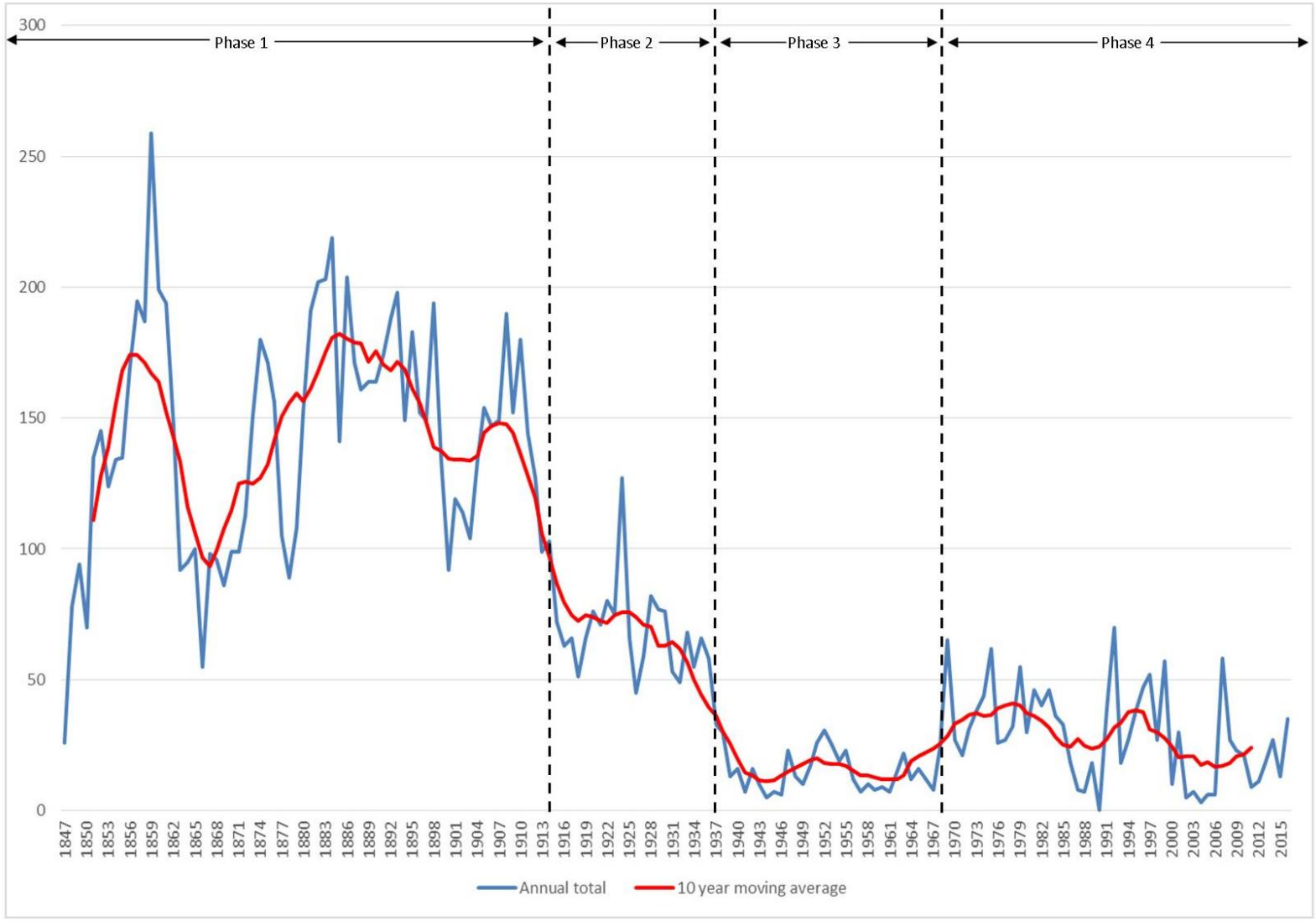


n = 12,799

Chart 1. Total accession events, 1847-2016.

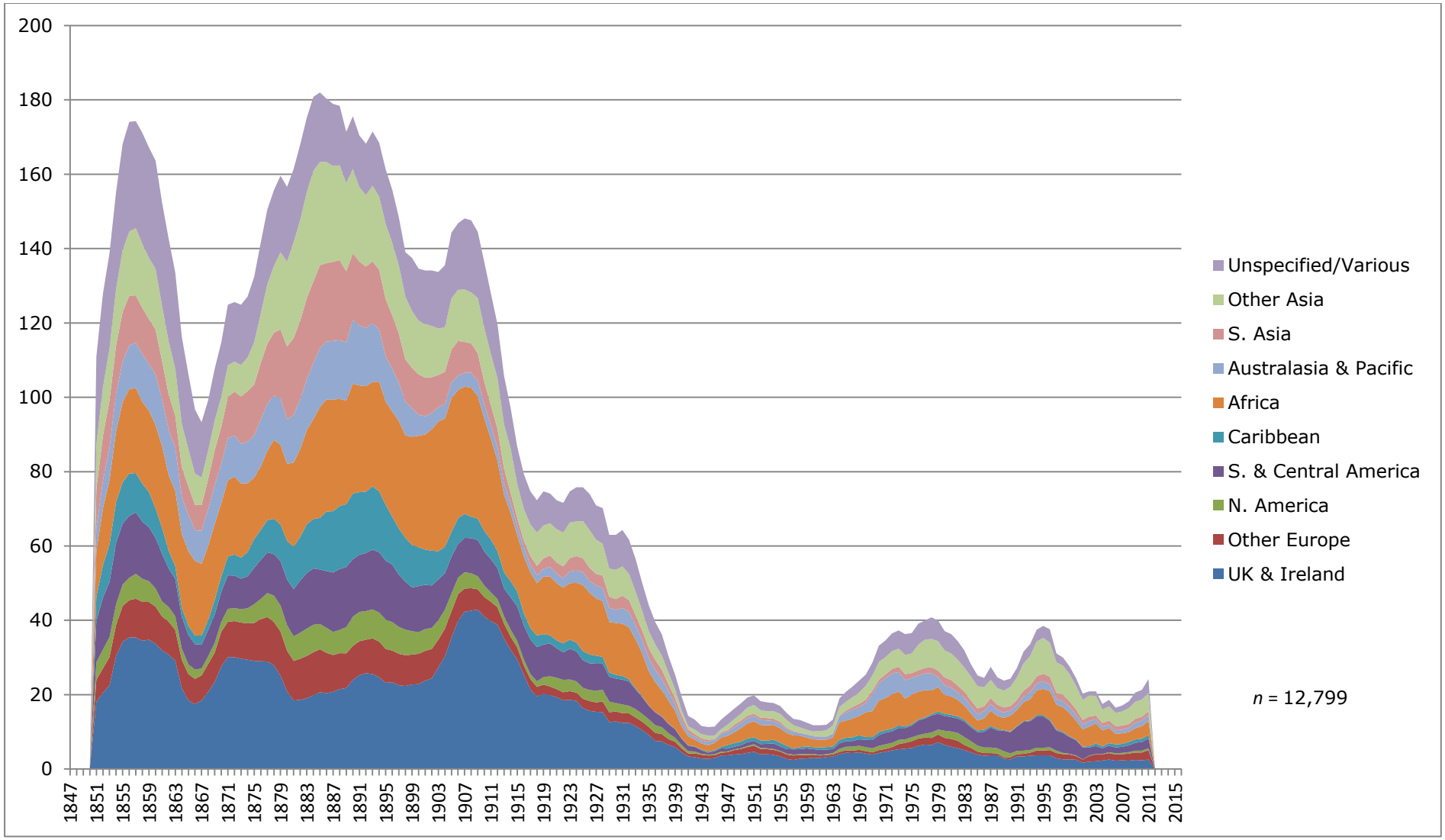


Chart 2a. Accessions by source region – 10 year moving average, 1851-2011.

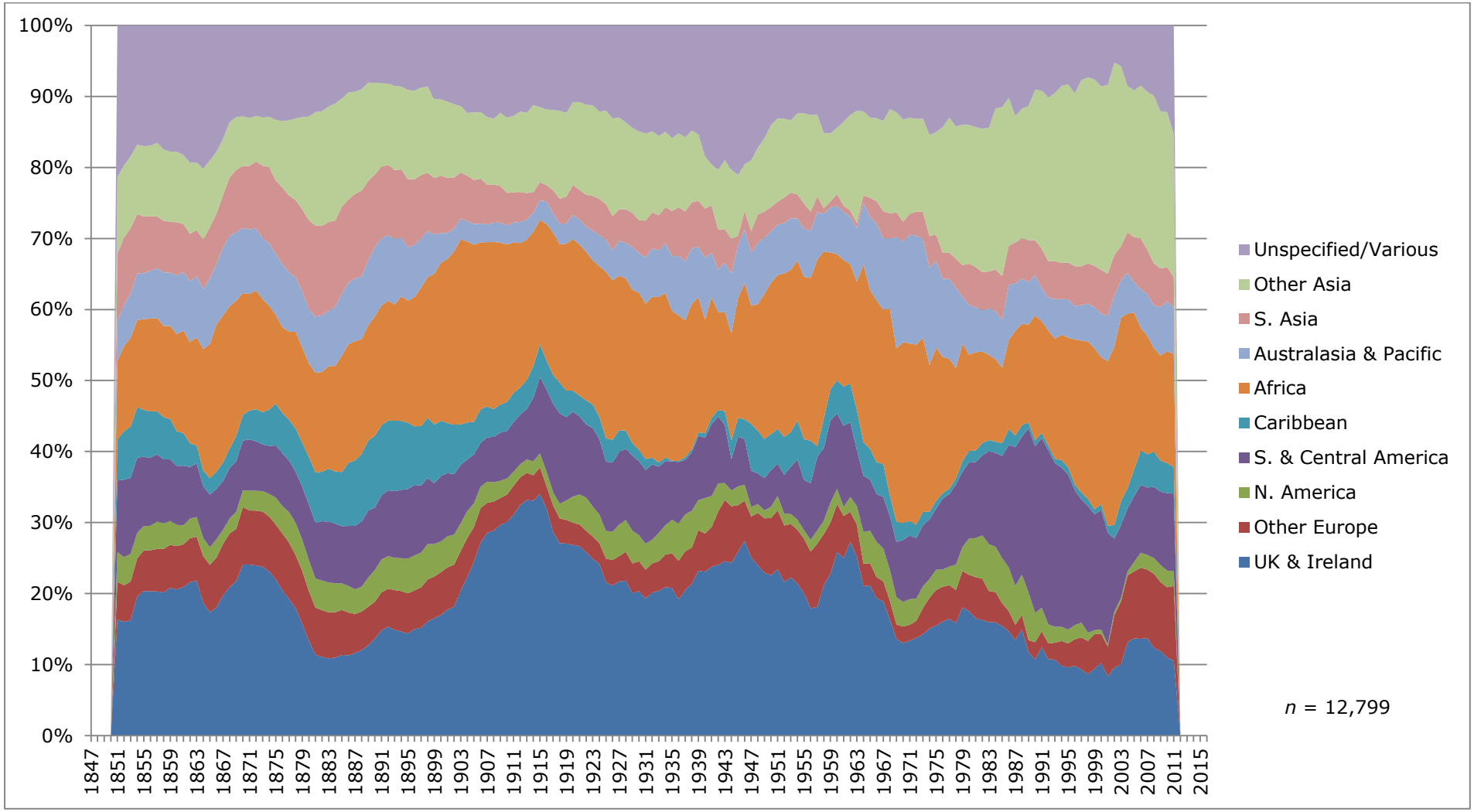


Chart 2b. Accessions by source region – 10 year moving average, 1851-2011 [expressed as percentages].

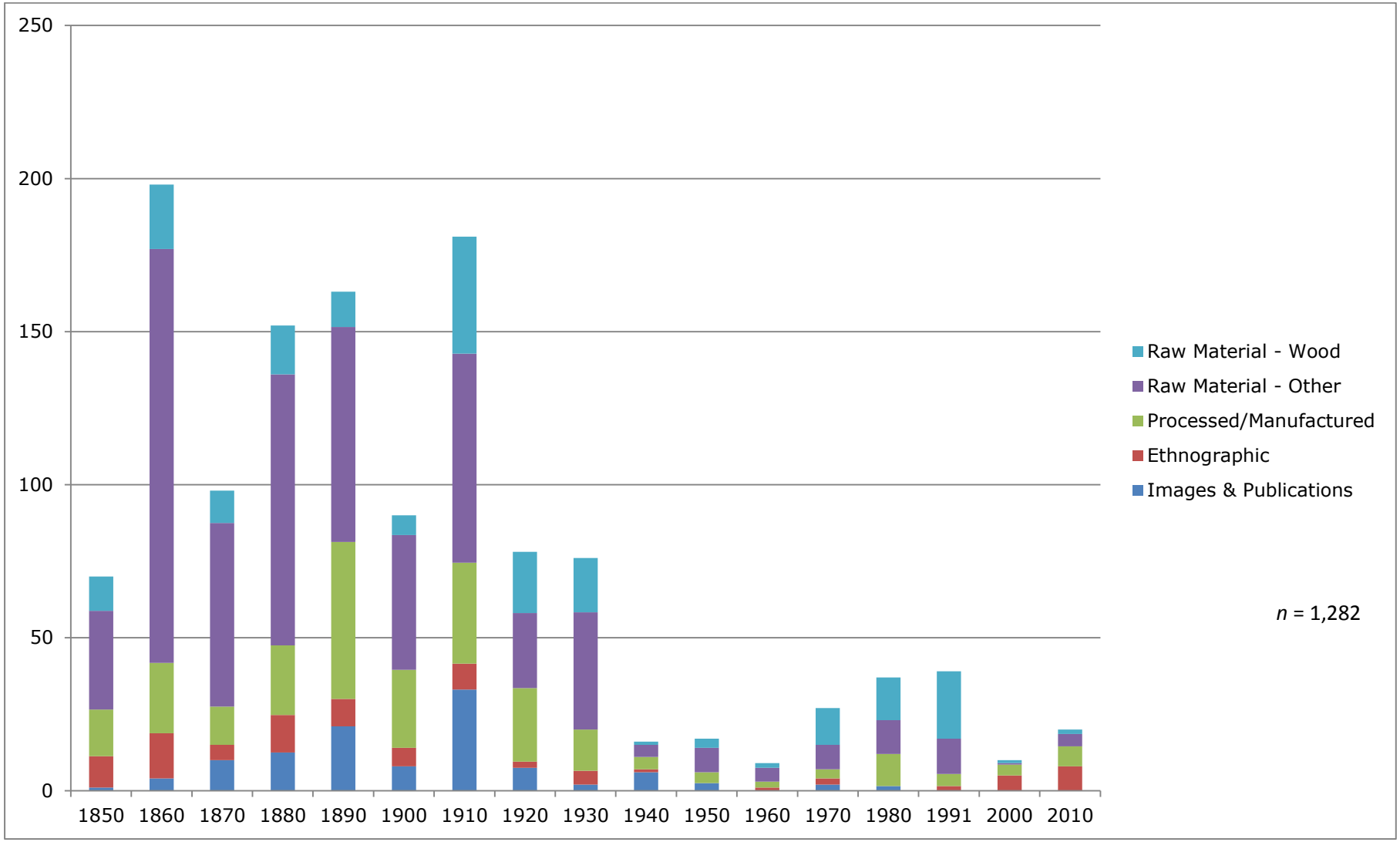


Chart 3a. Accessions by object type: decennial samples, 1850-2010.

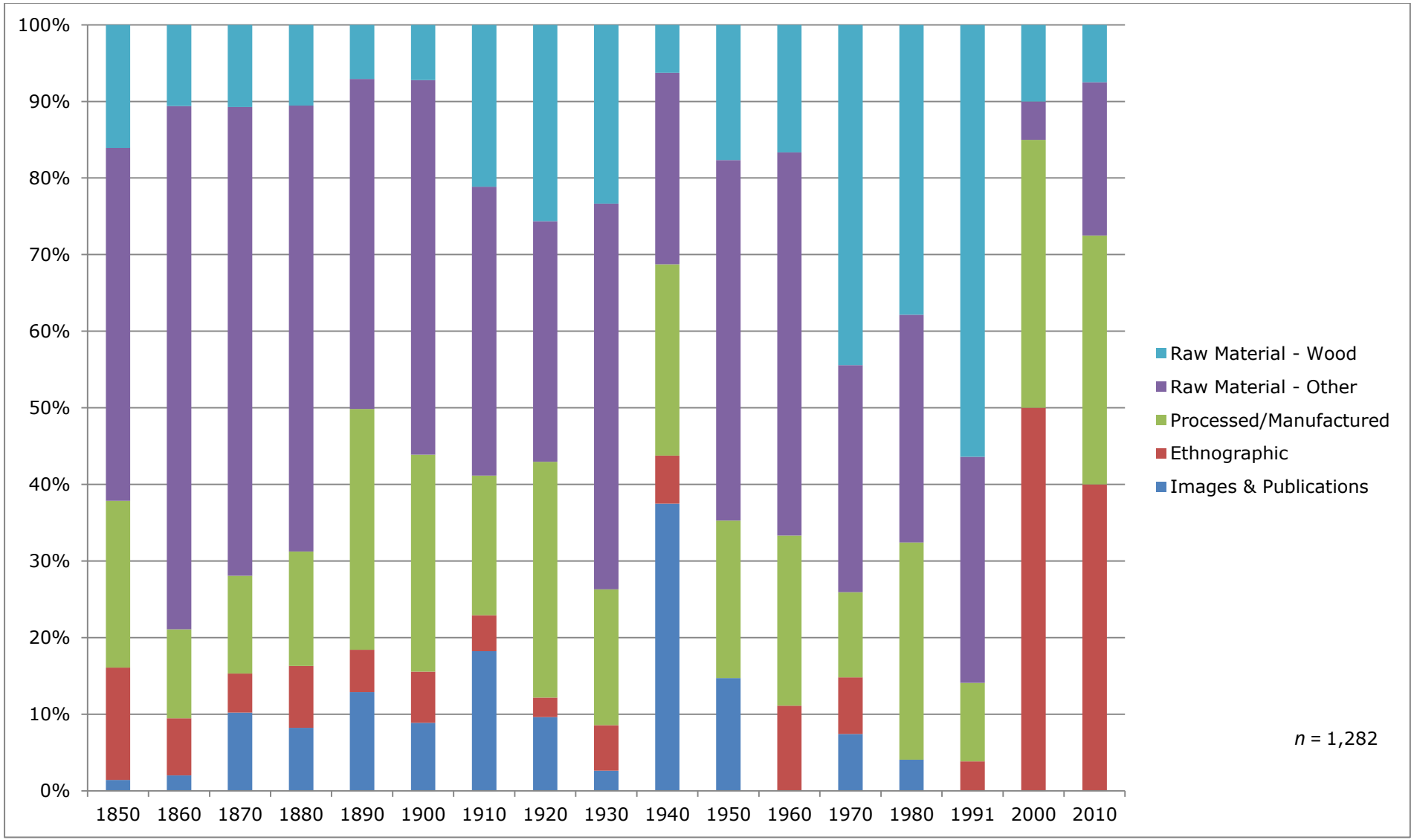


Chart 3b. Accessions by object type: decennial samples, 1850-2010 [expressed as percentages].

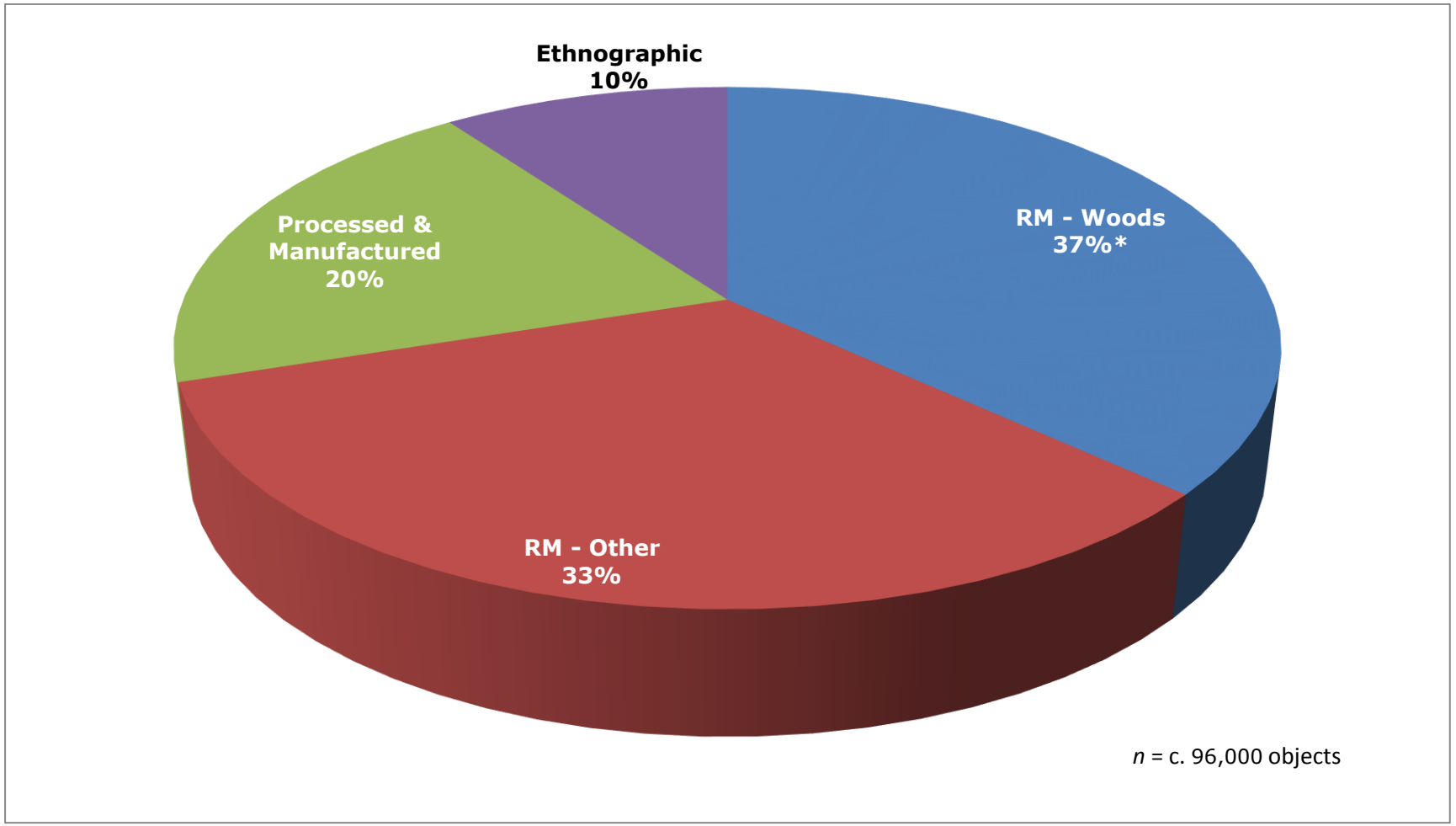


Chart 3c. Estimate of the current composition of the EBC by object type, May 2017.

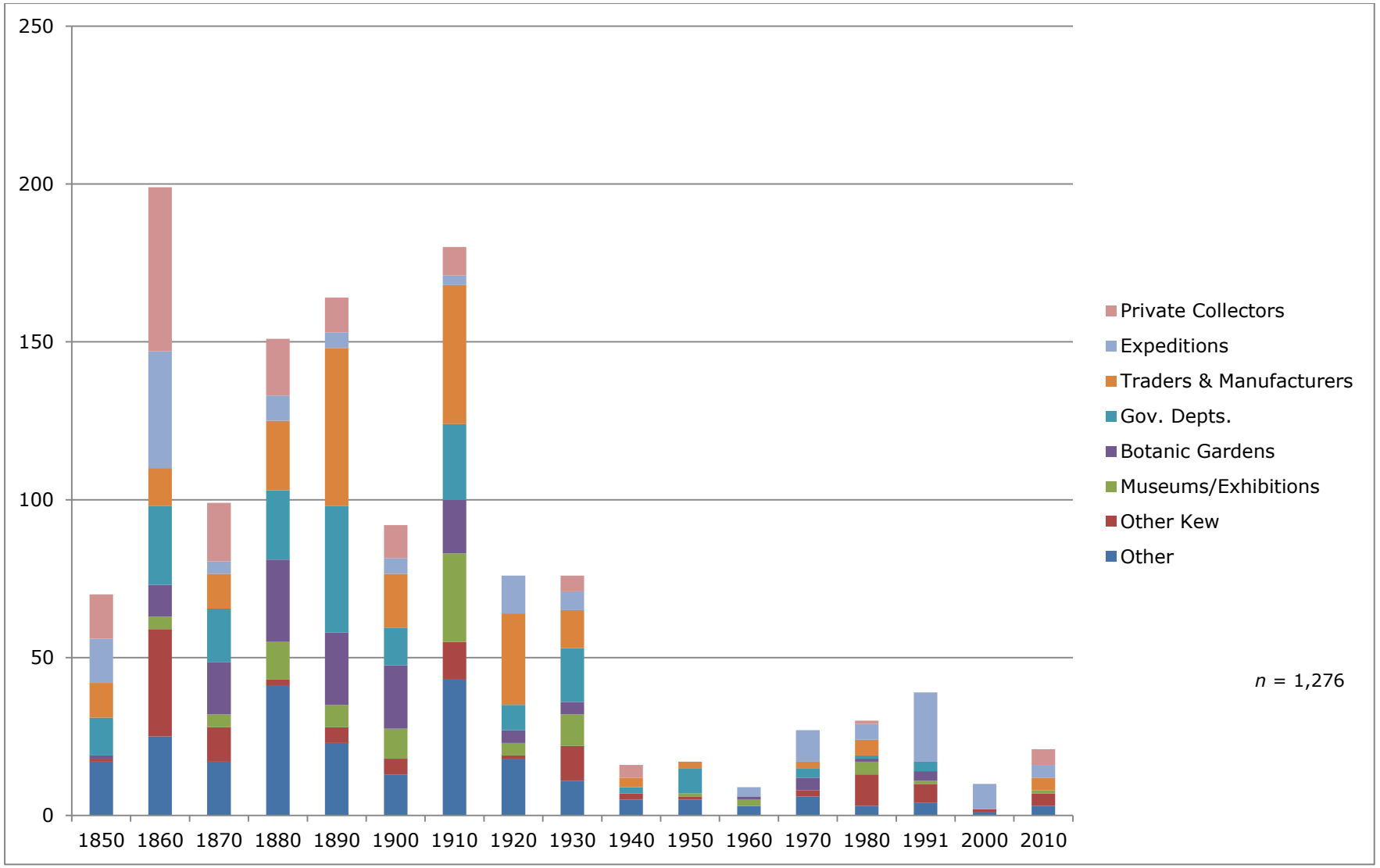


Chart 4a. Accessions by donor type: decennial samples, 1850-2010.

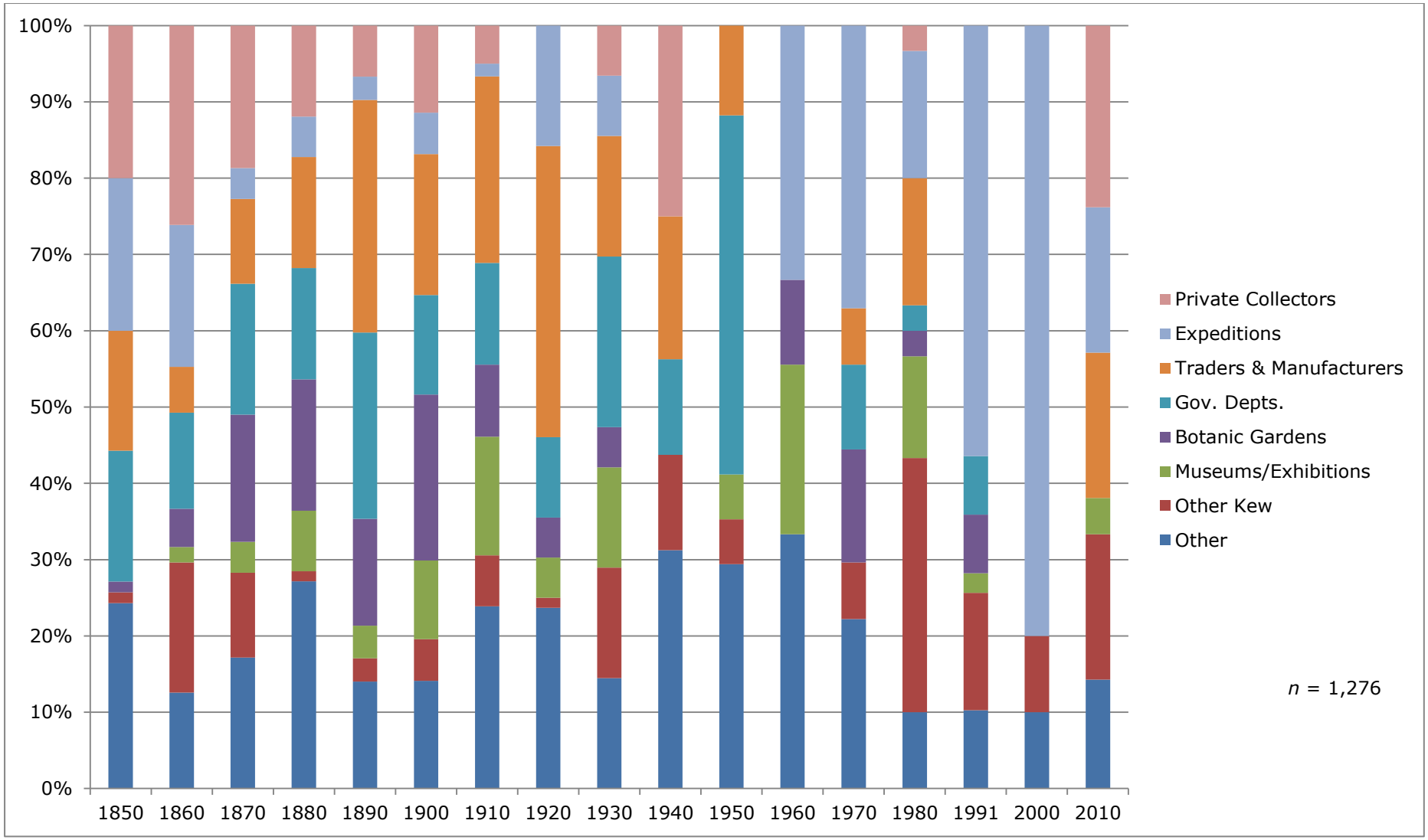


Chart 4b. Accessions by donor type: decennial samples, 1850-2010 [expressed as percentages].

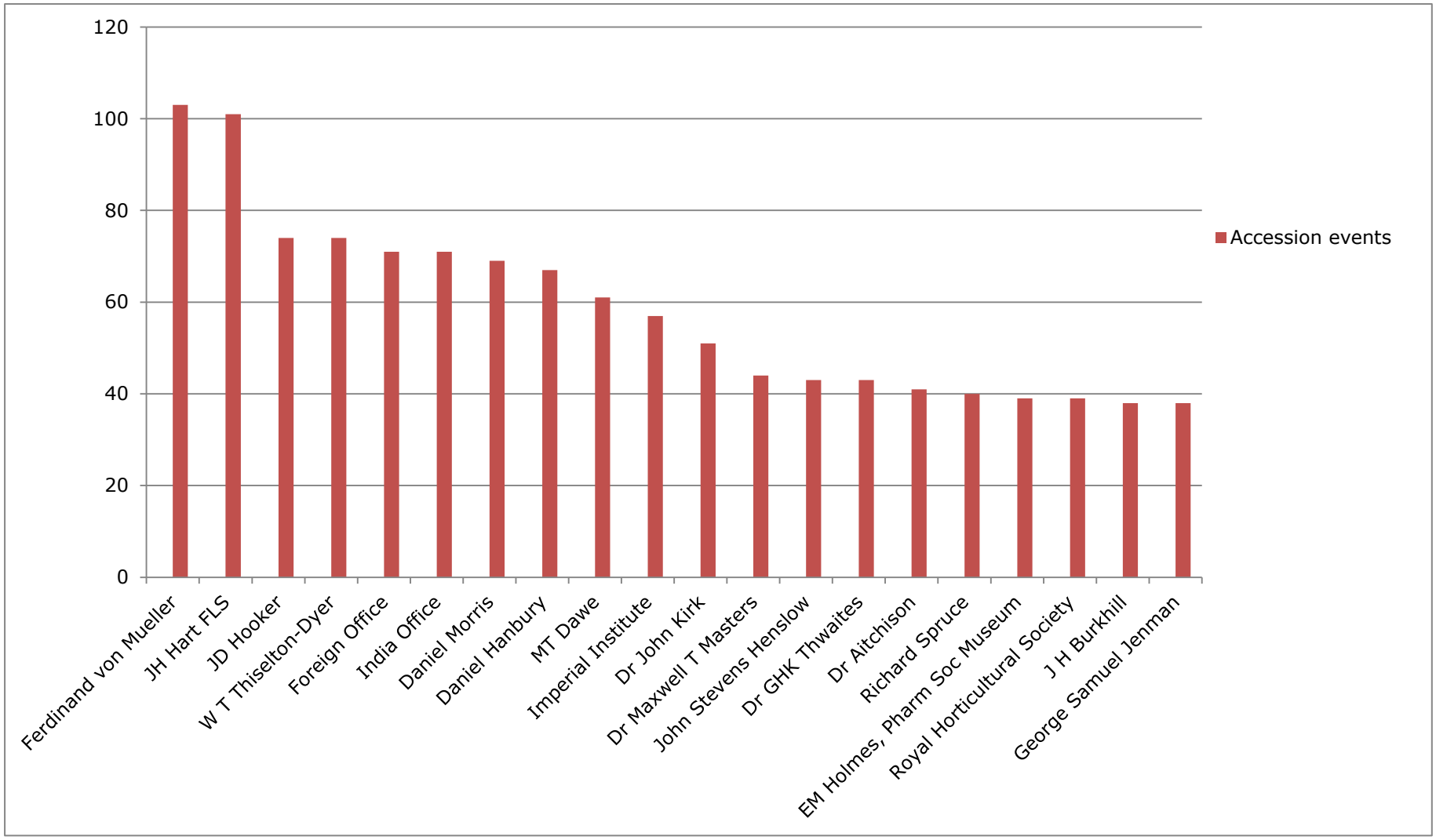


Chart 4c. Top 20 named donors, 1847-2010.

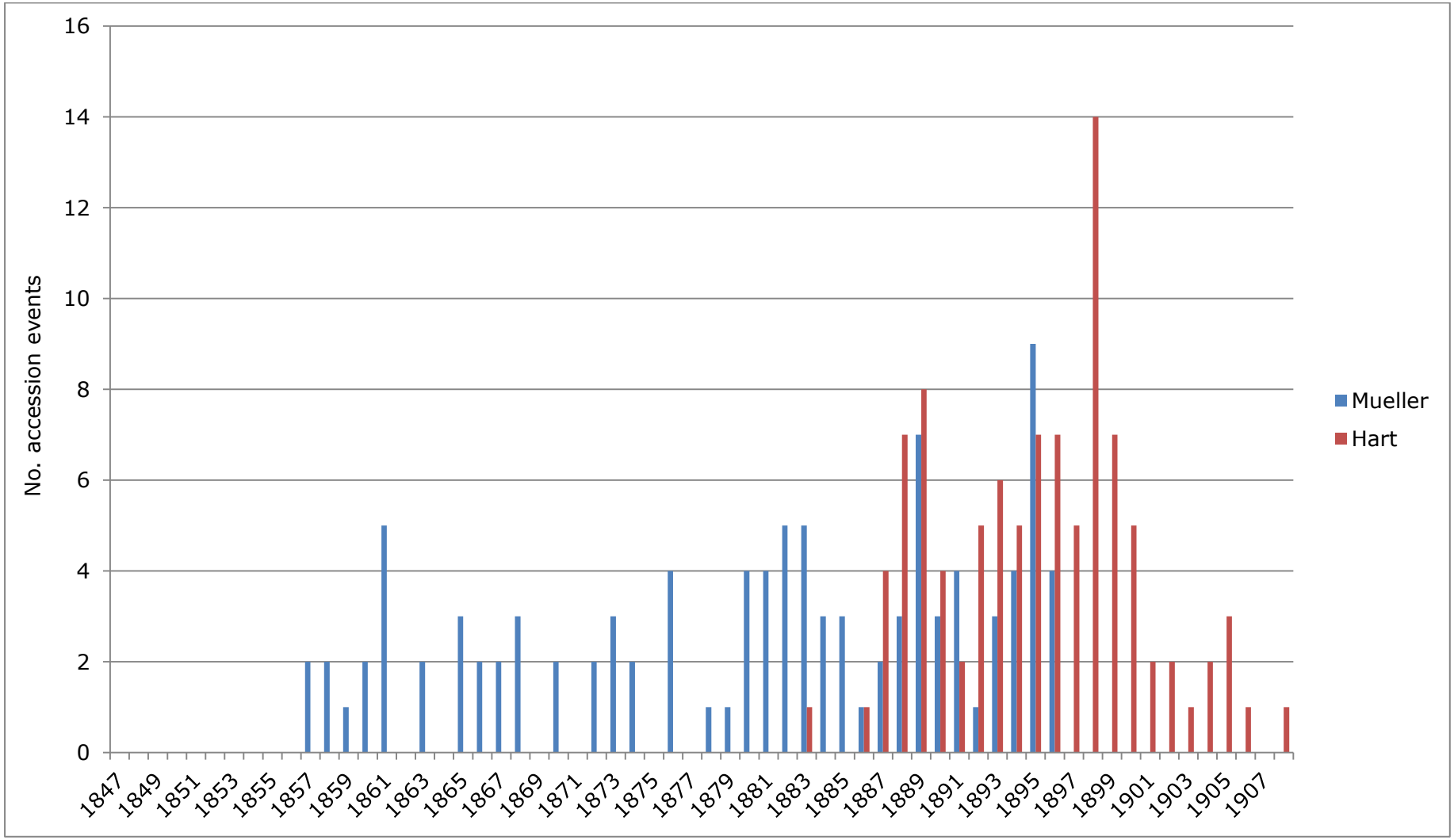


Chart 4d. Mueller and Hart: comparative patterns of donation.

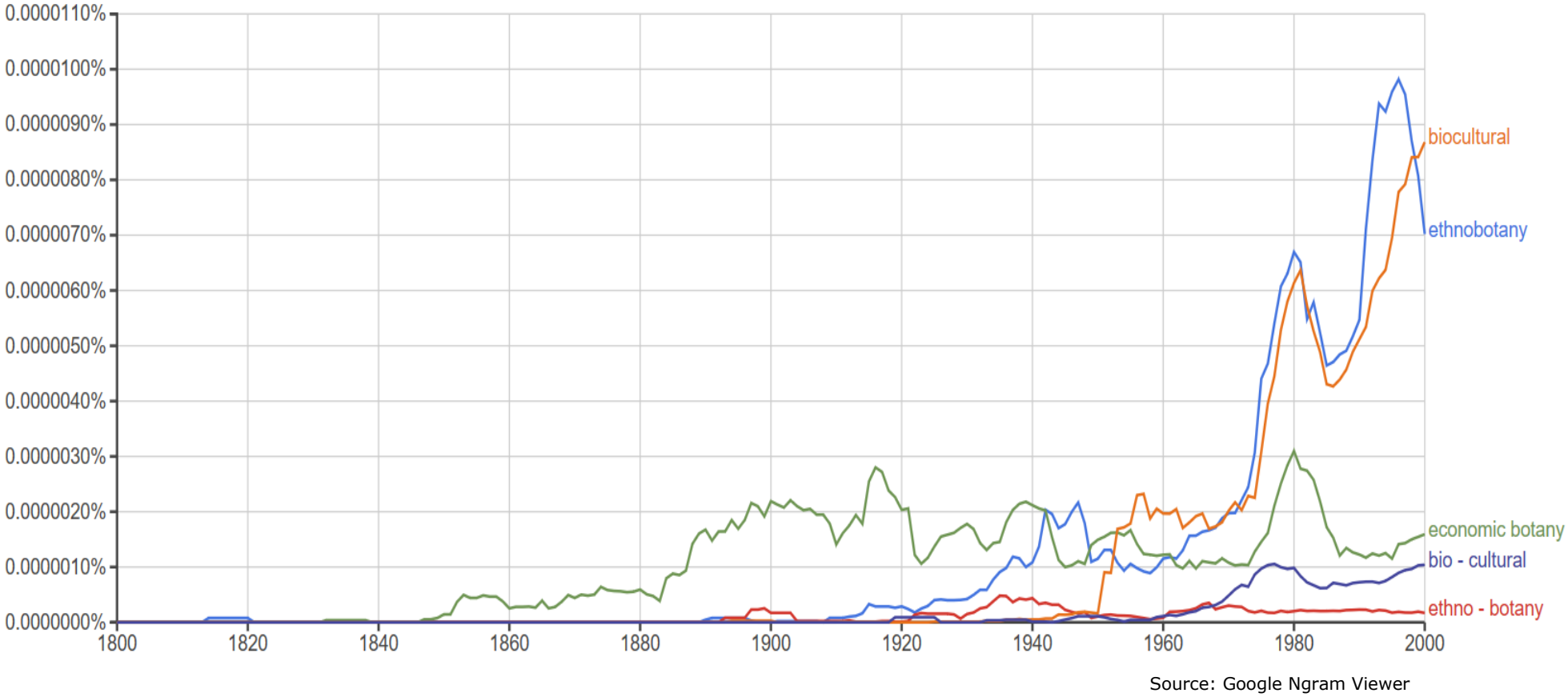


Chart 5. Occurrence of 'biocultural' and related terms in published works from 1800 to 2000.

	RM - Wood	RM - Other	Processed & Manu-factured	Ethno-graphic	Images & Public-ations	Total
1850	11.3	32.3	15.3	10.3	1	70
1860	21	135.3	23	14.8	4	198
1870	10.5	60	12.5	5	10	98
1880	16	88.5	22.8	12.3	12.5	152
1890	11.5	70.3	51.3	9	21	163
1900	7.5	44	25.5	6	8	91
1910	38.3	68.3	33	8.5	33	181
1920	20	24.5	24	2	7.5	78
1930	17.8	38.3	13.5	4.5	2	76
1940	1	4	4	1	6	16
1950	3	8	3.5	0	2.5	17
1960	1.5	4.5	2	1	0	9
1970	12	8	3	2	2	27
1980	14	11	10.5	0	1.5	37
1991	22	11.5	4	1.5	0	39
2000	1	0.5	3.5	5	0	10
2010	1.5	4	6.5	8	0	20
Sample total	**210**	**613**	**258**	**91**	**111**	**1282**

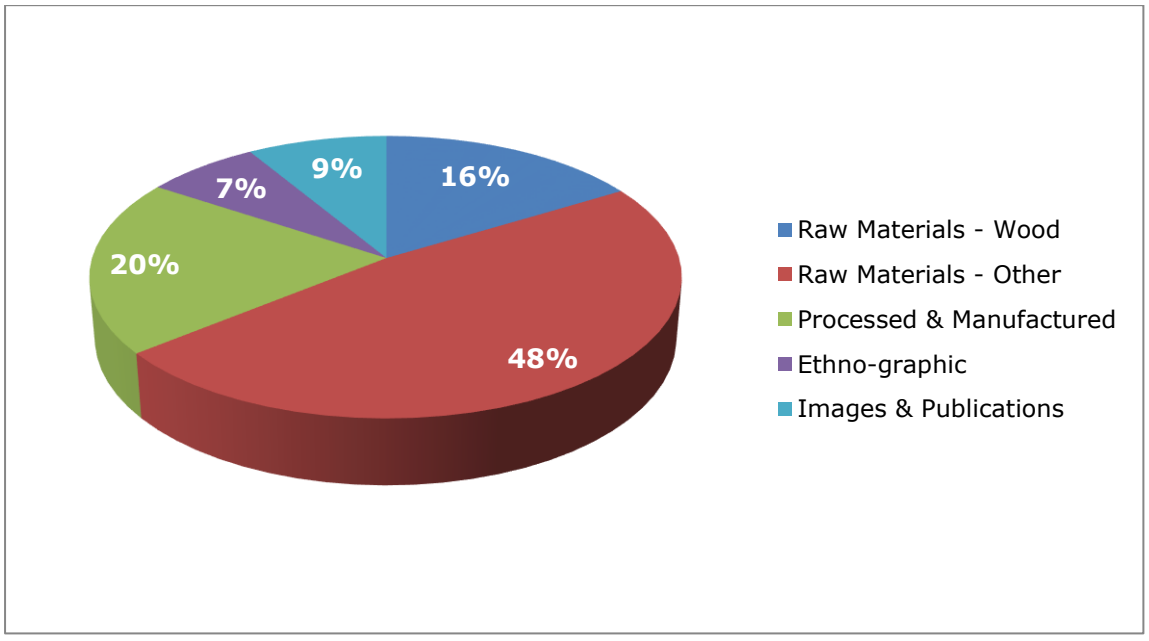
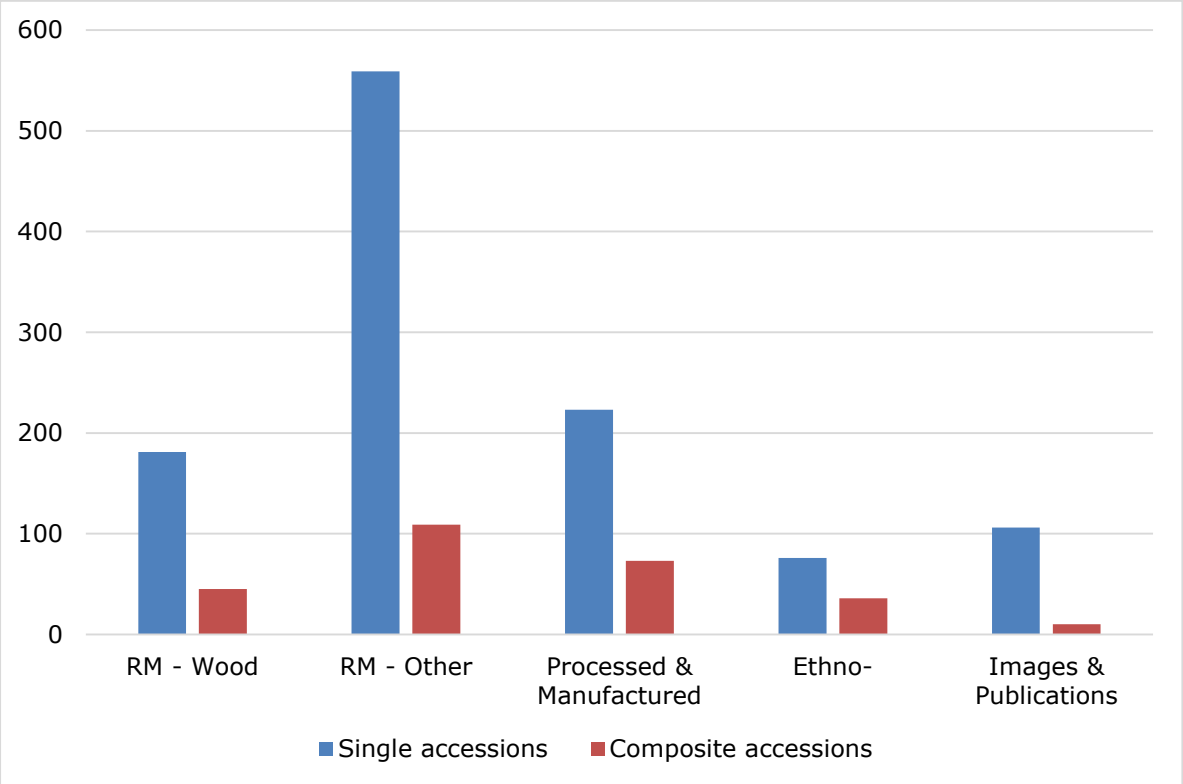


Table A. Decennial samples of accession events by object type, with summary pie chart (Note: total of 1282 accession events represents 10% of all accession events, 1847-2010).

	RM - Wood	RM - Other	Processed & Manufactured	Ethnographic	Images & Publications	Totals
Single accessions	**181**	**559**	**223**	**76**	**106**	**1145**
Composite accessions	**45**	**109**	**73**	**36**	**10**	**273**
Sample Total	**226**	**668**	**296**	**112**	**116**	**1418**



n = 1,418

Table B. Analysis of decennial samples of accession events by object type, distinguishing the number of single and composite accessions.

	Private Collectors	Exped-itions	Traders & Manu-facturers	Govt. Depts.	Botanic Gardens	Museums/ Exhibitions	Other Kew	Other	Total
1850	14	14	11	12	1	0	1	17	70
1860	52	37	12	25	10	4	34	25	199
1870	18.5	4	11	17	16.5	4	11	17	99
1880	18	8	22	22	26	12	2	41	151
1890	11	5	50	40	23	7	5	23	164
1900	10.5	5	17	12	20	9.5	5	13	92
1910	9	3	44	24	17	28	12	43	180
1920	0	12	29	8	4	4	1	18	76
1930	5	6	12	17	4	10	11	11	76
1940	4	0	3	2	0	0	2	5	16
1950	0	0	2	8	0	1	1	5	17
1960	0	3	0	0	1	2	0	3	9
1970	0	10	2	3	4	0	2	6	27
1980	1	5	5	1	1	4	10	3	30
1991	0	22	0	3	3	1	6	4	39
2000	0	8	0	0	0	0	1	1	10
2010	5	4	4	0	0	1	4	3	21
Sample total	**148**	**146**	**224**	**194**	**130.5**	**87.5**	**108**	**238**	**1276**

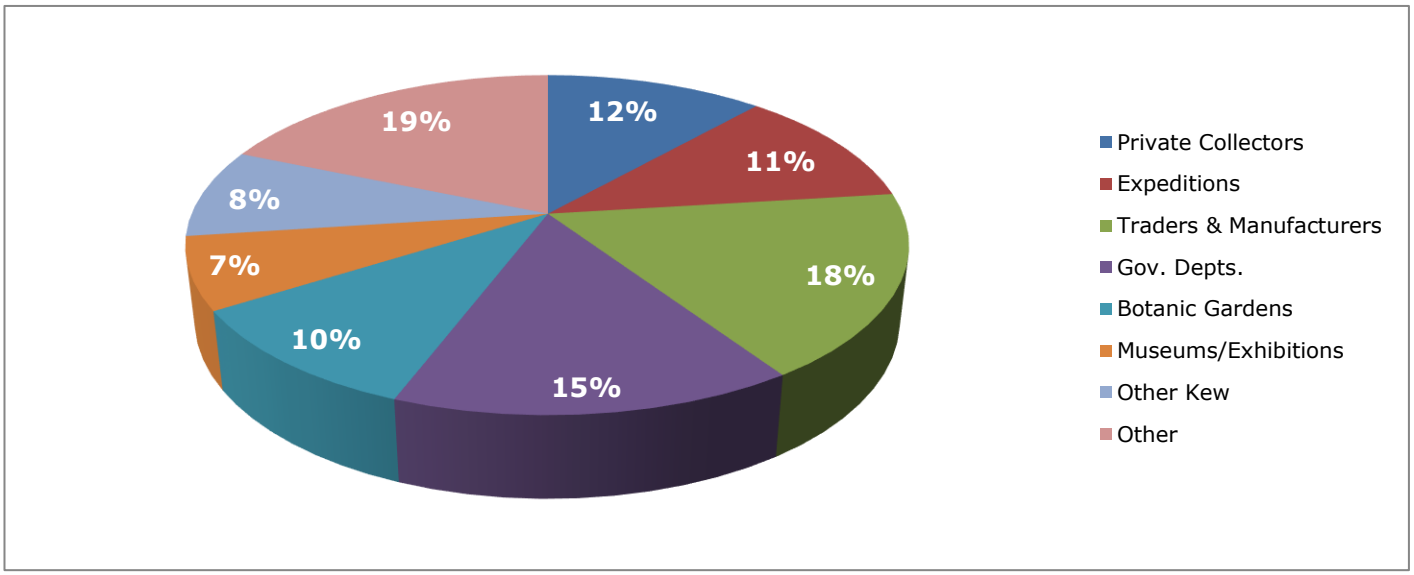


Table C. Decennial samples of accession events by donor type, with summary pie chart (Note: total of 1276 accession events represents 10% of all accession events, 1847-2010).

	Donor	Positions Held
1.	Ferdinand von Mueller (1825-1906)	Government Botanist, Victoria (1853-57); Superintendent, Royal Botanic Gardens, Melbourne (1857-73).
2.	John Hinchley Hart (1847-1911)	Superintendent Jamaica Cinchona Plantations (1881-87); Director of Botanic Garden, Trinidad (1887-1908).
3.	Joseph Dalton Hooker (1817-1911)	Naval surgeon; botanist; plant collector; Assistant Director, Royal Botanic Gardens, Kew (1855-65); Director (1865-85).
4.	William Turner Thiselton-Dyer (1843-1928)	Assistant Director, Royal Botanic Gardens, Kew (1875-85); Director (1885-1905).
5.	Foreign Office	Government department, est. 1782; responsible for protecting and promoting British interests abroad.
6.	India Office	Government department, 1858-1948, successor to the EIC; responsible for 'superintendence, direction and control' of British India.
7.	Daniel Morris (1844-1933)	Assistant Director, Royal Botanic Gardens, Kew (1886-98); Imperial Commissioner of Agriculture, West Indies, 1898-1908.
8.	Daniel Hanbury (1825-75)	Botanist; pharmacognocist; director of Allen, Hanbury & Barry, pharmaceutical manufacturer.
9.	Morley Thomas Dawe (1880-1943)	Botanist; civil servant; Head of Botanical, Forestry & Scientific Dept. of Uganda (1903-10); Director of Entebbe BG & Director of Agriculture Mozambique & Angola (1910-14); Agricultural Adviser, Columbia (1914-19); Crown Agent for Gambia; Commissioner for Lands & Forests, Sierra Leone.
10.	Imperial Institute	British research and educational institute, est. 1888.
11.	John Kirk (1832-1922)	Physician, botanist; botanist on Livingstone's Zambezi Expedition (1858-64); British Consulate in Zanzibar (1866-86).
12.	Maxwell Tylden Masters (1833-1907)	Physician, horticulturalist; editor of *Gardeners' Chronicle* (1865-1907); writer.
13.	John Stevens Henslow (1796-1861)	Clergyman, botanist & geologist; Professor of Mineralogy, Cambridge University, 1822-27; Professor of Botany, Cambridge University, 1825-33.

	Donor	Positions Held
14.	George Henry Kendrick Thwaites (1812-1882)	Superintendent of Peradeniya Botanic Gardens (1849-57); Director of same (1857-1880).
15.	James Edward Tierney Aitchison (1836-98)	Colonial doctor & botanist; Bengal Medical Service (1858-88).
16.	Richard Spruce (1817-1893)	Explorer and plant collector, Amazon & Andes regions.
17.	Edward Morrell Holmes (1843-1930)	Pharmacist; curator of Materia Medica Museum of UK Pharmaceutical Society (1872-1922)
18.	Royal Horticultural Society	Founded 1804; learned society and horticultural gardens.
19.	Isaac Henry Burkill (1870-1965)	Herbarium Assistant, RBGK (1897-1901); Assistant Reporter on Economic Products to the Government of India (1901-1912); Director of Botanic Gardens, Singapore (1912-25).
20.	George Samuel Jenman (1845-1902)	Superintendent, Castleton Botanical Garden, Jamaica (1873-79); Government Botanist & Superintendent Botanical Gardens, British Guiana (1879-1902).

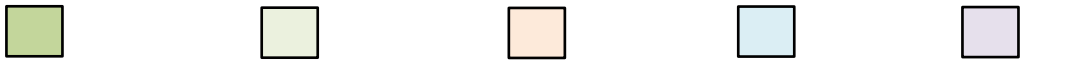


Table D. Top 20 donors by occupation.

	From Mueller	To Mueller
J. Hooker	375	98
O. Tepper	284	19
W. Thiselton-Dyer	214	1
G. Bentham	202	122
M. Holtze	198	3
A. Macdonald	142	2
R. Tate	135	5
E. P. Ramsay	118	8
E. FitzGibbon	85	41
J. von Haast	85	2
A. Peterman	80	11
W. Hooker	80	2
A. de Candolle	50	2
W. Gill	49	4
E. Henderson	48	0
F. Barlee	32	2
F. von Krauss	32	2
C. Hodgkinson	28	22
O. Nordstedt	28	8
A. Engler	28	0
A. Gray	27	0
L. Dejardin	25	0
J. Agardh	23	1
C. von Martius	22	0
F. Parlatore	22	0
E. von Regel	21	3
A. Milne-Edwards	20	8
F. McCoy	17	11
J. Stirling	17	7
A. Purchas	15	17
J. Maiden	12	46
W. Woolls	8	49

Kew botanists

Table E. Mueller's correspondence 1860-1896.

Source: Lucas et al, 2002, 49; 2006, 43.