

Chapter 7

Colombian plants in Kew's Economic Botany Collection



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Snake carved from the twisted stem of a liana of *Entada polystachya*, collected in Antioquia, Colombia and sent by William R. Jervis to Kew in the 1850s.

Economic Botany Collection, EBC 59030

Chapter 7

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ABSTRACT

Kew's Economic Botany Collection was first founded as the Museum of Economic Botany in 1847. Among a total collection of 100,000 plant raw materials and plant products, it contains 320 specimens from Colombia. Recent research has enabled botanical names to be updated and provenance data retrieved through archival research. The Colombian specimens are best understood as representing changes in the scientific relationship between Colombia and Kew from the mid-nineteenth century to today. We identify three stages in bioprospecting. In the nineteenth century, medicines, dyes, and other commercial materials were sent to Kew for evaluation and subsequent display, often by British residents in Colombia. The Royal Pharmaceutical Society Museum, now part of the Kew collection, also includes medicinal plants from Colombia. In the early twentieth century, the Colombian government employed Morley Thomas Dawe to explore Colombia's agricultural and botanical potential, leading to the donation of 70 specimens to Kew. Later in the twentieth century, Colombian botanists donated timber specimens. In the twenty-first century, the Colombia Bio project (between Colombia and Kew) led to the acquisition of new objects, emphasising the development of sustainable livelihoods and the preservation of biocultural knowledge.

RESUMEN

La Colección de Botánica Económica de Kew fue fundada como Museo de Botánica Económica en 1847. Con un total de 100.000 materias primas vegetales y productos vegetales en la colección, 320 especímenes son de Colombia. Investigaciones recientes han permitido actualizar los nombres botánicos y recuperar datos de procedencia mediante la investigación de archivos. Los especímenes colombianos representan cambios en la relación científica entre Colombia y Kew desde mediados del siglo XIX hasta la actualidad. Identificamos tres etapas en la bioprospección. En el siglo XIX, diversos medicamentos, tintes y otros materiales comerciales se enviaron a Kew para su evaluación, a menudo por parte de residentes británicos en Colombia. El Museo de la Real Sociedad Farmacéutica, ahora parte de la colección Kew, también incluye plantas medicinales de Colombia. A principios del siglo XX, el gobierno colombiano empleó a Morley Thomas Dawe para explorar el potencial agrícola y botánico de Colombia, lo que llevó a la donación de 70 especímenes a Kew. Posteriormente en el siglo XX se evidencia algún contacto con botánicos colombianos a través de donaciones de madera. En el siglo XXI, el proyecto Colombia Bio condujo a una intensa interacción entre Kew y Colombia, y la adquisición de objetos que enfatizan el desarrollo de medios de vida sostenibles y la preservación del conocimiento biocultural.

INTRODUCTION

The Economic Botany Collection (EBC) at the Royal Botanic Gardens, Kew (Kew) is a large, wide-ranging biocultural collection of over 100,000 materials and plant products spanning food products, tools, artefacts, medicines, poisons, wood, ornaments and textiles, among other objects, covering all aspects of plant uses in human life. The EBC is the successor to Kew's Museum of Economic Botany, founded in 1847. Such museums of economic botany were widespread in the second half of the nineteenth century, connecting producers of raw materials with manufacturers. Economic botany collections are identifiable by their emphasis on usefulness to humans, by their distinctive combination of raw materials and products, and by the consistent application of botanical (Latin) names to the specimens (Cornish & Nesbitt, 2014; Nesbitt & Cornish, 2016).

Economic botany was a fundamental part of the colonial system. By the 19th century, vegetable products were considered strategic elements, and oversight of their trade was a state priority (Drayton, 2000). As different colonial and commercial powers sought to control the economic potential of tropical biodiversity, they funded the creation and establishment of museums of economic botany. It is likely that similar materials, such as cinchona barks, were held by the 'Botanical House' in Bogotá: the base of the Real Expedición Botánica del Nuevo Reino de Granada. These specimens were removed to Madrid in 1816 (Díaz-Piedrahíta, 1986).

Although Colombia, with its recognised biological wealth, seems like a strategic source for economic botany specimens, it is surprisingly under-represented in the EBC. Unlike other countries of the region such as Mexico

(850 items; Rico Arce *et al.*, 2013) and Brazil (2,700 items), the Colombian component of the EBC is only 320 items (Echeverri-Sanchez *et al.*, in press). As part of the larger Colombia Bio project, the authors of this chapter have catalogued, digitised, and studied these items and uploaded them to the Plants of the World Online (<http://www.plantsoftheworldonline.org/>) and ColPlantA platforms (<https://colplanta.org/>). Updated records are also available on the EBC database, searchable online at: <https://www.kew.org/science/collections-and-resources/collections/economic-botany-collection>.

The Colombian element in EBC is small in number and is uneven in coverage of the many ways in which plants are used in the country. Although the EBC underrepresents the enormous botanical diversity of the country, it offers a useful perspective on British scientific and commercial interest in Colombia from the Victorian period to the current day.

BRITISH – COLOMBIAN RELATIONS

As a government institution since 1840, Kew's relationship with Colombia reflected the official stance of the British government. In the second half of the nineteenth century, this was characterised by a tentative interest in the country's natural wealth but little or no interest in formal administrative control. The British banking industry sought to make loans to the new nations of South America, establishing a debt system that, on many occasions, exerted a profound influence on these countries. This type of 'soft' power or, as historians now term it, 'informal empire', was considered more effective than formal political and economic control (Cain & Hopkins, 2016). However, British powers represented economic interests in the region, especially in countries with the greatest economic potential, such as Argentina, Brazil, and Chile (Thompson, 2008; Cain & Hopkins, 2016). Ensuring debt servicing of British loans and opening the Latin economies to English investors was London's main policy in South America.

In Colombia, informal political and economic control over the territory was rarely plausible. However, although Britain was one of the greatest investors in the young Andean nation, political instability, rurality, and geographical obstacles made it unattractive for English banks (Bushnell, 1993). Colombia was constantly trying to pay off large debts throughout its history and was quickly considered too risky for international investment (Deas, 1993, 2008). At the same time, the country had a relatively small luxury goods market and its rugged geography limited transportation. Foreign companies that tried to enter the domestic market often went bankrupt (Deas, 1993). Even large infrastructure investments, such as the Colombian rail network, failed. For these reasons, Colombia was one of the few countries in Latin America that did not produce large English fortunes, never being at the centre of British military and colonial interests.

The only product that could generate wealth in the country was gold, and as a result, several mines were granted by

the Colombian government to pay interest on loans. These mines would be English cultural enclaves until the middle of the 20th century (Mejía Rivera, 2016; González Rodríguez, 2005). People working in the mines were one of the main sources of early collections in the EBC. They housed British doctors and engineers interested in local history and with the ability and interest to communicate directly with Kew. A search to find new medicines or industrial products was of great interest to local British enterprises. Scientists, merchants, and diplomats would send materials to Kew to explore their potential as a commodity.

As the geopolitics of empire and trade changed during the 20th century, objects collected for the EBC reflect these changes. Founded in part as a tool to classify and control the biodiversity of tropical colonies, the purpose of such institutions has transformed profoundly. The differences between the objects collected at the beginning of the 20th century and those at the end of the century demonstrate the gradual change. When the British colonial project ended, these scientific institutions began to focus on documenting and understanding biocultural diversity to enable its preservation and use in local livelihoods. As such, items collected in the past 40 years are focused on preserving biocultural diversity, with fuller documentation of the techniques and knowledge associated with them.

THE NINETEENTH CENTURY: SEARCHING FOR COMMODITIES

By the time the EBC was constituted in the 1840s, the mercantilist trade dynamics of the nineteenth century had led to a focus on Europe as an importer of raw materials, and an exporter of manufactured goods, with an emphasis on trade within a country's imperial territories. For countries outside the imperial system, entering this trade network required commodities and internal wealth that would incentivise foreign investment, which often came with heavy political and economic interventionism. The young South American nations were not part of any global imperial system at the time, following their recent independence from Spain and Portugal. They were often integrated into the north Atlantic trade network through a specific commodity or through banking and financial transactions. Throughout the history of the continent, several products caused exponential economic growth for local communities. Most of these products were raw resources produced from the local biodiversity, such as rubber, quinine, sugar, tobacco, alongside other lesser-known products, such as dyes and tropical fruits.

But Colombia was not part of the British colonial sphere, so there was no interest in investing in national agricultural production. Instead, the country was understood as a possible source of resources that could break the existing monopolies, such as Brazil with rubber and Peru with quinine. The race to find species that produce quinine and rubber, evidenced in the collection, demonstrates the interest in these products in the British markets. At the same time, it highlights the efforts of the Colombian government to look for new products for global trade, leading in the early

twentieth century to financing European experts to visit Colombia and analyse the local biodiversity (see Morley Thomas Dawe, below)

Unlike other Latin American nations, Colombia was relatively poor. Its economy was based mostly on gold extraction, with smaller subsistence farming throughout the Andean region and larger plantations on the coast. In the absence of important export products such as guano in Peru, cocoa in Venezuela, or rubber in Brazil, Colombia had little to offer to international markets. Those products that gained a certain international value had a limited effect on the national economy, thanks to mismanagement and civil conflicts, as in the cases of the tobacco boom of 1850 (Bushnell, 1993) and quinine in the 1860s (Tirado Mejida, 1971). It was only with coffee in the late 19th century that Colombia effectively entered world trade. This market was directed towards the United States rather than Great Britain but began consolidating Colombia's influence throughout the continent.

MEDICINES

Some specimens highlight a local interest in finding alternative products that could generate income. An early example of this is Té de Mutis (*Symplocos theiformis*), with several samples in the EBC collection. The earliest specimen (Catalogue number EBC 50445, Figure 1a) was donated to Kew in 1893 by London's Pharmaceutical Society. This donation was an early attempt – involving the Spanish botanist Jose Celestino Mutis, resident in Bogotá – to commercialise an alternative to the lucrative tea (*Camellia sinensis*) trade.

However, as a biodiverse region, there was much interest in the potential of local medicines found in the forest and jungles of the new nation. Several items in the collection, given by W.R. Jervis, demonstrate the role of British imperialism and trade in the formation of botanical medicine bioprospecting. Jervis was probably William R. Jervis, a doctor in the English mines of Marmato (Mejía Rivera, 2016; González Rodríguez, 2005). Though we have little information on him, Jervis was a proficient collector with over 30 items collected between 1825 and 1850. He was one of several British citizens who emigrated to Antioquia during the first half of the nineteenth century, when a small population of foreigners managed the British-owned gold mines.

Jervis collected several specimens of cinchona bark (*Cinchona* spp., Figure 1b) and balsam (*Myroxylon* sp. and *Myrospermum* sp.), among other medicinal plants. The two examples of curare (*Strychnos toxifera*) from Colombia (EBC 49123 and EBC 49125) were sent to Kew by Jervis in 1853. Curare is used to poison darts used with blowguns or sometimes with arrows for hunting animals. It is prepared from the bark of *Strychnos* stems, mixed with a plant gum (usually from *Couma macrocarpa* latex) so that it will stick to the dart or arrow. *Strychnos* and other tubocurarine-containing plants are used throughout the Amazon basin. It is unclear how Jervis obtained this specimen, which might have come from the Amazon region (far from Marmato). Nevertheless, several *Strychnos* species grow in Andean and inter-Andean valleys. The 1850s were when curare played an important role in understanding the usefulness of paralysis-inducing drugs in medical treatment.

The EBC contains about 1,000 examples of *Cinchona* bark but only 32 specimens from Colombia. *Cinchona* bark

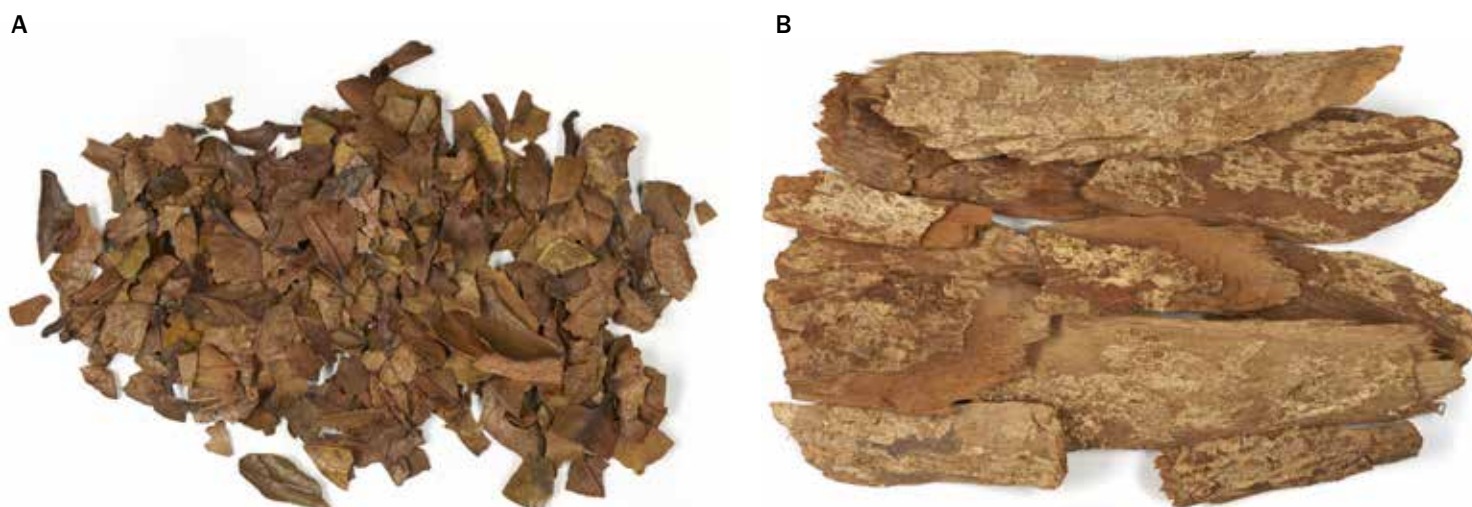


FIGURE 1. Medicines. **A** Té de Mutis (leaves of *Symplocos theiformis*), donated to Kew in 1893 by the Pharmaceutical Society of Great Britain (EBC 50445). **B** Bark of *Cinchona pitayensis* (Wedd.) Wedd., from Antioquia, Yarumal, sent to Kew by W.R. Jervis, 1854 (EBC 52393).

A



B



C



FIGURE 2. A Materials. Top. Leaves, twigs, and dyed fabric of '*Bignonia tinctoria*' (this is an unplaced name according to Plants of the World Online; it is probably related to *Fridericia chica* (Bonpl.) L.G. Lohmann), given by Robert Thomson to the Pharmaceutical Society of Great Britain c. 1890 (EBC 47638). **B** Fibre from leaves of *Furcraea* sp., given to Kew as 'picta' by London brokers Messrs. Wigglesworth & Co in 1919 (EBC 29981). **C** Bag waterproofed with *Castilla elastica* Cerv. Sent to Kew in 1919 by Morley Thomas Dawe, described by him as 'a rubber sack made by the Indians of that region [Darién Country]. They buy the material in the coastal towns or villages and waterproof it in the forests with the latex of *Castilla elastica*' (EBC 43012).

was the only effective treatment for malaria in much of the world from 1630 to 1940. It was used as powdered bark until the extraction of the quinine alkaloids, which was perfected in the 1820s (Walker & Nesbitt, 2019; Rønsted *et al.*, 2020). Since Peru had established a near-monopoly over *Cinchona* bark exports, Colombia had little effect on the international market (Crawford, 2016). However, there was a smaller-scale *Cinchona* bark industry in Colombia, which was characterised by a series of short-lived booms and busts over three periods: 1849–1852, 1867–1873, and 1877–1882 (Sastoque, 2011; Sandoval & Echandia, 1986; Tirado Mejida, 1971). Most of the quinine was harvested from the wild, and the samples found in the collection represent species common in Colombian cloud forests such as *Cinchona pitayensis* and *Cinchona pubescens*. Most of these specimens were donated to Kew by the Royal Pharmacological Society, which collected many samples from the London trade. From the 32 samples of the quinine-producing plants catalogued as Colombian, they represent five species of *Cinchona*, three species of *Ciliosemina*, and one each of the species of *Carapichea* and *Ladenbergia* (incl. *Cascarilla*). Colombia never had a sustained quinine industry, and when production shifted to Asia from the 1860s, Latin America lost its role in producing this important medicine.

MATERIALS

Dyes were of great interest to early Colombian and British bio prospectors. An interesting example is the *chica* dyes (*Fridericia chica*) held by the Pharmaceutical Society of Great Britain and transferred to Kew in 1983 (EBC 47638, Figure 2a). These were brought to London by Robert Thomson, a British gardener who visited Bogotá in the 1880s-1890s (Cendales Paredes, 2012). Even though this dye produced a beautiful red colour, correspondence in the Kew archives highlights that the colour does not last. This fact was the reason it was never a commercial alternative to cochineal dyes.

Rubber was another neotropical product of great interest for the British empire. Although there are many rubber products in the EBC, there are no Colombian items made with *Hevea brasiliensis*. Instead, five objects are made of the rubber ‘substitute’ known as caoutchouc or Indian rubber (*Castilla elastica*, Figure 2c). Since *H. brasiliensis* only grew wild in the Amazon basin, until the development of Asian plantations late in the nineteenth century, Brazil had a monopoly overexploiting this important commodity. Due to its strategic value, there was a constant incentive to search for alternatives that could compete against the Brazilian industry. Although *C. elastica* has been used as a source of rubber by indigenous people since pre-Colombian times, it was never a realistic alternative due to its lower quality and production limitations (Hosler *et al.*, 1999).

There was also much interest in materials to make strong ropes, which were considered strategic in an age before plastics. In the early twentieth century, the British naturalist and collector Morley Thomas Dawe had a particular interest in the figue or *Furcraea* genus plants,

the source of excellent rope materials (Figure 2b). In 1916 he wrote, “There are probably few vegetable products, the subject of domestic industry, particularly in the fibre world, which have so wide an application in everyday use as figue in Colombia” (Dawe, 1916). Even though the production of figue in Colombia was mostly to supply a growing internal industry, the trade potential of this product was not lost to Dawe, who, in that same bulletin, highlights the cost of production and export to ports such as New York.

TIMBER

A key factor in Colombia’s international trade was its access to transport. This fact is particularly the case with bulk materials such as timber. As late as 1916, its railways were poorly developed, with the main transport route being the Magdalena River. An easy connection between the country’s Pacific and Atlantic coasts awaited the opening of the Panama Canal in 1914 (Simmons, 1916). Simmons reported an extremely challenging environment for timber exports, with stands of two desirable timber trees, Spanish cedar (*Cedrela odorata*) and Colombia mahogany (*Swietenia macrophylla*), so scattered as to be economically inviable – at least for export.

The wood component (xylarium) of the EBC contains about 42,000 specimens, with only 77 from Colombia. The history of the xylarium falls into two parts: collecting timber species from 1847 to the 1930s and then a broadening of interest to all woody species to support broad taxonomic surveys of wood anatomy (Cornish *et al.* 2014). The Colombian woods fall into two groups: a first period (1890–1920), mostly of Dawe’s collections, and a second one (1960–1980) based on academic cooperation with the Universidad Nacional of Colombia (Figure 3).

The first group contains three important timbers even today: Andean cedar (cedro de Bogotá, *Cedrela montana*), native pine (pino chaquiro, *Prumnopitys montana*), and laurel (comino cespado or chachajo, *Aniba perutilis*). Santiago Cortés (1897) highlighted these species as important for the timber industry, and all are now categorised as at threat of extinction.

The second group of woody plants represented in the collection (and currently used in the country) belongs to 1960–1980 accessions. These items include commonly used plants in rural areas and are highly harvested throughout the country. Examples of this group are *Couma macrocarpa* (juansoco), *Terminalia amazonia* (arenillo), *Cariniana pyriformis* (abarco), and *Bulnesia arborea* (guayacán), which are also threatened (BGCI, 2021). Nowadays, according to MADS (2021), it is estimated that nearly 21,528 cubic metres of these trees were harvested between January 2020 and March 2021.

RICHARD SPRUCE’S ETHNOBOTANICAL COLLECTIONS

The scope of Kew’s Museum of Economic Botany was, from its foundation, defined as ‘all kinds of useful and curious Vegetable Products, which neither the living plants of the Garden nor the specimens in the Herbarium could exhibit’

(Hooker, 1855: 3; Cornish, 2012). In other words, not all specimens were purely utilitarian. This scope is reflected in the c. 350 ethnobotanical specimens collected from indigenous peoples in the Amazon region by the botanist Richard Spruce, mainly in the years 1850–1855 (Martins *et al.*, 2021). Some of these are clearly of economic potential, as in the fruits or the caapi vine (*Banisteriopsis caapi*), a component of ayahuasca, which was of medicinal interest in Europe. Spruce also collected other items of less obvious usefulness in a European context, such as ritual weapons

or clothing, with the same scrupulous level of attention to their botanical identity.

Most of Spruce's ethnobotanical specimens were collected in the Rio Negro region of the northwest Amazon, along the Rio Uaupés, probably into Colombia. These Colombian specimens include poisoned arrows with shafts made from grass (EBC 38648, *Gynerium sagittatum*) and a palm leaf (*Mauritiella armata*, EBC 35883). He also collected items on the border between Venezuela and Colombia.

THE TWENTIETH CENTURY: COLOMBIA'S NATIONAL AGENDA

One of the most interesting themes drawn from the EBC is the transformation of British global science: from the commercial focus of the late colonial period to a postcolonial scientific interest in biodiversity. Botanists, diplomats, and experts would send items to Kew that reflected their interests and what they believed was the interest of Kew as an imperial scientific institute. From the late twentieth century onwards, these sources dry up, and donations are made almost exclusively by professional botanists operating within the Convention on Biological Diversity parameters, working in a collaborative and conservation-based framework for science.

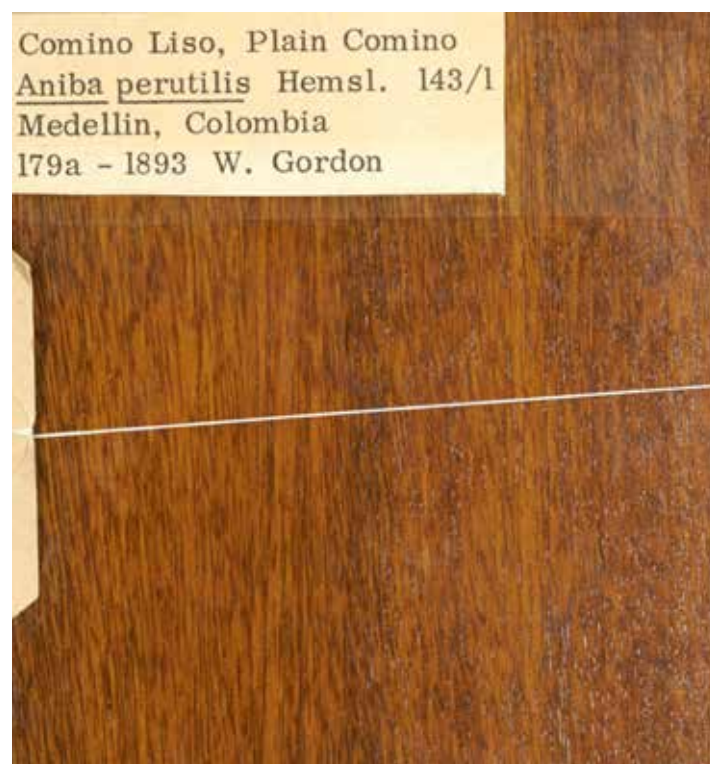
The work of Morley Thomas Dawe, who was a consultant for the Colombian Ministry of Agriculture, is emblematic of the shift from individual or commercial collectors to the state agency, albeit still working within a framework of bioprospecting. Dawe travelled the country between 1915 and 1920, drawing on his expertise as a trained botanist and long-time collaborator with Kew and exploring Colombia's botanical potential (Figures 2c and 4). Though Colombia had a policy of highlighting its botanical potential on the global stage since its independence (del Castillo, 2010), it relied mostly on foreign experts.

Due to his pre-existing relationship with Kew, Dawe sent over 70 items (representing a quarter of the entire Colombian EBC collection). His expeditions were mostly in the northern and western regions of Colombia, traversing the different ecosystems of the Caribbean, Andean, and Pacific regions. He later published lengthy reports (such as Dawe 1918, 1921a, 1921b). This scenario highlights the mediating role he had between the UK and Colombia. As with the fique collections, these studies were fundamentally economic, looking for commercial and agricultural alternatives to benefit Colombia and the UK.

The lack of Colombian specimens (except for timber) during the rest of the twentieth century reflects both a wider decline in acquisitions during this time, as the development of the Museum of Economic Botany ceased to be a priority for Kew, and a parallel lack of engagement of Kew botanists with Colombia. Colombia entered the commercial sphere of the United States, and American botanists played a major role in the exploration of the Colombian flora.

Typical of the sporadic acquisitions of Colombian items during this period was the basketry purchased by Kew botanist Lauren Gardiner at the World Palm Symposium, held in 2015 in the municipality of Montenegro, Quindío

A



B

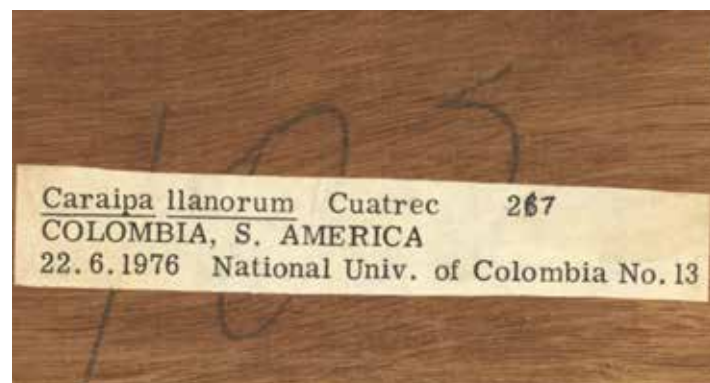


FIGURE 3. Wood specimens. **A** *Aniba perutilis* Hemsl., trade names 'Comino liso', 'Plain Comino'. Sent to Kew in 1893 by William Gordon, British Vice-Consul, Medellin (EBC 14468). **B** *Caraipa llanorum* Cuatrec. Sent to Kew in 1976 by the National University of Colombia (EBC 1130).



FIGURE 4. Model with figures and utensils made from corky outgrowths of the bark of 'hobor' tree, *Spondias mombin*. Sent by Morley Thomas Dawe in 1916 (EBC 37950).

Department (Figure 5). The Symposium included an organised market for attendees to buy traditional crafts and other palm products. This reflected the shift during the 20th century from an emphasis on exporting raw materials to benefit large corporations or manufacturing industries overseas, to projects that emphasise high-value products, the retention of income in local communities in Colombia, and the sustainable use of biological resources.

THE TWENTY-FIRST CENTURY: THE COLOMBIA BIO PROJECT

In the 21st century, Kew has developed a new relationship with Colombian researchers through collaboration with the national Colombia Bio project. This Colombian government initiative is based on the sustainable use of local biodiversity. Kew has collaborated with Colombia Bio in several projects, of which the 'Biodiversity Expeditions' in Boyacá provided several items for the collection. Although there are many similarities between these expeditions and those conducted by Dawe one hundred years earlier, Colombia Bio is based in a well-established community of botanical researchers in Colombia. The items collected during the Colombia Bio expeditions, such as the sample of the basketry in the Boyacá area (EBC 100447-100449), demonstrate a different vision and perspective: one of self-reflection and identification of the country's own ecological and cultural heritage.

CONCLUSIONS

Our initial study of the Colombian component of the EBC – and there is much more to be done – demonstrates the importance of such case studies of countries that (during our study period) did not form part of one of the European empires. We emphasise the complex routes by which specimens reached Kew, with the strong involvement of commercial interests and actors within Colombian society in the nineteenth century. While economic botany in the nineteenth century clearly continues to function as a tool for extracting wealth from South America, even after independence, this is a complex process in which Kew's engagement was fitful.

From the early twentieth century onwards, the main actors are the Colombian government and, later, Colombian scientists. In both the early twentieth and twenty-first centuries, the emphasis shifts towards supporting local economic development. Now, we can see an explicit focus on conservation and ethnobotanical methodologies as the bridge between biodiversity conservation and its use. The Economic Botany Collection is thus an archive both of traditional knowledge (for detailed case studies, see Echeverri-Sanchez *et al.*, 2021) and an archive of Colombia and Kew's changing engagement with the world.



FIGURE 5. Bag woven by Reinaldo da Silva, of the Tikuna people of the Colombian Amazon, with fibres from the unexpanded leaves of the chambira palm, *Astrocaryum chambira* Burret. This palm, the most important source of fibre in western Amazonia, was in process of domestication by the time of the European conquest (Garcia *et al.* 2015). Bought by Lauren Gardiner at the World Palm Symposium, Montenegro, Quindío, Colombia, 2015 (EBC 99453).

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References

- BGCI (2021) GlobalTree Portal. Available at: <https://www.bgci.org/resources/bgci-databases/global-tree-assessment-portal/>
- Bushnell D (1993) *The making of modern Colombia: a nation in spite of itself*. Berkeley, University of California Press. 335p.
- Cain PJ, Hopkins AG (2016) *British imperialism: 1688-2015*. 3rd Edition. London, Routledge. 794p.
- Cendales Paredes C (2012) Robert Thomson (1840-1908): a Kew gardener in Bogotá, Colombia. *J Gard Hist*, 40: 239-52.
- Cornish C (2012) Useful and curious: a totem pole at Kew's timber museum. *J Mus Ethnogr*, 25:138-151.
- Cornish C, Gasson P, Nesbitt M (2014) The wood collection (xylarium) of the Royal Botanic Gardens, Kew. *IAWA J*, 35:85-104.
- Cornish C, Nesbitt M (2014) Historical perspectives on western ethnobotanical collections. In: J. Salick, K. Konchar, M. Nesbitt eds. *Curating biocultural collections: a handbook*. pp. 271-293. London, Royal Botanic Gardens, Kew.
- Cortés S (1897) *Flora de Colombia*. Vol. 1. Bogotá, Samper Matiz. 288p.
- Crawford MJ (2016) *The Andean wonder drug: Cinchona bark and imperial science in the Spanish Atlantic, 1630–1800*. Pittsburgh, University of Pittsburgh Press. 284p.
- Dawe MT (1916) Fique: *Furcraea gigantea*. Bulletin of Miscellaneous Information. *Kew Bull*, 1916(7), 169-170.
- Dawe MT (1918) *Account of a journey down the Magdalena River, through the Magdalena Province and the Peninsula of Guajira (Colombia)*. Bogotá, Ministry of Agriculture and Commerce.
- Dawe MT (1921a) *Account of a journey through the western portion of Colombia, showing the possibilities of the economic development of the districts visited*. London, Colombian Bureau of Information and Trade Propaganda. 28p.
- Dawe MT (1921b) An account of a journey from Tolima to the Pacific Coast, through the Departments of Caldas and El Valle (Republic of Colombia). In: MT Dawe ed. *Account of a journey through the western portion of Colombia, showing the possibilities of the economic development of the districts visited*. London, Colombian Bureau of Information and Trade Propaganda. 28p.
- Deas M (1993) *Del poder y la gramática: y otros ensayos sobre historia, política y literatura colombianas*. Santafé de Bogotá, Tercer Mundo Editores. 346p.
- Deas M (2008) Weapons of the weak? Colombia and foreign powers in the nineteenth century. In: *Informal empire in Latin America: Culture, commerce and capital*, ed. M. Brown, pp. 173-86. Oxford, Wiley Blackwell.
- del Castillo L (2010) La Gran Colombia de la Gran Bretaña: la importancia del lugar en la producción de imágenes nacionales, 1819 - 1830. *Araucaria*, 12(24): 124-149.
- Díaz-Piedrahíta S (1986) Las compuestas de la Real Expedición Botánica del Nuevo Reino de Granada (1783-1816). *Caldasia*, 14: 371-393.
- Drayton RH (2000) *Nature's government: Science, imperial Britain, and the 'improvement' of the world*. New Haven, Yale University Press. 346p.
- Echeverri-Sánchez H, Sánchez-Garzón N, Nesbitt M, Ávila, F, Diazgranados M (2021) Enviados directo a Londres: Los objetos colombianos en la Colección de Botánica Económica del Real Jardín Botánico de Kew. *Apuntes Pontificia Universidad Javeriana*, 34:doi.org/10.11144/Javeriana.apu34.edlo
- García N, Galeano G, Mesa L, Castano N, Balslev H, Bernal R (2015) Management of the palm *Astrocaryum chambira* Burret (Arecaceae) in northwest Amazon. *Acta Bot Bras*, 29: 45-57.
- González Rodríguez AL (2005) Educación y práctica médicas en Antioquia. Antecedentes históricos de la fundación de la Escuela de Medicina de la Universidad de Antioquia. *Iatreia*, 18: 332-343.
- Hooker WJ (1855) *Museum of Economic Botany: Or, a popular guide to the useful and remarkable vegetable products of the Museum of the Royal Gardens of Kew, London*. London, Royal Botanic Gardens, Kew. 11p.
- Hosler D, Burkett SL, Tarkanian M J (1999). Prehistoric polymers: rubber processing in ancient Mesoamerica. *Science*, 284: 1988-1991.
- MADS - Ministerio de Ambiente y Desarrollo Sostenible (2021) Base de datos de movilizaciones de madera con salvoconducto forestal en Colombia. Bogotá, Dirección de Bosques, Biodiversidad y Servicios Ecosistémicos.
- Martins L, Fonseca-Kruel V, Cabalzar A, Lima Azevedo D, Milliken W, Nesbitt M, Scholz, A (2021) *A maloca entre artefatos e plantas: guia da coleção Rio Negro de Richard Spruce em Londres*. São Paulo, Instituto Socioambiental. Available at: <https://acervo.socioambiental.org/acervo/publicacoes-isa/maloca-entre-artefatos-e-plantas-guia-da-colecao-rio-negro-de-richard-spruce>
- Mejía Rivera O (2016) *Historia de la medicina en el eje cafetero 1865-1965*. Manizales, Universidad de Caldas. 440p.
- Nesbitt M, Cornish C (2016) Seeds of industry and empire: Economic botany collections between nature and culture. *J Mus Ethnogr*, 29:53-70.
- Rico Arce M de L, Nesbitt M, Rodríguez A, Hiscock C (2013) Mexican Plant Materials Housed in the Economic Botany Collection of The Royal Botanic Gardens, Kew. *Ibugana*, 5:3-38.
- Rønsted N, Allasi Canales N, Hansen TG, Cornett C, Walker K, Driver F, Antonelli A, Maldonado C, Nesbitt M, Barnes C (2020) Historical chemical annotations of *Cinchona* bark collections are comparable to results from current day state-of-the-art High-Pressure Liquid Chromatography technologies. *J Ethnopharmacol*, 249:112375. doi:10.1016/j.jep.2019.112375
- Sandoval Y, Echandía C (1986) La historia de la quina desde una perspectiva regional: Colombia, 1850-1882. *ACHSC*, 13-14:153-187.
- Sastoque E (2011) Tabaco, quina y añil en el siglo XIX: Bonanzas efímeras. *Credencial Historia*, 255: 8-16.
- Simmons RE (1916) *Lumber markets of the west and north coasts of South America*. Washington, Department of Commerce. 162p.
- Thompson A (2008) Afterword: Informal empire: Past, present and future. In *Informal empire in Latin America: Culture, commerce and capital*, ed. M. Brown, pp. 229-241. Oxford, Wiley Blackwell.
- Tirado Mejía A (1971) *Introducción a la historia económica de Colombia*. Bogotá, Universidad Nacional de Colombia. 320p.
- Walker K, Nesbitt M (2019) *Just the tonic: the natural history of tonic water*. London, Kew Publishing. 140p.

Catalogue of Useful Plants of Colombia

Royal
Botanic
Gardens **Kew**

Edited by
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The *Catalogue of Useful Plants of Colombia* is the most comprehensive listing of the known useful plants for this country. Compiled by a team of Colombian and international botanists from the Royal Botanic Gardens, Kew, the Humboldt Institute and numerous partner institutions, it consolidates expert-generated information linked and accessible through an online portal (ColPlantA). The checklist is accompanied by 11 chapters written by specialists, providing perspectives on the state of knowledge on the useful plants of Colombia, covering a range of topics, from taxonomic, geographic and conservation aspects, to their use in sustainable value chains and contributions to the bioeconomy, specific topics such as medicinal, edible and insecticide plants, and their representation in the Amazon region, and in Kew's economic botany collection. The catalogue is further enriched by diverse supplementary material, allowing users to explore further open questions and opportunities, to develop new ideas on the use of plants and their conservation, and to foster social and environmental awareness.



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