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Title: Restoration of a 19th Century Materia Medica Chest and Contents

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Source: Hall, G. (2012). Restoration of a 19th Century Materia Medica Chest and Contents. *NatSCA News, Issue 23*, 70 - 74.

URL: <http://www.natsca.org/article/97>

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Restoration of a 19th Century Materia Medica Chest and Contents

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Abstract

The conservation challenges of a deteriorated 19th century Materia Medica chest are described. The restoration procedures devised allowed the chest to be restored to a condition where it is now suitable for display in exhibitions and events.

Introduction

In 2010, Leicestershire Museums Service acquired a 19th century Materia Medica chest that had belonged to Rev. D.P. Murray, a priest of the Dominican Order, who worked as a missionary in South Africa during the early years of the twentieth century, before returning to England in 1937. He was an active lepidopterist and botanist, and a short biography appears in the Flora of Leicestershire (Primavesi & Evans, 1988). The chest had been donated to Leicester City Museum Service on his death in 1967, along with a collection of objects that included his herbarium of 1,860 sheets and some entomological specimens. It is not known when Murray acquired the chest, whether he used its contents in his work or whether he acquired it because of his interest in botany.

Materia medica chests were used as a learning tool for students of pharmacy and medicine during the 19th century, although the term has been in use from the period of the Roman Empire. The identification of drugs of animal, vegetable or mineral sources was part of their qualifying examination. The students needed to identify drugs macro- and microscopically, so the specimens would have been numbered, and a list of contents supplied.

Murray's chest was made by Wyley's & Company, a firm of "wholesale and export druggists and manufacturing chemists", based in Coventry, that was established in 1750 and active until the early twentieth century. The box is labelled, "Wyleys & Company, Coventry & London" which was in use by the company from 1891 to 1921. As the specimens were labelled, the date of the chest could no later than 1900, when specimens were housed in cardboard boxes. So the box most likely dates from the period 1891-1900.

Following its transfer to Leicestershire Museums in 2010, it was discovered that the chest and its contents had not been well treated or stored in the past, and required specialist conservation to restore its contents before it could be used in public displays (fig. 1, and fig. 2).

The Chest and its Contents

The chest consists of a wooden case containing four drawers, each with square or rectangular compartments made from cardboard and paper, and a glass cover. Of the 204 compartments, 183 (90%) still had their contents, which consisted of a large variety of medicinal herbs (leaves, seeds, twigs, fruits, bark, wood, lichens, seaweed), animal parts, resins, gums, chemical reagents, preparative materials and oils (Table 1), nearly all of which were labelled. The labels would probably have been cut from a book of labels and glued to the relevant bottle or compartment, but it is unknown whether the labels were attached by Murray himself. Some items are contemporary food flavourings e.g., star anise, nutmeg and vanilla, whereas others are, or contain poisons, toxins or items that are now classified as dangerous drugs by the U.K. Government, although no materials in the latter category remained.



Fig. 1. Chest before (left) and after (right) restoration.

Drawer	Compartments	Items Present	General Description of Contents
1	60	54	Loose seeds, fruits and berries; phials of seeds, powders, reagents oils
2	48	46	Loose barks of various kinds, berries, roots, resins
3	48	37	Lichens, seaweeds, fungi, resin blocks, preparative materials
4	48	46	Seeds, roots, bark, resins

Table 1. Composition of Drawers

Conservation Challenges

The chest was frozen for 7 days at -40°C before treatment to kill any insect pests and fungal spores. Inspection of the structure and contents of the chest revealed the following types of damage .

- Mechanical damage (Fig. 2). One outer case panel was loose, one drawer had broken glass, and many of the paper compartments were split and/or loose. Shaking had mixed the contents of some compartments, and leakage of contents from phials with broken or poorly fitting cork stoppers had both stained one drawer with (now encrusted) resins and oils, and had caused some cork stoppers to stick fast.
- Heat damage. Some gums and resins had melted, congealed and stuck to the linings.



Fig. 2. Mechanical damage to glass and mixed materials. Fragmentation of Barbados Aloes. Leakage from phials.

- Damage by biological agents (Figs. 3-5).
Fungi There was fungal growth on most plant material, with sometimes substantial decay, some light fungus growth on phial corks, and often varying degrees of fungal damage to card compartments and paper linings.
Insects Insect damage of materials had produced quantities of frass, with pupae present in some compartments that were badly damaged. Oil-rich seeds, e.g., *Ricinus sp.*, *Croton sp.*, *Areca sp.*, *Cannabis sp.* etc. were preferentially attacked, often with only husks remaining. Red sandalwood had been comminuted making it difficult to separate out.



Fig. 3. Fungal and insect damage to paper and card compartments.



Fig. 4. Fungal damage to plant materials and cardboard.



Fig. 5. Insect damage and frass (left) and insect pupa (right).

An inventory of the chest’s contents showed that it contained poisons, toxins and animal parts. Also, there were missing items, missing or misspelt labels e.g., Ellateria Cardamomum for *Elettaria cardamomum*, or labels that used ‘long forgotten’ names for materials.

The often substantial fungal surface growth on hard and woody materials suggests that the chest was stored in an environment with high humidity for a relatively long period of time. The presence of a moderately large number of insect pupae (about 30 in all the drawers) suggests that most of the material had been stored unprotected.

Conservation Procedures

Each item was removed and placed into labelled polythene bags before inspection and treatment. The insect frass and unrecoverable plant debris was emptied and the compartments cleaned with a soft brush and micro-vacuum cleaner. Debris lodged between the wooden sides of tray and the card compartments was removed using a stiff brush. Pupae were removed with forceps. The cleaned card and paper compartments were repaired with acid-free, neutral, conservation grade PVA adhesive (Lineco, Holyoak, USA), using folding clips and stiffeners/tensioners made from Plastazote to hold them in place, which greatly increased their strength.

Labels and loose paper were reapplied using PVA glue, but some had deteriorated and could not be read, whereas others fragmented when removed or moved. Some loose labels were easy to reunite with unlabelled items e.g., *Cera flava*, but others were more difficult e.g., *Punica granatum* was found with *Rhamnus frangula* bark close by.

Items were cleaned with a soft brush and microvacuum, but those showing surface sporulation of fungi, especially where extensive, were cleaned in a fume hood to contain spore dispersal. Heavily infested hard tissues or robust items were placed in glass universal containers and gently agitated with distilled water to remove spores resistant to brushing, then left to dry and re-brushed to remove remaining spores (Fig. 6). Items were returned whole, or were placed in small Melinex envelopes for display, depending on their fragility. One item, *Cucumis colocynthis*, disintegrated when brushed lightly, but all other items remained intact, although cleaning often revealed holes and channels created by insect larvae.



Fig. 6. *Podophyllum* root before (left) and after (right) cleaning.

Broken corks were repaired using PVA which also served as a seal to prevent future leakage of the contents. The chest was sprayed with Constrain (Historyonics, Cardiff), a pH-neutral, water-based insecticide predominantly for woodworm, and the sheet of broken glass was removed and replaced with a sheet of 2mm thick acrylic Perspex (The One Stop Plastic Shop, Melton Mowbray).

Labels and Labelling

The plant names on the labels were often misspelt, so were checked against the on-line database 'The Plant List' (see <http://www.theplantlist.org/>) for synonyms and current names. In most cases, checking resolved identification, but where the name was equivocal, inspection of the contents was required. For example, an item labelled *Cassia lanceolata* could be *Cassia lanceolata* Link, which is a synonym for *Senna sophera* var. *sophera* (L.) Roxb., or *Cassia lanceolata* Pers. which is a synonym for *Chamaecrista desvauxii* var. *mollissima* (Benth.) H.S.Irwin & Barneby. The item was clearly the former, by morphology. Similarly, in drawer three, the label 'ditto serratifolia' and 'ditto crenatula' were found to refer not to *Garcinia* sp. (on

their left) but to *Baronia* sp. (on their right). Some labels required research before they could be re-united with their material, e.g., 'Tinnevelly' was found to refer to Tinnevelly Senna which is also known as Egyptian Senna, Tinnevelly Senna, East Indian Senna or the French 'séné de la palthe'.

The Result of Conservation Treatment

After cleaning, 183/204 (89.7%) of the compartments had contents that could be used for display (Fig. 7). Although it was impossible to recover some items, e.g., '*Taraxacum Dens-leonis*' which had been completely destroyed by insects, many others were cleaned and returned to a state suitable for display. Indeed, the remains of some items e.g., Areca Nut, could be used to demonstrate the effect of insects on oily seeds and the need for effective conservation. Strengthening the card and paper compartments increased the stability of each drawer, but further treatment with insecticide was not considered necessary following freezing. Despite its unpromising initial appearance, the chest is now suitable for use in exhibitions and events to illustrate both the role of plants in human health, as well as the conservation process and the importance of appropriate conservation.



Fig. 7. Drawer 4 before restoration (top) and after restoration (bottom) showing repaired compartments, cleaned materials and Melinex envelopes.

Reference

Primavesi, A.L. & Evans, P.A. (1988) Flora of Leicestershire. Leicestershire Museums Arts & Records Service.