Secrets of the plant kingdom uncovered after over a century in storage

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(Phys.org)—The relocation of the Herbarium's one million pressed and dried plants to their new home in the University's state-of-the-art Sainsbury Laboratory is turning up hundreds of unique specimens never seen since their collection centuries ago.

"I was going through a box labelled in 1950 'to be sorted'. Inside it, wrapped in a newspaper from 1828, I found fungi and seaweed collected by Charles Darwin on the Beagle Voyage in South America during 1832 and 1833. And in a brown paper bag, I discovered plant specimens collected by C.G.Seligmann, doctor on the 1898 Cambridge Anthropological Expedition to the Torres Strait Islands".

Sent to Cambridge for the University Herbarium's scientific collection of pressed plants from around the world, these were stored away and have never been looked at since. Chief Technician Christine Bartram is making remarkable finds on a weekly basis as she sorts through the entire collection following its relocation to the University's Sainsbury Laboratory.

Such specimens, in conjunction with their accompanying field notes, hold fascinating, often unique information that can shed new light on plant evolution and, through analysis of their DNA, help to rediscover lost plant genes that may code for valuable attributes.

They are also providing a tantalising new insight into the ways local cultures, such as those in the Torres Straits and Papua New Guinea, used

their indigenous plants as medicines, in hunting, and even as love potions. Such traditional knowledge, holding the promise of future products and therapies, may otherwise have disappeared forever along with the loss of local languages.

The Herbarium's collection dates back 300 years, yet only a fraction of it has been catalogued in digital form, a practice that has only recently begun at herbaria across the world. Originally created for the study of plant taxonomy – the naming and classification of plants – in the past 20 years herbaria have undergone a revival as their specimens have been recognised as a valuable source of genetic material.

By extraction and analysis of their DNA, they are now informing studies of contemporary issues, from the effects of climate change on the spread of invasive 'alien' plants, to the measurement of biodiversity changes over time.

Six years ago, Bartram, under the Directorship of Professor John Parker, began the enormous task of digitally cataloguing the Herbarium's one million specimens, a programme that is revealing for the first time the full extent of its botanical treasures. Her work will make these accessible to a global audience and allow current and future generations of scientists to unlock new secrets about the plant kingdom. An online resource with high resolution images of the plants collected by Darwin during the Beagle Voyage, from 1831 to 1836, is available at: www.darwinsbeagleplants.org.

Darwin's are just some of the unique specimens that Bartram has rediscovered in the process of sorting and relocating the priceless collection to its new home. Recent finds include Thelypteris gardneri (Holttum) Panigrahi, a fern once endemic to Sri Lanka but now extinct, and the only known specimen of the Brazilian fungus Allantula diffusa in existence. "There are probably thousands of plants we have no idea

are in the collection," said Bartram. "Digitisation will make it so much easier for specialists across the world to identify these plants."

The Sainsbury Laboratory, whose construction was funded by an £82 million donation from the Gatsby Charitable Foundation, opened in 2011 and provides state-of-the-art research facilities for the molecular and genetic study of plant development. The Herbarium's new location within the Laboratory creates a unique working environment in which the past will inform the future.

Experts estimate that of the 70,000 flowering plants believed yet to be described, up to half of them will have been collected decades ago and filed away uncatalogued in herbaria. "It is vital to unlock this information as quickly as possible" said Bartram, "as historic collections of this nature have the potential to be of equal importance to new botanical studies in the field."

Provided by University of Cambridge

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