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Botanical Time Capsules The William Henry Harvey exsiccatae volumes

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ABSTRACT

For ten very short months during the years of 1854 to 1855, an Irish marine botanist Dr William Harvey visited the shores of Australia. From Rottnest Island in Western Australia to Newcastle in NSW, Harvey collected some 20,000 seaweed specimens, which he painstakingly identified to species then pressed onto paper. On returning to Ireland, he then set about selling these biological treasures to Museums, Herbaria and wealthy naturalists around the world for the then princely sum of 2 pounds 5 shillings for 100 species. This would have amply paid for his round-the-world expedition. One hundred packages or exsiccatae were thought to have been disseminated each containing anything up to 150-220 species. Four such exsiccatae found their way to the vaults of the State Library on NSW. Two of the exsiccatae were of unmounted specimens wrapped in their original brown paper parcels, while

specimens in the other two were stuck to acidic card that were then bound into two albums. Although seaweeds are hardy organisms, the acidic board of the 1800s had long started its systematic destruction of the plants. In an effort to save these scientifically priceless specimens from complete destruction, the National Herbarium of NSW and the State Library of NSW have collaborated in a project to re-house the 1200 individual specimens. This paper discusses the collaborative project between two major institutions, and the work involved in the conservation of these items to allow the preservation of the historical content, whilst providing access of this material for scientific research.

INTRODUCTION

My present intention is to make it a *Coasting* tour, & devote special attention to Algae- making such a collection as never

before seen in Europe. I fear you will think this low, & mean, & *slushy* plan- & will be sending me to climb mountains & gather nobler plants. But I say, other collectors there are by score who look after such things – while no one minds poor Algae save a few *scrap-picking folk* & consequently we have little or no knowledge of the veg. of the tropical seas. (Extract from Harvey's letter to Sir William Hooker 15 Feb 1853, Ducker p.38)

William Henry Harvey (1811-1866) was a Professor of Botany from Trinity College Dublin, Ireland. A man of great warmth, intelligence and energy, Harvey would travel to the South Seas in the mid 19th century to pursue his passion for phycology, that is the collection and study of seaweed. Harvey's journey is all the more remarkable not just for the enormous body of work and specimens collected (more than 20,000) but that it was carried out under the shadow of tuberculosis, which would eventually kill him. Harvey's journey became in part a pursuit of warmer, drier climates to improve his health, but primarily to fulfil his dream of surveying the marine plants of Australia, a task that he would poignantly refer to as his 'memorial'.

In a *Subscription Prospectus* of 1853, Harvey advertised that he was about to undertake a voyage to Australia to collect marine algae and that he was intending to sell 'sets' or 'exsiccatae' of the excess specimens not required for filing in the herbarium of Trinity College Dublin. He calculated that he would make 'at the most to 50' sets of exsiccatae that would contain anywhere between 200-600 species/specimens. These sets he would sell at the rate of 2 pounds 5 shillings (approximately AUD\$600 current rates) for every 100 species 'delivered free of charge' to Dublin, London or Glasgow. Each specimen would be numbered and lettered corresponding to a master list, giving the name or binomial of the genus and species, and to its collection locality.

During the years 1854 to 1855, over an eighteen-month period, Harvey visited Australia, where he travelled widely from Western Australia, Victoria, Tasmania and

New South Wales. Landing in King Georges Sound, Western Australia on 7 January 1854, he travelled overland to Fremantle, Rottnest Island, and Cape Riche; then by steamship to Port Fairy, Port Phillip Heads, Geelong, and Western Port in Victoria; then to George Town and Port Arthur in Tasmania; and finally to Port Jackson, Newcastle and Kiama in New South Wales. He left Sydney, on 15 June 1855 and visited New Zealand, the Friendly Islands and Fiji, before returning to and then departing from Sydney in December 1855 for Valpariso, Chile.

Whilst in Australia Harvey collected 20,000 specimens of marine plants that consisted of 600 species of which approximately 200 (or 30% of the entire collection) were new genera and species to science. On his return to Ireland, Harvey made good his promise of exsiccatae and started to sell his sets to botanists, philanthropists, naturalists, the clergy, and herbaria and museums around the world. Four of these scientifically valuable exsiccatae are to be found in the collections of the State Library of New South Wales (SLNSW).

As explained in the original prospectus, Harvey would personally press or oversee the preservation of these delicate and perishable algae. From what he records we can estimate he pressed and sorted a minimum of 100 species a day. He also laments in his correspondence that

sea plants take so much time in washing, laying out, and changing, that my whole time is literally occupied, except at meals; and one day's walk sometimes takes me three days to put on paper. This is because I have to dry such a number of specimens of each kind for my seventy subscribers' (Harvey to Sir William J. Hooker, Fremantle 19 May 1854, Ducker, 118)

For the purposes of collecting algae, Harvey had sent out to Australia in 1853 at least one large bale of paper, 'it appears that I must take out paper for drying, as well as for laying out specimens upon...' (Harvey to Mrs Gray, Kew 18 July 1853, Ducker, 57) However, during his travels he would occasionally find himself short of

supplies, and therefore was forced 'use any paper I can procure, and by begging and buying get along. Mr Roe gave me some capital brown, and I have got cartridge from the Convict Establishment' (Harvey to Sir William J. Hooker, Freemantle 19 May 1854, Ducker, p118)

Due to the sheer weight and volume of his collection, as well as ever-present worries about his health, Harvey sent back boxes of his specimens to Trinity College throughout his time in Australia. He was fastidious, in all things relating to his precious algae, and packed them extremely carefully. Once collected and dried, the specimens were packed into a zinc lined box and soldered shut as he states that 'I do not like its being left too long open, as it will be more likely to breed dust and insects...' (Harvey to W.A Sanford, Colonial Secretary of Western Australia Kojunup 31 July 1854, Ducker p. 127)

Harvey referred to his collections as bundles or packets as they were not books as such with text, but were actual pressed samples of plants. At a later time, once disseminated to subscribers, these packets could be made up into bound volumes, the volumes often reflecting a particular region or botanical group of specimens.

As an internationally recognised phycologist Harvey knew he was discovering new genera and species to science as he was collecting. In botanical science (now known as the International Code of Botanical Nomenclature), when a new species is discovered and described, a single specimen must be designated by which the species will forever be referred to and known by. Such a specimen is known as the **type** or holotype specimen. It is the single most important specimen of any given species and is only that by which comparisons can be made to assure a correct identification of future collections of that particular species. When two or more specimens of the same species have been collected from the same locality at the same time and by the same person, each is essentially a type specimen.

These are known as 'isotypes', that is they are the 'same' or exact duplicates of the holotype.

When Harvey returned to Ireland, he had what he referred to as his 'travelling set' of pressed marine plants. This was a book with pages onto which he had pressed the 'type' and all other specimens of his new and known species that he discovered. The specimens in the exsiccatae therefore, that directly correspond to the same locality and collection details as the types, are all isotypes.

THE HARVEY COLLECTION AT THE STATE LIBRARY

The State Library of NSW traces its origins back to 1826 with the opening of the Australian Subscription Library. With over 4.7 million items, its collections are vast, not only books, newspapers, maps, manuscripts, photographs, but also major collections of paintings, sketchbooks, watercolours and plans by important Australian artists, such as John Glover, Conrad Martens and Eugene Von Guerard. The Library has nine first fleet journals, as well as manuscripts from the great explorers, Abel Tasman, James Cook, Matthew Flinders and William Bligh. Given that its collections are so vast and varied, it is not entirely unexpected to find the works and specimens of the great phycologist William Henry Harvey in them.

Although botanists knew there were two Harvey exsiccatae in the Mitchell Library, State Library of NSW listed in the Printed Book Catalogue, Dr Alan Millar was the first to critically examine them in 1988. In 2003 Dr Millar again visited the Library concerned for the items' well-being, and willing to offer expert advice on how to preserve and protect the scientifically priceless specimens. The specimens were brought to the attention of the Mitchell Librarian and Assistant State Librarian, Collection Management Services, Elizabeth Ellis as well as the Manager of Collection Preservation, Heather Mansell. At this time two other exsiccatae were found, which in 1997 had been transferred from the Printed Book Collection to the Original Materials Collection.

Therefore there were four sets of Harvey's Exsiccatae in the State Library: two fully bound and two as loose-boxed specimens. In all four sets, deterioration of the specimens had occurred due to what is now considered an inappropriate mounting systems used for this material over 100 years ago. In some cases the specimens had fragmented due to the mechanical stress of page turning and flexing of the card supports. In this old assembly many specimens were often adhered to one page of the bound volume and when these are damaged, fragments from different algae intermix.

Because the specimens were of such scientific and historic importance the decision was made to conserve them. This work involved the collaboration between the Royal Botanic Gardens (RBG) and the State Library of NSW. The RBG is a leading international scientific institution, and Australia's first scientific institution registered, to carry out research on the NSW, Australian and many southern hemisphere floras, both terrestrial and marine. With over 1,000,000 vascular plant specimens and 80,000 marine plants, it is one of the most comprehensive herbaria in the world.

In deciding how to approach such delicate, and unusual items found within the Library, it was decided that the volumes should be examined and the specimens conserved at the RBG. Dr Alan Millar in consultation with senior Library staff decided on a course of action for the fragile specimens. The specimens would be carefully removed from the acid backing boards, but not from their original backing papers as applied by Harvey. They would then be and stored within the botanical standard for such materials, in acid free enclosures one specimen to a page and then placed in boxes to prevent further deterioration.

The ethical dilemma posed by these items revolved around the dismantling of a 19th century assembly to protect the specimens held within. Future use and the prospect of further damage to these collections also imposed parameters on the decision. The

work to preserve the specimens would also give the botanists at the RBG unprecedented access to such an important algal collection.

THE SPECIMENS

Two of the original "packets" of exsiccatae were unbound and wrapped in brown paper. The first exsiccatae was labelled Set 49 (F589.3), and sold to W. Stuart, London for what we think is 6 pounds, 8 shillings and 3 pence (about \$1700 today). It contains 285 specimens. The second unbound exsiccatae was labelled Set 51 (PXD 724 vol 2) and sold to John Van Voorst¹ of London for 5 pounds, 16 shillings and 6 pence (about \$1500 today). It contained 259 specimens.

Originally the made up albums were bound and numbered. The third exsiccatae was numbered 57 (F589.3) and was marked as sold to the Rev. J.H. Pollexfen and contained 292 pressed specimens, representing 248 species and no less than 56 isotypes. The fourth, Set 79 (PXD 724 vol 1), had no buyer's name or price marked on it but contained 204 pressed specimens, representing 156 species of which 35 specimens were isotypes.

TREATMENT AND REHOUSING

The Bound and Loose Volumes

In recognition of the need to provide an historical context for these items, the original binding and boards have been retained, and will be boxed at the completion of the project to provide an historical reference as to how the specimens were originally mounted and stored. The specimens on their original backing papers were mechanically lifted from the acidic backing boards. In most cases the backing papers had been adhered at the four corners with what appears to be animal glue. In the case of the unbound volumes, the specimens were not adhered to an additional card and therefore could be simply be transferred on their original backing papers into their Mylar™ enclosures, which have been used to contain the specimens and any fragments.

In some instances the backing papers have notations in Harvey's hand on the reverse. All Harvey's backing papers with their specimens attached have been retained. The backing papers Harvey used, appear to be varied (as previously discussed depending on supplies available), and both wove and laid in type. The paper however is universally lightweight, with no adhesive used to adhere the specimens, as algae when wet has a naturally occurring gum.

Mounting and storage

The specimens, on the paper backings were then placed in Mylar™ pockets to suit, and attached with a stainless steel pin to a larger backing sheet (teaton warm white cover 239 gsm, from Edwards Dunlop) on to which all botanic details are written. This sheet is placed in a plain folder (glow pague 70gsm acid free) however in the case of the type specimen a special orange edged folder, which designates type, is used. The specimens are then placed in a standard pentax brown polypropylene box, which has a polyethylene lid for flexible easy opening. These are made using RBG dies. These boxes are a RBG standard (made by APS plastic at Minto) and allow the boxes to be stored horizontally in the RBG rack storage system. The four volumes of specimens will now amount to between 50-75 boxes of material by the time the project is completed.

CONCLUSION

This project continues as a collaboration between the RBG and the State Library NSW. The significance of these volumes for both institutions is still in a state of exploration. In one sense, the significance of these items as part of the great and diverse collections of the State Library NSW is not a unique case, as there are many parts within the collection, which compliment the algal specimens. The Library possesses the printed book versions of Harvey's voyage and algal discoveries in the *Phycologia australica* (1859), which resides in the Mitchell Rare Book Collection. Harvey's work is also tied to the Manuscript collection, in that correspondence from Harvey to Dr George

Bennett² and Alexander Walker Scott exists here.³

These volumes are also of great importance to RBG as they provide exceptional information and access to Harvey's actual specimens. The Harvey specimens are scientifically invaluable as they give a snap shot of what the marine flora was like in the 1850s from selected localities in Australia. The specimens can still be microscopically examined for reproductive and vegetative details that have not changed since the day they were collected.

This collaboration has enabled members of the Collection Preservation Branch to visit and understand how specimens are preserved at the RBG. Materials used within conservation at the State Library have also provided treatment options for the RBG team. Mylar™ has been used as it provides a more rigid sleeve in which to place the fragile specimens, and these have been used through-out the Harvey collection. The work on this collaborative project continues, but it would be pleasing to think that William Harvey would be happy to see his specimens so well observed and tended some 150 years after he collected them at such personal cost to himself. His remarkable work and labour still hold enormous relevance for botanists, librarians and conservators alike.

REFERENCES

- Sophie Ducker, 1988, *The Contented Botanist, Letters of W.H Harvey about Australia and the Pacific*, Melbourne University Press., p. 38
ibid., p. 118
ibid., p. 57
ibid., p. 118
ibid., p. 127

ENDNOTES

¹ John Van Voorst was prominent London publisher. He played an important role as a publisher of Harvey's works including his 1849 publication of *A manual of the British algae*. Harvey sent Van Voorst packets of exsiccatae whilst in Australia. Van Voorst would later be involved in the distribution and payment for these sets of exsiccatae.

² Bennett a physician and naturalist had provided lodging for Harvey whilst he was in

Sydney. An affectionate friendship was formed during the stay, and the Bennett's would later visit Harvey in Ireland in 1860. Harvey would name a beautiful, lace-bearing, red alga discovered in Sydney Harbour in his honour (*Claudea bennettiana*) as well as well as dedicating his *Phycologia Australica* vol.2 (1859) to Bennett. Tragically, this alga is now extinct and has the dubious honour of being the world's first marine plant to be officially listed as such (Millar 2003). Millar, A.J.K. (2003) The world's first recorded extinction of a seaweed. Proceedings of the Seventeenth International Seaweed Symposium, Oxford University Press, Oxford pp.313-318.

Harvey would also give Bennett his personal copy of *Nereis Australis*, 1847 by Harvey (Q589.3) and would inscribe it "To George Bennett Esq from The Author, Sydney. May 6. 1855". This work now forms part of the Mitchell collections and has Dr Bennett's bookplate on the inside cover as well as David Scott Mitchell's signature. It would appear that David Scott Mitchell purchased parts of Bennett's collection. Bennett would also publish in 1860 his *Gathering of a naturalist in Australia* with John Van Voorst, Harvey's friend and publisher. This volume may be found both in the State Reference Library and in the Dixson Library of the State Library of NSW.

³ Alexander Walker Scott, a retired and highly educated gentleman living in the Hunter region provided Harvey with lodgings. His daughters Helena and Harriet charmed Harvey with their exquisite drawings of botanic specimens and natural history. Many of these watercolours are held in the Original Materials Collection at the State Library

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At the Library, Arthur Easten and David Pollock have helped in unravelling the mystery of Harvey as well as finding various volumes and manuscripts within the collections. Finally Mark Hildebrand who actually rediscovered the two additional volumes of specimens to complete the set of four.

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