Conservation of the Selden Map and its display at the Hong Kong Maritime Museum

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Abstract

The Selden Map of China arrived at the Bodleian Library in 1659 and remained largely unknown until recognition of its historical significance in 2008 gave impetus for its conservation. Its conservation has not only assured the preservation of a unique and important manuscript map, but also enabled it to be studied by scholars and widely displayed to the public, currently as the centrepiece of the Hong Kong Maritime Museum's exhibition *Mapping Ming China's Maritime World – The Selden Map and Treasures from the University of Oxford*.

A number of published articles and books, and its display in Oxford and Hong Kong have offered both scholars and the public an opportunity to view the map in detail. This international symposium offers the chance for further discussion of its importance and wider significance in the context of research into maritime trades, seafaring and underwater archaeology of the Ming Dynasty.

This talk will present an overview of the map's conservation and later display, emphasising how important discoveries made during its treatment have been key in the understanding of the map and its construction, adding to scholarly research of cartography and map-making at the end of the Ming Dynasty.

Introduction

In March 2014 preparation began for the display of the Selden Map of China at the Hong Kong Maritime Museum as the centrepiece of the exhibition *Mapping Ming China's Maritime World – The Selden Map and Treasures from the University of Oxford*. The exhibition opening was timed to coincide with the University of Oxford's first Alumni Weekend in Asia, which took place in Hong Kong from 21–23 March, hosted by the Chancellor Lord Patten of Barnes and Vice-Chancellor, Professor Andrew Hamilton **(Fig.1)**.

The map was the subject of talks and events organised by the museum, including this international symposium. A first international colloquium on the Selden Map had been held in Oxford in September 2011, on which occasion the map was displayed for the first time. Scholars were invited to discuss the origins and significance of the newly discovered map, celebrating the completion of its conservation treatment, which had lasted over two years.

This paper presents an overview of the conservation of the map, which until 2008 was in extremely fragile condition. Its access had been restricted as every time the map was unrolled its delicate surface would crack and fragments would flake off. Its conservation had therefore become imperative, to assure its long-term preservation, and to enable it to be safely consulted by scholars and widely displayed to the public. The conservation treatment also offered hidden surprises, which have helped scholars to better understand map-making techniques at the end of the Ming Dynasty.

Displaying the Selden Map in Hong Kong

An important aspect of the conservation was a re-assessment of how the map should be remounted and presented to enable access for consultation and display. For this reason the map was remounted flat on a panel, minimising handling which a rolled format would have required, and is now kept in a box allowing its direct viewing unhindered by glazing. However for its display, a glazed wooden frame was designed to offer physical protection against any damage caused by environmental conditions, such as fluctuation of Relative Humidity and exposure to high UV light **(Fig. 2)**.

This frame used firstly at the Oxford colloquium, and immediately afterwards in the *Treasures of the Bodleian* exhibition had to be further adapted for the added challenge of transporting and displaying such a large, fragile paper artefact to the Far East.

Most importantly the frame was sealed with *Art Sorb*® placed inside; a moisture-sensitive silica material, which absorbs and desorbs moisture in order to offset changes in external Relative Humidity, providing additional buffering during transit and display.[1] The back of the frame was also covered with a barrier film against humidity, to minimize environmental fluctuations within the frame.[2]

To assess how effective this method of framing is in providing a stable display environment, a small coin-sized data logger was inserted into the sealed frame to record temperature and Relative

[1] *Art Sorb*® sheets (made from non-woven archival polyethylene/polypropylene fibres impregnated with fine particles of *Art Sorb*®) were preconditioned at 55% RH. *Art Sorb*® provides over 5 times the moisture buffering capacity of regular density silica gel, and is even more efficient at higher RH. Available from Preservation Equipment Ltd., Vinces Road, Diss, Norfolk, IP22 4HQ, UK. Tel: +44 (0)1379 647400, Email: info@preservationequipment.com

[2] *Marvelseal*® is an aluminised polyethylene and nylon barrier film, which resists the transmission of water vapour and other atmospheric gases. Available from Preservation Equipment Ltd. (see Footnote 1 above)

Humidity.[3] The use of this new type of small, self-contained data logger enabled it to be hidden behind the map's panel so as not to affect the aesthetic of the framed map.

The Selden Map of China and Early Chinese Collections at the Bodleian Library

In 2008 Robert Batchelor of Georgia Southern University, whilst examining the map with David Helliwell, Curator of Chinese Collections at the Bodleian Library, recognized the huge significance of its trading routes and compass bearings. This artistically painted map soon acquired an iconic status not only as a library treasure, but also as a unique and accurately drawn, early 17th-century sea-chart of China and South East Asia. The discovery highlighted the need to make the map accessible, giving impetus for its conservation **(Fig.3)**.

Whilst the map's provenance is uncertain, its early history since 1659 is irrefutable, arriving at the Bodleian with the estate of the London Jurist John Selden.

John Selden was a lawyer, antiquary, and Orientalist. He read Hebrew and several other Middle Eastern languages including Syriac, Arabic, Persian and Turkish, a competence in languages which grew out of his practice as an historian, which is reflected in his library and the collections which came to the Bodleian. Selden's was the greatest single collection received in the 17th century numbering around 8,000 volumes.

[3] Button Data Loggers are self-contained, sealed units capable of taking 8000 readings (~43 Days of logging at 15 minute intervals). They can be easily hidden while keeping an accurate record of temperature and humidity (calibrated to ±0.5°C and ±2%RH), and data can be down-loaded with the software provided. Available from Preservation Equipment Ltd. (see Footnote 1. above)

Although he didn't read Chinese his collection included Chinese books and of course the Selden Map. His interest in owning such an artefact is unsurprising considering his reputation as a legal scholar. In 1635 he published *Mare Clausum* a work which considered the question of dominion of the seas. The title translated from Latin means "Closed Sea," and was in opposition to the work *Mare Liberum* or "Free Sea" published by the Dutch legal scholar, Hugo Grotius in 1609. While Grotius argued that the sea was openly navigable by all countries for trade, Selden contended that the sea was as subject to a country's private dominion as land. Although the Selden Map, as a map of Chinese trade, encompassing free trade and growth of global trade, favoured the cause of Grotius, Selden's argument in *Mare Clausum* provided the basis of England's official position on the seas for the next century and his participation in the debate was influential in the shaping of modern international law.

The Map is part of a small but very important collection of pre-modern Chinese maps at the Bodleian Library in Oxford, and is among the earliest Chinese maps to have reached Europe. It is remarkable that no other comparable manuscript map has been found with such accurate maritime trading routes, and with the South China Sea at its centre rather than China itself, as is more commonly seen in printed maps of the period.

By the time it arrived at the Bodleian, the library had already been collecting Chinese books for several decades, the first Chinese acquisition being in 1604, just two years after Thomas Bodley had re-founded his library at the University **(Fig. 4)**.

At the time nobody was able to read Chinese, and Thomas Bodley even had no way of knowing which way up Chinese books should be read, revealed by his inscriptions written up-side-down on the back

covers. It does however show his desire in collecting books which, although at the time couldn't be read, he believed would be studied in the future. It is interesting that although many of the Chinese characters on the map were transcribed with Romanised and Latin annotations later in the 17th century, the map lay dormant in the library's collections for almost 400 years before its true significance was discovered.

These early Chinese acquisitions were books which had been brought to Europe primarily to satisfy the contemporary appetite for curiosities. Collections known as "cabinets of curiosities" subsequently became the founding collections of many of the older European museums, including the Ashmolean Museum in Oxford. With later acquisitions, the Bodleian's collections amount to around a quarter of all extant Chinese books that arrived in Europe in the 17th century.

Many of the books have inscriptions in Dutch, or point to a Dutch origin, indicating the centrality of Holland in the importation and distribution of Chinese books in the early seventeenth century. They were imported and sold in Amsterdam either by the Dutch East India Company or the trading expeditions that preceded its incorporation in 1602.

Most had been obtained from overseas Chinese trading communities and were the publications not of scholars, but of the commercial publishing industry. They included Confucian canon; model answers to examination questions; medical works; encyclopaedias, arithmetical reckoners; and popular literature, including novels, plays, and songs.

Archbishop William Laud, whose library also came to the Bodleian in the early 17th century, had also collected some of these books. Of

particular relevance to the Selden Map is a manuscript rutter or manual of sea routes with compass bearings, also displayed at the Hong Kong Maritime Museum exhibition. It was probably written during the late 16th or early 17th century by a member of the sea-faring merchant class, and it is thought that such a rutter was used to produce the accurate routes and bearings on the Selden Map.

John Selden also owned five of these early seventeenth-century Dutch imports, and this is all he had apart from the map. However, the map was part of a later group of seventeenth-century imports, books brought back by the merchants of the English East India Company, but this time, far fewer in number.

Many of the printed books are unique surviving editions, the sort of books that would never have got into the library of a Chinese scholar, and thence into libraries in China. These are in contrast to books such as those in the Bodleian's Backhouse Collection which were mostly produced by the Chinese government or educated scholars. Therefore, as rare surviving books and maps, these seventeenth-century Chinese acquisitions – including the Selden Map and the Laud Rutter – are particularly important.

Technical Examination

A preliminary, detailed examination of the map and its material characteristics and condition was required to inform options for its conservation.

The manuscript map is large and visually striking, measuring approximately 1.6 m in height and 1 m wide, and is painted with

Chinese, black carbon ink and watercolour on thin Chinese paper.[4] The Chinese ink was applied by brush with varying concentrations and thickness of line to produce landscape features, rivers or province boundaries, mountains, trees and vegetation, and waves in the sea.

All Chinese inscriptions on the map are also written in Chinese ink, as well as the circles around them, the compass and rule at the top of the map, and the trading routes, which have the appearance of a thinner ruled line. The later Romanisation of Chinese characters and their Latin translations are written in iron-gall ink.

A limited paint palette was applied, for example pale brown for the land background and more opaque layers of green for areas of the sea, and blue and yellow for the mountains. Thicker layers of red and yellow have been used for the Great Wall, and for the circles around province and place names. White has been used to highlight features, such as the waves.[5]

Assessing the map with transmitted light revealed that it was painted on three sheets of thin Chinese paper, joined with narrow overlapping joins prior to painting. It also revealed patches or repairs underneath the cotton lining, which had been applied directly on the back of the map either in areas of loss or as reinforcement **(Fig.5)**.

[4] Paper fibres from a detached fragment of the map were identified by polarising microscopy as a bast fibre from the inner bark of the *Edgeworthia* genus of plants native to Asia. Known as *Mitsumata* in Japan, it is also found in papers in many other Asian countries including China, Korea, Vietnam, India and Nepal.

[5] Pigments and ink were identified by analysis of detached fragments: using Raman microscopy, the black ink was found to be carbon-based; the red, vermillion; and the blue, indigo. Using X-ray Fluorescence spectroscopy, the green pigment was identified as predominately copper-based, but iron, manganese, nickel, zinc and lead were also seen, as well as traces of arsenic in some areas.

Condition

The most significant damage to the map was mechanical damage typical of tightly rolled items with stiff or multiple linings. Cockles and creases running parallel to the rolling axis had developed over time, as materials had deteriorated and become stiffer with age. This resulted in sharp peaks in the unrolled map, which in the most severe cases had caused splitting and cracking of the map's paper support **(Figs. 6 & 7)**.

The map's delicate surface was delaminating and fracturing where brittle fragments had lifted and become detached. A heavy Western paper border added to the map had also caused stiffening, tension and cracking along the edges.

The paint layer appeared to have lost much of its original richness and thickness of colour, again caused by mechanical damage, and possibly as a result of earlier restoration. This had caused superficial paint loss through abrasion and weakening of the paint layer, and cracks, loss and flaking corresponding to areas of distortion in the paper support.

The condition of all these areas of damage, in particular the detaching fragments, was exacerbated by the physical rolling and unrolling of the map.

Conservation

The map's large format, fragile materials and extremely unstable condition, caused in part by its heavy cotton lining applied in 1919, posed difficult problems for its conservation. Expertise was required in Western paper conservation and traditional Far Eastern materials and techniques used in the conservation of scroll-paintings, presenting

an opportunity for a unique collaborative conservation project with conservators from the Bodleian, British Museum, and British Library.

Options for treatment ranged from minimal stabilisation of the map's fragmentary surface, to a full treatment involving removal of old linings and repairs. It was decided that a full treatment was necessary to adequately address the severe damage, as the most effective long-term preservation of the map.

Further examination of the map was essential in assessing the effects of the proposed treatment. In particular, the stability of inks and pigments had to be fully established for the safe removal of previous patches and linings, and for the map's re-lining, both wet processes.

To remove the cotton lining, the map was gently humidified and brushed flat, applying only with water a temporary support paper on the face to protect the map's unstable surface and to enable it to be lifted and turned over.[6] These support papers were replaced several times, drawing out discolouration caused by degradation products within the map's paper support **(Figs. 8, 9 & 10)**.

This process allowed the adhesive to soften, so that it was possible to carefully peel back the cotton lining, taking particular care in the fragmentary areas **(Fig. 11)**.

[6] 12g and 18g *Rayon 'Paper'* was used, which is made from a manufactured regenerated and purified cellulose fibre, primarily from wood pulp. It is considered semi-synthetic as it is made from naturally occurring polymers. As rayon expands when wet, it expands and contracts with an object when used as a facing material. Available from Yoshida Co., Ltd., 18-2 Umazuka-cho, Yasui Uzumasa, Ukyo-ku, Kyoto, 616-8077 Japan. Tel: +81-75-841-6133, Email: wagamiya@topaz.ocn.ne.jp

Afterwards a temporary facing was adhered on the front of the map to protect its surface and to hold the fragments in place and to support the map when dry, allowing removal of repairs and adhesive layers over a longer period of time.[7]

Following the removal of the cotton lining, a fascinating discovery was made on the verso of the map. Unexpectedly a drawing of trading routes was found, matching almost exactly the main routes along the coast of China on the front. This, together with draft markings of the map's scale at the top of the map, became key in understanding how the map was made; that the trading routes were partially drawn on the back first, and drawn before all other details of the map were painted. Scholars were able to view and discuss these vital details with conservators as work progressed, which was of enormous significance in understanding how the map was made. These findings and other observations of the map were first presented at the colloquium in Oxford **(Fig. 12)**.

Once the lining had been removed, the full extent of damage of the map's thin paper support could clearly be seen with transmitted light.

It was also necessary to remove the paper patches and thick adhesive layer from the back of the map, requiring many hours working under magnification.

Chinese paper dyed to a neutral light brown tone and matching characteristics of the original paper, was used to infill losses in the map's paper support **(Fig. 13)**.

[7] The Japanese 'dry' backing removal method was adopted, applying a facing of rayon paper with *Funori* Japanese seaweed 'paste', a polysaccharide mucilage (similar to carrageenan) made from the red algae genus *Gloiopeltis*, which is easily reversible.

To apply new linings, the map was again gently humidified and the temporary facing removed. Linings of Japanese paper were applied to the back of the map using wheat-starch paste, providing a strong, flexible and durable support for the map (**Figs 14 & 15)**.

Finally, the edges of the lined map were pasted and attached to a Japanese drying board, where it was left to dry for several weeks, before mounting it flat on a panel as you see it now mounted in its frame.

Conclusion

The difficult and challenging conservation treatment of the Selden Map of China was vital in the preservation of a highly important and significant map, enabling the consultation and display of a previously inaccessible artefact. This treatment was prompted by recognition of its significance in the context of the Bodleian's 17th-century Chinese collections and more widely in the context of contemporary maps of China, and of research into maritime trades and seafaring in the Ming Dynasty (**Fig. 16)**.

Although further technical analysis and research of the materials and techniques used in the production of the map are needed, the discoveries made during its conservation treatment highlight the important role that conservation plays in revealing and documenting important and often unexpected evidence. The collaboration between conservators and scholars in looking at this evidence has been key in understanding how the Selden Map of China was made, and discovering the techniques of the unknown cartographer who made it, furthering research into cartography and map-making techniques in the early 17th century.

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