Difficult decisions in the conservation of '*The Book of Curiosities*', a 13th century Islamic manuscript

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Abstract

A 13th century manuscript purchased by the Bodleian Library contained a series of unique maps of great importance to the history of cartography. Conditions of the Heritage Lottery Fund led to a collaborative project to provide access to the manuscript, including a complex programme of conservation. Compromises had to be made when making difficult decisions regarding the removal of later repairs which affected the physical safety of the manuscript whilst forming part of its cultural history. The extent of the damage and complexity of repair, together with a limited time-scale meant that only a few firm conclusions could be drawn about the production and history of repair.

Keywords

unique maps, authentication, paper, collation, pigments, Raman spectroscopy, decision-making, repairs

Introduction

In February 2002 the Bodleian Library bought the '*Book of Curiosities of the Sciences and Marvels of the Eyes*', a recently discovered 13th century Islamic manuscript. The manuscript is formed of two books, the first on celestial and the second on terrestrial matters. It contains a remarkable series of early astronomical diagrams and coloured maps, most of which are unparalleled in any Greek, Latin or Arabic material known to be preserved today. Of particular interest are a unique rectangular world map incorporating a graphic scale (Figure 1), a circular world map and several Mediterranean island and city maps original to this treatise.

The manuscript was purchased with the help of many generous grants, including one from the Heritage Lottery Fund (HLF). A condition of the HLF grant required that physical and virtual access to the manuscript be provided. A collaborative project ensued, headed by the Bodleian Keeper of Oriental Books, involving a research team to translate and interpret the manuscript, the photographic studio and exhibitions officer as well as two conservators. Each of these had their own priorities, which affected the eventual time-table, style and extent of conservation, the most important deadline arising from the forthcoming exhibition.

The scholars in the research team had established that the original treatise was probably compiled in the first half of the 11th century in Egypt. Although

Figure 1. Fol. 24a–23b, Rectangular World map after repair, showing both old and new repairs

undated and unsigned, the Bodleian copy is thought to have been made much later, but is still the earliest copy known. Their examination of the script suggested the early 13th century, a date which proved to be consistent with the type of paper, which was produced in the Egyptian/Syrian area from the early 13th through the 14th century (Johns and Savage-Smith 2003). The importance of the discovery of this manuscript to the history of cartography meant that it might be vulnerable to a charge of forgery, so it was important for the conservators to investigate all the available physical evidence to corroborate the scholars' dating and authentication of the manuscript. It was hoped that some light might be shed on its history and production, including the quire make-up, sewing pattern, pigments and the history of the repairs.

Preliminary examination

The paper

Examination of the manuscript began with the paper. According to Helen Loveday, it was not of top quality but was nonetheless very good. It was made from a grass mould, which would have been predominant by the 13th century (Loveday 2001). Her description reads, 'A smooth, cream lightly burnished laid paper: five to six laid lines per centimetre, with no distinct chain lines visible; vertical rib shadows apparent' (Loveday 2003). Islamic paper from this period is not heavily beaten and can be prone to delamination, which was severe in this manuscript, but apart from the obvious wear, much of the body of the paper was still strong and flexible.

The collation

The first examination of the collation took place before the manuscript was disbound. There were eight quires of uneven make-up, sewn with a modern thread, though not necessarily conventionally through the centre of a section as some quires were very unbalanced, with the sewing some way away from the centre. The extensive tipping and guarding made it difficult to see whether the thread had been taken through a conjoint bifolium, though sometimes it was clear that it had not. Most quires had an odd number of leaves.

There were seven double-page images in the manuscript and it was initially assumed that these were painted across the spine-fold. However more careful inspection of the images showed that in some cases each half showed subtle differences that suggested they had been done separately and it was even questionable whether the two halves had ever been conjoint.

It was first thought that successive guarding and re-sewing had completely altered the original collation, and it was hoped that evidence of the original make-up would emerge during the course of conservation. But was it time to question the assumptions that were being made about the nature of Islamic manuscripts? Descriptions of Islamic codices by Bosch et al. (1981) suggested that odd numbers of leaves, irregular quire make-up or even sections made up by guarding single leaves together were not unusual in Islamic manuscripts. Could it be that the quire make-up had always been irregular in this manuscript?

There was no obvious sign that sections had been made up by guarding together single leaves, as described by Bosch et al. (1981). Examination of the spine-folds over a light-box showed that beneath the guards, the edges were damaged and so presumably had once been bifolia rather than single sheets. In many cases there was too much damage to say conclusively which the original bifolia were, but where two leaves were guarded only on one side, enough evidence sometimes remained at the spine edge to show that they had once been conjoint. In some cases there was clear evidence of changes that had taken place. One leaf, fol. 48, by then a singleton, had been bound out of position at the end of the text-block, so there had been at least some alteration to the original make-up. Further evidence of alteration to the collation was discovered during the course of repair and will be discussed in that section.

To continue the search for evidence of the original make-up, the paper was

examined under raking light to see which side of the leaf had been ruled. Although the ruling lines were visible, no clear pattern emerged of whether they had been ruled on rectos only, or on facing pages. Nor was it possible to distinguish the mould side of paper from a grass mould (Loveday 2003).

It was hoped that the different styles and types of old repairs and guards could be grouped into types to show some chronology of the repairs. There were approximately 20 different papers, but whilst the oldest and the most modern were easier to recognise, in practice it proved very hard to distinguish between many of the papers which appeared very similar. Often the repairs were too small to show many features, and it was difficult to compare different papers if they were still attached. The lack of time due to the exhibition deadline was a factor, but the sheer complexity of the repairs meant that the analysis remained incomplete.

The sewing

The conservators also looked at the relationship between the successive sewing of the manuscript and the guards in the spine folds, assuming that changes in the quire structure would have taken place at the time of re-sewing. For example, in the case of fol. 3–7, which is discussed more fully in the section on repair, it was possible to see that these leaves, which were not originally conjoint, had been guarded together at some earlier stage and had been in that configuration for the last two or possibly three sewings. On the whole the evidence was hard to interpret because it was not possible to analyse the sewing holes simply by comparing all the centres of the gatherings, as the centres had, at times, changed due to re-guarding in a different format. What could be said given the number of spine repairs was that at least three previous sewings were indicated. There was no sign of any supported sewing structure, only an unsupported one. Two sewing stations had been used for the most recent sewing, but a three hole-sewing might have been used earlier. Again, although lack of time for more examination and conjecture was a constraint, it was mainly the level of complexity and damage that prevented more conclusive results from being reached.

The pigments

Raman spectroscopy

The research team wanted to have some corroboration for their dating of the manuscript by an analysis of the pigments. Examination under the microscope suggested that there had been some over-painting and re-touching, which could be confirmed if the original palette could be distinguished from any pigments used in subsequent restoration.

It was decided to analyse the pigments using Raman spectroscopy. The narrow range of pigments that were clearly identified from the original palette were indigo, lazurite, cinnabar (or synthetic vermilion), orpiment, lead white and carbon-based black. Nearly all the colours in the manuscript had been mixed from these few pigments.

There was little in the way of data on Islamic materials with which to compare the results apart from a study by the Bibliothèque Nationale de France in which pigments were analysed from a group of 17 Arab manuscripts. In contrast to the other manuscripts in the study, one 13th century manuscript, BNF Arabe 2221, Traitè de al-Idrisi, from North Africa, was notable for having used very much the same palette as the Bodleian manuscript. Some of the pigments used, such as lazurite and orpiment, were not specific to a particular time or place; but the use of indigo was considered rare when compared to the other manuscripts of the same period in the study (Dèroche 2000). The mixture of indigo with both orpiment and lazurite, and a lack of copper-based pigments[1] were also exclusive to both manuscripts. However, these were both secular manuscripts, and therefore stood apart from the other religious texts in the study. They would have been produced in a very different context, so these differences were not so remarkable (Savage-Smith 2004). Although, the correlation between them was reassuring, this remained a very small sample from which to draw conclusions.

The Raman results failed to confirm any difference in composition between the original palette and the presumed over-painting. Indeed, the analysis indicated that both were largely mixtures from the same small palette, although microscopic examination showed that some of the pigment used in the re-touching was of finer particle size, which might have indicated a more modern synthetic pigment (Chaplin 2003). The lack of clear results in some areas of the over-painting may have been due to excess binder which would have interfered with the Raman spectrum. A single rogue aggregate of the 20th century pigment phthalocyanine was confirmed by Raman analysis but this was thought to have been caused by air-borne contamination of the sample (Chaplin 2003).

Conservation planning

The book came to the Library in an ill-fitting and badly damaged 19th century Ottoman binding. The leaves were dark with handling grease and the damaged edges had successive layers of repairs. The accumulation of multiple layers of stiff spine-guards had caused excessive breakage at the spine-folds, and the opening was very restricted (Figure 2). It was extremely fragile and could not be handled safely.

Figure 2. Fol. 27b–28a, Circular World Map showing poor opening

The desire to make clearly visible all information obscured in the gutters, combined with the inadequate protection the late binding gave to the text-block, made the decision to disbind a fairly straight-forward one. The question of eventual rebinding in an Islamic format was discussed, but could not be finalised until decisions on possible future exhibition loans had been made.

More contentious for the conservators was how far to remove successive layers of repairs and guards, which testified to the age, authenticity and cultural provenance of the manuscript. There was also the question of aesthetics. The manuscript was perceived as being scruffy, clumsily executed, and generally of little beauty, but the patchwork of different repairs was not untypical of Islamic manuscripts. How far would conservation change its appearance? The conservators' priority was to preserve and make safe the original, but how should this be interpreted?

A project meeting was held with the Keeper, the research team and the conservators to discuss the repairs on each leaf in detail. It emerged that the researchers' over-riding priority was the removal of any repairs that concealed information, in either text or image areas. It was also agreed to remove repairs which interfered substantially with the aesthetic appreciation of the images, but not the text leaves. Repairs which had been over-painted or re-touched were to

remain in place. Beyond these guidelines, it was left to the conservators to decide how far to go in removing repairs.

One dilemma remaining for the conservators regarded the future use of the manuscript. With a high quality digital image available on the web, in theory, handling could be minimised. However, given the novelty and importance of the manuscript, a certain level of use had to be anticipated. On one hand, removal of the majority of the repairs would improve leaf-flow and reduce the risk of damage caused by stiffness. On the other hand, a less thorough approach would reduce risk from the treatment itself, preserve evidence of earlier restoration and leave the manuscript as close as possible to its 'found' state, so as not to interfere with present or future bibliographical research. These conflicting perspectives were championed respectively by the book conservator and paper conservator who worked together on the project. Judgements about removing particular repairs could be quite subjective and the two conservators often saw the situation differently. A coherent approach had to be found, and the resulting compromises on both sides probably led to a better end result.

Repairs

To describe the treatment that ensued it is convenient to divide the old paper repairs into the three main categories discussed below.

1. Traditional edge repair strips

These were on the majority of the leaves, in a toned paper of at least two types, possibly dating back to the 17th century (Loveday 2003). A typical example can be seen on the right-hand edge of the Circular World Map (Figure 3); and the skinned area at the tail shows where they have been removed at an earlier date (Figure 3). In many cases these appeared to be the oldest repairs, but in a few cases even earlier repair strips, and indeed evidence of removal of other similar ones, could be seen underneath them. In general, although they had stiffened the leaves, there was little evidence that they had caused serious damage. As they frequently covered weak and abraded edges of the paper, they would also be extremely time-consuming and difficult to remove without the risk of further damage. It was decided to leave them in place and to bridge breaks and tears where necessary with fine tissue, a process made easier by the tendency of the edges of the original paper to delaminate allowing a supporting tissue to be inserted between the layers.

Figure 3. Fol. 27b–28a, Circular World Map, after repair

2. Repair patches and guards in spine-folds

Most commonly these were found on the inner rather than the outer folds. They had to be judged on a case-by-case basis as up to five successive layers of many different types of paper were found, both as full or partial length guards and particularly as patches at head and tail. Fol. 3b–7a gives an indication of the stiffness they caused even after the manuscript was disbound (Figure 4). In the case of this folio, the decision was made to remove[2] the guards for the following reasons:

(i) The stiffness was more severe than in most other cases.
(ii) Fols. 3 and 7 could not have been conjoint as there was sufficient evidence from matching profiles at the spine edge to be sure that fols. 2 and 3 had originally been conjoint. This was further confirmed by earlier guards which were uncovered when fols. 3 and 7 were separated.
(iii) This most recent quire was a clumsy, unbalanced section which would not have functioned well at the beginning of the book when it was eventually rebound.

In the case of the Rectangular World Map it was decided to leave the guard on the verso in place (Figure 5). The stiffening was not as severe as in the previous example and the risk of removal was too great on such an important map. The original beneath was heavily skinned and green pigment used to retouch the map could be seen penetrating the sewing holes. Therefore this sewing must have post-dated that particular re-touching, and it was important to preserve that evidence. The edges of the guard were lifted and fine toned tissue placed underneath to ease out and support the creases caused by the hard edges of the guard. The edge of the guard was left unstuck to further soften the hard edge.

Figure 4. Fol. 3b–7a, stiff guards

Figure 5. Fol. 23a, lifting a guard to ease stresses, with evidence of retouching from the verso showing in the sewing-holes

Problems arising from the map of the Indian Ocean (fols. 29b–30a), led to a more difficult decision. This map was drawn over a double page, and thus might have been presumed a bifolium (Figure 6). However, the next opening revealed another double page map, the Mediterranean (fols. 30b–31a), and all three leaves were guarded together. It was not clear whether they were originally all single leaves or whether there had been one bifolium guarded with a single. The Indian Ocean opening of this trio was stiff and distorted but had two layers of repairs in the centre that had been retouched at different times. Cautious removal of the two uppermost guards, just at the tail margin where there was no image, revealed that the two halves of the Mediterranean had been guarded together prior to the guarding of the Indian Ocean map. This suggested that the Mediterranean was the more likely of the two to have once been conjoint (Figure 7). It was decided to retain the Indian Ocean as a bifolium rather than follow the probable original collation. This decision was made so that the evidence of the collation and the retouching would be retained, interference would be minimised and the

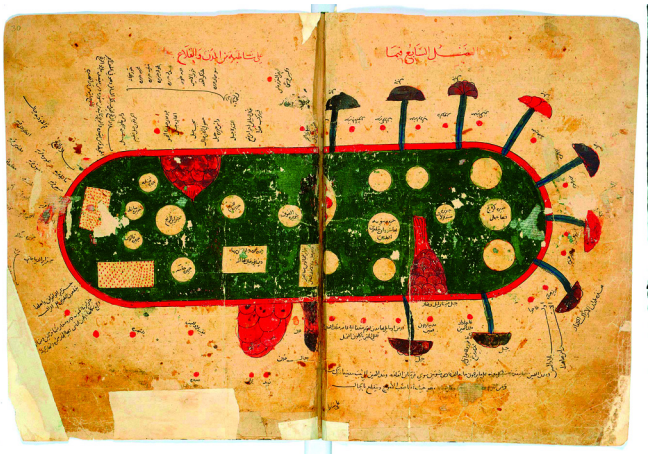

Figure 6. Fol. 29b–30a, Indian Ocean before repair showing modern, white repairs

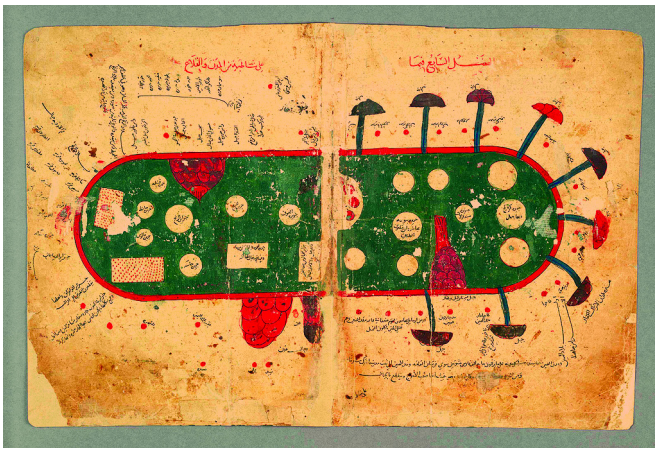

Figure 7. Fol. 29b–30a, Indian Ocean after repair

difficulty of making a satisfactory and unobtrusive repair according to the earlier format would be avoided. The Mediterranean map retained the later format, with one half remaining as a singleton.

3. Modern patch repairs

There were a number of different paper types but the most obvious of these were the most recent repairs of a fine burnished white paper. These repairs were often quite large, and were visually obtrusive due to their size and whiteness. Examples can be seen at the head of the Circular World Map and along the tail edge of the Indian Ocean (Figures 1 and 5). It had been decided to remove most of these from the image areas at least for aesthetic reasons. As in other cases, removal of these repairs sometimes revealed evidence of other treatment beneath. One such, removed from the bottom left corner of the Rectangular World Map, revealed the loss of pigments underneath, probably caused by the removal of another earlier repair (Figure 8). However, many were left in place, particularly on the text leaves. An example is the repair left undisturbed on the bottom right-hand corner of the map of the Indian Ocean (Figure 7). The Circular World map appeared quite altered after being repaired with a toning paper (Figure 3).

Conclusion

Whilst the eventual conservation of this manuscript involved no specifically new techniques or materials, the decisions taken were heavily influenced by the

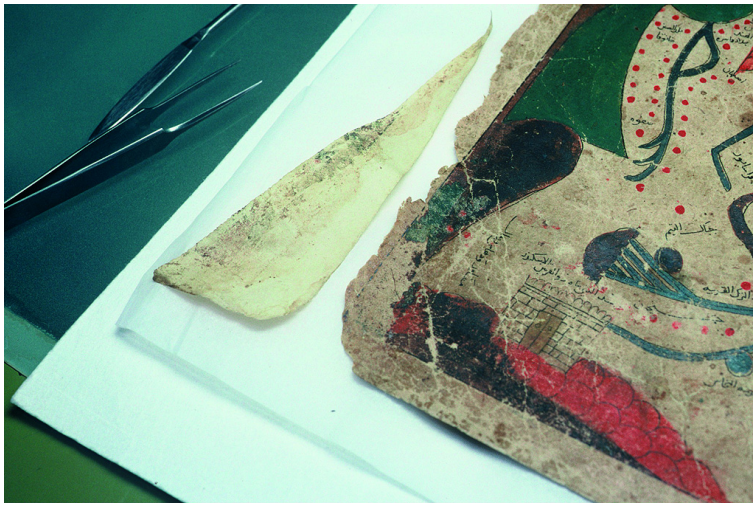

Figure 8. Fol. 24a–23b, Rectangular World Map: modern repair removed showing disturbance to pigments beneath where an earlier repair might have been removed

context of a collaborative project and the complexity of the physical history of the manuscript. A minimal approach was favoured, using techniques to alleviate the stresses caused by the repairs whilst still retaining their evidence. Assumptions made about the original make-up of the manuscript often proved unfounded on close examination, but only limited conclusions could be drawn regarding its production and history of restoration. It is hoped that this paper will add to the discussion on conservation decision-making and the different ways conservators can interpret their role.

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Notes

1 A copper green is thought to be present on the Circular World Map, though this has not been confirmed.
2 Most of the repairs were stuck with paste, and were removed with direct application of water.

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Materials

Hasegawa hand-made papers (6 different weights 1.6-3.0 'monme'),

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1942-1 Warabi
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