

THE CONSERVATION OF THE LEAVES AND FRAGMENTS
AT ST. CATHERINE'S MONASTERY, MOUNT SINAI

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The monastery of Saint Catherine is world famous for its treasures, but perhaps the most remarkable thing about it is its survival through the centuries as the succession of fathers over more than 1500 years have, by preserving the monastic way of life in this remote place, ensured the survival of its treasures. None of these treasures is more famous than the Codex Sinaiticus, lost to the monastery when it was removed by the scholar Konstantin Tischendorf in 1859.

The discovery therefore in 1975 of 12 whole leaves of the Codex, as well as one leaf in two halves and numerous fragments of various sizes amongst a cache of manuscript fragments found in a tower on the north side of the monastery during repairs following a fire caused a great deal of excitement. The New Finds, as all these manuscript fragments have been known since their discovery, seem to have been set aside by the fathers in a sort of *genizeh*, a place where damaged and unusable manuscripts were kept, in baskets (including perhaps the famous waste paper basket of Tischendorf's story), two of which remain on the platform at the end of the small room where they were found, hidden for a century or more under the debris of a collapsed ceiling. The fragments of the Codex Sinaiticus were recognised almost immediately by the present Archbishop, Damianos, and the Archimandrite Sofronios, who was responsible for the initial discovery of the first manuscript fragments, and are to be published by Professor Nikolopoulos, Director Emeritus of the National Library in Athens in his forthcoming edition of the Sinaitic leaves and fragments. It was on his shoulders that the task of sorting, identifying and studying the tens of thousands of fragments fell and he has devoted much of the intervening period to this work, which stills continues today. To the chief conservator of the National Library, Vassilios Peltikoglou, and his colleagues has fallen the equally massive task of cleaning and opening out these fragments, many of which were crumpled, eaten by insects and rodents, stuck together and badly stained, and making protective enclosures for them. However, the leaves of the Codex Sinaiticus, because of their unique importance, were put on one side for future consideration.

Some leaves had survived more or less unscathed, though stained and damaged by dirty water and badly eaten by insects and rodents. Other more fragmentary leaves had suffered more extensive damage, the corrosive ink having eaten through the parchment in many places where there had been sufficient moisture to allow this to happen. In a few cases, the parchment had suffered serious deterioration through mould, and many of the fragments were folded over and crumpled.

In addition, the text on several pieces was obscured by an insect-related deposit which looked initially like small pen-strokes [I am told by Caroline Bendix that these may well be the result

of termite infestation], and in some areas, especially on the flesh-sides of the skins, which had suffered extensive ink loss, seriously reducing the legibility of the text.

One group of whole leaves remained in the form of a gathering of five leaves with small fragments of at least one additional leaf at the beginning of the gathering. These leaves were held together with a narrow parchment tape whipped along the length of the spine edges of the leaves, locking the spine edges and hiding the original spine-folds. The spine of the gathering had taken on a pronounced curve, inhibiting the ease with which the leaves could be opened, a problem exacerbated by the cockling which had affected all the leaves.

This is the only group of leaves to remain in a coherent historic unit, though it is clear that many were in this condition when the manuscript was removed from the monastery and before the rebinding by Douglas Cockerell after its purchase by the British.

Characteristic of these leaves was a large area of water damage in the centre of the lower half of the leaves which had resulted not only in extensive ink-loss and ink-corrosion damage, but also in deep creases which radiated from the damaged area, created as the wet parchment dried without any restraint. Where these creases run horizontally across the leaves, they seriously reduced their flexibility, though the fact that they could be opened safely to about 100° allowed the photography to proceed without the need to dismantle the gathering.

This was the condition of the leaves after they were discovered in 1975, identified and given some initial cleaning to remove the dust and earth under which the manuscript fragments had lain for so long, the smaller pieces stored in envelopes, the full leaves in a box made by Mr Peltikoglou and his colleagues.

With the setting up of the Codex Sinaiticus Digitisation Project, it became clear that the monastery fragments needed to be carefully examined to see how they might be needed to allow them to take their part in the project. In July 2003, following a meeting of the Conservation Working Party of the Digitisation Project, on which I was asked to represent the monastery, I formally proposed to the Archbishop and the Holy Synaxis of the Monastery that we should ask Chris Clarkson to carry out a detailed examination of the fragments to assess their condition and what might be done with them by way of conservation. With their agreement, Chris joined one of our regular survey-team visits in September 2003 and in the course of a ten-day visit, with the help of Father Justin, examined all the fragments. We also photographed the damaged areas of the leaves as an *aide-memoire* to help with the writing of his report. On his return, Chris compiled a very detailed report which was translated into Greek for the consideration of the fathers.

At the same time as this was happening, plans were being developed for the construction of a conservation workshop in the unused bishop's apartments at the western end of the south range of the monastery, which was to be part of the more general renovation of the upper

floor of the range, which also contains the library. Our hope was that the building work would have been finished in time for any work on the Sinaiticus fragments to be carried out in a new, properly-controlled workshop under optimum conditions, conditions suitable for work on material of this importance. In reality, the timetable of the Codex Sinaiticus project and that of the renovation project did not keep step, and a continual series of delays in the latter, many of which were the result of protracted negotiations with the Egyptian Authorities.

As a consequence of the delays in the building project and the needs of the Codex Sinaiticus Project to meet its own deadlines (the transcribers had to finish their work by the end of June 2008), we were asked if the work could be brought forward and, after further consultation with Chris Clarkson, we forwarded, in early 2008, a second proposal to the monastery to undertake only the work that would be needed to open up the leaves for transcription and photography and such superficial cleaning as might be agreed with the librarian where access to the text was compromised. This was agreed to and in May of 2007, Chris Clarkson, myself and George Boudalis, the book conservator at the Byzantine Museum in Thessaloniki and long-time team-member of the conservation project, travelled to the monastery.

The work was carried out in the empty bishop's apartments at the western end of the south range, where the working conditions were cramped, busy and dusty, with the need for Dr David Cooper and Father Justin, who were operating the digital camera, to move constantly backwards and forwards through the room to work the camera. There was a lack of work surfaces, and such as there were, were provided by some rather elderly tables and a desk. It was hot and very dry, with relative humidity levels averaging 20% for the duration of the visit. Given the small size and thinness of many of the fragments, it was not possible to ventilate the room, for fear of gusts of wind catching the fragments as they were being worked on. The situation was therefore far from ideal, but the result of a situation brought about when one part of a major project establishes a momentum with which other parts have to fit in. In an ideal world, we would have waited another two years for the new workshop to be completed.

Because we had no existing workshop and equipment with which we could work, we used a humidity chamber made on-site from expanded polystyrene, with the humidity supplied by an ultrasonic humidifier. This chamber was devised by Chris Clarkson to use in situations where a more sophisticated piece of equipment might not be available, but it has advantages beyond its simplicity, chief amongst which is the insulating effect of the polystyrene and the fact that condensation does not gather on the inner walls of the chamber, and therefore eliminates the risk of drops of water landing on anything placed inside it.

The RH could be raised to in excess of 70% (though we found that 50% was enough to relax most of the thin parchment of the Codex fragments, as thin in some areas as 0.09 mm). The pieces of polystyrene were held together with duct tape, which served also to create the hinge at the top of the door and to act as adhesive latches to hold it shut, and the hole made for the probe of the electronic hygrometer was sealed with a wine cork.

Inside, the chamber was fitted with nylon cords to create a support for the pieces of Bondina on which the manuscript fragments were placed for humidification.

The fragments were left in the chamber for about 10 minutes at between about 50% RH and were brought out on the sheets of Bondina, and placed on top of dampened blotters which were intended to slow down the rate at which they dried out and were then manipulated by Chris and George with fingers and folders to open fold-overs, flatten curling, etc., working from one side to the other of each piece and using weights to hold treated areas in place.

This process was repeated for virtually every fragment, and even the smallest needed two pairs of hands to control them as they were opened up, as the low RH levels in the room caused constant movement as the parchment dried, and required local treatment with moisture, 50/50 isopropyl alcohol and water, applied by Q-tips to allow the fold-overs to be opened out while the most recently-treated area was held down by a folder. The process was complicated by the fact that the more the fragments were worked on, the more fold-overs became apparent. Once fully opened, the fragments were placed between Bondina and blotters and left to dry under weights.

The same process had to be repeated for even the tiniest fragments. One small fragment, on exceptionally thin parchment (the thinner the parchment the quicker it dried) proved particularly difficult to open up as it moved so rapidly as it dried, and its complex folded state meant that relating it to the 'before' images as it was opened up became increasingly difficult. Chris and George worked on it, on and off, over a day and a half, but its treatment is not yet finished and we shall be returning to it when the new workshop is completed and we can work in better conditions.

Larger fragments presented the same problems, as the damaged, insect-eaten edges presented many areas with small folded-over projections which had to be identified and opened, requiring local humidification to combat the rapid drying in the low RH and the discovery of further folds extended the time required to work on them. The isopropynol/alcohol mix was also used to soften the insect droppings so that they could be removed, with Father Justin's agreement, where they obscured text. They were left in place where they did not obscure text. While George held down the parchment, Chris applied the moisture and then held the opened area down to allow the parchment to adjust to its new position, before covering it with Bondina – while still holding the parchment down and checking that each part was held flat. Problematic areas would then be revisited until every part was opened out and secured.

My own role was to fill in the survey forms supplied by the British Library, though we found this process, designed for the whole and relatively undamaged leaves in the British Library portion of the manuscript, often very hard to apply to the fragments in the monastery. Where necessary we supplemented photographs with drawings, as when we recorded the sewing-thread tackets used to secure the turn-ins of a leaf once used as a book cover.

The larger fragments often required three pairs of hands to hold the parchment as it dried on removal from the humidity chamber, a problem which would have been almost entirely avoided if we had been able to work in the new workshop, which is to have a small room in which the RH levels can be raised to allow prolonged working times on humidified materials.

Once the fragments had been opened up and were lying flat and had dried, Chris began work on securing the more awkward areas with temporary bridging repairs carried out with two different weights of Japanese Kozo tissue by Hasegawa and rice-starch paste.

The five-leaf gathering presented different problems, in that there was no question of removing the overcasting along the spine – if that is ever to be done it will need to be the result of very careful consideration and consultation. Instead, Chris worked on each leaf with localised treatment to try to ease out the worst of the cockling to give a better result under the camera, restraining the leaves with clips on a piece of board cut slightly larger than the size of the leaf as they were worked on, and securing some of the small, damaged areas with Japanese tissue and paste.

When the fragments were flattened, George Boudalis mapped them on writable melinex sheets for the British Library survey process and we filled in as much of the spreadsheet form as was possible for fragments whose location within a leaf was not always clear.

The fragments were not immediately able to lie flat on their own, and tended to curl up quite strongly when taken out from under the weights, in addition to which, some of the fragments had such uneven edges that they presented significant handling risks. The decision was therefore taken to encapsulate the fragments between sheets of melinex and by a fortunate coincidence a father was visiting the monastery to make robes while we were there and agreed to use his sewing machine to make the encapsulations that are intended to be only temporary protection until a long-term solution is agreed on. We used small tackets of linen thread to make sure that the fragments do not move around inside the encapsulations. This left the fragments accessible to the transcribers, but much safer to handle.

The recently-treated fragments were otherwise extremely difficult to handle on the platen of the digital camera, as we did not have time to let them settle after the humidification. The low suction used on the platen was not powerful enough to hold them flat, so they were held in position under a sheet of melinex which was unrolled in line with the curvature of the curling parchment, thus allowing it to be lowered to the surface of the platen without undue handling or strain. The vacuum then pulled the melinex down and held the parchment securely, though of course the resulting image was not of sufficient quality – because of the melinex – for the final publication, but it did provide the transcribers with the high definition images that they needed to complete their work. The images were photographed again later in the year, by which time the parchment did not present the same problems.

Most recently, Nikolas Sarris, a member the Codex Sinaiticus Project when he was working in the British Library, noticed, in the process of working through the photographic records from our manuscript survey for his PhD thesis, noticed a familiar-looking script inside the right board of MS Greek 2289. He immediately referred this to the librarian, Father Justin, who identified the text as coming from the book of Joshua and to be a part of the text missing from the known leaves of the Codex Siniaticus. It would appear that this is indeed another fragment of the Codex, but it presents enormous problems. It was used in as a board lining in one of a small group of bindings identified by Nikolas as having been bound in the monastery in the first half of the eighteenth century. At some date, someone tore part of the pastedown away to reveal the manuscript (and in the process apparently removing some of the ink), but there appears to be no further record of it. From a brief visual examination of the fragment, it would appear to be in a badly deteriorated condition with possibly a second leaf under it, but the turn-ins of the leather cover are very firmly adhered to it, as is much of what is left of the paper pastedown.

Any attempt to lift even the paper pastedown let alone the leather turn-ins and then the leaf itself, even if this can be done without compromising the binding, will be fraught with difficulties, and no decision should be made without wide consultation. At this early stage of thinking about it, the most sensible course of action would appear to be to consult with specialists to explore what imaging processes might offer the opportunity to find out exactly what lies under the pastedown and leather without disturbing the components of the binding at all. If successful, this at least should allow a more informed decision to be made, and may even allow access to the text without incurring the risks of trying to lift it. The same should be done with the other bindings in this group, in case other fragments may have been used in their bindings (the left pastedown of Greek 2289, for instance, is still firmly adhered and there is no indication of what might lie under it). It is my opinion that this examination should wait until we can provide clean, dust-free, controlled working conditions in the new workshop on which I hope building work will start in October.

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1. The humidity chamber made from expanded polystyrene and an ultrasonic humidifier.



2. Chris Clarkson (right) and George Boudalis working on one of the humidified fragments.



3. Chris Clarkson, Nicholas Pickwoad and George Boudalis working on one of the larger fragments.

