

The historic repair and reuse of Byzantine wooden bookboards in the manuscript collection of the monastery of St Catherine, Sinai

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ABSTRACT This paper discusses the historic repair and reuse of wooden bookboards on Byzantine Greek-style bookbindings in the library of the monastery of St Catherine, Sinai. It is based on a detailed condition survey of the monastery's manuscripts that also provided a comprehensive description of the materials and structures of these manuscripts. A total of 124 wooden boards with repairs to major splits was found on 101 manuscripts. These repaired boards have been categorised by damage to the boards, information about their repair techniques and materials and the time of repair. Finally it has been possible to compare those manuscripts with repaired boards to the rest of the collection and place the repairs into a wider context of eastern Mediterranean manuscript repair and rebinding. The study of early board repairs offers new approaches to the repair of split wooden bookboards by book conservators.

KEYWORDS bookbinding, Byzantine, wooden boards, repair, conservation database

Introduction

Books represent one class of object whose very survival has resulted from both their continual use and from the value that readers have placed on them over many centuries. Early manuscripts have survived due to the care taken both in use and storage and this careful preservation has included repair or rebinding carried out by successive generations. Although the history of early manuscript repair remains largely uncharted, the library of the monastery of St Catherine, Sinai offers new opportunities to investigate early techniques and materials used for these purposes in the eastern Mediterranean. This paper discusses one part of this process: the repair of wooden bookboards. The repaired boards discussed were identified as part of a detailed condition survey of the monastery's manuscripts.

The monastery of St Catherine, Sinai, Egypt

The famed monastery of St Catherine at the foot of Mount Sinai is one of very few early Christian monastic complexes that have never been destroyed and can claim continual

monastic life from the fourth century AD. The importance of the monastery, its location as a major pilgrimage site and its great antiquity has left it with treasured collections. One such is the library, which has been described as 'one of the finest collections of manuscripts in the world' (Brock 1996: 85).¹

The library contains over 3,300 bound manuscripts, of which over half were written before AD 1500. Greek manuscripts form the majority but there are also Arabic, Georgian, Slavonic, Syriac, Ethiopic and Latin manuscripts. While the importance of the monastery's library has been known since the nineteenth century, the fact that the majority of the manuscripts survive in early bindings with little modern interference has only recently been appreciated. It is now known that this is 'the largest surviving collection of Byzantine bindings' in the world and as such is of great importance (Pickwood 2004: 34). Although the study of Greek-style binding is still in its infancy the bindings can be classified by their major structural qualities: an unsupported sewing structure with the boards attached to the sewn bookblock by means of sewing thread only, a spine lining usually of textile extending onto the outer face of the boards and endbands sewn to the bookblock and the head and tail edges of the boards.²

St Catherine's library conservation project and manuscript condition survey

In 1998 the Saint Catherine Foundation and the University of the Arts, London began a preservation project with the aim of 'securing the future of [the monastery's] library' (Pickwood 2004: 33). One activity was a detailed condition survey of the bound manuscripts.³ The uncharted nature of the monastery's manuscripts, preserved in bindings which are unfamiliar to most conservators, meant that the survey was designed to serve two purposes: to record the condition of the collection at the start of the twenty-first century and to record the structures and materials of the books themselves (Pickwood 2004: 35). The wealth of information collected included the systematic recording of repairs to both bookblocks and bindings and offered the opportunity to chart the history of care, repair and rebinding for this important collection.⁴

The survey methodology used and its conversion into a relational database is described by Pickwood (2004, 2005) and Velios and Pickwood (2005, 2006, 2008). The digitised version of the resulting conservation archive was used in this study to extract data based on specific relevant criteria.⁵

Gathering the survey information on bookboard repairs

For this study, manuscripts were identified from the database whose bookboards were wooden and had been marked as 'composite' (42 manuscripts, 43 boards) or 'old repairs' (164 manuscripts, 198 boards) on the survey forms.⁶ The survey did not gather 'composite' information for MSS Arabica 2-321. The resultant dataset included 206 manuscripts or 241 boards, with not all manuscripts having repairs to both boards.

Review of survey data

The raw survey information for the resultant dataset was then reviewed on a per book basis. This did not include the re-examination of any of the original manuscripts or re-inspection for repaired boards not identified by the survey. The results must therefore be viewed as preliminary.

It became clear that the 241 wooden boards identified in this database exhibited a wide range of damage and repairs. This study concentrates on 'repaired boards', boards with a repair to a major split or splits in the thickness of the board that had resulted in it breaking and failing to function as a single unit. Repairs therefore took the form of continuous butt joints (Hewett 1985: 244). Cracked boards that left the board weakened but still acting as a single unit or constructed or extended boards were not included.⁷

The term 'repaired board' does not necessarily equate to the term 'composite board' (see Ligatus Research Unit 2008). With St Catherine's collection, the inclusion of two factors in the definition of 'composite boards' are relevant: 'typically found on books made in areas where timber of a suitable size and quality was not readily available' and 'such boards may difficult to distinguish from repaired boards' (Ligatus Research Unit

2008). Reuse of damaged boards in subsequent rebinding of a manuscript further confuses the distinction.

Results

The final dataset for repaired boards was narrowed to 124 boards on 101 manuscripts from four language groups (Arabic, Georgian, Greek and Syriac). This was from a total of 1,886 manuscripts with wooden boards, of which 1,877 were from these four language groups (Table 1).

Table 1 Repaired board dataset by language group and frequency.

	Total number of manuscripts with repaired boards	Number of manuscripts with one repaired board	Number of manuscripts with both boards repaired	Total number of repaired boards
Arabic	25	19	6	31
Georgian	2	1	1	3
Greek	62	48	14	76
Syriac	12	10	2	14
	101	78	23	124

During the review it was possible to add further information to that gathered by the survey. The information for all of the 124 identified repaired boards is presented in the appendix (p. 74) and based on these data it was possible to compare manuscripts with repaired boards with the rest of the collection.

For each repaired board the wood type was identified visually and its grain direction noted.⁸ The location of the splits and repairs to the boards were recorded, with the board divided into three equal regions: spine, centre and fore-edge for those boards with vertical grains and head, centre and tail for those with horizontal grains. In all cases the splits followed the direction of the grain – 71% of the wood was identified as hardwood, and 23% as softwood. The majority of boards had a vertical grain (111 examples), with a horizontal grain being found in only 13 examples (Figures 1 and 2). The repaired splits were predominantly in the centre of the board irrespective of grain direction. With vertically grained boards, the repaired splits occurred in the central third of the board in 62 examples with the spine and fore-edge areas accounting for 39 and 21 examples respectively. Of the 13 boards with a horizontal grain the repaired split occurred in the central region in 11 examples with two examples in the head region. In one case (MS Syriac 12, repaired board 113) a vertically grained split board had been repaired and then extended with an additional piece at the tail (illustrated in Baddeley and Brunner 1996: 32). The size of the boards or their thickness did not appear to have influenced the likelihood of either damage or repair. The mean thickness of all the repaired boards (9.4 mm) correlated closely with the mean thickness (9.1 mm) for all wooden boards and a relationship between size and likelihood of board repair could not be discerned. Merian (1993: 40–43) reports that a horizontal grain direction predominates (89%) in a collection of 148 Armenian manuscripts, though these are much thinner boards (average thickness 3.8 mm) than studied here.

She suggests this marked use of horizontal grain is to counter the risk of splitting.

The original cause of the repaired splits could be discerned in some cases, but in many others (99 cases) covering leather and pastedowns obscured the repaired board.

ess of binding, with its requirement for holes drilled though the board for board and endband attachment, foredge strap anchoring and the provision of nailed bosses and book furniture, potentially weakens a wooden bookboard, leading to damage either at the time of binding or during use. In 28 exam-



Figure 1 A full, sewn single direction repair. The board repair is continuous with the sewn board attachment (MS Greek 1104, repaired board 88). (© Holy Synaxis of the Monastery of St Catherine, Sinai and Ligatus Research Unit, University of Arts, London.)



Figure 2 A partial, sewn single direction and pegged repair (MS Greek 579, repaired board 65). (© Holy Synaxis of the Monastery of St Catherine, Sinai and Ligatus Research Unit, University of Arts, London.)



Figure 3 A full, adhesive and sewn single direction repair to a horizontal grain board (MS Greek 563, repaired board 60). (© Holy Synaxis of the Monastery of St Catherine, Sinai and Ligatus Research Unit, University of Arts, London.)



Figure 4 A full, sewn and textile patch repair (MS Greek 1275, repaired board 100). (© Holy Synaxis of the Monastery of St Catherine, Sinai and Ligatus Research Unit, University of Arts, London.)

ples on 25 individual boards, a split could be seen to start from one of these types of hole. In eight examples the split had been caused by a nail or boss and in one example by a strap anchor hole. However, the largest discernable cause of splits (14) was from holes drilled for board anchorage. In 13 cases this was from holes used for a previous binding with one solitary example of a repaired split being caused by a hole drilled for and being used by the current binding. A similar pattern was found for splits starting from holes drilled for endband attachment. Here three examples were from previous attachment holes and two from holes drilled through the board for and being used by the current endband attachment. The more even distribution of current and previous endband attachment may reflect damage caused and then repaired during binding, as the sewing of endbands occurs towards the end of the binding sequence. In one case (MS Greek 52, repaired board 40), a board split appeared to have been caused during repair when a crude tanned leather overback was nailed to both boards; the resulting split had been repaired with an ad hoc extension of the overback.

The 124 repaired boards had 136 repaired splits, with the majority (91%) of boards having only a single repaired split. Repairs to hold the butt joints had been executed using a mixture of adhesive and mechanical means in five main types: sewn, adhesive, patch, plate and treenail. In some cases (33), more than one method had been employed, and in many cases adhesive had probably been used alongside other methods, although from the photographs and survey information this was hard to confirm (Figures 3 and 4). In addition to the primary repair method, if the repair was carried out before covering the leather acted as an additional and important external patch.

The most frequent repairs identified (90) were those where the boards were sewn together with the two sides of the board held by a thread passing through a series of holes on either side of the split. In most cases one thread was used for a series of pairs of holes, the thread being lashed between the holes before continuing on to the next pair. In some crude repairs individual thread tackets had been used. In the case of repairs sewn with one thread some had the thread travelling in one direction (57 examples; Figures 1 and 3), while in a smaller number of cases (24 examples) the thread travelled in two directions, working up the repair and then returning with additional lashing back to the start with a characteristic crossed appearance (Figure 5). Details of the sewn repairs were unclear in many cases due to pastedowns but in some the same thread had been used for board repair as well as board attachment (Figure 1). In two cases, both single direction sewing, the thread had been further anchored with wooden pegs in the holes (Figure 2).

The second most frequent method of repair (41 examples) used a patch adhered over the length of the split (Figure 4). Adhesive repairs were found in 21 cases (Figure 3) and four repairs were carried out with plates, where a material had been nailed or riveted across the split. Finally, in one case a repair had been executed with a number of wooden treenails angled through the thickness of the board as well as a single direction sewn repair, perhaps as an additional method of strengthening the repair (Figure 6).

The repair materials found were those that would be familiar to bookbinders. The sewn repairs were carried out with plain threads in 79 cases. In three cases, processed skin thongs were used (one of tanned leather and two of parchment) and there was one example of a sewn repair using



Figure 5 A partial, sewn repair in two directions (MS Greek 58, repaired board 41). (© Holy Synaxis of the Monastery of St Catherine, Sinai and Ligatus Research Unit, University of Arts, London.)



Figure 6 A full, sewn and angled-treenail repair (MS Greek 231, repaired board 46). (© Holy Synaxis of the Monastery of St Catherine, Sinai and Ligatus Research Unit, University of Arts, London.)



Figure 7 An 'ends only' sewn repair (MS Arabica 262, repaired board 17). (© Holy Synaxis of the Monastery of St Catherine, Sinai and Ligatus Research Unit, University of Arts, London.)

wire. For patches, paper was used in 20 cases, textiles in 13 (Figure 4), tanned leather in three and parchment in one. In MS Greek 326 (repaired board 51) a patch of recycled blind-tooled leather was used. The leather was probably cut from the covering leather of a disused bookbinding. One board (the only example of a twentieth-century repair found) had a masking tape patch.

Although the splits were predominantly either the entire height or width of a board, the extent of the repair varied and was characterised as full, partial or ends only. Full repair (defined as affecting at least two-thirds of the length, Figures 1, 3 and 4), was found in the majority of cases (101), with partial repair (up to two-thirds of the length) in 16, although in a number of cases these were quite small (Figures 2 and 5). Eight repairs were found where only the extremities of the split had been mended. Two of these repairs were iron plates while one had textile patches on the inner faces of the boards. The remaining five examples were sewn and often executed as part of the primary endband sewing (Figure 7).

It was not possible, with the current state of knowledge of both the collection and Byzantine Greek-style bookbinding, to date precisely the repairs to these manuscripts, although the repair and rebinding of three of the manuscripts was dated by Boudalis (2005: 891–4): MS Greek 44 (repaired board 39) fifteenth–sixteenth century; MS Greek 500 (repaired board 55) AD 1632; and MS Greek 804 (repaired board 77), AD 1627–28. Notes dating repairs were found in MS Greek 500 and 804 (Boudalis 2007b). A more useful approach was to date the repairs in relation to their current binding. This was based on whether they were executed before covering and their relationship to pastedowns or, in the case of visible sewn repairs, the relationship to board and primary endbands attachment. In some cases the sewn repair was continuous with the sewn board or endband attachment and took place at the same time (Figure 1). Some manuscripts had been partially repaired or recovered and board repair may have been part of a major overhaul, although perhaps without entirely pulling and re-sewing the bookblock. The distinction between rebinding and repair is often unclear: MS Greek 939 (repaired board 84) had a repair carried out as part of a well-executed and tooled rebinding, MS Arabica 440 (repaired board 25) had a neat patch repair carried out before the manuscript was recovered with a recycled tooled cover from a larger binding and MS Greek 595 (repaired board 68) had the covering leather and pastedown trimmed to allow a sewn repair, the manuscript then being rebacked. Repair after binding was easier to recognise, where repairs were obviously carried out either after covering or through pastedowns. In the majority of bookboards the repairs seemed to have been carried out at the time of binding or other major repair work. It would seem that the retention, repair and reuse of broken wooden boards was a common practice on the manuscripts represented in the collection. In only ten cases were the repairs carried out after the binding and these examples were in many cases the crudest repairs.

Discussion

The wealth of data collected during the survey meant that the manuscripts with repaired boards could be compared with the rest of the collection. Many of the boards seemed to have been repaired at the time of rebinding and the repair of manuscript leaves could be compared with the repair of boards. In 64 cases, manuscripts with repaired boards also had repairs

Table 2 Comparison of tooling on manuscripts with repaired boards against all manuscripts with wooden boards by language group.

	Tooled bindings		Plain bindings	
	Manuscripts with repaired wooden boards	Manuscripts with wooden boards	Manuscripts with repaired wooden boards	Manuscripts with wooden boards
Arabic	24% (6)	29%	76% (19)	53%
Georgian	0% (0)	61%	100% (2)	31%
Greek	47% (29)	63%	53% (33)	31%
Syriac	25% (3)	18%	75% (9)	78%
Total	38% (38)	50%	62% (63)	42%*

*plus 8% not known or not applicable

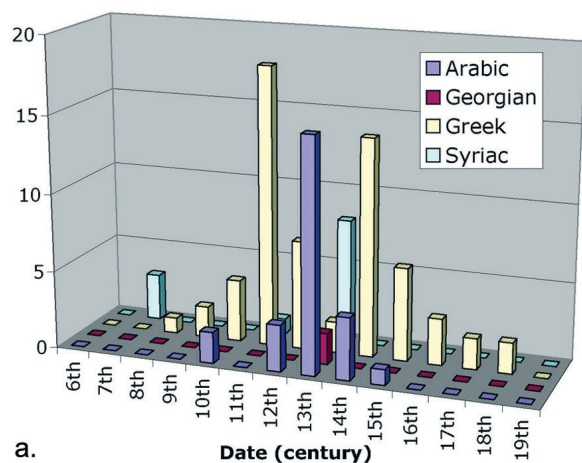
to their leaves (patch repairs or overcasting to the spinefolds) that could only have taken place while the manuscript was disbound. It would seem that boards, even with major splits, were repaired and reused rather than being replaced as part of larger repair campaigns. Likewise the status of the bindings with repaired boards could be crudely judged by the presence or absence of tooling to the covering leather. The bindings with repaired boards were less likely to be tooled when compared to all manuscripts with wooden boards. While 50% of manuscripts bound with wooden boards had tooling, only 38% of the manuscripts with repaired boards showed tooling of the covering leather. This possibly indicates a utilitarian approach to some repairs (Table 2).

Comparing the date of manuscripts with repaired boards against all those with wooden boards, the manuscripts with repaired boards were disproportionately drawn from the oldest manuscripts. This was particularly noticeable in the largest group, the Greek manuscripts, where eleventh- and fourteenth-century manuscripts form the largest groups with repaired boards although this did not reflect the date distribution of Greek manuscripts with wooden boards as a whole (Figures 8a and 8b). This might begin to indicate that board repairs took place alongside other periodic campaigns of repair and rebinding, possibly dating from fairly early peri-

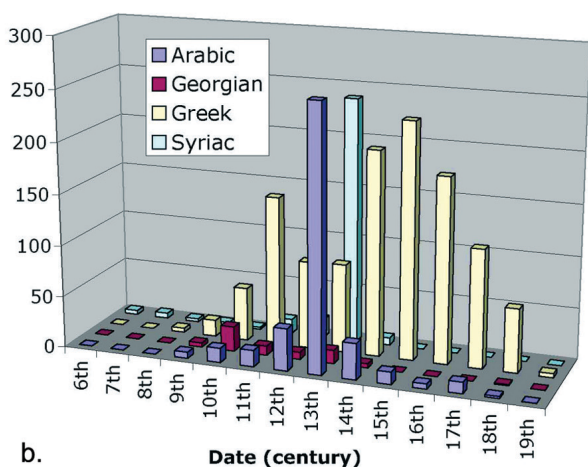
ods. Although these manuscripts may have had utilitarian repairs or were plainly rebound, they were likely to retain early boards.

The absence of comparable large collections of manuscripts with Byzantine Greek-style bindings, the complex and long development of the collection and the absence of a complete detailed modern catalogue means that it would be premature to extrapolate too much information from this group. The isolation of the monastery and the probable shortage of wood in the region may also mean that this collection is atypical. However the collection contains many manuscripts still in the condition they were in when they ceased to be routinely used and the fact that they remain in this original condition may indicate that Byzantine manuscripts were subject to repair and reuse of materials to a greater extent than believed from observations made of Byzantine manuscripts now in western libraries. For comparison, of the 112 manuscripts with Byzantine Greek-style bindings preserved in the Vatican Library, 29 are probably rebound and this may begin to indicate a level of repair and rebinding of manuscripts during the Byzantine period (Federici and Houlis 1988: 82–5).

The materials and techniques of board repair found in this sample are directly related to those used in Byzantine Greek-style bookbinding, relying as they do on sewing, adhesives and reinforcement of joins with patches of textile, paper, parchment or leather. Even the isolated use of treenails is an echo of a method of securing leather turn-ins found in the monastery's collection and the use of plates can be seen to draw inspiration from the metal furniture found on the boards of many Byzantine Greek-style bindings. The binders, who appear to have made these repairs, seem to have relied on their own experience and familiar materials when faced with broken boards (note the similarity of the sewn repairs and sewn board attachment in Figures 1 and 3). This is a particularly exciting outcome of this study as it indicates methods and approaches that may prove useful to modern book conservators. Although the majority of these early repairs were carried out at the time of rebinding, the range of techniques and the fact that they had been used in some cases in only selective areas shows promise for future *in situ* or minimal repairs. The survival of these early repairs creating functioning bindings while retaining severely damaged early boards offers inspiration.



a.



b.

Figure 8 The date distribution by century and language of (a) manuscripts with repaired wooden boards and (b) manuscripts with wooden boards.

Conclusions

This paper shows the potential of both the monastery's library and the wealth of detailed information held in the survey archive to illustrate historic repair methods for manuscripts of the eastern Mediterranean. This research is tentative and the grouping and dating of repairs and wider conclusions can only be drawn after detailed studies of the individual manuscripts have taken place and with a fuller understanding of the complexity of Byzantine Greek-style bookbinding. It is hoped that this study of historic repair techniques will help to inform the future conservation methods that will be necessary for the continuing preservation of this precious collection.

Appendix data for bookboards studied

Manuscript information					Board information						Repair information						
Repaired board reference	Manuscript	Date of manuscript (century)	Tooled binding?	Text-block repair?	Number of repaired boards	Repaired board location	Wood type	Wood grain direction	Repair location	Damage cause	Number of repairs	Repair type	Sewing material	Patch material	Plate material	Extent of repair	Time of repair
1	Arabica 0002	10	Y	Y	1	R	HW	V	V-S	NK	1	S2	Th			F	CB
2	Arabica 0010	13	N	Y	1	R	NK	V	V-S,C	EB1	1	S1	Th			F	CB
3	Arabica 0025	13	N	N	1	R	HW	V	V-F	NK	1	S	Th			EO	CB
4	Arabica 0026	14	N	N	1	R	HW	V	V-C	NK	1	S1	Th			F	CB
5	Arabica 0113	12	N	N	1	L	HW	V	V-C	NK	1	S1	Th			F	NK
6	Arabica 0130	13	N	Y	1	R	HW	V	V-S	NK	1	S2	Th			F	CB
7	Arabica 0159	12	N	Y	2	R	HW	H	V-H	NK	1	S1	Th			F	CB
8						L	HW	H	V-C	N/B	1	S2	Th			P	CB
9	Arabica 0209	13	Y	Y	1	R	HW	V	V-S	B2	1	S2	Th			F	CB
10	Arabica 0215	13	N	Y	2	R	HW	V	V-C,F	NK	1	P		Pap		F	CB
11						L	HW	V	V-F	NK	1	P		Pap		F	CB
12	Arabica 0216	13	N	Y	1	R	HW	V	V-C	NK	1	S1, P	Th	Pap		F	CB
13	Arabica 0220	14	N	N	1	L	HW	V	V-C	NK	1	S1	Th			F	CB
14	Arabica 0229	13	Y	Y	1	R	HW	V	V-S,C	NK	1	S2	Th			F	CB
15	Arabica 0255	13	N	Y	2	R	HW	V	V-S	B2	1	S1	Th			F	CB
16						L	HW	V	V-C	NK	1	S	Th			EO	CB
17	Arabica 0262	13	N	N	1	R	HW	V	V-C	NK	1	S	Th			EO	CB
18	Arabica 0276	13	N	N	1	L	HW	H	V-C	B2	1	S1	Th			P	CB
19	Arabica 0280	14	N	Y	1	R	HW	V	V-C	NK	1	S2, P	NK	Pap		F	CB
20	Arabica 0315	15	N	N	2	R	SW	V	V-C	NK	1	A, P		Pap		F	CB
21						L	SW	V	V-F	N/B	1	A, P		Le		P	CB
22	Arabica 0341	13	N	Y	1	R	HW	V	V-S	B2	1	A, P	NK	T		F	CB
23	Arabica 0407	14	Y	N	1	R	HW	H	V-H	NK	1	S, A	NK			F	CB
24	Arabica 0431	10	N	Y	1	L	HW	V	V-F	NK	2	S2	Th, Pch			F	CB
25	Arabica 0440	13	Y	Y	1	L	HW	V	V-S	NK	1	P		T		F	CB
26	Arabica 0445	13	Y	Y	1	L	HW	V	V-C	N/B	1	S1	Th			F	CB
27	Arabica 0493	12	N	Y	2	L	HW	V	V-,C,F	B2	3	S1, P	Th	Pap		F	CB
28						R	HW	V	V-S, C,F	NK	2	S1, P	Th	Pap		P	CB
29	Arabica 0505	13	N	Y	2	L	HW	V	V-C,F	NK	2	S1	Th			F	CB
30						R	HW	V	V-S	NK	1	S2	Th			F	CB
31	Arabica 0530	13	N	N	1	L	HW	H	V-C	NK	1	S1	Th			P	CB
32	Georgian 0077	13	N	Y	2	L	HW	V	V-S	NK	2	S1	Th			F	CB
33						R	HW	V	V-C	NK	1	S1	Th			F	CB
34	Georgian 0094	13	N	N	1	R	SW	V	V-S	NK	1	S, P	Th	Pap		P	AB
35	Greek 0022	10	Y	Y	2	L	HW	V	V-C	NK	1	S1	Th			F	CB
36						R	HW	V	V-C	NK	1	S1	Th			F	CB
37	Greek 0032	9	N	N	1	R	HW	V	V-S	NK	1	S1	Th			F	CB
38	Greek 0035	8	N	N	1	L	HW	V	V-C	NK	1	P		Pap		F	AB
39	Greek 0044	12	N	Y	1	R	SW	V	V-C	NK	1	A, P		T		F	CB
40	Greek 0052	12	N	Y	1	R	HW	V	V-F	N/B	1	Pl			Le	P	AB
41	Greek 0058	12	N	Y	1	L	HW	V	V-C	NK	1	S2	Th			P	CB
42	Greek 0059	11	N	N	1	L	HW	V	V-S	B2	1	A				F	NK
43	Greek 0132	13	N	Y	1	R	HW	V	V-C	N/B	1	S1	Th			F	CB
44	Greek 0196	15	Y	Y	1	L	HW	V	V-C	NK	1	A				F	CB
45	Greek 0225	11	N	N	1	R	HW	V	V-S	NK	1	A				F	NK
46	Greek 0231	11	N	N	1	R	SW	V	V-C	NK	1	S1, Tr	Th			F	CB
47	Greek 0266	15	Y	Y	1	L	HW	V	V-C	NK	1	S1	Th			F	CB
48	Greek 0289	12	N	Y	1	L	HW	V	V-S,F	NK	2	S1, P	Th	Pap		F	CB
49	Greek 0296	15	Y	N	1	L	HW	V	V-C	NK	1	P		T		F	CB
50	Greek 0320	16	Y	Y	1	L	HW	V	V-C	NK	1	P		Le		F	CB

Manuscript information					Board information						Repair information					
51	Greek 0326	11	Y	Y	1	L	HW	V	V-C	NK	1	P	Le	F	CB	
52	Greek 0383	9	Y	N	1	L	HW	V	V-F	NK	1	A		F	CB	
53	Greek 0499	11	Y	Y	2	L	HW	V	V-S,C	NK	1	S1, P	Th	T	F	CB
54						R	HW	V	V-S	EB2	1	P		T	EO	CB
55	Greek 0500	11	Y	Y	1	L	HW	V	V-S	NK	1	Pl		Fe	F	CB
56	Greek 0512	11	Y	Y	1	L	SW	V	V-C	NK	1	S1	Th		F	CB
57	Greek 0519	10	Y	N	2	R	SW	V	V-C	NK	1	S1	Th		F	CB
58						L	SW	V	V-C	NK	1	S1	Th		F	CB
59	Greek 0541	12	N	Y	1	L	NK	V	V-C	NK	1	S2	Th		F	CB
60	Greek 0563	11	N	N	1	R	HW	H	V-C	NK	1	S1, A	Th		F	CB
61	Greek 0565	15	Y	Y	2	L	NK	V	V-C	NK	1	P		NK	F	CB
62						R	NK	V	V-C	NK	1	P		NK	F	CB
63	Greek 0578	10	N	N	1	R	HW	H	V-C	NK	1	S1	Th		F	CB
64	Greek 0579	11	N	Y	2	R	HW	H	V-C	NK	1	S1, A	Th		P	CB
65						L	HW	H	V-C	NK	1	S1, Pe			P	CB
66	Greek 0583	11	Y	N	2	L	HW	V	V-C	NK	1	A, P		T	P	CB
67						R	HW	V	V-C	NK	1	S	NK		P	CB
68	Greek 0595	11	N	N	1	R	NK	V	V-S	EB1	1	S1	Th		F	AB
69	Greek 0606	11	Y	Y	1	L	HW	V	V-S	B2	1	S1	Th		F	CB
70	Greek 0610	11	N	Y	1	R	HW	H	V-C	NK	1	S2, A			F	CB
71	Greek 0755	10	Y	N	1	R	HW	V	V-F	NK	1	A			F	CB
72	Greek 0760	11	N	N	1	L	SW	V	V-S	B2	1	S1	Th		F	NK
73	Greek 0768	16	Y	Y	1	R	SW	V	V-F	NK	1	S1	Th		F	CB
74	Greek 0777	11	N	N	1	L	HW	V	V-C	N/B	2	S1	Th		F	CB
75	Greek 0786	14	Y	N	1	R	SW	V	V-S	NK	1	S1,Pe,A	Th		F	CB
76	Greek 0790	11	N	N	1	R	HW	V	V-C	NK	1	S2	Th		F	CB
77	Greek 0804	15	Y	Y	1	L	SW	V	V-C	NK	1	S1, P	Th	Pap	F	CB
78	Greek 0821	13	N	Y	1	L	HW	V	V-C	NK	1	S2	Th		F	CB
79	Greek 0831	14	N	Y	1	R	HW	V	V-S	B2	1	S1	Th		F	CB
80	Greek 0834	14	N	Y	1	R	HW	V	V-S	B2	1	S	Th		EO	CB
81	Greek 0865	12	N	Y	1	R	SW	V	V-S	B1	1	S1	Th		F	CB
82	Greek 0868	14	N	Y	1	L	HW	V	V-C	NK	1	P		MT	F	AB
83	Greek 0919	14	N	Y	1	R	HW	V	V-C	NK	1	S1	Th		F	CB
84	Greek 0939	15	Y	Y	1	R	HW	V	V-C	NK	1	P		T	F	CB
85	Greek 0990	14	N	N	2	L	HW	V	V-S	NK	1	S2, A	Th		F	CB
86						R	HW	V	V-C	NK	1	S2, A	Th		F	CB
87	Greek 1042	14	N	Y	1	R	SW	V	V-F	NK	1	S1	Th		F	CB
88	Greek 1104	14	Y	Y	1	L	NK	V	V-C	NK	1	S1	Th		F	CB
89	Greek 1123	17	Y	N	2	L	HW	V	V-F	NK	1	S2	Th		F	CB
90						R	HW	V	V-C,F	NK	2	S2	Th		F	CB
91	Greek 1151	16	Y	Y	1	R	HW	V	V-C	NK	1	P		Pch	F	CB
92	Greek 1220	12	Y	Y	2	R	SW	V	V-S	NK	1	S1	Th		EO	CB
93						L	SW	V	V-S	NK	1	S1	Th		P	CB
94	Greek 1224	14	Y	Y	1	L	HW	V	V-C	NK	1	S1, P	Th	Pap	F	CB
95	Greek 1225	14	N	Y	2	R	SW	V	V-C	NK	1	S1, A			F	CB
96						L	SW	V	V-S	NK	1	A			F	CB
97	Greek 1235	18	Y	N	1	L	HW	V	V-C	NK	1	Pl		Fe	EO	AB
98	Greek 1241	11	N	Y	1	R	HW	V	V-C	NK	1	S2	Th		F	CB
99	Greek 1243	11	N	N	1	R	HW	V	V-S	NK	1	S2, P		T	F	CB
100	Greek 1275	14	N	Y	1	R	HW	V	V-S	NK	1	S, P	Th	T	F	CB
101	Greek 1333	14	Y	Y	1	L	HW	V	V-C	NK	1	S1, P	Th	NK	F	CB
102	Greek 1453	14	Y	Y	2	L	SW	V	V-C	NK	1	S	Pch		F	AB
103						R	SW	V	V-C	NK	1	P		Pap	F	AB
104	Greek 2087	17	Y	N	1	L	HW	V	V-F	NK	1	Pl		Fe	EO	AB
105	Greek 2097	18	Y	N	2	R	SW	H	V-C	NK	1	A, P		Pap	F	CB
106						L	SW	H	V-C	NK	1	A			F	CB
107	Greek 2128	14	N	Y	2	R	SW	V	V-F	NK	1	S1	Th		F	CB
108						L	SW	V	V-F	NK	1	S1	Th		F	CB
109	Greek 2203	NK	N	Y	2	L	SW	V	V-C	NK	1	S2, P	Th	Pap	F	CB
110						R	SW	V	V-C	NK	1	S1, P	Th	Pap	F	CB
111	Syriac 0003a	7	N	Y	2	R	HW	V	V-C	NK	1	S2, P	Th	Pap	F	CB
112						L	HW	V	V-C	NK	2	S2, P	Th	Pap	F	CB

Appendix data for bookboards studied *cont'd*

Manuscript information					Board information						Repair information					
113	Syriac 0012	7	N	Y	1	L	HW	V	V-C, H-T	N/B, NK	2	S1	Th		F	CB
114	Syriac 0016	7	Y	N	1	R	HW	V	V-C	NK	1	S1, P	Th	Pap	F	CB
115	Syriac 0032	11	N	N	1	L	SW	V	V-C, F	NK	1	S1	Le		F	CB
116	Syriac 0083	13	Y	Y	1	L	HW	V	V-C	NK	1	P		T	F	CB
117	Syriac 0090	13	N	N	1	L	SW	V	V-S	NK	1	P		T	P	CB
118	Syriac 0103	13	N	Y	1	L	HW	V	V-S	N/B, EB2	2	A, P		T	F, P	CB
119	Syriac 0112	13	N	Y	1	L	HW	V	V-S	B2, EB2	1	S1	Th		F	CB
120	Syriac 0115	13	N	N	1	L	SW	V	V-F	NK	1	S2	Th, W		F	AB
121	Syriac 0118	13	N	Y	1	R	HW	V	V-S	B2	1	S1	Th		F	CB
122	Syriac 0139	13	Y	Y	2	L	HW	V	V-S	NK	1	P		Pap	F	CB
123						R	HW	V	V-S	B2	1	S1	Th		F	CB
124	Syriac 0264	13	N	Y	1	L	NK	H	V-C	St	1	S2	Th		F	CB

KEY

Y/N	Yes/No	Damage type	Repair type
NK	Not known	B1 Board attachment (current binding)	A Adhesive
L/R	Left/Right	B2 Board attachment (previous binding)	P Patch
H/V	Horizontal/Vertical	EB1 Endband attachment (current binding)	Pe Pegged
HW/SW	Hardwood/Softwood	EB2 Endband attachment (previous binding)	Pl Plate
		N/B Nail or boss	S Sewn (unknown direction)
Repair location		St Strap anchorage	S1 Sewn (one direction)
H-H	Horizontal head	Repair material	S2 Sewn (two directions)
H-C	Horizontal centre	Fe Iron	Tr Treenail
H-T	Horizontal tail	Le Leather	Time of repair
V-S	Vertical spine	MT Masking tape	AB After current binding
V-C	Vertical centre	Pap Paper	CB Current binding
V-F	Vertical foredge	Pch Parchment	
		T Textile	
Repair extent		Th Thread	
EO	Ends only	W Wire	
F	Full		
P	Partial		

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Notes

- For recent overviews of the monastery and library with detailed bibliographies see Manafis 1990; Brock 1996; Nelson and Collins 2006. For catalogues of the manuscript collection see Gardthausen 1886; Kamil 1970; Weitzmann and Galavaris 1990.
- For an overview of Greek-style bookbinding with bibliographies of the earlier literature, see Federici and Houlis 1988; Szirmai 1999: 62–92; Boudalis 2005, 2007a. For bookbinding terminology, see Ligatus Research Unit 2008.
- See Pickwoad 2004 for details of the survey.
- For accounts of the repair and rebinding of Byzantine manu-

scripts with bibliographies of the earlier literature see Boudalis 2005, 2007b.

- For the methodology see Velios and Honey 2009.
- For definitions of these terms see Pickwoad 2005.
- See Ligatus Research Unit 2008 for definitions.
- See Pickwoad 2005: 51 for the methods used.

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