

Measurements of Identical Books in the Legal Deposit Libraries

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Introduction

The process of identifying the Identical Books and the gathering of the measurements is described in my previous paper in these proceedings. Most of the IB collection at The British Library is shown in figure 1. The term “Identical Book” includes a number of collection categories that are not books, such as maps, musical scores, and pamphlets. A photomontage of one set of identical books, figure 2, illustrates the difficulty in ensuring “identicalness”. These books were never seen together, so differences in issue, binding or post acquisition changes could easily be missed.



Figure 1. The majority of the collection of IBs at The British Library, omitting the maps and larger atlases. Similar collections were brought together at all the legal deposit libraries.



Figure 2. Photomontage of all the copies of IB211 , Whitaker's Almanac (1903). The only method of comparison between the different libraries' copies was by juxtaposing their photographs or instrumental values

In February 2007, two nominated conservators from each institution were trained at a workshop in the purpose and methodologies of the various measurements, by Dr Jana Kolar, Dr Matija Strlič and myself. The overall measurement process was managed by Giordana Santoro of the National Library of Scotland (see her paper in these proceedings) working with conservators at the libraries, who carried out the measurements. A measurement kit was transferred between the libraries from May 2007 to January 2008, with additional measurements in early 2009. Having gathered together the set of IBs at NLS, she prepared, and modified as necessary, over 380 templates, figure 3, used to locate the measurement points and samples on each page.

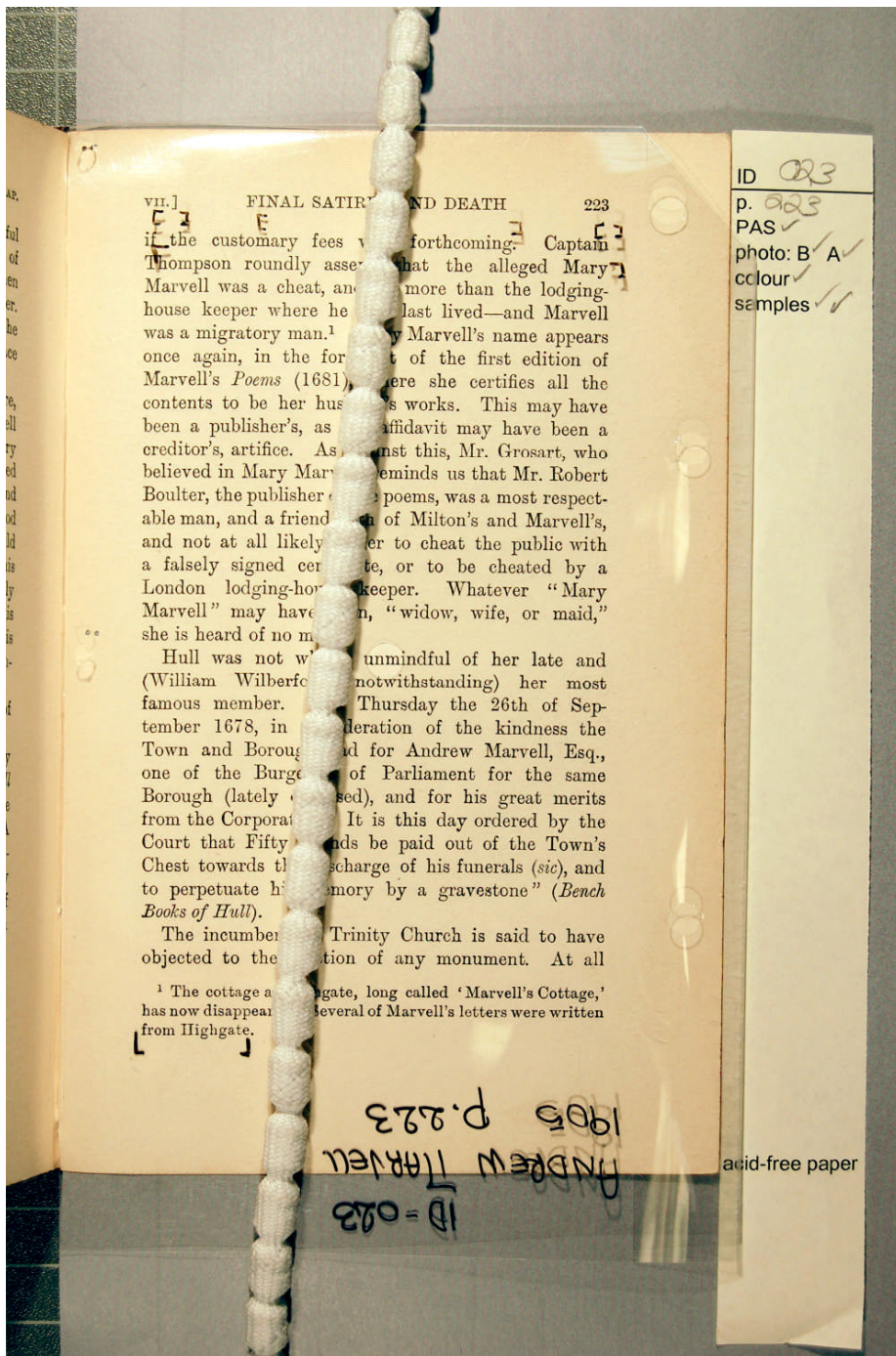


Figure 3. Melinex template over p.233 of BL023, showing the text alignment marks at the top and bottom of the page. This book had been trimmed and rebound, so the template (prepared with a book in another library) did not fit this page. The colour measuring points are the holes on the top right and centre of the sheet. The sampling positions are holes along the gutter at the top and middle.

Conservators were trained to carry out micro-pH measurements in their libraries. Unfortunately, the equipment and technique proved too delicate for multi-user application, so the measurements were carried out in a single laboratory.

As the British Library's contribution to testing in the SurveNIR project¹, the IBs at the BL and NLW were measured by the SurveNIR tool in April-May 2008.

Methods used

Preservation Assessment Survey

The National Preservation Office Preservation Assessment Survey² is widely used in the UK for informing judgements about the state of a library collection and recommendations for improvements. The PAS guidelines for the assessment of an individual item, were followed. Each item was visually assessed over 8 aspects (physical, chemical, biological damage and damaging repairs, separately for the binding and the body of the item) using a set of criteria, grading damage from 0 (minimal) to 2 (severe). Subsequent analysis has focused on chemical damage to the text block.

Colour measurements

Measurements were made at two locations on one page, using a Konica CM-2600d reflection spectrophotometer, controlled by SpectraMagic software on a laptop computer, figure 4.

Colour measurements were taken close to the external top right corner (designated e.g. BL023-T) and at a position in the middle of the page (e.g. BL023-M) with no printing on either side of the leaf. A backing sheet of paper was used to reduce the effect of underlying leaves. Each measurement was the average of three small area replicate measurements (3mm diameter) at each position by raising and replacing the Konica over the hole in the template. The software recorded the measurement reference, date and time, reflection measurements 360-740nm, CIELAB (D65, 10° observer), hue, chroma, lightness values for both Specular Component Included (SCI) and Excluded (SCE) modes in Konica format in one file for each library. These full data sets are archived. Subsequent analysis has focused on SCE b* measurements.

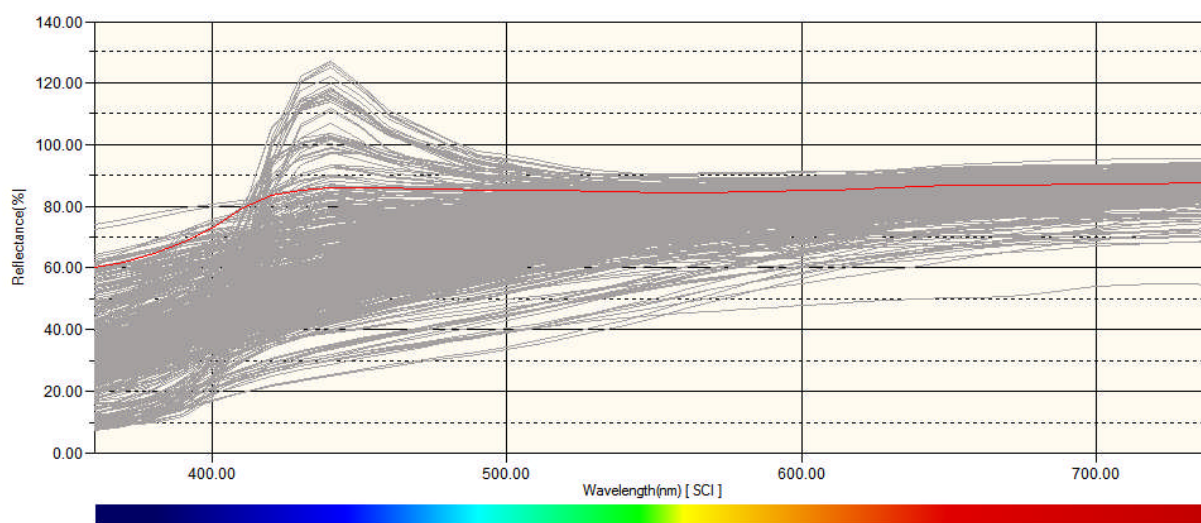


Figure 4. Combined reflectance spectra of the BL IBs, taken from the middle of the page. Data from one item, BL456M: Ordnance Survey Landranger series 2004, has been highlighted. Although all nominally “white”, many of the (older) papers show severe yellowness (absorption in the blue region). Some of the (modern) papers also

show enhanced reflection in the blue region, due to the presence of fluorescent, “brightening” chemicals.

SurveNIR measurements

The SurveNIR tool was trialled at the NLW and BL on the IB collections. Infra-red spectra were taken from two positions on the identified page, as near as possible to the colour measurement positions. Each measurement was the result of 5-7 replicates, which were assessed for suitability for inclusion in the data analysis by later filtering. The usual reason for rejection of a replicate was the presence of ink in the stack of paper (up to 7 sheets deep) from which the near infra red radiation is reflected. Where possible, the spectra were taken by laying the volume on the measuring head in order to ensure that a stack of paper sheets could be measured. However where there was ink on underlying pages or where the item was made up of insufficient sheets (e.g. a map), the measurement was made in single sheet mode using a calibrated reflector as a backing sheet. A single spectrum sampled a 2mm diameter spot. The top right positions were taken 5mm below the top edge (using a guide), while the ones in the middle of the page were positioned by eye and a quick evaluation of the reflection spectrum.

The spectra for IBs in NLW were taken by Dirk Lichtblau (ZFB) and those in the BL by Tanja Trafela (University of Ljubljana), with considerable local assistance, during the weeks 22nd April to 1st May 2008.

Post processing of the data demonstrated that there were 345 items in common, and that half the spectra taken from the middle of the pages were not useable, leaving 293 items with useful data. This analysis has led to improvement to the tool and technique. Papers of two of the IBs, 216 (*Whitaker's Almanack* 1955) and 299 (*Snoopy Parade*, C M Schultz, 1983), were shown to have significantly different amounts of lignin, so are unlikely to be identical.

Results

Comparisons between the measurements from the various libraries are incomplete and will be further developed. The comparisons of colour measurements are made here.

Colour

Figure 4 demonstrates the range of measurements obtained from the BL IBs. Measurements from the other libraries show a similar distribution. There is considerable scatter of yellowness as a function of age, figure 5. However, figure 6 shows a consistent difference between the edge and middle of the pages at the BL. Figure 7 demonstrates that there are small but significant differences in colour between the books held in the different libraries.

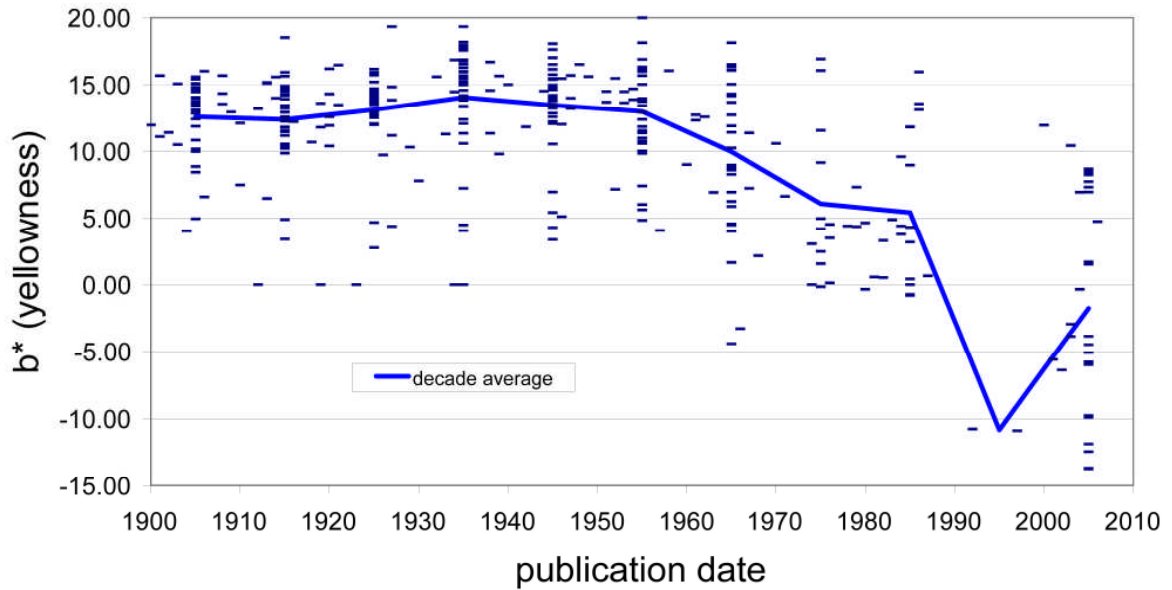


Figure 5 The yellowness of BL IBs, measurements at the middle of page, BL-M. There is considerable scatter across the sample chosen. More modern books are less yellow, even after the paper containing fluorescent additives are discounted. The average for the 1990s is probably distorted because of the few (2) books in the sample. It appears that paper is increasingly yellow as it gets older, then the trend plateaus after 50 years. This may be the result of ageing, or that yellower paper was made in the past, or both.

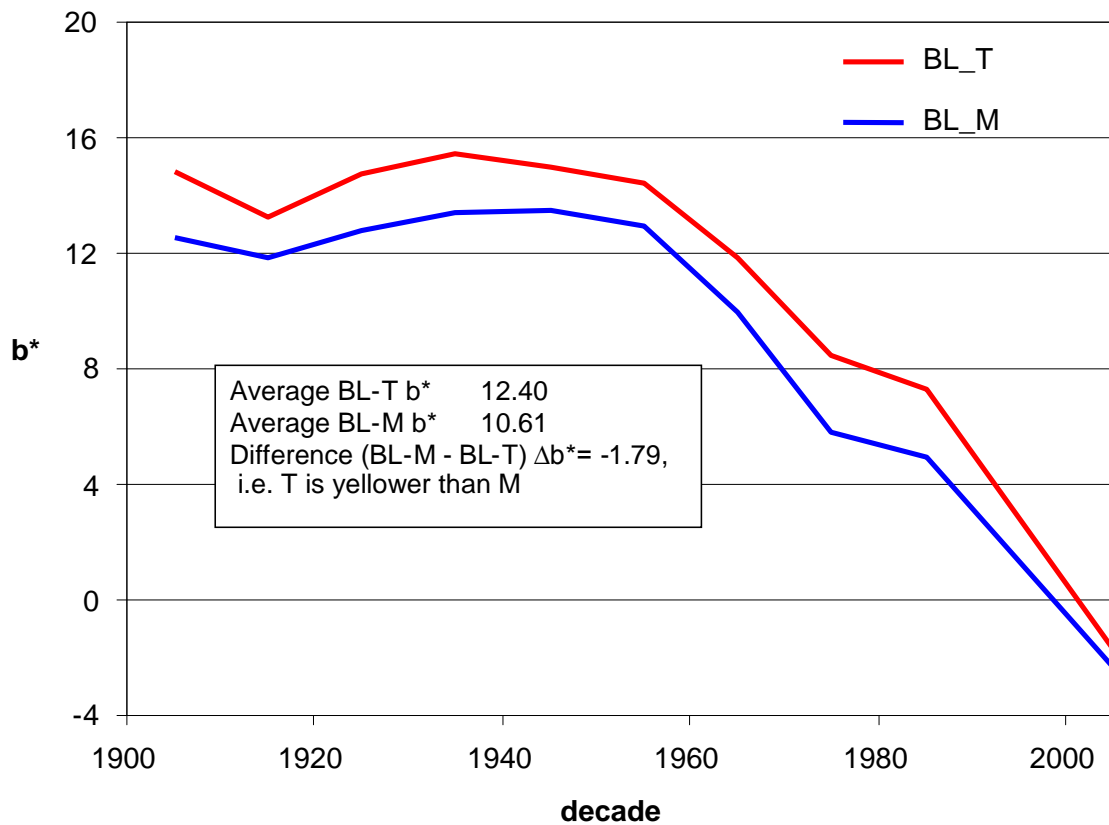


Figure 6. Difference in yellowness between the top edge and middle of the IBs. On average, the top right corners of the BL IBs are yellower than the middle of the pages. The difference appears to become established and constant after a couple of decades.

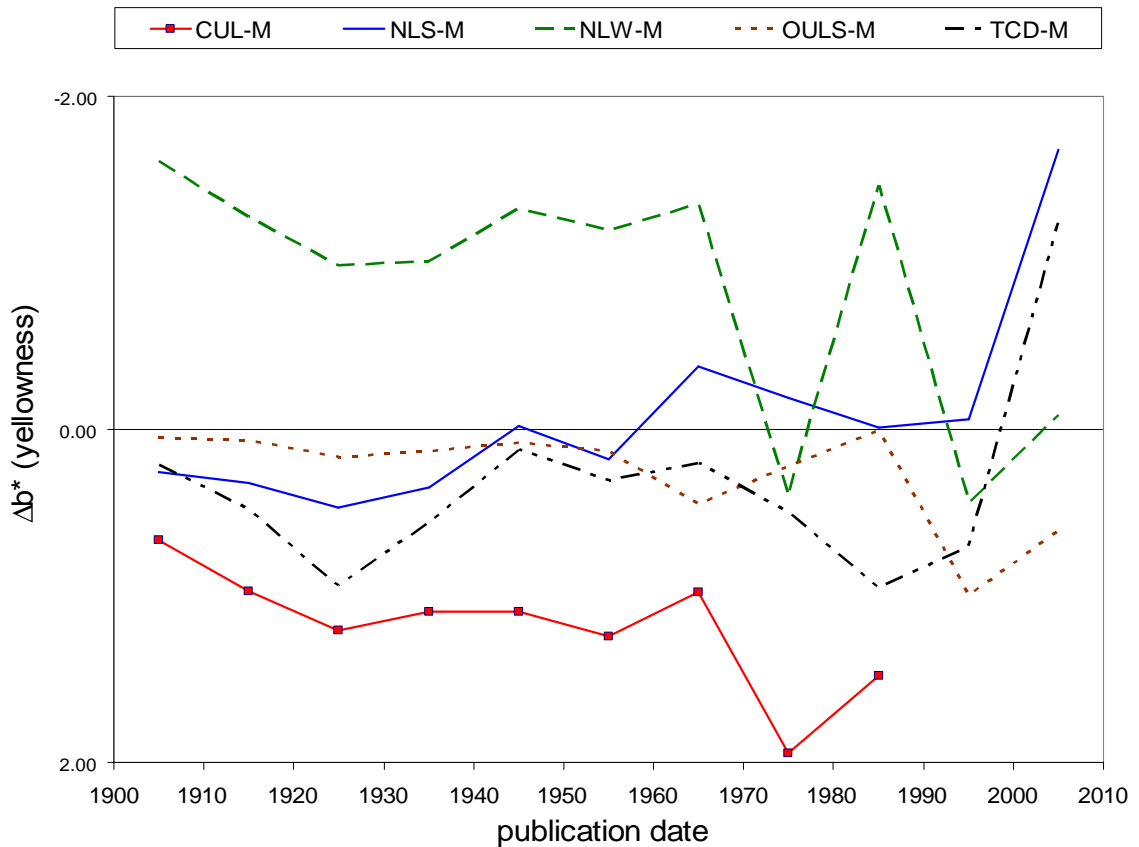


Figure 7 Comparison of yellowness between the IBs in the LDLs. The yellowness of the IBs, middle measurements, were averaged by decade, then subtracted from the BL values. Books which are yellower than the BL (e.g. NLW) are at the top of the chart.

Δb*between	BL-M - LDL-M	BL-T - LDL-T
CUL	0.722	1.228
NLS	0.102 <i>(not statistically significant)</i>	0.465
NLW	-0.952	-0.167 <i>(ns)</i>
OULS	0.162	0.457
TCD	0.400	0.626

Conclusions

The “distributed national collection” held in the UK legal deposit libraries provides considerable redundancy, enabling copies to survive that were elsewhere not collected or destroyed. Distribution of responsibilities has led to a variety of curatorial practices. For instance, the British Library, having the greatest usage rate and therefore wear and tear, appears to have bound and rebound items, backed maps etc far more frequently than the other LDLs.

Considerable difficulties in first choosing then sampling the items were created by the emerging differences between nominally identical items. These difficulties were well managed, but could not be eliminated, by the conservators in the libraries. It was not possible to bring the IBs from the LDLs together. Lack of direct comparison between the IBs led to variation in the details of sampling so reducing the power of the comparison. A close visual comparison is inadequate for identifying “identical” books, with differences in paper types revealed by the SurveNIR tool. Choosing IBs for comparison is likely to be a separate, major, research strand in any similar project.

Developing a cadre of conservators to undertake, and carry forward, this research has been rewarding. Ensuring that they formed a coherent team that communicated without restraint internally and with the external experts was essential. Bringing the group together for joint training sessions helped in this as did enabling them to travel, to each others’ libraries and to research laboratories. Turnover of library staff has reduced the reinforcement of the learning and transmission of lessons to other staff in the institutions. This was helped, but not eliminated, by including two conservators from each institution.

The project tried to introduce state of the art measurement techniques into the libraries’ work. For colour measurement, this worked well because it was adapting a well developed method and technology from other established fields. However, the use of micro samples and micro pH sensor required considerably more training and experience than was anticipated or could be provided in the project. This aspect therefore had to be outsourced to experienced researchers. The limited application of the new tool, SurveNIR, demonstrated the advantages of a rapid, non-destructive, evaluation of paper.

It is likely that the differences in colour are due to conditions of storage and use in the various LDLs, but making connections between the effects on the books and the potential causes is impossible in the current state of knowledge. Standards of librarianship and thus collection care, environmental control etc have been fairly uniform across the LDLs for much of the 20th century. Differences in storage and usage conditions will therefore have been small, resulting in marginal differences in the current state of collections.

These IB collections are now some of the best characterised books in collections. They are therefore a valuable resource for future researchers and measurements following the changes in the future. Their value will be increased considerably as their conditions and usage are also recorded.

¹ <http://www.science4heritage.org/survenir/>
² {Walker, 2006 #104}