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# The reproduction of Leonard Jenyns *Entomologia Cantabrigiensis*: An insight into the preservation issues of bound books

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## Abstract

Natural science museums often contain book and paper material that is inherently important to their collections. Although these materials can be as vital to the museums' narrative as the specimens themselves, natural science conservators are not necessarily familiar with this aspect of the collection and its conservation needs. During the recent redevelopment of the University of Cambridge Museum of Zoology, a project was undertaken to produce a facsimile of Leonard Jenyns' *Entomologia Cantabrigiensis*, Part One in order that it could be put on long term display. The notebook includes observations made by Jenyns regarding the Lepidoptera of Cambridgeshire, and as well as providing context to specimens as part of the display, it remains a significant source in evaluating wildlife conservation efforts occurring in the area today. The process of replicating the notebook gave unique access to the exploration of traditional bookbinding methods and offered an opportunity to gain new skills transferrable to one's needs. By outlining the various stages, and by introducing some general preservation issues regarding bound books, it is hoped that greater insight will be given as to their nature and the problems museum professionals may encounter in caring for books as part of their collections.

**Keywords:** conservation, Leonard Jenyns, *Entomologia Cantabrigiensis*  
book binding, facsimile

## Introduction

As part of the ongoing redevelopment of the Museum of Zoology at Cambridge University, a dedicated part of the new displays will exhibit material collected by Leonard Jenyns, a 19<sup>th</sup> century naturalist with distinct connections to the museum. This offered the opportunity to display a rare body of work, the contents of which continue to influence wildlife conservation efforts today. However, due to conservation concerns, it was not deemed appropriate to put the original journal on long term display. Guidelines regarding library

and archival material state that if highly sensitive material has a preservation target of 100 years, a limited display of 25 days per year at 50 lux should be aimed for (BS4971, 2017). It is also suggested that books displayed open have the pages changed as often as required to limit exposure to light and to limit strain on the binding structure in any one area. Both points severely restricted the scope of the new display and a viable solution was to exhibit a facsimile in place of the original notebook (NPO, 2000).



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### Leonard Jenyns and the significance of his work

Leonard Jenyns was one of two men offered the position of naturalist on board H.M.S. *Beagle*, before declining and suggesting a young Charles Darwin as a replacement. After declining this offer, Jenyns lived in Cambridgeshire for much of his life, collecting and observing wildlife in the local area. His work forms a rare, long-term list of species living in the area nearly 200 years ago and much of the material he collected is now stored or on display at the museum where it provides a glimpse of Cambridgeshire's recent past (Preece, 2012).

In 1868 Jenyns sent three handwritten notebooks to what is now the Museum of Zoology (Figure 1). These form what is known as *Entomologia Cantabrigiensis* and contain notes on all the insect and arthropod species he observed. Jenyns also recorded details on the timings of natural phenomena, such as the emergence dates of insects and flowers as well as a range of basic meteorological measurements which when taken together produce a valuable dataset to measure the effects of local climate change over time (Preece, 2012).

The significance of the journal extends well beyond the fabric of the museum and the examination of such records is one of the few ways we can view wildlife of the past and assess long term trends.

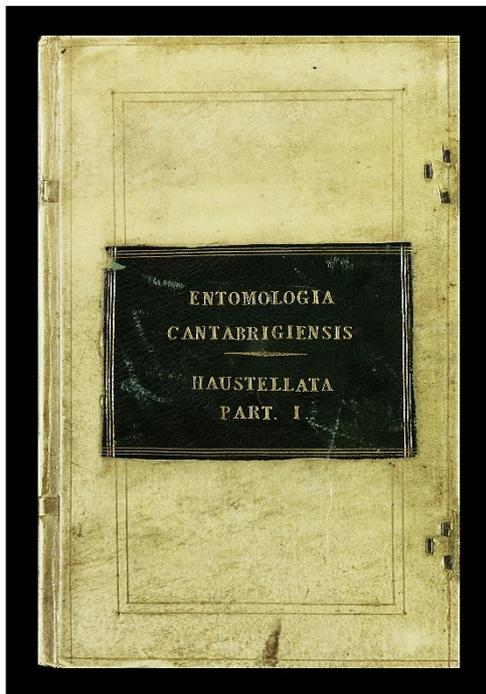


Figure 1. Rev. Leonard Jenyns' handwritten notebook, *Entomologia Cantabrigiensis*, Part I. © University of Cambridge.

Examples taken from *Entomologia Cantabrigiensis* highlight how the preservation of historic records can help shape the future of certain species and their habitats. Jenyns' notebook entry for the Swallowtail Butterfly *Papilio machaon* Linnaeus, 1758, for example, reads that between 1820 – 1849 it was 'Found in the greatest plenty, thro'out the Fens between Ely & Cambridge'. In 2018 the species is locally extinct: most of their wetland habitats have been drained for agriculture. From the same period, Jenyns' notebook entry reads that the Large Copper Butterfly *Lycaena dispar* Haworth, 1803, was 'Not uncommon in Cambridgeshire'. In 2018 it is nationally extinct. It became extinct in the mid-1800s due to fenland drainage and could no longer survive without a large wetland habitat (Brian Eversham, 2018 pers. comm, 13<sup>th</sup> Oct). By comparing the records from these two time periods, we see that populations of some species have declined, others have increased, and some have remained much the same. What the Swallowtail and Large Copper Butterflies have in common is that they both live in wet fenland habitats. Using such information ensures that population decline can be better understood, furthering efforts to reverse specific trends.

As indicated by Jenyns records, the loss of the fens has been a large driver of species decline in the local area. It is clear, therefore, that re-expanding this habitat could help bring them back, something the Great Fen Project and Wicken Fen Vision are targeting by rewetting the landscape of Cambridgeshire.

The Museum is supplying these organisations with historical specimen data to provide them with a benchmark of a past 'natural' state. With time, Swallowtails may be able to recolonise these areas and if enough fenland can be reclaimed, it may even be possible to reintroduce the Large Copper Butterfly from populations abroad.

### The original notebook

Jenyns' notebook is a case bound book on vellum with metal clasps (Figure 2). The text block, the pages which make up the book, has been constructed separately and then attached to a case which gives it protection. This is a common book type; most hard cover books we own at home have a similar construction. Pages of text were folded and collated into seventeen sections. These were sewn together incorporating what is termed a sewing support, in this case two vellum thongs sewn onto the spine and laced to the cover boards, helping to maintain its shape and provide attachment to the case. Decorative marbled

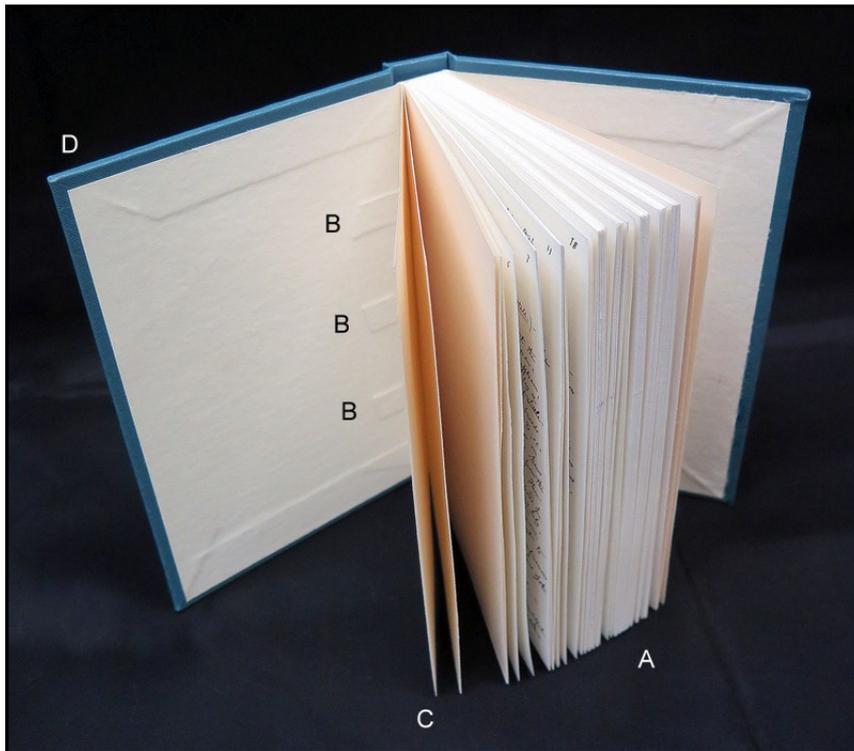


Figure 2. Example of a case bound book. (A) Multiple sections of folded paper. (B) Sewing supports. (C) Endpapers, the outermost of which is adhered to the case. (D) Case of the book which is made separately to the book block. © University of Cambridge.

endpapers were used. These are a collection of leaves at both the beginning and the end of a text block which are separate from a printed or written text. The spine was lined with layers of thick paper or card for strength and flexibility. Decorative marbled endpapers sewn into the text block as the first and last sections were then adhered to a case made of solid pieces of board and a flexible incised vellum covering material.

The notebook is in good condition. The vellum cover is lightly soiled and has warped slightly owing to its susceptibility to changes in humidity, but it does not affect the opening of the book. The stiff spine is likely due to the use of animal glue as part of the spine lining. Care must be taken not to open the pages too far as this could cause the lining to crack. Two copper alloy clasps had been attached to the covers to help keep the book closed and protect against the penetration of dust and light, the lower clasp, however, is no longer present.

#### **Aims and considerations in producing the facsimile**

The primary consideration for the facsimile was that the reproduction must act as a surrogate for display and for any outreach activities. This meant that it had to have the same construction and aesthetic as the original to ensure that it could be perceived as a journal used day to day in the field. Printed excerpts from the book, although effective in conveying information, would give no indication of the deliberateness of Jenyns in compiling the

body of work that is *Entomologia Cantabrigiensis*. The facsimile had to be durable to facilitate handling and be constructed from materials that would be relatively resistant to environmental conditions whilst on display. It was hoped to remain as close to the aesthetics, materials and binding structure of the original as possible.

As a display item, the facsimile should hold the same gravitas as the original and should use the same format. If, in the unfortunate situation that the original and all information relating to it were lost, a surrogate would provide a record of its materials and composition, as well as its contents. As time was a factor in preparing for the museum's opening, the project had to be completed within a certain timeframe and with the materials and equipment readily accessible for conservation.

#### **Binding process**

The original notebook was scanned and printed externally by Cambridge Print Solutions. This step may perhaps have warranted more thought with respect to the quality and long-term performance of the paper and ink. The author was not involved in the project at this stage and as the composition of the paper or ink was not known, it would be difficult to judge how the materials would react or last over time. However, considering some common faults with case bound books, the quality of construction from this point onwards would perhaps play a greater role in how well the facsimile is preserved. For example, the sections of

commercial case bound books today are frequently held together with adhesive rather than by being sewn. To keep costs as low as possible, inferior materials are often used and certain structural components ignored. This means the cover is not adequately attached to the text block, an area critical to it fulfilling its purpose as a protective enclosure (Milevski, 1992). A consideration of these points in its manufacture would ensure the facsimile would be fit for purpose for the foreseeable future.

Suitable endpapers were then selected. They can be quite important for a cased-in book where the endpaper is the only attachment of the book boards to the text block. They strengthen the book as a whole and give one final element of support to the joint of the case (Blaser, 1994). A rather thick and heavily weighted endpaper was selected. This would create a stronger attachment to the case. The endpapers do not resemble the marbled papers of the original and although this selection was contrary to the aim of maintaining the aesthetics of the original, it was the most viable considering time constraints and limited resources. Indeed, sections of the book which would be selected for display will include pages from within the book and not likely the end page areas.

### Sewing

Prior to sewing the sections together thought was given to the materials to be used for the sewing supports as well as their placement on the spine of the text block. As mentioned, sewing supports act as points of attachment between the spine of the text block and the book covers. They are the *hinged areas* (Figure 3), the joints where the covers open and close and must hold the book together while also allowing it to open freely (Middleton,

1994). Weakness in these areas can lead to the text block becoming loose in its cover and the two can ultimately detach (Milevski, 1992). It should not be assumed that all case bound books exhibit sewing supports. In such books the pastedowns at the front and back of the text block are adhered to the case and this serves as the only form of attachment. As such, the joint indicated in Figure 3 will be much weaker and as there is no support across the spine to hold it in shape, a phenomenon occurs whereby the spine becomes concave, pushing out the pages beyond the cover and leaving them exposed (Szirmai, 1999).

Linen tape was selected owing to its strength and flexibility, and three pieces of tape were placed equal distances apart (Figure 4). This would give enough support in proportion to the size of the book. A template was used to mark the sewing stations, the holes through which thread is passed to tie the sections together. One set of sewing stations was marked at both the head and tail of the book and three pairs of sewing stations along the spine which, after sewing, held the linen tapes in place. These markings were then pierced, and the sections sewn, the thread passing on the inside of a section, out over each tape, tied to another section that is placed on top of the previous and the process repeated in the opposite direction.

### Lining the spine

After the book was sewn the spine was lined in a laying press (Figure 5). It takes rather a lot of hand strength and accuracy to make sure the spine is nicely aligned between two pieces of board before placing in the press and tightening. Prior to lining, a satisfying step is to burnish the sections of paper with a Teflon bone folder so they lock together and give a flat compact spine. This also prevents

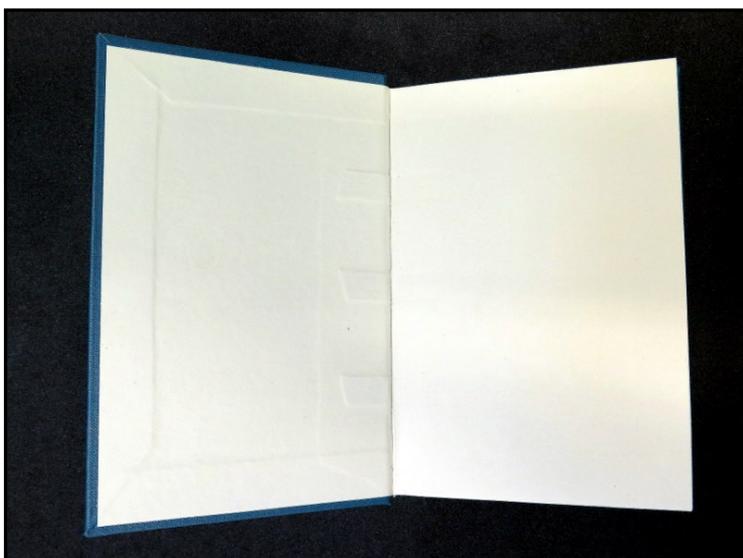


Figure 3. The sewing supports help from a joint, the centre crease, between the text block and case.  
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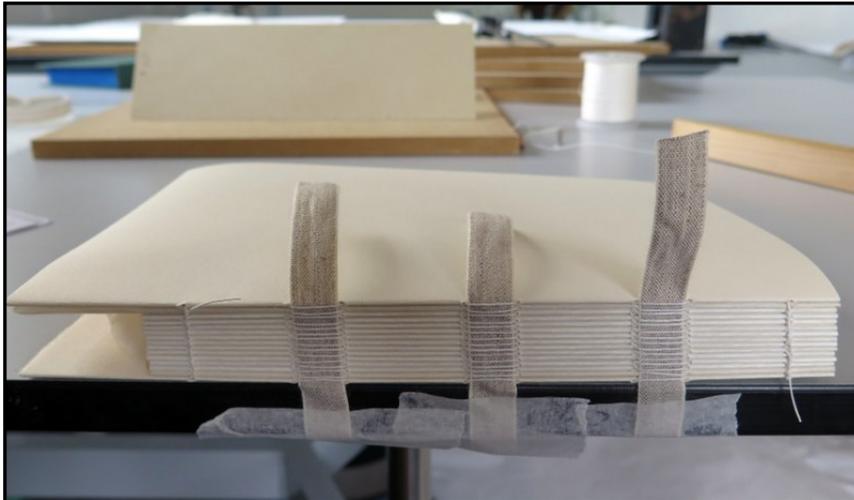


Figure 4. Sections sewn together over tapes. These support the sewing and help attach the text block to the case. © Samuel Suarez Ferreira.

any paste used to attach the spine lining getting into the pages and causing them to stick together. The spine was then covered with a layer of Japanese tissue using starch paste that was thick in consistency, almost gel like, again for ease of application and to prevent it from flowing between the pages. A layer of cambric, a lightweight, sized cotton cloth, was adhered on top of this with ethylene vinyl acetate (EVA), adding further support and flexibility to the spine. Finally, a piece of Manila paper was added using EVA to provide rigidity and structure.

### Casing-in

The final stage was to create the case cover for the book block which became the biggest visible diversion from the original. It would have been preferable to use vellum and include metal clasps to replicate the original materials and aesthetic of Jenyns' notebook, however, none were available and there was little time to source them. Moreover, vellum can be a tricky material to work with as when it comes into contact with an adhesive, it can

slip and stretch and can be difficult to manipulate for those with little experience of handling it. The material selected was an acrylic coated buckram. Buckram is a book cloth made from cotton, sometimes linen. It is a closely woven fabric that is filled or coated and pressed between rollers to give a smooth finish. In the past it was filled with starch or pyroxylin but is commonly coated today with acrylic (Roberts and Etherington, 2011). This makes the fabric very durable and water-resistant, factors which were ideal when considering the facsimile as an instrument for public outreach sessions. The only cloth available, however, was a blue/green colour. This was not preferable in trying to imitate the original as closely as possible. If more time had been available prior to the notebook being displayed, it would have been desirable to attempt using vellum and failing that, at least a book cloth more sympathetic in colour. Despite these visual limitations, the real motivation in producing the facsimile, was in making Jenyns' information more accessible through outreach and for public display. The book will always be open at a particular page and little emphasis would ever be placed on the decorative elements.

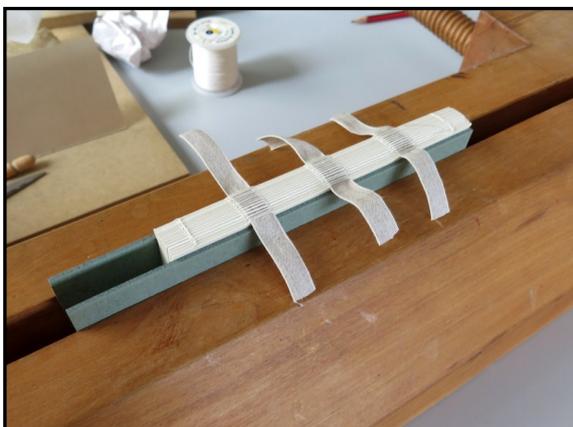


Figure 5. Lining the spine in a laying press. © Samuel Suarez Ferreira.

The choice of book board was also considered. Almost any rigid board can be used as a casing but its lifespan, like anything, is dependent upon the quality of the materials. Millboard is commonly used by bookbinders, so called because of its smooth surface produced by rolling or milling under pressure (Roberts and Etherington, 2011). Previously made from old rope and other fibrous materials, it is now composed of recycled paper or wood pulp. A defect which may become visible on books made from millboard is that the material can split due to excessive lamination when placed under pressure (Roberts and Etherington, 2011). It remains, however, more dependable than materials such as grey board, and is less prone to warping.

The boards that make up the front and back covers as well as a thinner piece of board for the spine were cut to a size slightly larger than the text block. This would ensure the pages are encased completely from external damage. A piece of book cloth was cut to size and the pieces of board adhered at predetermined distances apart using EVA. These distances are significant as they ensure that the spine of the text block is in accordance with the spine of the case and ensure the cover boards hinge easily around the text block so that the book closes flat (Milevski, 1992). The book cloth was turned over the edges of the boards and pasted down to leave a neat border. EVA was then brushed evenly over the front and back boards and the back of the text block pressed firmly on top of the back board. The front board was then folded around to meet the front of the text block and the book placed in a nipping press so that the adhesive could dry without warping the pages or boards. Finally, a scan of the original book label was affixed to the front cover using EVA to complete the facsimile (Figure 6).

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### Summary

As conservators, curators, or collections assistants, we are frequently faced with specimens and objects that we do not fully understand. Conservators often have material placed on their benches that they have limited experience of working with. In many cases they do not have the luxury of refusing intervention based on a lack of knowledge. Although books and works on paper are generally treated by specialists in those fields, the materials are likely represented in every collection. By possessing a working knowledge of how they behave, the conservator ensures that they are handled and cared for in a manner that extends their working life. Through this paper I hope to have made the reader a little more curious about the books present on a shelf. Why has a book been made in a specific way, how does it work, and what damage might occur if you use it in a way in which it was not intended? Every book on a shelf is subtly different from another and although there are some general guidelines for handling books, different types can benefit from specific measures to ensure they receive the best care.

### Acknowledgements

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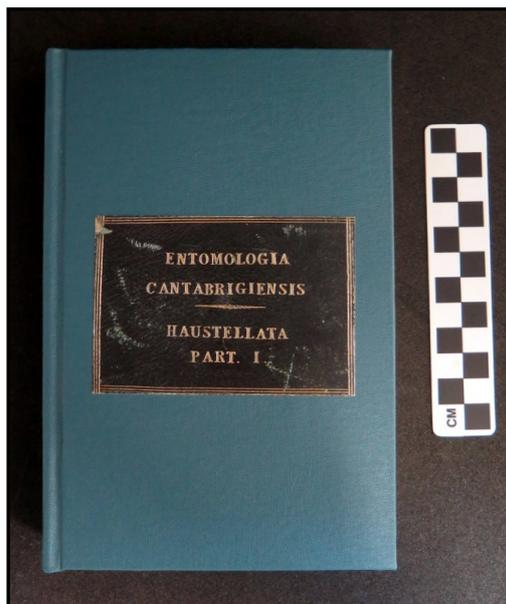


Figure 6. Front cover of the completed facsimile.  
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at Cambridge County Council, for proof reading the sections on bookbinding. A final thanks to my wife, Rebeca Suarez Ferreira, for reading and editing drafts of this paper.

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