

Far from ordinary – Conservation of pop-up techniques from 19th century children’s books

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ABSTRACT

With their pull-tabs and pop-outs, their wheel-charts and flaps, their pop-ups and pull-downs. Based on examples the special challenge of conserving these books will be explained. Not only the torn and deteriorated paper has to be treated, but also the connection between the parts of the mechanics, which can consist of metal, cloth or other materials. There can be missing or loose parts within the picture or the connecting mechanics. The parts have to be reconstructed to restore them to their original function. The treatment of animated books differs from the conservation of books with just flat pages as they are filled with 3D pictures. A great deal of creativity is required during the conservation process in order to achieve a satisfactory result. The State Library of Berlin houses one of the few large scientific special collections of children’s and young people’s literature. The collection puts one focus in collecting historical children’s books, as one of the most extensive and important of its kind in Europe. Particularly interesting are animated books from the end of the 19th century as a special category. Even in these early times of children’s books publishing, animated books contained a variety of very complex paper constructions. Among others, Lothar Meggendorfer is notable as one of the most famous artists and authors. Mechanical damages represent the greatest challenge for the conservators. These result from handling - not always very careful children’s hands – but also due to the poor quality of the material often used. As a consequence of the different damages, the construction may not work properly or not work at all. The correct functioning of the moving parts is essential to the readers understanding of the animated book. These books are far from ordinary.

KEYWORDS

Pop-up children’s books, Conservation, Meggendorfer

CITATION

Grotewohl, M., “Far from ordinary -Conservation of pop-up techniques from the 19th century children’s books”. JIB, 1 (April 2022): 36-46. DOI: <https://doi.org/10.57579/2022JIB004MG>

State Library of Berlin

As the largest academic library in Germany, the State Library Berlin is a central provider of national and international literature with the focus on humanities and social sciences.

More than 11 million volumes of printed and written material have been collected since the library was founded in 1661. The special collections comprise over 2.2 million additional objects of often unique materials – such as western and oriental manuscripts, music autographs, maps, newspaper, children's and youth literature and objects from Eastern Europe and East Asia.

As an archive library with the mission to collect and preserve national and world cultural heritage, the State Library also puts great importance on the protection and preservation of the library's holdings.

Like no other library in Germany, the State Library has had to overcome the consequences of the Second World War and the division of Germany and Berlin. The library was institutionally and physically separated for over 40 years, one building in the eastern part from 1914 on the boulevard Unter den Linden and one in the western part from 1978 at Potsdamer Platz. In January 1992, they were merged under the auspices of the Stiftung Preußischer Kulturbesitz. The State Library of Berlin is still located in both impressive buildings.

The children's and young people's book collection

The State Library houses one of the few large collections of children's and young people's literature for scholarly research. This collection consists of historical and contemporary literature written for young people from all over the globe. It also features children's magazines, original works of art for book illustration, pictorial broadsheets and posters.

One special focus of the collection is on historical children's books, as one of the most extensive and important of its kind in Europe. Particularly interesting are animated books from the end of the 19th century as a special category.

The artist Lothar Meggendorfer

Among others, Lothar Meggendorfer is notable as one of the most famous artists and authors for movable books in Germany in the late 19th century. He was born in 1847 in Munich and studied art to become a painter, drawer and illustrator. Some of the first three-dimensional and tab activated books for children were produced by Meggendorfer. He is credited for engineering and illustrating over 200 works, which made him successful not only in German speaking countries, but also partly in England and the US.

The incredible complex animations he created, are highly honored and make him a role model in this field until today. The "Movable Book Society" in the US for example awards the Meggendorfer prize to a paper engineer for the best commercial publication each year.



Fig. 1 || L. Meggendorfer, *Internationaler Circus*, Eßlingen: Schreiber, 1887

A typical example of a book, Meggendorfer had created, is the book *International Circus* from 1887, which shows a lively circus ring scene. If the book is opened and is viewed at eyelevel (where children`s heads usually are) one has the feeling of being in the circus ring. Meggendorfer loved details, so the reins for the horse are real ribbons.



Fig. 2 || L. Meggendorfer, *Im Stadtpark (In the City Park)*, München: Braun & Schneider, 1887

In the City Park is a tunnel book in the form of a leporello and another example of Meggendorfer`s creativity from the same time. Every page is a cut out silhouette. On the inside of the front and backboard are

explanations how the order of the pages can be changed – in a rectangle, behind each other, in a zigzag or like a spiral. In that way, it will create different scenes, views and possibilities to play with. (Fig. 3)

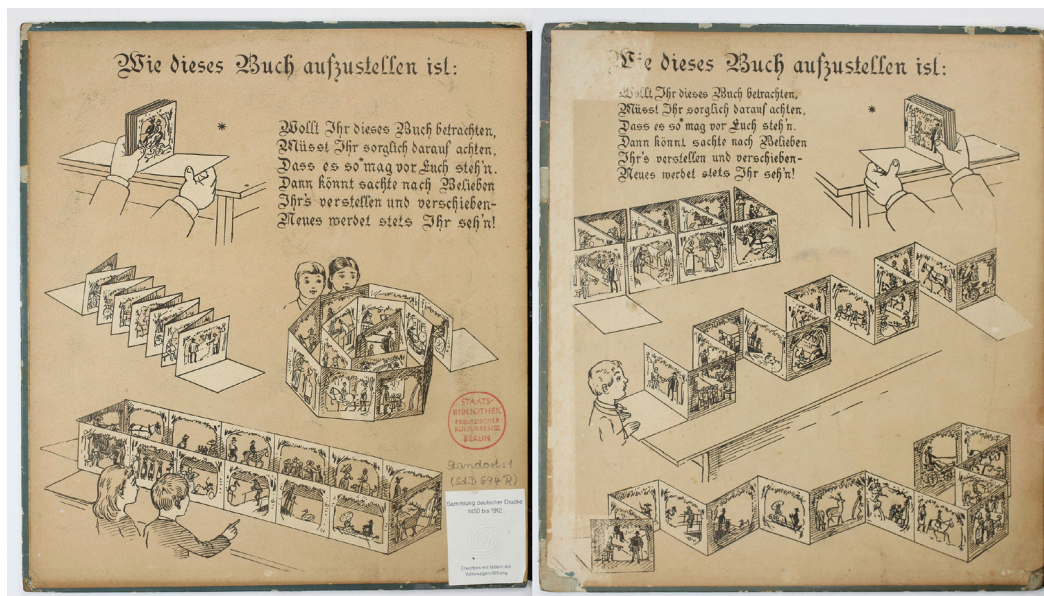


Fig. 3 | Explanations, how to order the pages
Lothar Meggendorfer, Im Stadtpark, München: Braun & Schneider, 1887

Techniques of movable books

The conservation of four different techniques of movable books will be explained, each one with their own typical damage and conservation challenges. The following examples are not only from the artist Meggendorfer, but also from other authors and illustrators of this time:

- complex pull-downs to move the picture
- wheel-charts (volvelle) and very damaged pages
- a book with the technique of flaps to open a scenery out of three layers
- a classic pop-up book

It is important to keep the moving parts as functional as possible to have the full experience of a movable book again, as the books are not only museum objects, but also for careful use in the library.

When treating a movable book, preferably, the original technique will be reconstructed and the original material will be attached, because it belongs to the history of the book. If original fragments cannot be used in the book again for different reasons (if it no longer serves the purpose or is quite damaged), it will be kept with the object. For every object, the technique, material, damage and treatment are documented. The documentation includes also pictures of the condition before, during and after treatment.

Pull-down technique

Within a pull-down book, the pictures are moved with the help of tabs. The mechanism is hidden behind the picture and a sheet of paper covers it on the back, mostly glued along the edges. The strips of the mechanism are connected to tiny little metal spirals.

Different kinds of damage can occur, which are typical for books with pull-down mechanisms:

1. There can be loose parts within the picture, torn or detached from the mechanism. (Fig. 4)

2. The end of the pull-down strips are often worn from use. As a result, they are often dirty, broken or creased. Some are so badly damaged that they can't be pulled any more. (Fig. 5)
3. Sometimes you can even look behind the scene. Either the lining of the back, where the mechanism is hidden, is damaged or the lining has to be opened to repair the mechanism. On the one hand, it is fantastic to see the performance of the complex engineering, on the other hand, it is a challenge to figure out how to repair the mechanism to let it move again. (Fig. 6)
4. The metal spirals that hold the paper layers together are often rusty, broken, bent or even lost. (Fig. 7)



Fig. 4 | Loose parts in the picture
Lothar Meggendorfer, *Nah und Fern*, München: Braun & Schneider, 1887

Fig. 5 | Pull-down tabs, dirty and worn
Lothar Meggendorfer, *Nah und Fern*, München: Braun & Schneider, 1887

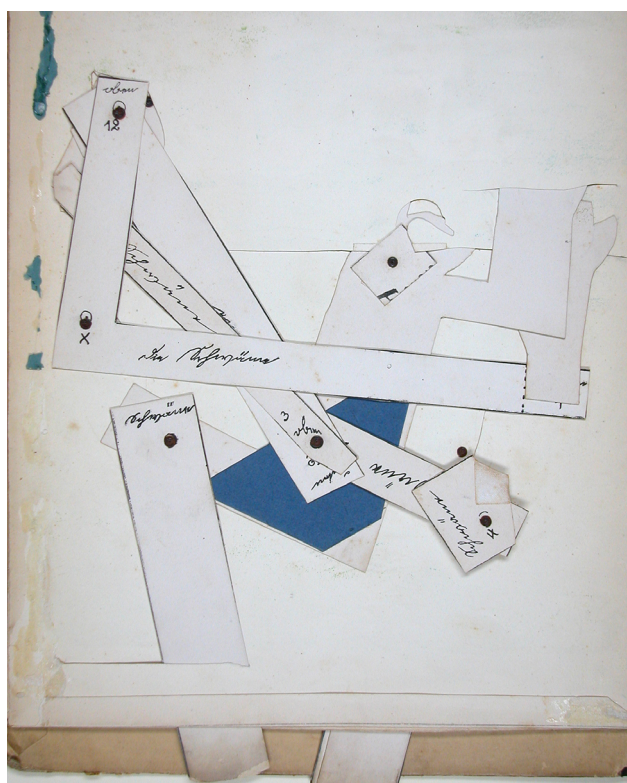


Fig. 6 | Complicated mechanism
Lothar Meggendorfer, *Nah und Fern*, München: Braun & Schneider, 1887

Fig. 7 | Rusty spirals
E. Haertel, *Thierbuch*, Berlin: Schulze, [1863]



Fig. 8 | Page with a pull-down mechanism
In E. Haertel and Dr. C. Wallen, *Thierbuch (Animal book)*, Berlin: Schulze, 1863.

The Animal Book by Meggendorfer from 1863 is an example, which illustrates the treatment of a pull-down book. It shows pictures of different animals and their habitat. Every recto page has a picture with a pull-down animation. Either the animals move or the people are feeding, patting or watching them. (Fig. 8). There are many missing parts in the picture (for example a part of an upper body, an arm or a head of an animal), also rusty and loose spirals and tears in the paper. Because of all, this kind of damage the animation was partially inoperable (Fig. 9).



Fig. 9 | Missing parts within the picture
E. Haertel, *Thierbuch*, Berlin: Schulze, 1863

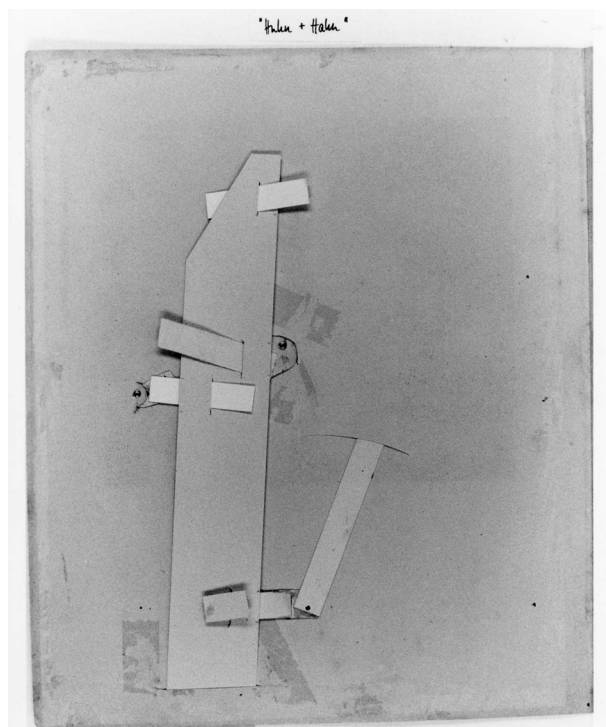


Fig. 10 | Inner mechanism
E. Haertel, *Thierbuch*, Berlin: Schulze, 1863

The mechanism behind the picture is covered with paper and glued at the edges. The paper was torn and acidic. Because of all this the animation was partly not working. The paper had to be detached to replace it and in order to repair the mechanism (Fig. 10).

The pull-down strips were damaged mostly at the ends and had been badly repaired in the past. To be able to use them again, the pull-down strips and other smaller parts had to be replaced with new layers of acid free cardboard or paper. One of the next challenges was repairing the metal spirals. The original spirals were rusty, deformed or even lost. A stainless, thin, solid wire usually used for electronics with a copper-nickel-alloy was chosen to replace the missing spirals. Furthermore, a little construction had to be created to help with the handling of the wire. The

constructions consisted of a little platform made of cardboard, where a needle was pierced through and protruded upward from the platform. With the help of that fixed needle, the forming of the little spiral was possible (Fig. 11) (Fig. 12).

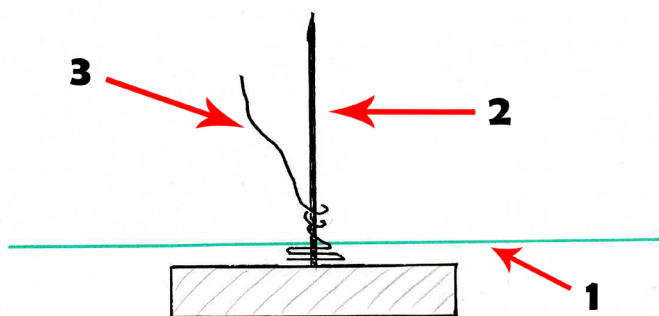


Fig. 11 || Construction aid to build the spirals: 1 Sheet of paper, 2 Needle, 3 New wire

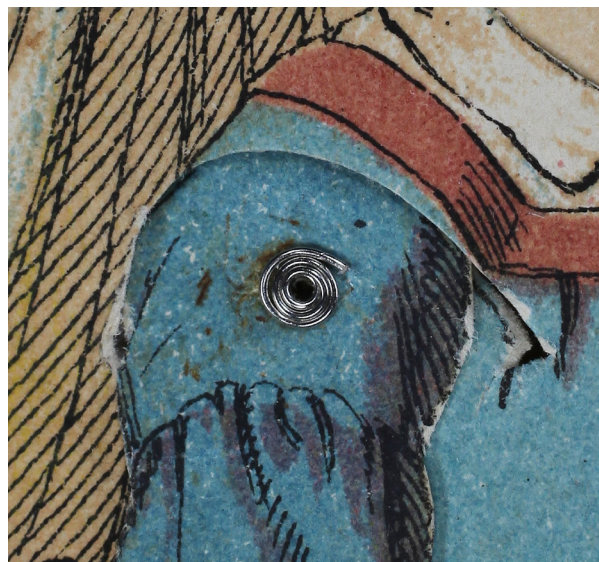


Fig. 12 || New spiral
 E. Haertel, *Thierbuch*, Berlin: Schulze, 1863

Many of the movable parts in the picture were completely missing and it was unknown what they had looked like. To avoid false reconstruction, only those parts were replaced, where fragments were still visible and the shape and the color could be determined. Therefore without any original trace, it was not possible to replace and reconstruct all the movable elements that were missing in the scenes.

Technique of a wheel chart/ volvelle

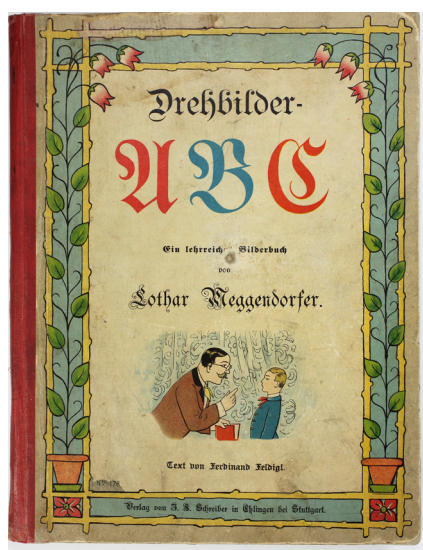


Fig. 13 || Lothar Meggendorfer, *Drehbilder-ABC*, Eßlingen: Schreiber, 1898

The book *Drehbilder ABC* (*Wheel Pictures of the ABC*) by Meggendorfer from 1898 is an example for a volvelle book, which was severely damaged (Fig. 13). On every page, a new letter of the alphabet is introduced. Behind little windows, which are cut out in every page, are different pictures of examples of words starting with that letter, moved by the wheel chart. The construction of a page in this wheel-chart book differs from others. Here the double leaf has the hinge at the front with another cutout for the wheel chart. Towards the spine of the book, one page of the double leaf is longer to staple the pages together. The wheel is attached with a metal spiral between the pages of the double leaf. (Fig. 14)

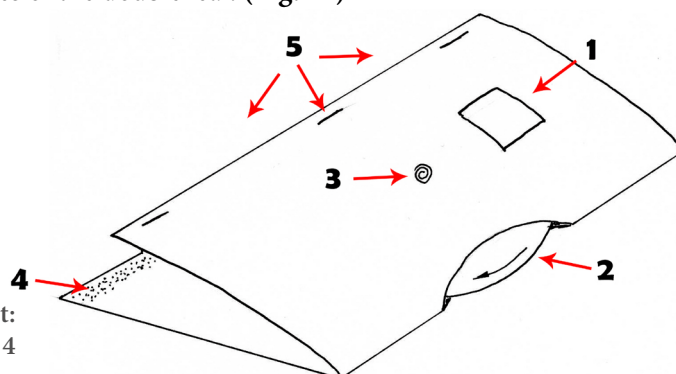


Fig. 14 || Construction of one section with a wheel-chart: 1 Window, 2 Wheel chart, 3 Metal spiral, 4 Adhesive area, 5 Staples
 Lothar Meggendorfer, *Drehbilder-ABC*, Eßlingen: Schreiber, 1898

The whole book was in bad condition. The structure of the book was totally disassembled, only loose pages were left. The paper was brittle and torn at every edge with a lot of missing areas. The metal spirals were deformed, rusty and mostly lost. Rusty staples in the hinge couldn't hold the pages together anymore. Handling was not possible without the risk of further damage or even further loss.

Every edge of the pages had to be mended with Japanese paper, which is a special thin paper with strong and long fibers. Wheat starch paste was used as an adhesive. The color of the Japanese paper was toned to match the original paper. All spirals had to be reconstructed with the method explained before. (Fig. 15)



Fig. 15 | Before and after treatment
Lothar Meggendorfer,
Drehbilder-ABC, Eßlingen:
Schreiber, 1898

The mechanism of a wheel-chart and flaps with three layers



Fig. 16 | Th. v. Pichler, *Singhalesen und Sudanesen*, Wien: Perles, 1888

The book *Singhalesen und Sudanesen* from Theodor von Pichler was published in 1888. The way of life of the Singhalese and Sudanese in former Ceylon is described. The text written from a colonial perspective is controversial and interesting from today's point of view (Fig. 16).

This book includes two different movable techniques. In the front board, a wheel chart is inserted. The picture on the wheel shows different indigenous people and perhaps a missionary or the author.

In the book, various scenes can be turned up on every recto page. The flaps consist of three layers behind each other. By opening the flaps with the help of a cloth strip and looking from the front, a view into a theater scenery is created (Fig. 17).

The damage inside the book affected the paper of the text block, which holds the layered 3D scene rather than the paper of the pop-up itself. The paper of the book was very acidic and discolored, therefore not very flexible anymore. The three layers are made of cardboard. This puts a certain weight on the paper and therefore an additional risk for further damage. As a result of natural aging of the acidic compounds the paper deteriorates, the acidity will cause the paper to become very brittle and it will probably break at the edges or will not be able to hold the scene. It was therefore necessary to neutralize the acidity in the paper. In preparation for the deacidification the base of the flaps were detached from the paper and the text block was disbound to make an aqueous treatment possible. After a wet deacidification the text block was re-sized and rebound. The layers of the flaps received a new base of acid free paper. The strips for pulling up the scene had to be reinforced with Japanese paper at the back.

The wheel chart mechanism in this case is placed in-between two boards glued together at the edges. The mechanism inside was damaged and could not be moved at all. The sharp corners of the metal clamp, that should move the wheel chart, cut through the lining inside, which was supposed to hold everything together (Fig. 18).



Fig. 17 | Flaps with 3 layers behind each other
Th. v. Pichler, *Singhalesen und Sudanesen*, Wien: Perles, 1888

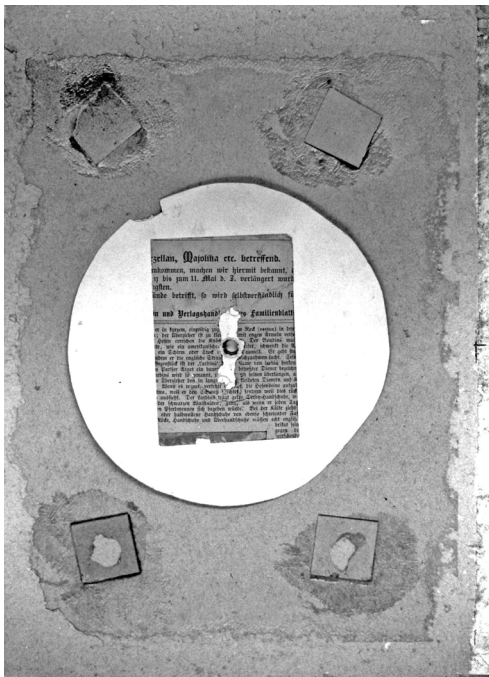


Fig. 18 | The inside of the front board with the wheel-chart mechanism
 Th. v. Pichler, *Singhalesen und Sudanesen*, Wien: Perles, 1888

Pop-up technique



Fig. 20 | *Glückliche Stunden (Happy hours)*, C. Lechler, Nürnberg: Stroefers Kunstverl., 1897

In some places, the boards were already detached. In order to repair the mechanism, the boards had to be opened mechanically. A new lining for the mechanism inside, made of strong cloth, had to be attached to make it work again. The new clamp, to move the wheel chart from outside, received a strip of leather around it allowing a smooth and safe handling.

(Figs.19 and 20)



Fig. 19 | New clamp with leather
 Th. v. Pichler, *Singhalesen und Sudanesen*, Wien: Perles, 1888

The book *Glückliche Stunden (Happy hours)* by C. Lechler from 1897 is a classical pop-up and contains poems with four lovely pop-up scenes. The pop-up scenes always extend over both sides of the pages. In-between the scenes are pages printed with the story. The pop-up consists of two horizontal layers with strips of cardboard as spacers (Fig. 21).

The paper of the book is not the best quality. The dirty edges of the paper are evidence of frequent use in the past. The spacers, which allow the pop-up to move when the book is opened, are made of thin cardboard and were loose, creased, or torn. The spacers were mended and reinforced with Japanese paper and wheat starch paste or were replaced with new acid free cardboard (Fig. 22).



Fig. 21 | Page with a pop-up
 C. Lechler, *Glückliche Stunden*, Nürnberg: Stroefers Kunstverl., 1897

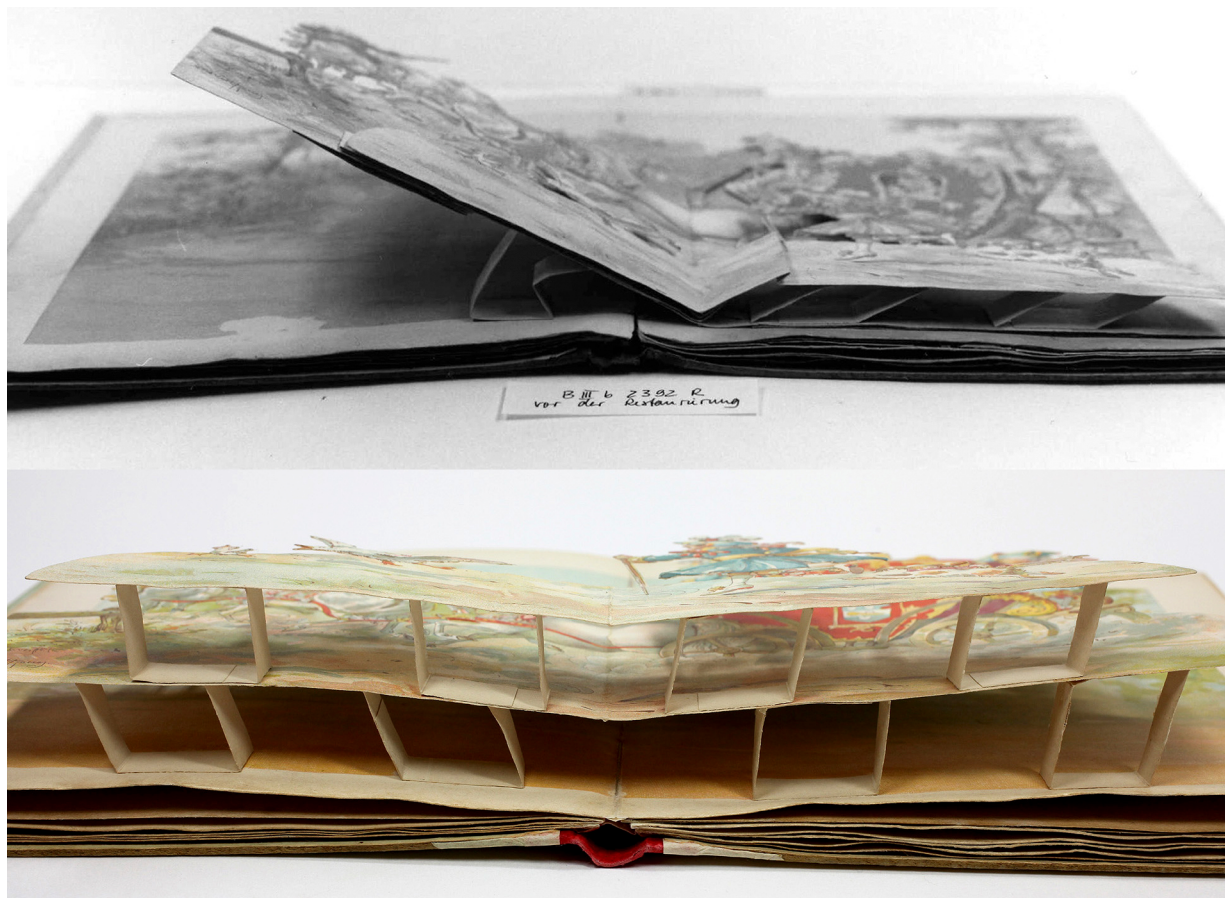


Fig. 22 | Before and after treatment
C. Lechler, *Glückliche Stunden*, Nürnberg: Stroeyer's Kunstverl., 1897

Conclusion

It can be seen from these examples that the conservation of movable books with varying techniques requires individual and creative approaches and solutions.

It is important that books in a library collection have their functionality retained or repaired, so that they are brought to life again.

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