Forms, Treatment Measures, and Implications of Historical Restoration Remnants in Ancient Books: Later Print Editions

Authors: Wang Guoqiang

Date: 2023-04-01T15:51:22+00:00

Abstract

[Purpose/Significance] Historical restoration remnants constitute an integral part of ancient books and serve as the subject of treatment in new restoration cycles. Research on historical restoration remnants in ancient books can not only enrich restoration techniques but also improve restoration quality. [Method/Process] The forms and treatment measures of historical restoration remnants in ancient books were investigated using inductive and case study methods respectively. [Results/Conclusion] The forms of historical restoration remnants in ancient books include restoration materials, restoration techniques, and their imprints, among others. The treatment of historical restoration remnants should implement retention, restoration, and removal measures according to specific circumstances. The implications of historical restoration remnants for Chinese ancient book restoration work include actively developing treatment technologies for historical restoration remnants, prioritizing physical restoration techniques, comprehensively promoting excellent restoration techniques, and systematically constructing restoration archives.

Full Text

Preamble

Volume 66, Issue 2, January 2022

Forms, Treatment Measures, and Enlightenments of Historic Conservation Remains of Ancient Books

Wang Guoqiang
School of Information Management, Zhengzhou University, Zhengzhou 450001

Abstract:
[Purpose/Significance] Historic conservation remains are integral components

of ancient books and constitute the primary objects of new conservation cycles. Studying these remains not only enriches conservation techniques but also enhances the quality of ancient book restoration. [Method/Process] This paper examines the forms and treatment measures of historic conservation remains in ancient books using inductive and case study methods. [Result/Conclusion] The forms of historic conservation remains include repair materials, methods, and their marks. Treatment should be implemented based on specific circumstances through retention, conservation, or removal. The enlightenments for Chinese ancient book conservation are: actively develop treatment technologies for historic remains, prioritize physical conservation techniques, comprehensively promote excellent conservation technologies, and systematically construct conservation archives.

Keywords: ancient book conservation; historic conservation remains of ancient books; conservation cycle; conservation technologies; ancient book preservation
Classification Number: G264
DOI: 10.13266/j.issn.0252-3116.2022.02.008

Historic conservation remains of ancient books refer to the materials, methods, and marks left by past conservation activities in extant ancient books. As time passes, an increasing number of books have undergone multiple conservation cycles, making these historic remains ever more abundant. These remains represent crucial objects for conservation cycle management, and their treatment is more complex than repairing the books themselves. A comprehensive understanding and proper handling of historic conservation remains can both enrich conservation techniques and improve restoration quality, warranting serious attention from both theoretical and practical circles in the field.

Research on the forms and treatment of historic conservation remains has progressed through two stages: 1980–2006 as the first stage, and 2007 to the present as the second. During the first stage, research output gradually increased, with evolving perspectives shifting from removal-only to balancing removal and preservation. In 1980, Xiao Zhentang and Ding Yu first discussed methods for removing aged, substandard remains [1]32-33, followed by similar proposals from Pan Meidi in 1995 [2]. In 2002, Zhang Ping introduced three treatment approaches for the *Yongle Encyclopedia* remains: making old books look new, altering binding formats, and preserving historical authenticity [3]. Two years later, Du Weisheng discussed treatment measures for binding formats and covers [4]. In 2006, Zhang Ping summarized treatment methods for Dunhuang manuscript remains [5], Hu Yuqing introduced treatments for supplementary papers and fine hemp ropes [6], and Zhang Zhiqing advocated preserving some historic remains in Dunhuang manuscripts [7], while Lin Shitian et al. summarized the forms and characteristics of ancient repairs on Dunhuang manuscripts [8].

The second stage has produced richer research emphasizing retention or pro-

tective conservation of historic remains. In 2007, Du Weisheng proposed 酌情 retaining conservation information from various historical periods [9]. In 2010, Zhang Ping argued for preserving modified binding forms from historic repairs [10], Lin Shitian outlined 4th–11th century remains in Dunhuang manuscripts [11], and Gu Jinqiu surveyed the current state of historic remains [12]. In 2016, Fang Guangchang documented the removal of chemical materials from British Library Dunhuang collections after the 1980s [13]13-15, and Zhu Zhenbin advocated preserving conservation information from all periods and conducting protective repairs whenever possible [14]. Between 2016–2019, Zhu Zhenbin [15-16], Cui Zhibin [17], and Tian Tingting [18] respectively examined remains and treatment measures in the "Tianlu Linlang" collection. In 2018, Wang Guoqiang et al. summarized destructive historic remains and proposed preventive measures [19]. In 2019, Wan Qun argued that remains not affecting preservation should not be over-treated [20]118.

In practice, the National Library's conservation projects for the *Yongle Encyclopedia*, subsequent Dunhuang manuscript repairs, and the "Tianlu Linlang" collection have increasingly focused on historic remains, with the latter explicitly adopting the principle of "preserving previous repair traces" [21].

---

2. Historic Conservation Remains as Products of Conservation Cycles

Historic conservation remains accumulate through successive conservation cycles. In the field, a "conservation cycle" typically refers to the period between two conservation interventions on the same book [17], or the minimum interval required to initiate two consecutive conservation projects. No definitive data exist on cycle frequency because influencing factors are highly complex: variations in book materials, binding methods, and storage environments; differences in techniques and scale applied in each cycle; difficulty determining optimal timing for intervention; varying aging rates at different life stages; and evolving interpretations of minimal intervention principles all complicate precise determination.

Nevertheless, scholars have attempted to estimate conservation cycles. In the 1960s, Zhao Wanli first suggested that repaired books should remain stable for a century, after which future generations would assume responsibility [22]. In 2010, Zhang Ping proposed that "based on current preservation conditions, most ancient books require re-conservation every 200–300 years" [10]. Later scholars suggested that "given past experience and current technical levels, a properly executed conservation treatment typically lasts decades to over a century before the next cycle becomes necessary" [23]. These estimates range from several decades to 200–300 years depending on book condition and conservation quality.

Case studies largely support these estimates. The National Library's 2013 "Tianlu Linlang" project involved books previously repaired in 1821 and 1874,

representing cycles of 192 and 139 years respectively [15]. Shanghai Cishu Press's Song edition *Ruzhu Fuyin Sima Wengong Zizhi Tongjian Gangmu* was repaired in 1567 and again in 1805 (a 238-year interval), remaining stable after 215 years [14]. The most frequent documented cycles appear in the earliest extant printed *Diamond Sutra*, which underwent multiple repairs over 1,000 years ago [25]41. Between 1920–1960, it experienced four cycles using overall backing techniques that progressively deteriorated its condition, followed by a 1987 intervention removing five layers of backing paper [25]98-107—six cycles averaging approximately 12 years.

Based on scholarly judgment, temporal evidence, and empirical data, general conservation cycles can be estimated: poor-condition books require intervention every 10+ years; excellent-condition books every 200–300 years; and most average-condition books approximately every 150 years. These figures demonstrate that conservation cycles are regular and frequent occurrences throughout the long lifespan of ancient books.

The quantity, quality, and style of historic remains directly reflect these cycles: (1) Remain abundance depends on cycle frequency and scale—more frequent and extensive repairs yield richer remains. (2) Techniques applied in each cycle determine remain characteristics and quality, with some demonstrating successful reinforcement and others revealing negative impacts from inferior materials or methods. (3) Aesthetic concepts from different periods shape the stylistic features of remains, reflecting varying social trends, conservation philosophies, and the tastes of collectors and conservators.

---

3. Main Forms of Historic Conservation Remains

3.1 Repair Materials

3.1.1 Repair Papers Historic repair papers include supplementary papers, slip papers, backing papers, and interleaving papers:

(1) **Supplementary papers** constitute the largest volume and most diverse type: plain or printed papers, handmade or machine-made. Books with multiple repair cycles may have several layers; most are square-cut and pasted, though some feature hand-torn fibers minimally overlapping page fibers [11].

(2) **Slip papers** for reinforcing folds are common and varied, typically thin wrapper papers.

(3) **Backing papers** appear frequently in northern regions where dry, windy conditions cause severe embrittlement [26], making direct repair difficult. Contemporary southern repairs occasionally use backing papers. Multiple layers indicate repeated backing applications.

(4) **Interleaving papers** serve several functions: leveling uneven repairs; preventing text show-through in thin pages; increasing tension in weakened leaves; thickening thin volumes; "gold-inlaid jade" bindings; and reinforcing damaged, thin gutters where some conservators attach gutters directly to interleaving paper, using it as both supplement and support [17].

3.1.2 Repair Adhesives Historic adhesives primarily include wheat flour/starch, agar, bletilla, and paper mulberry sap:

(1) **Wheat flour** (north) and **starch** (south) are most common, traditionally compounded with medicinal and mineral additives like frankincense, alum, wax, pepper, lime, rue, honey locust, and tung oil.

(2) **Agar** from seaweed was popular in Guangdong, producing flexible, highly reversible paste. Guangdong scholar-collector Lun Ming used it for his collection, as did the Guangdong Provincial Library [27-28].

(3) **Bletilla** and **paper mulberry sap** are plant-based glues with strong adhesion but poor reversibility, primarily used for thick Buddhist scriptures. Early Dunhuang repairs show brownish-yellow, water-insoluble plant adhesives [10].

(4) Modern repairs have employed chemical pastes, glues, and tapes.

3.1.3 Polymer Reinforcement Materials Contemporary remains include polymer materials. Chemical silk gauze was used mid-20th century for fragile papers; polyester film was common internationally in the 1980s. Most have since been removed.

3.2 Repair Methods

Common historic methods include rule-drawing and character-filling, trimming head/foot/spine, cover replacement, and binding alteration.

(1) **Rule-drawing and character-filling** was common in early Dunhuang remains [8] and Ming-Qing repairs. Abandoned after the 1980s for violating authenticity principles.

(2) **Trimming** appears as either fresh-cut edges or reattached trimmed sections [14].

(3) **Cover replacement** was routine, especially in utilitarian repairs.

(4) **Binding alteration** transformed Song-Yuan butterfly and wrapped-back bindings into thread bindings, as seen in National Library collections [7] and Shanghai Cishu Press's Song edition [14]. "Gold-inlaid jade" binding constituted 28% of titles and 45% of volumes in one northern collection's 19th–20th century remains [12].

4. Treatment Principles and Measures for Historic Conservation Remains

4.1 Treatment Principles

The principles of recognizability, minimal intervention, and reversibility—proposed by Italian scholar Cesare Brandi in the mid-20th century [29]90 and adopted in international and Chinese conservation charters—guide treatment of historic remains.

(1) **Recognizability** requires treated remains to harmonize with the original while remaining distinguishable: "consistent from afar, distinct up close." This involves maintaining coordination between remains from different cycles and the original, preserving information from each cycle, and respecting diverse stylistic expressions [30].

(2) **Minimal intervention** demands the smallest necessary scale of treatment: prioritizing protection of the book and remains, implementing minimal treatment only where required, and acknowledging that all interventions have minimum scales.

(3) **Reversibility**—the ability to return to the pre-treatment state—demonstrates awareness of conservation risks. Since complete reversibility is difficult, some scholars advocate for "re-treatability" or "sustainability" [31].

The treatment philosophy emphasizes maintaining the original morphology of historic remains [25]101 to preserve authenticity. All information, including repairs, represents historical development and deserves respect. Remains not affecting preservation quality should be fully retained [7], and even altered forms should be preserved when possible, as conservation aims not for stylistic uniformity.

4.2 Treatment Measures

Given the complexity and varying condition of remains, treatment requires case-by-case analysis through retention, repair, or removal.

4.2.1 Retention Remains that do not affect preservation quality should be preserved. Table 1 provides examples of forms, conditions, and retention measures.

4.2.2 Repair Some remains have issues from improper techniques or age but remain usable or reparable. These should be repaired for continued use. Table 2 provides examples of forms, conditions, and repair measures.

4.2.3 Removal Removal is a last resort for irreparable or harmful remains, including substandard papers, polymers, adhesives, and marks. Removed ma-

terials should be photographed, documented, and archived with image records. Table 3 provides examples of forms, conditions, and removal measures.

---

5. Implications for Ancient Book Conservation

5.1 Actively Develop Treatment Technologies for Historic Remains

In new conservation cycles, treatment of historic remains constitutes a critical technical component, with complexity concentrated in removal. Chinese publications and standards rarely address these techniques, and existing guidance lacks specificity. As more books enter new cycles, the field urgently needs technical direction. Key challenges include: (1) complete removal of supplementary, backing, and interleaving papers from deteriorated leaves without damage; (2) softening and removing poorly reversible adhesives; (3) preventing color loss and water staining during treatment [20]79, [25]112-113; and (4) removing residual materials from paper fibers. Some traditional-contemporary hybrid techniques, such as ultrasonic steam for diluting adhesives [25]119, show promise and warrant continued innovation.

5.2 Prioritize Physical Conservation Techniques

Historic remains demonstrate that physical techniques have proven safe, reliable, inexpensive, and reversible over time, effectively extending book life. In contrast, chemical materials like silk gauze, polyester film, and synthetic adhesives introduced since the mid-20th century have created serious preservation risks, poor reversibility, and were often discontinued within decades. Therefore, physical techniques should be primary, with chemical methods used only cautiously when physical approaches cannot achieve objectives [36].

5.3 Comprehensively Promote Excellent Conservation Techniques

Historic remains showcase China's sophisticated traditional techniques, yet some documented methods remain underutilized. For example, "micro-integration" technology—using thin, matching-fiber papers with minimally overlapping edges, detectable only by transmitted light—was documented in the 6th century [37] but rarely appears in important remains from Dunhuang (4th–11th centuries), Ming-Qing repairs, or the "Tianlu Linlang" collection, where "square patching" predominates. Innovation alone is insufficient; excellent traditional techniques must be widely promoted through strengthened communication between scientists and conservators.

5.4 Systematically Construct Conservation Archives

Historic remains are valuable resources showing materials, methods, and effects, but cannot document processes, cycles, personnel, or principles. Conservation archives—comprising textual, photographic, and video records—are

essential. Archive construction is a critical conservation component; Italy established standardized systems in the 1940s [29]249. While Chinese institutions have increased advocacy, most collections lack archives, though the Ministry of Culture and Tourism will soon issue the *Standard for Archival Documentation of Ancient Book Conservation*. The field should adopt uniform formats and standardized language to document material impacts, preserve comprehensive information for future cycles [23], and gradually build a rich, unified national database for systematic research.

Conclusion

All meaningful materials and information generated during a book's life should be preserved [39]. Historic remains are integral components representing authentic historical information and constitute important content for new conservation cycles. Treatment principles and measures reflect societal respect for cultural heritage and evolve with conservation ethics. The more standardized and scientific the treatment, the more objective and genuine the remains, ensuring higher conservation quality and longer book life. The consensus should be to avoid intervention when possible, and when necessary, implement minimal-scale treatment that maximizes preservation, allowing historic remains to continue extending book life alongside new conservation efforts.

References

[1] Xiao Zhentang, Ding Yu. *Chinese Ancient Book Binding and Repair Techniques* [M]. Beijing: Bibliographic Literature Publishing House, 1980.
[2] Pan Meidi. *Ancient Book Repair and Binding* [M]. Shanghai: Shanghai People's Publishing House, 1995: 112-113.
[3] Zhang Ping. Analysis of Repair and Preservation Methods for the *Yongle Encyclopedia* [C] // National Library of China. *Proceedings of the International Symposium on the 600th Anniversary of the Yongle Encyclopedia Compilation*. Beijing: Beijing Library Publishing House, 2003: 365-370.
[4] Du Weisheng. The Repair of the *Yongle Encyclopedia* [J]. *Journal of the National Library of China*, 2004(2): 64-68.
[5] Zhang Ping. Reflections on Standardizing Dunhuang Manuscript Repair [C] // Lin Shitian, Meng Antai. *Integration and Innovation: Proceedings of the Sixth International Dunhuang Project Meeting*. Beijing: Beijing Library Publishing House, 2007: 112-118.
[6] Hu Yuqing. Discussion on Common Damages and Repairs of Dunhuang Manuscripts [C] // Lin Shitian, Meng Antai. *Integration and Innovation: Proceedings of the Sixth International Dunhuang Project Meeting*. Beijing: Beijing Library Publishing House, 2007: 87-92.
[7] Zhang Zhiqing. Dunhuang Manuscript Preservation and the "Chinese

Ancient Books Special Collection Protection Plan" [C] // Lin Shitian, Meng Antai. *Integration and Innovation: Proceedings of the Sixth International Dunhuang Project Meeting*. Beijing: Beijing Library Publishing House, 2007: 1-15.
[8] Lin Shitian, Sa Ren Gaowa. *Jin Guangming Zuisheng Wang Jing* Dunhuang Manuscript in the National Library Collection: A Brief Discussion on Ancient Repairs [J]. *Dunhuang Research*, 2006(6): 183-191.
[9] Du Weisheng. Principles of Ancient Book Conservation [J]. *Journal of the National Library of China*, 2007(4): 79-84.
[10] Zhang Ping. Analysis of Basic Principles in Ancient Book Repair [J]. *Wenjin Journal*, 2010: 294-301.
[11] Lin Shitian. A Brief Discussion on Ancient Repairs of Dunhuang Manuscripts: Constructing a 4th–11th Century Chinese Book Repair History Framework [C] // China Dunhuang and Turpan Studies Society, Zhejiang Provincial Federation of Social Sciences. *Proceedings of the International Academic Conference on the Centennial of Dunhuang Document Collation and Research* (Vol. 2). Hangzhou: 2010: 434-446.
[12] Gu Jinqiu. Investigation and Case Analysis of Rare Ancient Book Conservation at Shanxi Museum [J]. *Journal of the National Library of China*, 2017(3): 109-112.
[13] Fang Guangchang. General Preface [M] // Fang Guangchang, Li Jining, Huang Xia. *General Catalog of Dunhuang Manuscripts in the National Library of China · Library Catalog Volume*. Beijing: China Renmin University Press, 2016.
[14] Zhu Zhenbin. Repair Issues of the Song Carved Edition *Ruzhu Fuyin Sima Wengong Zizhi Tongjian Gangmu* [J]. *Wenjin Journal*, 2012: 400-404.
[15] Zhu Zhenbin. On the Conservation of the "Tianlu Linlang" Rare Books in the National Library [J]. *Wenjin Journal*, 2016: 336-342.
[16] Zhu Zhenbin. Two Notes on the "Tianlu Linlang" Collection Repair [J]. *Wenjin Journal*, 2018: 424-429.
[17] Cui Zhibin. Summary of Previous Repair Remains and Solutions in the "Tianlu Linlang" Collection [J]. *Wenjin Journal*, 2017: 484-496.
[18] Tian Tingting. Repair, Reinforcement, and Supplementary Paper Selection for Fragile Documents: Notes on the "Tianlu Linlang" Collection *Tang Wencui* Repair [J]. *Wenjin Journal*, 2019: 369-377.
[19] Wang Guoqiang, Shi Qinggong. Analysis of Causes and Preventive Measures for Destructive Ancient Book Repairs [J]. *Library Tribune*, 2018, 38(11): 164-171.
[20] Wan Qun. *Conservation and Repair of Dunhuang Manuscript Fragments at Tianjin Library* [M]. Beijing: Xueyuan Publishing House, 2019.
[21] Li Yang. Rare Ancient Books "Tianlu Linlang" to be Repaired [N]. *Beijing Daily*, 2013-08-28(8).
[22] Ji Shuying. Protecting Ancient Books, Carrying Forward the Past: Remembering the Famous Bibliographer Zhao Wanli [C] // Zhang Shilin. *Academic Forest Past Events*. Beijing: Zhaohua Publishing House, 2000: 1136-1143.

[23] *Standard for Archival Documentation of Ancient Book Conservation* Editorial Committee. Industry Standard Compilation Notes [EB/OL]. [2021-09-02]. https://www.docin.com/p-2041725520.html.
[24] Huang Pilie. *Huang Pilie's Collation Notes on Collected Books* [M]. Annotated by Yu Minghong and Zhan Xudong. Shanghai: Shanghai Ancient Books Publishing House, 2013: 314-316.
[25] Frances Wood, Mark Barnard. *The Diamond Sutra: The Story of the World's Earliest Dated Printed Book* [M]. Translated by Yuan Yu, proofread by Cui Xiang. Guilin: Guangxi Normal University Press, 2019.
[26] Wang Guoqiang. Causes, Significance, and Enlightenments of North-South Differences in Chinese Ancient Book Preservation Methods [J]. *Journal of Academic Libraries*, 2020, 38(1): 93-98.
[27] Lin Ming. Research on Document Repair Paste Formulas [J]. *Library Work and Research*, 2012(3): 71-75.
[28] Sun Dianqi. Remembering Mr. Lun Zheru [C] // Lei Mengshui. *Notes from the Book Forest*. Beijing: People's Daily Publishing House, 1988: 90-94.
[29] Cesare Brandi. *Theory of Restoration* [M]. Compiled and translated by Lu Di. Shanghai: Tongji University Press, 2016.
[30] Wang Guoqiang. Principles, Techniques, and Applications of Recognizability in Chinese Ancient Book Conservation [J]. *Library and Information Service*, 2020, 64(6): 33-38.
[31] Salvador Muñoz Viñas. *Contemporary Theory of Conservation* [M]. Translated by Zhang Peng, Zhang Yixin, Wu Xiaojing. Shanghai: Tongji University Press, 2012: 170.
[32] Zhang Ping, Wu Shushi. *Case Studies in Ancient Book Repair* [M]. Beijing: National Library Publishing House, 2012: 8.
[33] Ningbo Tianyi Pavilion Museum. *Guidelines for Ancient Book and Document Repair* [Z]. Ningbo: 2015: 5.
[34] Zang Chunhua. Conservation of the *Zhengde Three-Year Jinshi Dengkelu* at Anhui Provincial Library [J]. *Sciences of Conservation and Archaeology*, 2015, 27(2): 114-121.
[35] Wu Xiaolan, Mu Di, Sha Mingjin. Research on the Repair of the 1447 Imperial Edition *Shu Jizhuan* [J]. *Library World*, 2018(4): 57-62.
[36] Wang Guoqiang. Research on the Basic Path of Chinese Ancient Book Conservation Technology System Construction [J]. *Library and Information Service*, 2013, 57(8): 74-77, 96.
[37] Jia Sixie. *Annotated Qimin Yaoshu* [M]. Annotated by Miao Qiyu, collated by Miao Guilong. Beijing: Agricultural Publishing House, 1982: 163-164.
[38] Du Weisheng. 60 Years of Ancient Book Conservation at the National Library [J]. *Library Work and Research*, 2008(9): 59-63.
[39] Second International Congress of Architects and Technicians of Historic Monuments. *Venice Charter* [EB/OL]. [2021-05-23]. https://wenku.baidu.com/view/c85e6664f7ec4afe04a1dfa0

Publication Ethics Statement

To strengthen academic standards, research integrity, and ethics in academic writing, peer review, and editing, establish good academic conduct, promote scientific spirit, resolutely resist academic misconduct, and create a fair, just, and open academic exchange environment, *Library and Information Service* Magazine (including editorial offices of *Library and Information Service* and *Knowledge Management Forum*) has formulated and officially released this Publication Ethics Statement in February 2020.

The statement commits to strictly complying with national policies and regulations on academic ethics and editorial publishing, standardizing the behavior of authors, peer reviewers, and editors throughout the entire editorial process, and accepting supervision from the academic community and society. The statement comprises three parts with fifteen articles covering: (1) Authors' ethics (academic papers as scientific research components; academic misconduct as a tumor; authors as primary contributors; authorship reflecting intellectual property; importance of IP and information security; normative citation; research data management; error correction mechanisms). (2) Peer reviewers' ethics (peer review as quality control; compliance with review requirements; adherence to ethical guidelines). (3) Editors' ethics (editors as quality guardians; monitoring academic ethics; final barrier against misconduct; zero tolerance for academic misconduct).

Full text available at: http://www.lis.ac.cn/CN/column/column291.shtml

Note: Figure translations are in progress. See original paper for figures.