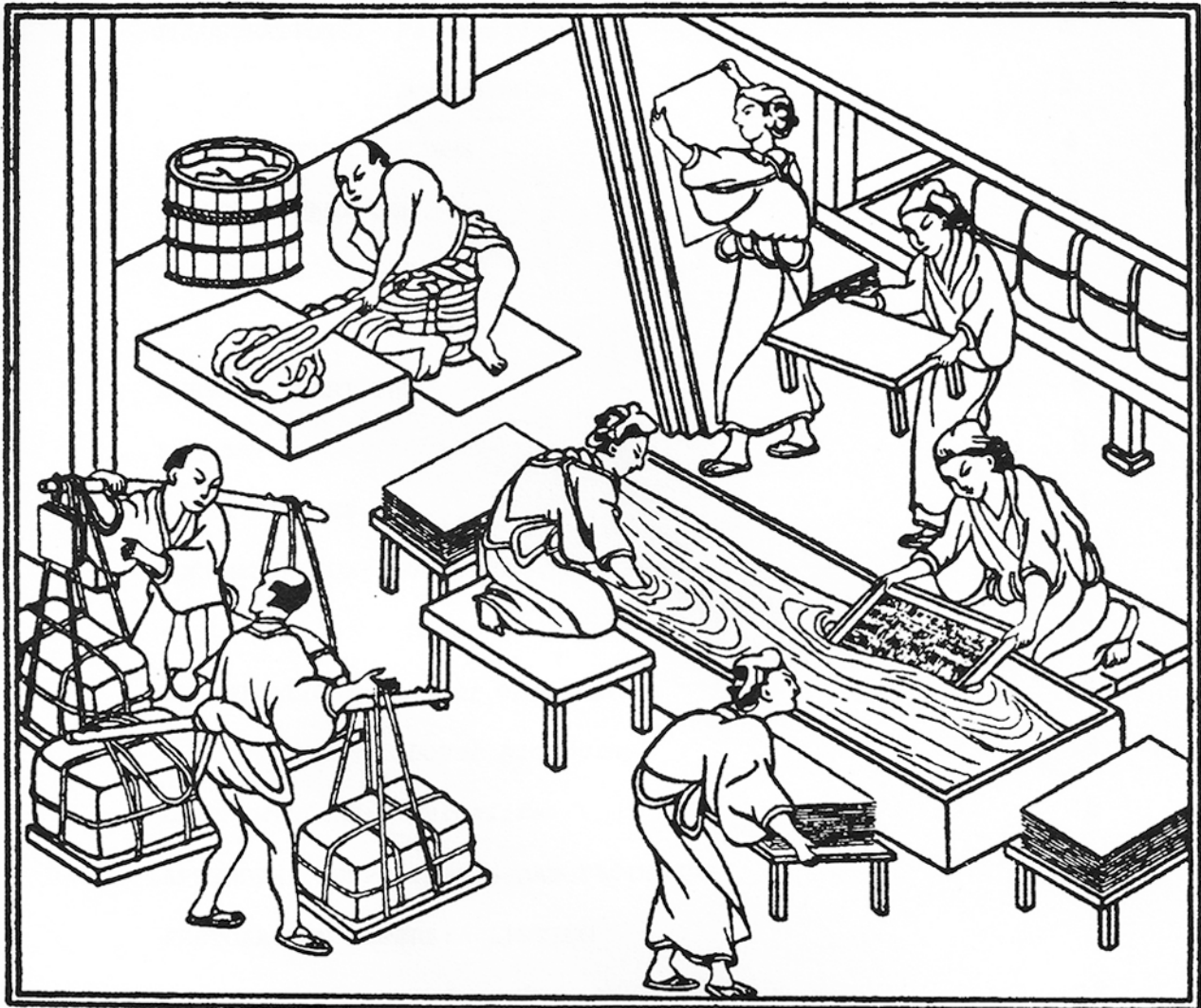


# RESTORATION PAPERS



PRINT OF JAPANESE PAPERMAKING FROM 1798 HANDBOOK OF PAPERMAKING BY JIHEI KUNISAKI

A study  
of restoration  
papers used by  
American print and  
book conservators

Research  
funded by  
the National  
Endowment for  
the Arts

Published  
and designed  
by Busyhaus  
North Andover,  
Massachusetts

Robert Hauser  
Fellow A.I.C.

Nineteen Seventy-seven



## INTRODUCTION

For over twenty centuries, paper has been the single most important carrier of cultural communication. Following its development in China during the period 200 BC - 100 AD, it spread eastward and westward, eventually dominating and replacing other writing materials such as wooden tablets, bamboo and palm, papyrus and parchment.

Historically, papers have been chosen for particular uses because of their availability or because certain characteristics recommended them to the needs of the user. One of these characteristics, permanence, has been noted especially since the second half of the nineteenth century by artists, printers, and other users of paper, but their concerns were expressed about Chinese paper as early as the eighth century: ". . . a rapid deterioration sets in, and thenceforward most of the papers are very coarse and flabby, drab in color, and difficult to write on." <sup>1</sup>

Almost since the development of paper, then, the concept of paper permanence and durability has been in evidence. Understanding the causes, effects and remedies of paper deterioration was based more on speculation and art/craft performance, but by 1876 there was a growing awareness among manufacturers as well as users.

*Nothing is made in the establishment but first-class, strong, linen paper, for record-books, legal documents, ledgers, and journals, and for uses where age and long use is required. [sic] The paper is made of linen rags, new cloth, and such strong, clean and white stock that alkali or acid bleaching is unnecessary, which injures the fibre of the stock, causing the paper to be tender and grow yellow by age.<sup>2</sup>*

The selection of a surface for writing, drawing or printing upon should depend on its meeting the requirements of the implement or graphic process being used and vice versa. Historically the choice of a writing or printing material or method was not necessarily one of design but one influenced by accident, preference, available resources and technology. Therefore, materials, processes, and the question of permanence and durability have not always complemented one another or been sought after together as mutually required conditions. Also, with the transition from hand to machine papermaking by the mid-nineteenth century, there was a change from predominantly rag materials and a craft industry to more increased use of wood pulps and chemical-industrial processes. This progression compounded manufacturing problems and contributed to the complexity of research into permanence, durability, and related issues.

The several graphic arts/book related professions share common interests in paper as a vehicle of communication, yet they frequently have different priorities to consider. The artist or printer is concerned with the performance of paper relative to graphic processes and visual solutions. The conservator or archivist is concerned with the performance of paper relative to deterioration processes and preservation solutions. Preferences for particular papers are indicative of these varying priorities, and the methods for selecting a paper for initial use seldom take into account the criteria used by the conservator. The conservator or archivist would prefer some consideration by the initial user of the different

physical and/or chemical properties of papers and their aging characteristics. This would influence the ultimate choice of papers, so they would better meet the archival expectations for any print, drawing or book. Verner Clapp described our ambivalent attitude toward the quality of paper:

*The truth is that we ask many qualities in a writing material, and to some we give higher priority than to its permanence. . . . If it had been an all-or-none proposition -- if all paper had been permanent, or none -- the matter would undoubtedly have been disposed of one way or another long ago. Instead, indeterminacy has exacerbated the problem for more than 850 years.<sup>3</sup>*

To understand the nature of paper, to assess the qualities needed in and demands placed on a paper, the user would be prudent to study papermaking both as craft and industry.<sup>4</sup> Once papermaking methods, technical resources, and standards for evaluating the permanence and durability of writing, printing, and artists' papers are understood by those who use them, this information can be applied as part of the priorities used in selecting a paper. Knowledge of paper's historical development and technical processes would contribute to its more successful application by the professional artist, printer, designer and publisher; to its preservation by archivist, librarian, and curator; and to its restoration by the print and book conservator.

## STANDARDS

There are many misconceptions about what permanence and/or durability mean. In 1933, the Technical Association of the Pulp and Paper Industry [TAPPI] Committee on Permanence and Durability stated a definition in rather clear and uncomplicated terms:

*Permanence is the degree to which a paper resists chemical action which may result from impurities in the paper itself or agents from the surrounding air. Durability is the degree to which paper retains its original qualities under continual usage.<sup>5</sup>*

Research and guidelines have been published by several agencies involved in paper research and developing standards, e. g., National Bureau of Standards, Association of College and Research Libraries, National Archives, National Historic Publications and Records Commission, American Council of Learned Societies, Society of American Archivists, Barrow Research Laboratory, and the American Library Association's Library Technology Program and Committee for the Preservation of Library Materials.<sup>6</sup> The consensus, generally stated, is that permanent/durable paper should have a minimum pH of 7, contain neither alum/rosin sizing nor groundwood, and should be further tested for folding and tear endurance, ash and fiber content, artificial aging, etc.

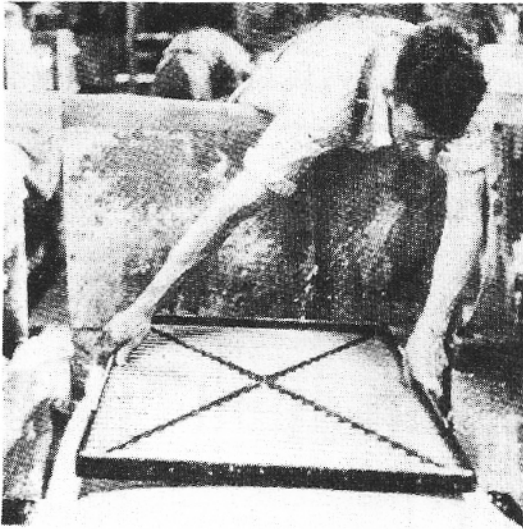
In a broader sense, these conditions can be somewhat arbitrary and depend on the purpose, format and service required of a paper. There are various standards for different kinds of papers and several ways to test for them. Because of this disparity, conservators and others find it difficult to evaluate standards for a paper being considered, whether for initial use or restoration.

It is also becoming evident that adherence to standards can be exclusionary, ignoring many of the paper characteristics (e. g., design, printing, and binding features) which are not part of the standard. The user must make his choice on a much broader base of information than what the standards have provided. Also, the user must be aware of the transitional implications standards can have on paper, papermaking methods, graphic and bookbinding processes and materials, as well as the effects from advancing paper technology which includes of late synthetic papers, dry formed paper, thermomechanical pulping, etc.<sup>7</sup>

To use an adage, the means for making and testing a permanent paper must justify the end result. In trying to produce permanent/durable paper, there are other features we must be aware of that should be maintained or carefully regulated.

*Nothing in the way a book is manufactured or the finished book is used makes acidity of the paper an advantage. And although the shift from acidity is not easily made, and involves considerable change in the papermaking process for some mills, it seems not to require a change in the balance of the other paper characteristics I have described which are so important to the functioning of paper in the book.<sup>8</sup>*

PAPERMAKING:  
Couching the sheet  
Hayle Mill, Maidstone



BOOKBINDING:  
Sewing the signatures  
Diderot. *Encyclopedie*



To date, research has been focused on documenting the historical and chemical causes of paper deterioration, defining permanence standards and testing methods, and studying corrective measures for treating papers.<sup>9</sup> Investigation into papers currently used by artists, publishers, or conservators would serve to identify the papers used by these professions, after which specific papers could be examined and evaluated in terms of their relative adherence to those permanence/durability standards.