TRADITIONAL HANDMADE PAPER IN CHINA TODAY: ITS PRODUCTION AND CHARACTERISTICS

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ABSTRACT

Handmade papers have long been produced in many different places all over China, and the paper made in each of these places has its own special regional characteristics. The raw materials that go into the paper and the techniques used to make the paper determine the characteristics of the handmade paper and how it will respond when used for calligraphy, painting, or printing and when it is mounted or bound as books.

Illustrations in this article show the production of handmade paper in four areas of China: Fuyang, Zhejiang; Jingxian, Anhui; Jiajiang, Sichuan; and Qian’an, Hebei. The photographs, taken on my visits to these sites between 1999 and 2003, show the physical setting, equipment and tools, methods of plant-fiber preparation, techniques for sheet formation and drying, and the processing and packaging of finished paper. Emphasis is placed on how materials and production techniques determine the qualities of the paper produced, which in turn influence any book or other project in which the paper is used.

KEYWORDS

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Paper Grain

TRADITIONAL CHINESE HANDMADE PAPER

Librarians, scholars of the history of the book and library culture, researchers in the fields of traditional printing, paper, ink, and writing brushes, and specialists in the repair and binding of old Chinese books have various reasons for needing to understand the paper on which the books they use or study are written or printed. For those who work with old and rare books made in China, the production of Chinese handmade papers reveals some of the differences and similarities of the
many kinds of handmade papers on which these books were written or printed. In fact, each of the steps in the production of Chinese handmade paper contributes to the characteristics of the finished paper. Of particular interest is the way in which sheets of paper are formed which determines the grain of the paper. I will draw on what I have learned about production of handmade paper in four areas of China: Fuyang, Zhejiang; Jingxian, Anhui; Jiajiang, Sichuan; and Qian’an, Hebei.

BACKGROUND FOR MY RESEARCH

I don’t come from a culture where handmade papers from China are well known, often used, or widely available. So why am I interested in how paper is made by hand in China? My work is as editor of the East Asian Library Journal at Princeton University. This journal publishes articles about the history of all aspects of the book in East Asia. Over time I have developed a very strong interest in a hands-on understanding of the materials and the structures of traditional Chinese, Japanese, and Korean books. About ten years ago I met the rare book librarian at Fudan University, and he very generously welcomed me to study with the book conservators in the rare book section at Fudan to begin to learn how to repair and bind Chinese string-bound books. As I worked with the papers on which these books were printed, I found I needed to learn about this fundamental component of traditional Chinese books. I began going to stores that sold Chinese papers to purchase samples of papers and to ask questions of the merchants. This led to invitations from the merchants, many of whom are the direct representatives of paper mills, to go with them to see how their papers are made. This in turn led to my purchasing more kinds of papers and to visiting more mills in China where papers are made by hand. And I also have met and talked with book conservators, binders, and librarians in major institutions and bookstores in many places in China. I continue to make Chinese-style books and to teach others how to bind these traditional book forms. This research project is an eye-opening, informative, and thoroughly enjoyable experience. And this hands-on knowledge and practice of making books and learning about the production of Chinese paper informs my understanding of the manuscripts on the history of the book in East Asia that I edit for publication in the East Asian Library Journal.

PRACTICAL UNDERSTANDING OF PAPER

Many kinds of Chinese handmade papers are in common everyday use for all kinds of practical things. Kites and lanterns rely on the lightness and strength of bast fiber paper (pizhi 皮纸). Learning to use a Chinese writing brush begins by writing on calligraphy practice paper (yuanshuzhi 元生纸) made from roughly processed bamboo fiber. (See figure 1.) A further interest in Chinese calligraphy,
painting, woodblock printing, or making rubbings leads artists, artisans, and scholars to experiment with various papers and to develop a preference for certain papers. How a specific paper absorbs and disperses ink to achieve exactly the desired effect is of special interest to anyone who uses Chinese handmade paper. Practice and experience in mounting scrolls, binding Chinese books, or repairing and rebinding Chinese books leads to an even deeper understanding of the different kinds of papers needed to do this work perfectly.

OBSERVING PAPER PRODUCTION

The more we can learn about the nature of handmade Chinese papers, the more easily we can predict how those papers will behave when we use them. It is quite understandable that a Chinese papermaker, just as is true with any other artist or crafts-person, will not reveal everything about the process of his or her craft. Certainly, it is a papermaker's right to guard the secrets of his craft, to preserve some aspects of the magic of paper production, and to protect detailed knowledge of this national Chinese treasure. So, much of our knowledge of the nature of Chinese handmade paper comes from experience and experimentation. However, observing how papers are made today can give some additional clues.

FIBER PREPARATION

Chinese papers are made from many kinds of plant fibers (zhixu xianwei 植物纤维) – bamboo (zhuzi 竹子); rattan (teng 藤); bast fibers (renpi 韧皮), such as paper mulberry (chupi 楮皮), wingceltis (qingtanpi 青檀皮), mulberry (sangpi 桑皮), mitsumata (sanyapi 三亚皮), wickstroemia (yanpi 禽皮), and hemp (ma 麻); and grass fibers (hecao 禾草), such as alpine rush (suocao 蓊草), longxucao 龙须草), rice straw (daocao 稻草, liaocao 燎草), and wheat straw (maicao 麦草). (For images of some of these fibers, see figures 2, 3, 4, and 5.) These raw plant materials can be processed by the papermakers themselves, or they can be purchased in a pre-processed form (zhiban 皮板). (See figure 6.) Most often papermakers use the plant fibers that grown in abundance in the region where they live.

Raw plant materials must be cut or crushed, retted – that is, soaked in water to soften the fibers –, and then cooked in an alkaline solution (lye, jianshui or shaojian). (See figure 7) The duration of the soaking and cooking and the strength and kind of alkaline all influence the condition of the plant fibers. The cooked fibers are rinsed thoroughly and bleached – traditionally outdoors under the sun, but today often using chemical bleach. (See figure 8.) The fibers are then beaten and hydrated – that is soaked in and mixed with water – to form paper pulp (zhijiang). Both the natural minerals in and the temperature of the water influence the qualities of the paper produced. Formation aide (zhiyao 紙药), and sometimes other ad-
ditives (tianjiaji 添加剂), are combined into the pulp-and-water mixture. For a thorough explanation of just how each of the above factors in the paper production process influences the qualities of the paper produced, we would have to turn to those experts in the chemistry of papermaking or to papermakers themselves.

FORMING SHEETS OF PAPER

Here I will concentrate on the next steps in the production of handmade papers, that is, the way sheets of paper are formed and how they are dried. Sheet formation techniques and drying methods give some very valuable clues as to how Chinese handmade papers behaves when they later come into contact with ink, water, or paste – that is when the papers are used, for example, for calligraphy, painting, printing, scroll mounting, repair to book pages, and bookbinding.

To make a sheet of paper, paper pulp is scooped onto a screen of very thin bamboo rods woven together with fine silk threads. (See figure 9.) Chinese paper molds are usually wider than they are tall, but the size and the shape of the mold vary according to the kind of paper to be made. The thin bamboo rods of the mold leave fine lines, called “laid lines,” that run left to right on a sheet of paper. The thread used to weave the mold leaves fine lines, called “chain lines,” that run from top to bottom on a sheet of paper. As the excess water drains off, the screen and the bed supporting it are either held very still or moved to distribute the paper pulp evenly into a thin sheet of paper.

Hand papermakers in China use many different sheet formation techniques. Sometimes the screen is dipped into the pulp more than once as done in Anhui Jingxian to produce xuanzhi (宣紙), a fine paper for calligraphy, painting, book printing, and print making. (See figure 10.) Sometimes the screen is dipped only once and then held very still and level as the water drains off as is done in Fuyang, Zhejiang, to produce bamboo papers and other papers for calligraphy and painting. (See figures 11 and 12.) In Qian'an, Hebei, in the eastern part of China papermakers show a history of the influence of Korean papermaking techniques when they move the mold very, very quickly up and down and then left and right to make Gaolizhi (Korean-style papers), which is a little taller than it is wide. (See figure 13.) In Jiajiang, Sichuan, in the western part of China papermakers move the mold up and down and left and right, but do this rather slowly, and then toss off the excess pulp in a diagonal direction. (See figures 14 and 15.)

The long and thin plant fibers (zhiwu qianwei 植物纤维) in the pulp line up in the direction of the flow of the pulp. The way in which the plant fibers line up in the sheet of paper determines the “grain” of the sheet of paper (zhiwen 皮纸). A sheet of paper folds and tears most easily in the direction of the grain. And when a sheet of paper gets wet, it stretches in the direction perpendicular to the direction of the grain.
Papers made in Fuyang and Jingxian generally have a distinctive grain direction that runs parallel with the chain lines because during formation of the sheet of paper, the pulp flows only in the direction of the chain lines. But the grain of papers made in Jiajiang and the Gaolizhi made in Qian'an is not distinctly in one direction or the other, and these papers sometimes stretch in unexpected ways when it is used for writing, painting, or scroll mounting. The way that paper stretches and folds is very important to consider, for example, in mounting scrolls, wood block printing, repairing pages of books, and in binding books.

**DRYING SHEETS OF PAPER**

Wet sheets of newly formed paper are stacked up into a “post,” a stack of several hundred sheets, which is compressed slowly to remove excess water. (See figure 16.) The damp sheets are then peeled off one by one and brushed onto a flat drying wall, which depending on the region is either heated or unheated. Papermakers in Fuyang generally use a metal wall heated to a rather high temperature to dry a sheet of paper in less than a minute, while in Jingxian metal drying walls are heated to a much lower temperature. (See figures 17 and 18.) In Sichuan papermakers generally use unheated, specially prepared plaster walls or wooden planks to dry sheets of paper over several days' time depending on the weather. (See figures 19 and 20.) In winter or when the humidity is very high, Sichuan papermakers alternatively use metal drying walls heated to a very low temperature. In Qian'an, Hebei, plaster-covered drying walls stand outdoors under a covering of vines and mats to protect the sheets of drying paper from the sun's harsh rays. (See figure 21.) Sheets of paper that have been dried very quickly on a very hot metal wall tend to be brittle and likely to stretch and shrink much more than sheets of paper dried more slowly on a metal wall heated to a low temperature or on an unheated plastered wall or a wooden plank. Dried sheets are trimmed and folded into bolts (dao 刀) of around one hundred sheets.

**USING CHINESE HANDMADE PAPER FOR PRINTING, PAPER REPAIR, AND BOOK BINDING**

Knowing where and how paper is made lets calligraphers, artists, printers, printmakers, scroll mounters, and bookbinders anticipate how the paper they use will stretch when it gets wet with ink paste and folded when used to bind and repair books.

Wood block printing is usually done so that the grain of the paper runs vertically, that is, parallel with the center of the printing block (banxin 板心). Thus, when Chinese book pages are folded, the finished book remains very flexible and easy to open. (See figure 22.) Of course, sometimes in the interest of saving money by not wasting paper, printers will print so that the grain of the paper runs
horizontally. The completed book is considerably less flexible, even when printed on extremely thin Chinese papers.

Book binders and conservators who repair damage to the pages of old and rare Chinese books must deal with many kinds of damage to paper – worm and insect holes, tears and mold, burned or lost parts of pages, and weakness and brittleness. They very carefully choose materials to repair or support the book pages, selecting papers that are of just the right weight and color. To repair holes in book pages, a paper conservator applies thin paste around the hole or tear and attaches a piece of handmade paper to fill in the damage. (See figures 23, 24, and 25.) Sometimes a weak book page is backed with a thin sheet of soft, strong bast fiber paper (mianzhi 棉皮) and the split center fold repaired using the same paper. (See figure 26.) A very valuable book whose pages are weak can be rebound with each of its pages inter-leaved with a thin sheet of handmade paper. (See figure 27.) This “gold-edged-in-jade” (jinxiangyu) conservation binding is time-consuming, but it supports and protects the pages of the book very well. In all these repair and binding processes, when the grain of the repair, backing, or inter-leaving paper runs in the same direction as the grain of paper in the book, the repaired book is as flexible as it was originally.

This look at hand papermaking in several regions of China shows some aspects of how the raw materials, the production techniques, and the skill of the artisans determine the qualities of handmade Chinese papers used in so many traditional cultural arts in China – calligraphy, painting, printmaking, book printing, book binding, and the repair of old and rare Chinese books. Practitioners of these arts are well informed about the characteristics of the papers they use through their experience in using the papers. And scholars doing research on these literary products of Chinese culture are finding that understanding something of the complexity of Chinese handmade paper enhances their insights and understanding of China's paper-based cultural artifacts.

ABOUT THE AUTHOR

Nancy Norton Tomasko is editor of the East Asian Library Journal at Princeton in the United States. She earned a Ph.D. in Chinese literature at Princeton University and has taught in her field at Connecticut College and at Bryn Mawr College. At Bryn Mawr, she pioneered a studio course on Chinese books and their construction. Her interest in bookbinding centers on the physical aspects of traditional Chinese books, in particular, paper, printing techniques, and binding styles. Her ongoing research project on the traditional arts of the Chinese book takes her to China frequently to visit and to purchase papers from mills where handmade papers are produced, to meet librarians and book conservators, to visit publishing houses where traditional wood blocks for printing are kept. In addition, she collects pre-World War II books, maps, guide books, directories, and travel-related ephemera for countries in East Asia.
ILLUSTRATIONS

Figure 1: Stack of calligraphy practice paper (yuanshuzhi), Fuyang, Zhejiang.

Figure 2: Stack of calligraphy practice paper (yuanshuzhi), Fuyang, Zhejiang. Leaves of the blue sandalwood tree (qing-tanshu) whose inner bark is used in making xuanzhi, Jingxian, Anhui.

Figure 3: Papermaker holding bundles of cooked mulberry-bark fiber (sangpi), Qian'an, Hebei.

Figure 4: Basket of alpine rush fiber (sucao or longxucao), Jiajiang, Sichuan.

Figure 5: Washing rice straw (liaocao), Jingxian, Anhui.

Figure 6: Packages of pre-processed plant fibers (zhiban) for papermaking, Fuyang, Zhejiang.
Figure 7: Retting bamboo fibers in a large concrete vat, Jiajiang, Sichuan.

Figure 8: Sun-bleaching rice straw on the hillsides, Jiajiang, Sichuan.

Figure 9: Weaving a mold for hand papermaking, Jingxian, Anhui.

Figure 10: Husband-and-wife team forming a sheet of true xuan paper, double-dip method, Jingxian, Anhui.

Figure 11: Forming a sheet of bamboo paper (zhuzizhi), single-dip method, Fuyang, Zhejiang.

Figure 12: Forming a sheet of calligraphy paper (shuhuazhi), single-dip method, Fuyang, Zhejiang.

Figure 13: Forming a sheet of Korean-style paper (Gaolizhi), two-direction flow, Qian'an, Hebei.

Figure 14: Forming a sheet of calligraphy paper, two-man, three-direction flow method, Jiajiang, Sichuan.

Figure 15: Forming a sheet of calligraphy paper, one-man, three-direction flow method, Jiajiang, Sichuan.
Figure 16: Pressing a post of Korean-style paper, Qian’an, Hebei.

Figure 17: Drying paper on a very hot metal wall, Fuyang, Zhejiang.

Figure 18: Drying paper on a moderately hot metal wall, Jingxian, Anhui.

Figure 19: Paper drying on rows of specially made, plaster-covered drying walls in the courtyard of a papermaker’s home, Jiajiang, Sichuan.

Figure 20: Sheets of paper drying on large wooden planks hanging under the eaves of a papermaker’s home, Jiajiang, Sichuan.

Figure 21: Sheets of Korean-style paper drying on plaster-covered walls built outdoors, Qian’an, Hebei.
Figure 22: Printing a book page from a wooden printing block at Jinling Buddhist Press, Nanjing, Jiangsu.

Figure 23: Repairing insect damage to a book page: applying thin paste to the edges of the hole, Zhejiang Library, Hangzhou, Zhejiang.

Figure 24: Applying a sheet of thin, fine-quality handmade paper to repair the hole in the book page, Zhejiang Library, Hangzhou, Zhejiang.