

## **Chinese papers: their development, characteristics and permanence**

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### Abstract

Since the invention of paper, commonly attributed to *Cailun* 蔡倫 during the Eastern *Han* Dynasty 東漢 (A.D.25-220), the Chinese have developed various techniques in making papers for different uses. Generally speaking, there are seven main categories, namely: Hemp paper (*Ma zhi* 麻紙), Mulberry paper (*Sangpi zhi* 桑皮紙), Paper mulberry (*Chupi zhi* 楮皮紙), Ratten paper (*Tang zhi* 藤紙), Bamboo paper (*Zhu zhi* 竹紙), Wheat or rice straw paper (*Cao zhi* 草紙 ) and *Xuan* paper (*Xuan zhi* 宣紙). Nowadays, some papers are still available in the market. Most of them are further sub-divided into various groups with different names. Manufacturers are keen to offer new kinds of product by just slightly modifying the manufacturing process, fiber composition as well as paper characteristic, like laid pattern. Despite making from the same kind of plant fiber, Chinese papers can have different names, such as: Cotton stock *Xuan* paper (*Mianliao* 棉料), Fine Bark *Xuan* paper (*Jingpi zhi* 淨皮) and Super Bark *Xuan* paper (*Techong jingpi zhi* 特種淨皮). They are mainly made of the same plant fiber, *Pteroceltis tatarinowlii Maxim* 青檀樹皮 but in various percentages of content. It is always difficult to understand the composition of the paper by just referring to the “name” of the paper. Their names are not always clear indicators. This can make it difficult to choose the correct paper to use for conservation treatment or to recognize what was used to make a book or work of art. In the first part of this paper, the development of papers and their respective names in China over the past two thousand years was reviewed and will be reported.

There are a lot of paper mills in various provinces of China. It is not an easy task to select an appropriate paper for painting or conservation treatment. Even though a correct type of paper could be identified, the quality of it may not be guaranteed. As far as permanence is concerned, in the rest of the study, over fifteen different kinds of Chinese papers available in the market have been collected and studied. Samples with renowned brand name, “*Hong Xing* 紅星牌” which it has been claimed as the best quality of paper made in China, were specifically selected for the testing. They were manufactured by a state-run paper mill in *Anhui* province 安徽省 in China. All of the samples were hung freely in an aging chamber for 28 days under 90°C and 50% R.H. The pH, brightness (L\*a\*b\*) and the tensile strength of paper samples were measured before and after the experiment. A ranking system was derived from the data to rank the permanence of the selected fifteen paper

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