



## 7 TS'AI LUN

*fl. c. 105 A.D*

Ts'ai Lun, the inventor of paper, is a man whose name is probably unfamiliar to most readers. Considering the importance of his invention, the extent to which he has been ignored in the West is indeed surprising. There are major encyclopedias which do not have even brief articles on Ts'ai Lun, and his name is seldom mentioned in standard history textbooks. In view of the obvious importance of paper, this paucity of references to Ts'ai Lun may arouse suspicion that he is a purely apocryphal figure. Careful research, however, makes it absolutely clear that Ts'ai Lun was a real man, an official at the Chinese imperial court, who, in or about the year 105, presented Emperor Ho Ti with samples of paper. The Chinese account of Ts'ai Lun's invention

(which appears in the official history of the Han dynasty) is entirely straightforward and believable, without the least hint of magic or legend about it. The Chinese have always credited Ts'ai Lun with the invention of paper, and his name is well known in China.

Not a great deal is known about Ts'ai Lun's life. Chinese records do mention that he was a eunuch. It is also recorded that the emperor was greatly pleased by Ts'ai Lun's invention, and that as a result Ts'ai Lun was promoted, received an aristocratic title, and became wealthy. Later on, however, he became involved in palace intrigue, and this eventually led to his downfall. The Chinese records relate that upon his being disgraced, Ts'ai Lun took a bath, dressed in his finest robes, and drank poison.

The use of paper became widespread in China during the second century, and within a few centuries the Chinese were exporting paper to other parts of Asia. For a long time, they kept the technique of papermaking a secret. In 751, however, some Chinese papermakers were captured by the Arabs, and not long afterwards paper was being manufactured in both Samarkand and Baghdad. The art of papermaking gradually spread throughout the Arab world, and in the twelfth century the Europeans learned the art from the Arabs. The use of paper gradually spread, and after Gutenberg invented modern printing, paper replaced parchment as the principal writing material in the West.

Today, paper is so common that we take it for granted, and it is hard to envisage what the world was like without it. In China, before Ts'ai Lun, most books were made of bamboo. Obviously, such books were extremely heavy and clumsy. Some books were written on silk, but that was too expensive for general use. In the West, before paper was introduced, most books were written on parchment or vellum, which were made of specially processed sheepskin or calfskin. This material had replaced the papyrus favored by the Greeks, Romans, and Egyptians. Both parchment and papyrus, however, not only were scarce, but were also expensive to prepare.

That books and other written materials can today be produced so cheaply and in such large quantities is due in considerable part to the existence of paper. It is true that paper would not be as important as it is today were it not for the printing press; however, it is equally true that the printing press would not be nearly so important were it not for the existence of a cheap and plentiful material on which to print.

Which man, then, should be ranked higher: Ts'ai Lun or Gutenberg? Although I consider the two of almost equal importance, I have ranked Ts'ai Lun slightly higher for the following reasons: (1) Paper has many other applications besides its use as a writing material. In fact, it is an amazingly versatile material, and a large percentage of the paper currently produced is used for purposes other than printing. (2) Ts'ai Lun preceded Gutenberg, and it is altogether possible that Gutenberg would not have invented printing had paper not already existed. (3) If only one of the two had ever been invented, I suspect that more books would be produced by the combination of block printing (which was known long before Gutenberg) and paper than by the combination of movable type and parchment.

Is it appropriate to include both Gutenberg and Ts'ai Lun among the ten most influential people who ever lived? In order to realize the full importance of the inventions of paper and printing, it is necessary to consider the relative cultural development of China and the West. Prior to the second century A.D., Chinese civilization was consistently less advanced than Western civilization. During the next millenium, China's accomplishments exceeded those of the West, and for a period of seven or eight centuries, Chinese civilization was by most standards the most advanced on earth. After the fifteenth century, however, western Europe outstripped China. Various cultural explanations for these changes have been advanced, but most such theories seem to ignore what I believe is the simplest explanation.

It is true, of course, that agriculture and writing developed earlier in the Middle East than they did in China. That alone, however, would not explain why Chinese civilization so per-

sistently lagged behind that of the West. The crucial factor, I believe, was that prior to Ts'ai Lun there was no convenient writing material available in China. In the Western world, papyrus was available, and although that material had its drawbacks, papyrus rolls were infinitely superior to books made of wood or bamboo. Lack of a suitable writing material was an overpowering obstacle to Chinese cultural progress. A Chinese scholar needed a wagon to carry around what we would consider a quite modest number of books. One can imagine the difficulty of trying to run a government administration on such a basis!

Ts'ai Lun's invention of paper, however, changed the situation entirely. With a suitable writing material available, Chinese civilization advanced rapidly, and within a few centuries, was able to catch up with the West. (Of course, political disunity in the West played a role, but that was far from being the whole story. In the fourth century, China was less united than the West, but nevertheless was developing rapidly in cultural matters.) During the succeeding centuries, while progress in the West was comparatively slow, the Chinese brought forth such major inventions as the compass, gunpowder, and block printing. Since paper was cheaper than parchment, and available in larger quantities, the tables were now turned.

After Western nations began using paper, they were able to hold their own vis-à-vis China, and even succeeded in narrowing the cultural gap. The writings of Marco Polo, however, confirm the fact that even in the thirteenth century, China was far more prosperous than Europe.

Why, then, did China eventually fall behind the West? Various complex cultural explanations have been offered, but perhaps a simple technological one will serve. In fifteenth-century Europe, a genius named Johann Gutenberg developed a technique for the mass production of books. Thereafter, European culture advanced rapidly. As China had no Gutenberg, the Chinese stayed with block printing, and their culture progressed relatively slowly.

If one accepts the foregoing analysis, one is forced to the

conclusion that Ts'ai Lun and Johann Gutenberg are two of the central figures in human history. Indeed, Ts'ai Lun stands out well above most other inventors for another reason. Most inventions are a product of their times, and would have come about even if the person who actually invented them had never lived. But such is clearly *not* the case with regard to paper. Europeans did not start to manufacture it until a thousand years after Ts'ai Lun, and then only because they had learned the process from the Arabs. For that matter, even after they had seen paper of Chinese manufacture, other Asian peoples were never able to discover how to manufacture it by themselves. Clearly, the invention of a method of manufacturing true paper was sufficiently difficult that it was not bound to occur in any moderately advanced culture, but rather required the explicit contribution of some very gifted individual. Ts'ai Lun was such an individual, and the method of paper-making that he employed is (aside from mechanization, introduced about 1800 A.D.) basically the same technique that has been used ever since.

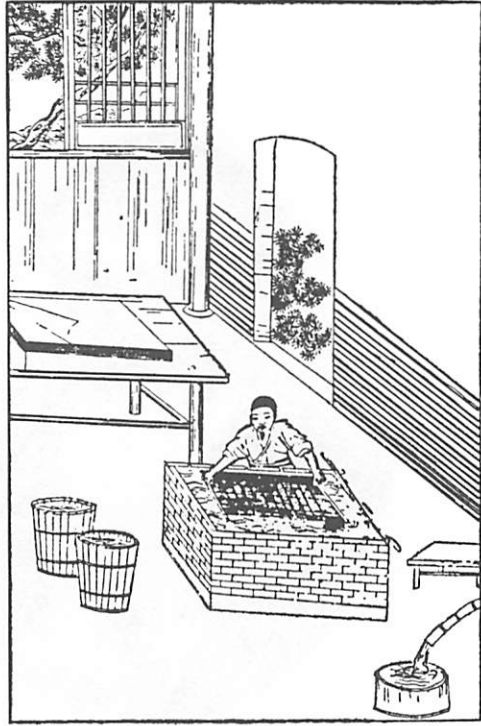
These are the reasons I think it appropriate to place both Gutenberg and Ts'ai Lun among the first ten persons in this book, with Ts'ai Lun ahead of Gutenberg.



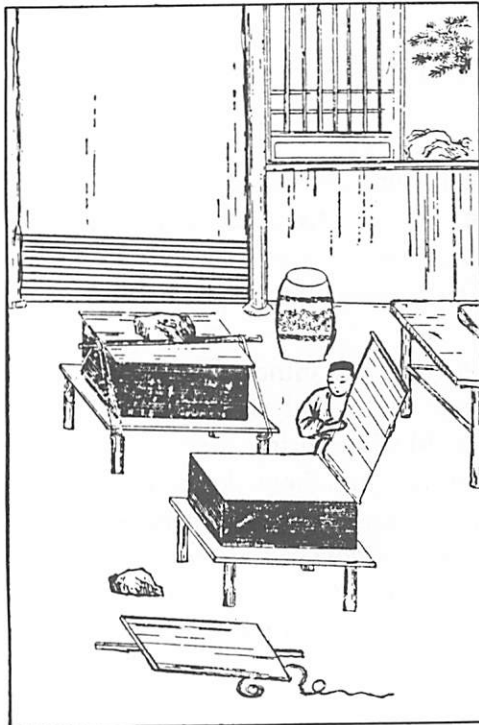
*Cut bamboo is washed and steeped in a water pit to prepare material for making paper.*



*Digesting the bamboo pulp.*



*Making a sheet of paper.*



*Pressing the sheets of paper.*



*Drying the sheets of paper.*