

## Volume 3, Chapter 9: The Method for Making Strings

The very best kind of silk for strings is made from the che (柘) tree.<sup>1</sup> The next best is made from silkworms fed on mulberry leaves. The third best is made from original silkworms, [second silkworms].<sup>2</sup> The che kind is clear and the mulberry variety is soft. The strings get finer as one proceeds from number one to number seven. There are also a set number of cords used to make up each string. Also strings one to four have an added wrapping.

The method of manufacture: There are three kinds, T'ai-ku, Chung-ch'ing, and Chia-chung. Chung-ch'ing is the most suitable. In all cases use "material glue"<sup>3</sup> and boil the strings with it after the strings are made.

**The method for matching up the cords:** Silkworms make their cocoons out of one thread. Every cord is made of twelve threads. If there are too many threads, then the cord will be too thick. If there are not enough, then it will be too thin. The first string should be made up of one hundred and eight cords. For the second string use ninety-six cords. For the third string use eighty-one cords. For the fourth string use seventy-two cords. For the fifth string use sixty-four cords. For the seventh string use forty-eight cords. These are Chung-ch'ing. For T'ai-ku add twenty percent to every string. For Chia-chung add fifty percent on every string. Every set of Chung-ch'ing weighs about three and a half ounces. T'ai-ku weight about four and one fifth ounces. Chia-chung weigh about five and one fifth ounces.

**The method for winding up the strings:** First take eighty feet of string cords that have been matched up and divide this up into three or four bunches. For every cord use a suspended foot of weight four ounces.<sup>4</sup> Revolve it to the left and twist the cords extremely tight. Let it turn to the right and come together becoming a string approximately sixty feet in length. Cut this up to make ten strings.

**The method for boiling strings:** Take the strings, which have already been wound together and wrap them on a bamboo rod six inches in length. Use a new earthenware cooking pot with a flat bottom [a new iron basin is also satisfactory]. It should be eight inches in height with a diameter of four inches. It should have the capacity for eight rods with strings wrapped around. Use material glue and water and immerse the rods with strings to two tenths of an inch. If too deep, then the strings will be soft. If too shallow, then they will be hard. Use a flame that is neither too mild nor too hot and boil them. Wait until the wheat has been cooked until done and then stop. If it is not cooked long enough, then the strings will not be able to make the wood resound very well and after a short while there will be no sound. If cooked too long, then the sound of the strings will not be clear and the strings will be easily broken. When boiling, check to make sure that standards are being met; that is, at their best the strings should be opaque and lustrous.

<sup>1</sup> *Cudrania triloba*. Cf. Porter E Smith *Chinese Materia Medica* (see bibliography), p. 137. He mentions that these leaves are especially valued for "lute" (ch'in) strings.

<sup>2</sup> This is the summer or second crop of silkworms.

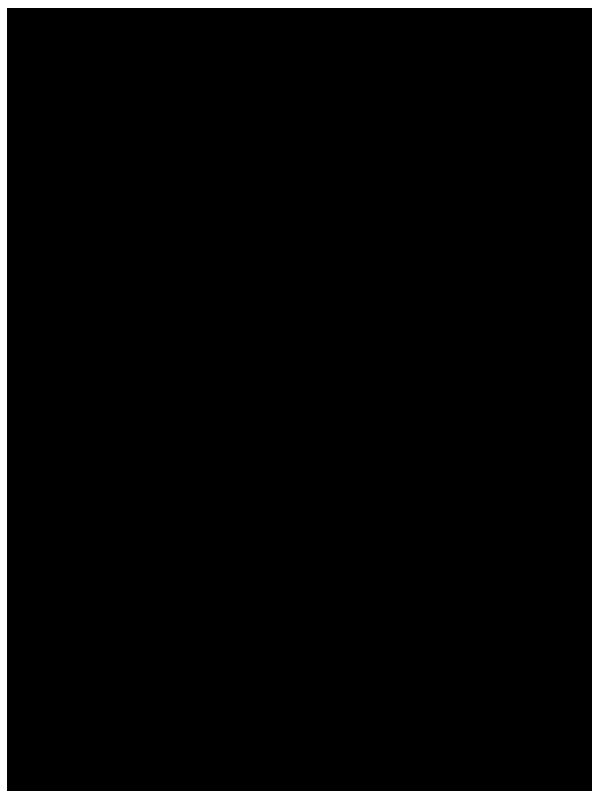
<sup>3</sup> Defined later on in this chapter.

<sup>4</sup> This is the weight that is put on the end of the strings.

Now take the strings and put them in cold water so as to bleach out some of the glue on the outside. Now quickly take the strings out and hang the ends up so that they can dry in the sun.

**To make material glue:** Use five ounces of clear fish glue.<sup>5</sup> [ *First boil it and then strain it clean.* ] Also use a spoonful of wheat, [ *choose and wash clean* ], five ounces of glistening whitewax,<sup>6</sup> five ounces of pai-chi (白芨)<sup>7</sup> [ *sliced* ], one ounce of pai-p'i (白皮)<sup>8</sup> [ *peeled, washed, and grated* ], and ten t'ien-men-tung (天門冬)<sup>9</sup> [ *sliced* ]. Use pure water and put everything in the bowl. Heat it until it is done. This glue can be used for boiling ten sets of strings. As for whatever strings one may have, after being immersed in this glue and sunned dry, their sound will be like new. Or take mulberry leaves and pound them into juice. Soak the old strings in the juice. Their color will be an emerald green.

**Figure 1: cart bed**



The method for wrapping the strings: First take six cords to be the woof or wrapping. [ *Woof means crosswise; warp means straight.* ] These should be very long. The strings should already have been boiled. Wrap them on a small bamboo rod. Now make a card bed<sup>10</sup> out of date wood. It should be strong and heavy. Take the rod with the woof

<sup>5</sup> Made from the swimming bladder of a fish.

<sup>6</sup> "White wax" or "cire blanche" is an insect secretion from *Coccus sinensis*. Cf. *ibid*, pp. 237-8.

<sup>7</sup> *Bletilla hyacinthina*, a kind of orchid with violet flowers used in Chinese medicine. The bulb is used to make glue. Cf. *ibid*, p.

<sup>8</sup> White bark from the roots of the mulberry.

<sup>9</sup> *Asparagus lucidus*, a creeper; the tuber is used in Chinese medicine. Cf. *ibid*, pp. 55-6.

<sup>10</sup> See Figure 1.

wrapped on it and mount it on the cart bed, so that it is movable and can turn. Now take a string that is twelve feet in length with both ends fastened tight and hung up straight horizontally, [*or suspend it from pillars left and right*] and put it through the warp string bunches. Afterwards shake the string and cause the cart bed to turn over itself. Therefore the woof on the rod will follow the revolutions and go out. Wrap it on the string body little by little. Although the rod for the woof is mounted so that it is movable, nevertheless the tips of the rod should be made somewhat tight so that the woof does not move too easily. In this way, the wrapping will be made. Also two round iron rods are used on the cart in order to pinch the woof in the crack between them, thus making sure that the woof is flattened and not round. Everything depends on this. If done properly, then it should be uniform, without scars. If the woof breaks, take the string, and using a needle, put it back through the warp, taking care that there are not any traces, then continue wrapping. Leave a foot or more between the heads of strings. Start and finish wrapping and then cut in the middle to make two. This is very convenient. Strings three, four, six, and seven are played a lot, moreover they are finer and they are thus more easily broken. So their overall length should be a foot or longer than strings one, two, and five, in order to ensure that when they break, there will still be string remaining. Beginning with students, when they use their fingernails too vigorously and damage the strings. So if one is careful when practicing, and avoids striking noises, then the strings will last for a long time.

As for the cart bed, carve it as a whole out of one piece of wood. It should be concave in shape, with the two heads high and the center low. In the middle of each of the two raised ends, drill out an eye for fitting the string warp. Under the eyes put the rounded, crosswise iron rods, which should be parallel. These have a narrow crack in the middle for the purpose of pinching the woof flat. Underneath in between the necks of the iron rods, open small holes just as big as the rod for the woof. These holes are female and tips of the rods are male. Thus one can be sure that the rods will be suitably mounted and free to revolve. It also makes possible their tightness. If the cart bed is too light, then mount some metal on the bottom of it. It is essential that the revolving of the cart bed should have some force in it.

