Volume 2, Chapter 9: Positioning the Hui Correctly

The ch'in has thirteen hui. The seventh hui is positioned in the middle[1]. All of the rest are positioned relative (to the seventh) on the left and right sides (of the seventh). Numbers six and eight, five and nine, four and ten are all paired. Three and eleven, two and twelve, and one and thirteen are also paired[2]. The distances between the positions are not equivalent. From the inner border of the bridge to the inner border of the nut, one can establish divisions of eight, six, and five parts[3]. As for the division into eight parts, its demarcations, numbers one, two, four, six, and seven, *C:[three and five are not used.]* correspond to hui positions one, four, seven, ten, and thirteen respectively[4]. As for the division into six parts, its demarcations, numbers one, two, four, and five, *C:[Number three is for the seventh hui.]* correspond to hui positions two, five, nine, and twelve respectively[5]. As for the division into five parts, its demarcations, numbers one, two, three, and four, correspond to hui positions three, six, eight, and eleven respectively[6].

First on the face of the ch'in, chalk on straight lines for the positions of the first and fourth strings. Furthermore, spaced about 2/10's of an inch all along the outside of the first line, draw in another straight line that will be the centerline for positioning the hui. *C:[Straight lines should be taken as meaning lengthwise; crosswise lines should be taken as meaning crosswise (on the ch'in).]* Now take a strip of mounting paper[7], *C:[It should have two or three layers.]* which is half an inch wide and as long as the face of the ch'in; that is, it is necessary that it should be made as long as the distance from the inner bridge to the inner border of the nut, and according to the method, divide it up into eight, six, and five fold divisions. *C:[The dividing must be done very precisely, otherwise there will be inaccuracies.]*[8]

---

[1] Middle here means the middle of a string on the top of the ch'in; that is, from the nut on the string side to the place on the bridge where the string rests and makes contact. Keep in mind that hui mark various harmonic nodes, and must be placed at the string harmonic positions. For example, the seventh hui perfectly divides the string into two parts and thus the harmonic is at an octave above the unstopped string itself.

[2] The pairs have the same harmonic note value.

[3] The idea here is that one can divide up the playable part of the top strings into eighths, sixths, and fifths, and various divisional nodes will correspond to the hui positions, thus the hui can be positioned correctly. Eighths mark octave positions. Sixths mark major fifths. Fifths mark major thirds.

[4] This set of divisions mark the hui that divide the string into octaves. Hui 7 is at the first octave. Hui 4 and 10 are at the second octave (higher). Hui 1 and 13 are at the third octave.

[5] This set of divisions mark the hui that sound a major fifth. Hui 2 and 12 are in the second octave, and hui 5 and 9 are in the first octave (relative to hui 7).

[6] This set of divisions mark the hui that sound a major third. All have the same pitch, which is a major 3rd in the second octave.

[7] The kind used for mounting Chinese paintings.

[8] The translator admits that harmonic series (dividing into quarters, etc.) can approximate the positions of the harmonics, but would also like to point out the following: it is a well known truism in the shop, that several small errors can lead to a large mistake. Given this problem, it seems reasonable to put on string one, and sanity check the harmonic nodes on the string with the hui positions before the hui are actually installed.

According to the fixed places of the hui positions, draw a dark line. Take a straight edge (lengthwise) of the paper slip and place it on the straight line for the fourth string. C: [The fourth string occupies the center of the bridge and nut. The first lies to the side.] Glue one edge on by the inner bridge border and the other by the inner nut border. If it is a little too long or short, then the paper slip's hui positions will be inaccurate. Now take the long edge of a T-square and place it on the fourth string line. Its crosswise side should be placed next to the lines drawn for the hui positions on the paper strip. Under the crosswise side there is a copper strip (on the square), which will be put on the straight line that is beyond the line for the first string. Trace these in so that crosses are formed with the straight, lengthwise line for the hui positions. All the hui positions should be fixed according to this method, so then the thirteen hui positions will be accurate. Continuing, mark crosses in the middle of the hui, which should already have been made. Then take the crosses on the hui and match them up precisely with the crosses at the hui line on the surface of the ch'in. Now consider the sizes of the hui and use a compass to make them round. Use a half round bit and drill into the surface. The depth should be equal to the thickness of the hui. Use lacquer and mix it with flour to glue the hui on the surface. If around the hui there is any excess sticking out, take a fine file and file it clean. Do not harm the surface of the ch'in. The placing of the hui must wait until the lacquer-powder mixture has been rubbed smooth. It should also wait until after the bridge and nut have been affixed. The preciseness of the positioning of the hui depends on the following: the length between the bridge and nut must be calibrated correctly, the method of divisions (into sections on the strip) must be very precise, and the crosses of the hui positions must be matched up right. There must be no deviations. So with this then the special technique of positioning the hui is completed.

In the making of the hui, some use gold and jade. This cannot be considered as auspicious for the ch'in[9]. Moreover it is not elegant to look at or striking to the eye. Using oyster shell makes for a beauty in color and a shifting of light that is lovely. But its brightness has its differences, depending on convexity, concavity, or whether or not it twinkles. So then the form may have its differences, but pick out the part that is bright and convex. The twinkling part should face in, *C:[towards the first string].* The oyster shell at first should be cut into a square piece. Then draw in the circles and cut them out in the precise sizes. The diameters should be approximately 1/10th of an inch, taking extreme roundness as perfection. They should be made as pairs, altogether equaling six pairs plus one left over, making thirteen. The seventh hui is a little bigger than the others, but if it is too big, then that would not be elegant.

[9] Possibly because as precious objects, they may lead a thief to damage the ch'in.

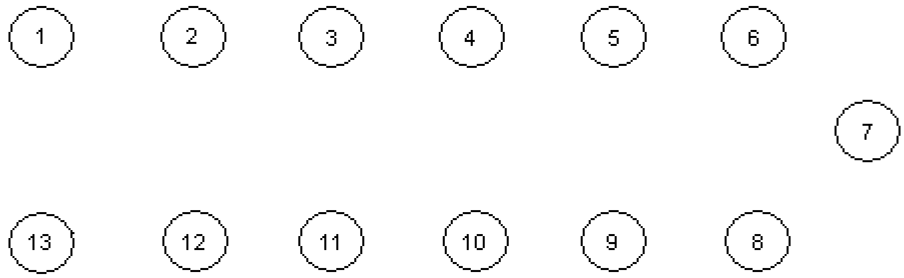

Figure 1: The thirteen hui are pictured and numbered. In terms of relative positions, the number 1 hui is close to the bridge. The number 7 hui is centered according to the length of the strings on the top. The number 13 hui is close to the nut. In this picture, the hui are all the same size, but that certainly does not have to be the case for all ch'in.