

## The temperaments of the *shakuhachi* pipes owned by the Hôryû-ji Temple and the Shôsô-in Repository

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This article investigates in detail the pipe lengths and the temperaments of the *shakuhachi* preserved at the Hôryû-ji Temple, as well as those of the eight specimens owned by the Shôsô-in Repository, in order to examine their provenance, including the countries of origin.

It has thus far widely been understood that the *shakuhachi* was invented by LU Cai (呂才: circa 600 - 665) of the Tang (唐) Dynasty. Therefore, the measurement of the instruments of both the Hôryû-ji Temple and the Shôsô-in was long considered to have been based on *Tang-xiao-chi* (唐小尺) measurement, even though some of them at the Shôsô-in do not match it.

Given such discrepancies, I propose, based on *the Old Book of Tang* (945) and *the New Book of Tang* (1060), as well as the residual sum of squares of the distinct temperaments, to classify *shakuhachi* instruments into categories: pre-LU and post-LU. Through this classification it becomes clear that the pre-LU pipes are one *chi* (尺) and eight *cun* (寸) long and are unstable in temperaments, while the post-LU ones can vary in length according to the ancient Chinese pitch pipes (twelve size in total) and are stable in temperaments in accordance with the method of *sanfen-sunyi* (三分損益, a kind of the circle-of-fifths system). This finding also indicates that the *shakuhachi* preserved at the Hôryû-ji Temple was a pre-LU one, whereas the ones at the Shôsô-in conformed to post-LU.

In addition, I argue, based on my close study of *the Book of Sui* (656) and of the 95 % confidence interval of the residual error for the theoretical values of the pipe lengths, that it is reasonable to classify the pipe length of the specimens both at the Hôryû-ji Temple and the Shôsô-in into two measurements, that is, those based on the *Tang-xiao-chi* and those based on the *Weï-chi* (魏尺). Since the four *shakuhachi* instruments given by Uija-wang (義慈王, Uija of Baekje, 599-660) have pipe length in accordance with the *Weï-chi*, we can say with fair certainty that the *Weï-chi* was used in Baekje (百濟).