Gilding and the Bureau of Artisans in Ancient Japan:
On the Ratio of Gold and Mercury

HORIBE Takeshi

Gilding, one of the most representative decorative techniques for metals used in ancient Japan, consists in the mixture of mercury and gold to produce gold amalgam, which is then applied to the surface of copper artifacts. These are heated up to let the mercury evaporate, and finally polished. In this paper I have, on the basis of early modern written sources, metallurgical experiments, and visits to workshops active in the traditional arts of metal decoration, examined the ratio of mercury and gold, and the process of production with regard to regulations for gilding found in the seventeenth scroll of the Engishiki (Bureau of Artisans).

When discussing gilding in ancient Japan, Kobayashi Yukio’s book Kodai no gijutsu (Techniques of ancient Japan) can still be considered a classic. In this work, Kobayashi uses not only archeological materials, which are his specialty, but also written historical materials, and he compares ledgers from the Nara period that mention gilding to the regulations found in the “Procedures for the Bureau of Artisans” from the Engishiki. However, he confines himself to raising some issues based on his interpretation of the latter without reaching a conclusion. A problem in Kobayashi’s analysis is constituted by the fact that while Nara period records indicate that the materials used for gilding are gold and mercury, in the “Procedures for the Bureau of Artisans” it is written that mercury and mekki should be used. This raises various questions: what does mekki refer to? How is mercury used? Why are the regulations on gilding phrased in this way?

We think it is highly possible that mekki in the “Procedures for the Bureau of Artisans” indicates gold amalgam produced mixing one part of gold with three parts of mercury; that mercury was mixed with plum vinegar, which was used to remove oil content from the surface of containers, in order to make the plum vinegar adhere when the containers were cleaned; and that the concentration of mercury in the amalgam was adjusted on the basis of the target object and specific part. In many of the articles in the “Procedures for the Bureau of Artisans” that deal with gilding, mercury is half the quantity of the amalgam, so that the total ratio of gold to mercury is one to five. This ratio is almost identical to the one used in temple construction works during the Nara period, and for gilding the great buddha statue at Tōdaiji. These regulations on mekki and mercury are unique to the “Procedures for the Bureau of Artisans”, and it can be said that the text of these procedures was shaped by the actual production process.

Key Words: the Engishiki, the Bureau of Artisans, Gilding, mekki