

Analysis of the Shosoin *Kasen* Felt Rugs with Floral Designs: Materials

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The Shosoin Repository holds a number of felt rugs that were considered to be imported to Japan from China in the 8th century. Felt is generally made of sheep wool or camelid hair using the felting or fulling technique. Previous research has indicated that the type of animal hair used for the Shosoin felt rugs was sheep wool (Bulletin of Office of the Shosoin Treasure House, No. 37, 2015).

The Shosoin is working on a patterned felt rug reproduction project and this paper reports the results of the preliminary study on selecting the materials from wools available in the market today that share similar qualities with that of ancient wool types. In this study, 10 types of sheep wool were chosen and for each various characteristics were examined including length, coarseness, fineness, thickness and variation in thickness distribution along the fiber, elasticity, luster, existence of medulla, etc. For comparison the same survey was also conducted with the felt objects.

As a result, it was found that among the 10 samples, the quality from the Turkish Fat-tailed sheep was the closest to that of the Shosoin felt rugs. The Turkish wool contains both coarse outer hair (hair) and soft inner hair (wool) which compares with the Shosoin felt rug quality. It became apparent that in the felts with floral designs, finer quality fiber (perhaps lamb's wool) was selectively used for the patterns compared to that used for their white rug base. Spanish Merino was chosen as one of the finer compatible wools for the floral design layer.

During this study, it was noted that one of the felt rugs contained fragments of sheep skin. This may indicate that scissors were used to shear the wool on the Asian continent in the 8th century. Furthermore, crimp specific to lamb's wool was also found in the felt rugs, proving that lamb's wool was used for felt making in that period.

Analysis of the Shosoin *Kasen* Felt Rugs with Floral Designs: Feltmaking Techniques

Jorie Johnson

Since 2015, the second stage investigation of animal fiber in the Shosoin treasures focused on the patterned felts called *kasen*. The sophisticated intricate patterns may suggest that these *kasen* were produced in workshops likely to close to a metropolis, rather than in a nomadic setting. Although more exist, 21 floral-patterned felt rugs, and two large fragments were analyzed. It was noted that a range of wool quality existed, slight variances in thickness and density show up, a few carpets employing multiple expressions in one design, as well as, mono-color patterns utilizing single motif techniques. Having such varied characteristics surely they were sourced from different workshops.

Presumably starting with a fat-tailed breed, usually wool classification began by hand, followed by tools such as flexible sticks used to beat and separate the clumps of wool. Finally, carding bows further fluffed out the fibers. The range of *kasen*, and previously studied single-color felts called *shikisen*, proved that better preparation in the initial stages contributed to higher quality, however the *kasen* patterns appear very different from typical nomadic designs of today.

All the *kasen* have coarser quality white wool bases (now naturally yellowed), yet the patterns show how with simple ingenuity complicated designs can be executed with dyed wool. Three motif types were studied in detail. In the most elaborate pair “pencil roving” or dyed wool in an untwisted yarn stage, was used exclusively in the floral mandalas, with the exception of dyed, combed wool used to fill in limited background areas. Pencil roving uses line drawing effects to show outline of form and color gradation very well. Basic dyed wool was used in one other carpet to depict looser gradations of color in cloud patterns and mountain ranges.

The third technique, proven the most efficient because all but two *kasen* employ this method, used a “soft” felt, generally of finer quality, called *prefelt*. Leaf shapes and strips, manipulated into floral forms, were easily cut from this weight. Surprisingly, making a thin, wide felt, dyeing it, and cutting shapes is speedier and more consistent than the task of pulling out lengths of dyed roving. Particularly the carpet center sections, as compared to the outer edges, often showed a lack of proper shrinkage. This confirmed the use of *prefelt* cut forms, as they were only minimally attached to the surface, as compared to an “inlay” technique wherein a negative, concave shape is hollowed and then filled in with dyed wool. In contrast, other well-fulled *prefelt* motif carpets showed a light “mist” of white across the surface, evidence that the white base wool had penetrated and entangled well producing a much tighter, smoother surface.

Four felt size divisions were deduced: single-width rug size, and double-width patterned or “bed pad” size, also bench or alter covers, and a square cushion size. All sizes were likely based on the proportions of the reed (or bamboo) mat used for support in the initial laying out stage of each. The final sizes also depended on whether the felt had been cut in half, or in sixths, during the making. Edge analyses show both folded over and cut characteristics.

The team repeatedly sampled for wool qualities, shrinkage, thicknesses, edge and motif execution, and natural dyeing of wool for roving and *prefelt*. The results were compared to current feltmaking

practices in Turkey and China today. An original 200-year-old, hand-drawn notebook by Chinese felt artisans in Nagasaki proved helpful in the conclusion that feltmaking procedures and equipment haven't changed much over the centuries.

Chronology of the Roof Tiles Laid on the Shosoin Repository and Their Value as Historical Materials

Jun'ichi Ashida

This paper mainly discusses the chronology of the roof tiles laid on the Shosoin Repository and their value as historical materials. The study is based on survey results of the conservation project on the Shosoin Repository from 2011 to 2014, and on the examination of the roof tiles implemented due to the opportunity this project presented. The roofing system of the previous repair in the Taisho period followed that conducted in the Edo period, resulting in a state in which old tiles produced in various eras were mixed.

To investigate the time period and scale of the roof repairs, the study focused on the round roof tiles and flat roof tiles which are greater in number than the eaves-end tiles. Specifically, this paper describes the method for type classification and chronology based on the standard specifications and chamfering adjustments of the tiles. With chronology, the scale of the repairs conducted in the past is elucidated based on the roof tiles on which the name of era was inscribed, the history of natural disasters, and the number of the surviving tiles.

Through the discussions based on the discovered materials including spatula inscriptions and engraved marks, it is conceivably estimated that the original roof tiles from the Nara period, were related to those produced by the tile workshops who supplied roof tiles to *Kofuku-ji* Temple; and that they were produced in the second quarter of the eighth century. The roof tiles from the repairs in the Kamakura and Momoyama periods show the standardization of specifications resulting from the mass production of tiles as well as the rammed traces/ patterns and engraved marks that indicate the existence of the management systems of manufacturers in those days. The inscriptions remaining on the ogre tiles and coping tiles from the Momoyama period repair revealed that since the medieval period, *Nishi-no-kyo* town had served as a production base of roof tiles; and elaborate tile-production techniques which spawned the term, “roof tile carpenters”. In addition, by examining the inscriptions on the roof tiles from the middle Edo period, the bases of the tile workshops in Nara in the early modern period became apparent. Furthermore, the tile manufacturers in those days were found to be rather household handcraft industry.

Textile Artifacts and Inscriptions relating to *Chō* and *Yō* Taxes
of the Shosoin Treasure House,
Part III: Photographs and Illustrations

—Supplementing Junsei Matsushima’s *Compilation of Inscriptions of the Shosoin Treasures*

Kazuki Sugimoto

This paper follows the first and second series, entitled “Textile Artifacts and Inscriptions relating to *Chō* and *Yō* Taxes of the Shosoin Treasure House — Supplementing Junsei Matsushima’s *Compilation of Inscriptions of the Shosoin Treasures*”, published in nos. 40 (2018) and 41 (2019) of the Bulletin of Office of the Shosoin Treasure House. This paper aims to supplement subjects that were not covered in the previous papers, including photographic illustrations, traced drawings of provincial government seals, and a list of persons’ names found in the inscriptions.

* Matsushima, J. 1978. *Shosoin Homotsu Meibun Shūsei* 正倉院宝物銘文集成 [Compilation of Inscriptions of the Shosoin Treasures]. Tokyo: Yoshikawa Kōbunkan (the text in Japanese).