

Medieval Textiles and Carbon 14 Dating in Reference to Two Kesa from a Japanese Imperial Convent

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In 2007 the Medieval Japanese Studies Institute 中世日本文化研究所¹ requested the Nagoya Center for Carbon 14 Dating to run tests on two *kesa* (Buddhist clerical robes/surplices 袈裟) stored in the Rinzaï Zen Imperial Convent Donge-in Monzeki 曇華院門跡 in Kyoto. As small scraps of both *kesa* were already separated from the robes, this involved no dismemberment or destruction of the original pieces. One of the *kesa* is rather deteriorated and will require major, very exacting and expensive restoration work. Initially we turned to scientific dating in order to verify the importance of getting such restoration work done. Circumstantial evidence suggested that both *kesa* were related to a single person, which prompted us to get the second *kesa* dated at the same time.

Our first encounter with these *kesa* occurred in conjunction with two interrelated projects of the Medieval Japanese Studies Institute. The first is research into historical materials related to its Imperial Convent Survey Project 尼門跡寺院調査プロジェクト and the second involves restoration and conservation of the convents' buildings and treasures. The research project began with a workshop at Columbia University in 1989 entitled "Workshop for Women and Buddhism in Pre-Modern Japan: Research Strategies for a Newly Developing Field 「明治以前の日本における女性と仏教」 and was followed in 1993 by a five-year research project on into historical materials culminating, in 1998, with an international conference in New York "Culture of Convents in Japanese History" 「日本史の中の尼寺文化」、and an exhibition, "Days of Discipline and Grace: Treasures from the Imperial Buddhist Convents of Kyoto 展覧会 「尼門跡寺院の秘宝—修行と優しみの日々—」. As an extension of this ongoing project, I personally am involved in researching the textiles preserved in the Imperial

¹ Sister research center located in Kyoto to the Institute for medieval Japanese Studies at Columbia University, New York, USA.

convents.

The second of the Institute's projects, conservation of the convent treasures and buildings, began in 1999 with the encouragement of Empress Michiko. Since that time the Institute, the Center has been acting as an intermediary recommending restoration and conservation of historical treasures in the convents supported financially by the Foundation for World Heritage and Art Research (Tokyo), the World Monuments fund (New York), and the medieval Japan Studies Foundation (New York).

Discovering the robes

On one visit to Imperial Convent Donge-in, Kyoto, the abbess produced a cedar box tied with green cords and wrapped in a square cloth *furoshiki*. She told us that the box had always been stored immediately behind the statue of the founder of the temple in the main altar space because it was said to contain kesa that she had worn. Although the temple suffered from fire twice (1527, 1708), the nuns had risked their lives to save this box and the main devotional statues from the flames. Upon opening the cedar box, we found another, smaller box richly decorated with a *maki-e* design of lotus growing in water done in gold on black lacquer. A colorful braided cord attached to engraved gilt fittings held down the lid with an elegant bow. Solemnly opening the box, and gently unfolding the thick wrapping paper, we found a mass of brown disintegrating threads. Enough remained of the original structure to indicate that the cloth had been woven in a simple gauze weave (*sha* 紗). Short sections of small, even backstitching in yellow thread were also visible, indicating that pieces of cloth had been stitched together in a manner typical of kesa (Photos 1 and 2). It appeared that originally the whole kesa had been made from a monochrome, unpatterned fabric that had been folded many times for storage. Now the layers had collapsed into each other forming a chaotic tangle.

Obviously the kesa appeared old. Since the founder of the convent, Chisen Seitsu 智泉 聖通 died in 1388 at the age of 80, if the kesa were really hers, it would have been made over six hundred years ago. Consultation about its restoration resulted in a very high estimate of the cost as well as time: it would involve peeling off each layer and reassembling the parts on a paper backing. The latter would be complicated since the precise original form was unclear (it could consist of five, seven, nine, or more panels, or *jô* 条). Intimate knowledge of the various forms of kesa as well as highly specialized conservation techniques would be needed. We felt it might not be worth doing if the

kesa were unrelated to the founder; however, if it were hers, serious consideration should be given to trying to get it conserved, both because of the importance it would hold for the temple as a relic and as a rare example of a textile from medieval Japan.

This brown kesa in its lacquer box was not the only kesa contained in the larger cedar box. In addition there were a number of other religious garments, including three other kesa: one green and purple, one yellow, and one purple. We unfolded the green and purple kesa, which remained in relatively good condition, and found it to be a nine-panel kesa (worn for formal ceremonies) measuring 362.5 centimeters by 124.6 centimeters at its highest side (Photo 3). Its colors and pattern of peony arabesques matched those represented on the medieval statue of the founder kept on the main altar and of the portrait painting of her made in the early Edo period. This coincidence, though not proof, was tantalizingly suggestive. Investigation of various documents related to the temple, including two histories with inventories, revealed mention of a green and purple kesa with peony arabesques having been presented in 1382, along with a letter, to the founder by the well-known priest from Tenryûji, Fumyô Kokushi Shun'oku Myôha 普明国師春屋妙葩 (1311-1388). The document lists his religious teacher, Musô Soseki Kokushi 夢窓疎石 (国師) (1278-1351) next to Shun'oku.² A modern historian of Donge-in Convent, Ohtsuka Jitchû, interpreted this presentation of a nine-panel kesa as a symbolic proof (*inka*) of the founder's enlightenment, though this needs further validation.³

In Zen, where personal transmission of the Dharma is given priority over the written word, the presentation of a kesa carries deep symbolic meaning and serves as tangible proof of spiritual authority. According to the founder of Sôtô Zen in Japan, Dôgen (道元 1200-1253) in his *Kesa Kudoki* (The Merit of the Kasaya 袈裟口説), the authentic

² Jizen Sôsen 慈全宗専 ed. *Records of a Tsûgen Abbess* 『通玄和尚語録』 1707, and Katô Yûkichi?? 加藤熊吉, copyist. *Tsûgenji Notes* 『通玄寺誌』 1888.

³ Ohtsuka Jitchû, "History and Lineage of Zuiunsan Tsûgenji, the Former Nun's Palace, Imperial Convent Donge-in Monzeki" 「瑞雲山通玄寺 旧比丘尼御所曇華院門跡の由緒」 Unpublished manuscript, 1994. The record in the *Tsûgenji Notes* is ambiguous as to the exact implication of the presentation of the kesa. It may have simply been a gift. Although it is known that Chisen studied with Shun'oku and Musô Soseki, so far we have found no other indication that she received verification of enlightenment from either of them. Ôishi Masaaki 大石雅章 makes no mention of the kesa in his article "Imperial Convents and the Muromachi Government—the case of the Gozan Convent Tsûgenji" 「比丘尼御所と室町幕府~尼五山通玄寺を中心にして~」 (日本史研究 335: 1990). In addition, he mentions 谷曇禪師 as her teacher, not Shun'oku.

transmission of the robe (kesa/ kasaya) worn by Sakyamuni Buddha went along with the transmission of the Dharma down to the twenty-eighth patriarch, Bodhidharma, who became the first patriarch of Zen in China, and it then passed on to successive patriarchs.⁴ Dōgen brought this idea of transmission to Japan and concludes, “The Kasaya is the object of the buddhas’ veneration and devotion. It is the body of the Buddha and the mind of the Buddha.”⁵ A kesa that has been ritually passed on from teacher to disciple who becomes the founder of a temple thus embodies the Buddha-mind of the founder and authenticates the transmission of the law. In Japan, the fourteenth century saw a proliferation of temples (including the Convent Tsūgenji, the predecessor of Donge-in Imperial Convent) and kesa associated with their founders. These “transmission kesa” ceased to be passed on, but instead came to be venerated as temple contact relics associated with the founders.⁶ In this context, we felt that carbon dating of the green and purple kesa might also prove significant for confirming it as indeed the founder’s kesa.

At the lab, small samples that had broken loose from each kesa were thoroughly cleansed in HCl-NaOH-HCl and then dated using an accelerator mass spectrometer (ASP). The results yielded two dates for each kesa, both spanning the lifetime of the founder, those for the green and purple one being slightly earlier (Charts 1 and 2).

Although these results point to a high possibility of at least one, if not both, of the kesa having belonged to the founding abbess, they are not conclusive, but rather must serve as a cornerstone for further investigation.

Textiles of Medieval Japan

Very few textiles remain from the medieval period, primarily due to the fragility of their fibers. Textiles wear out with daily use, and even when carefully stored, the fibers are subject to deterioration due to insect infestation, humidity and general ravages of time. Most ancient textiles that have been preserved were excavated from tombs, bogs,

⁴ Dōgen, Gudo Nishijima and Chodo Cross tr. Master Dogen’s *Shōbōgenzō*, (Windbell Publications, 1994), pp 119-121.

⁵ Ibid, 127. Although the whereabouts/existence of the original kesa lies shrouded in legend, the transmission of a kesa from teacher to disciple remains an important symbolic ritual in Zen practice.

⁶ Yamakawa Aki, “*Denpōe* and the Tōfukuji ‘Five Dharma-Transmission Robes’” unpublished paper.

and other places where they were protected from exposure to open air. The seventh and eighth-century textiles in Hôryûji monastery and the Shôsô-in Repository in Nara are a great exception in having been preserved above ground. In Japan almost no textiles remain from the Heian period, but a few have come down to us from the Kamakura period preserved as religious treasures. Zen kesa passed on as proof of dharma transmission (*denpôe*) occupy a special place among these.

Two recent exhibitions have brought a number of these into the public view. The first at the Gotoh Museum (spring 2007) featured kesa found, like those from Donge-in Convent, in boxes marked as containing relics of the founder or other important priests at Engakuji in Kamakura. The other was an exhibition of treasures from the Five Mountains Zen temples (Gozan) in Kyoto held at the Tokyo National Museum (fall 2007).⁷

Research done on such medieval kesa has revealed some guidelines for dating and locating their origins. This involves combining several types of evidence. First one looks at inscriptions written onto the kesa themselves or onto their storage boxes. One notes in addition any temple traditions attributing the kesa, or related objects like its box, to a specific person. One looks for documentation such as temple records, letters, and diaries. Second, analysis of the textiles for their weave structures, patterns, design techniques, fibers, and dyes also provides clues when collated with other textiles of the period.

The brown kesa in question is harder to date, both because so far we have not found any documentation relating to it and because there is little extraordinary in its materials and techniques. The weave structure *sha*, produced by crossing and uncrossing two adjacent warps to form an openwork fabric, can be seen already in eighth-century textiles, and it continues to be woven today for summer cloths. The kesa has, to our present knowledge, no woven or applied pattern, but as befits the basic garb of a mendicant, is totally plain. As yet we have not investigated the fibers or the dyes. The former are presumably silk, the latter may come from any number of plants containing tannin, or even other plant dyes that have lost their original color over time. The extent

⁷ *Forming Emptiness: Zen Masterpieces from the Engaku Temple, Kamakura*, 『鎌倉円覚寺の名宝』 Gotoh Museum, 2007 and *Zen Treasures from the Kyoto Gozan Temples* 『足利義満 600 年御忌記念特別展「京都五山禅の文化」』, Tokyo National Museum, August to September, 2007.

of deterioration compared with that of the other kesa dating from approximately the same time suggests that an iron mordant may have been used.

Comparison with other kesa from the thirteenth to fifteenth century is also inconclusive. Although one might posit that plain kesa were produced in great number during the medieval period, not many actually remain, perhaps just because they were less special. Their plain appearance is also less attractive for display in an exhibition, so fewer come to the general attention. The Engakuji exhibition included no plain *sha* kesa, but did have one *sha* with gold pattering. The Five Mountain Zen temple exhibition included none. Independent studies by textile historians Yamakawa Aki and Sawada Mutsuyo, however, have revealed a few examples.⁸ Of thirty-seven medieval-period kesa associated with specific clerics that were studied by Yamakawa, she lists three that are plain yellow or brown *sha*. Of the twenty-nine Sawada investigated, one used plain brown *sha* for its edging (*en* 縁) as well as its vertical and horizontal bands (*tatejō* 縦条 and *yokotsutsumi* 横堤), but not for the rectangular squares (*denso* 田粗). Although these numbers are no indication of the actual prevalence of *sha* kesa in the medieval period, it does suggest that brown may have been a common color and by extension that the Donge-in kesa may, indeed, have been brown to begin with.

As mentioned already, for the green and purple kesa, documentation includes several temple records and a copy of a letter noted in the records as still stored at the temple, though at this point its whereabouts are not clear. Analysis of the textile weave structure and pattern places both the green and the purple fabrics squarely within the trend of the time. The weave, gauze using a three-strand warp interchange (*kenmonsha* 顕紋紗) for the ground and a twill (*aya* 綾) for the pattern, is one of the more common open weaves of the period (Photo 4). Yamakawa lists four pieces with similar weave, and Sawada lists seven, all made, she believes, from Chinese fabrics, and almost all dating to the twelfth to fourteenth centuries (Southern Song to Yuan dynasty) and.⁹ These, she notes were generally brought back as robes by monks who studied in China, though some

⁸ Yamakawa Aki's presentation on "Denpōe in Kyoto" 「京都における伝法衣」 at the Symposium on Research into Textiles at Engakuji 円覚寺染織文化財記念シンポジウム; Sawada Mutsuyo, "Kesa of the High Priests of the Gozan Temples in Kyoto" 「京都五山禅宗高僧の袈裟」 in *Zen Treasures from the Kyoto Gozan Temples*. P. 43-53.

⁹ Note there is some overlap between these two investigations, Yamakawa's being limited to temples in Kyoto, several of which were also Gozan temples and included in Sawada's research, which also covers kesa from temples in Kanto, like Engakuji.

may have been imported as cloth and sewn in Japan.¹⁰

Within this context, which requires further research, it is likely that the Donge-in kesa may also have been made from imported cloth. Not only is its weave structure similar to those of the imported *kenmonsha* robes, but also its pattern. Peony arabesques were very popular during the Southern Song and can be seen on many priest's robes in portrait paintings as well as the actual textiles. Those of the twelfth to fourteenth century, according to Sawada, tend to have large motifs sparsely distributed with the vines appearing somewhat like stems bearing extraneous small buds. These arabesques, she points out, contrast with the denser more uniformly arranged patterns produced in the Ming dynasty (1368-1644).¹¹ The peony arabesque designs on both the purple and the green fabrics of the Donge-in kesa have remarkably large peony heads and rather stem-like, sparse tendrils (Photo 5). This would suggest an earlier rather than a later date of production within the hundred-year span indicated by the C14 dating.

Implications of the results of the dating

For us the results of the C14 dating of the two kesa help corroborate the temple tradition that associates both these robes with its founding abbess. For the brown kesa the dating results lend supporting evidence to the importance of considering conservation work for the kesa. For the convent, the kesa holds special value as having possibly belonged to, or even been made by, the founder. As a rare example of a plain kesa of over 600 years in age, it also has value for the textile historian. It would be of great interest to know its original form.

Although a probable date could be given for the green and purple kesa without using C14, obtaining scientific dating clarified the probability of it actually corresponding to the kesa mentioned in the records. If it is indeed one and the same, this kesa would join a handful of medieval kesa for which one not only knows the owner, but also that they functioned as symbols of the authenticity of dharma transmission. This would make it a very important contact relic for the temple. At the same time, for the textile historian, it

¹⁰ Not enough is known at this point about the Japanese weaving industry during this period to allocate provenance unquestionably. There are a few kesa that probably combine fabrics of Chinese and Japanese manufacture, and a very few others that are felt by some to have been woven in Japan.

¹¹ Sawada *ibid.*, p. 47,144.

provides an anchor for dating other pieces, and refines our considerations of technique and design. Although we have not researched either the silk or the dyes, data on these would contribute to our understanding of Japanese and Chinese (if the fabrics are imported) sericulture and dyeing in the fourteenth century. One might surmise that the green is dyed with a combination of indigo and a yellow such as miscanthus (*kariyasu*), while the good condition of the purple threads suggests it was probably dyed with precious gromwell roots (*shikon* 紫根).¹² Interestingly, the priest Shun'oku Myôha himself, who is recorded as presenting a green and purple kesa to the nun Seitsu the founder of Tsûgenji (Donge-in Imperial Convent), owned a kesa (now in the Tokyo National Museum) with a purple *sha* ground on which a design of peony arabesques was done in gold imprint (*inkin* 印金). Both pattern and color may both have been part of his dharma bequest.

Cautionary notes from American textile conservators

When weighing the pros and cons of getting these two kesa C14 dated, I turned for advice to curators and conservators at the Los Angeles County Museum, where there is a large textile collection. I will end by summarizing some of their responses, because they indicate both the importance and the problems of C14 dating on a broader scale and point to some ways in which our request for C14 dating was particularly favorable.

Recently they had an Anatolian rug dated. They sent samples from various parts of the rug to two different laboratories, Arizona and Zürich. By diversifying samples and labs they hoped to get clear, reliable results. When they got three very different dates spanning several centuries, they had to look into possible reasons for the disparity. The textile curator, Sharon Takeda, mentioned they had neglected to take x-rays of the rug to double-check for areas not immediately discernable to the naked eye that had had conservation done on them in the past. Presumably some of the samples were from restored areas. The problem, however, is that it was (and is), common practice to use old materials for restoration work, presenting the possibility that a restored area could by chance predate the manufacture of the rug. Secondly there was the possibility of

¹² Purple dyed with *shikon* has been specially prized in Japan since the eighth century and was restricted to the Imperial family at various times in Japanese history. In the religious world of the Edo period, only high priests could wear purple, but such restrictions were least operative during the medieval period. Since the nuns in the Imperial Convents were blood relatives and their abbesses high ranking prelates, purple robes are not out of place.

contamination from older and newer materials stored in the vicinity. Concerning these two problems, the conservator Marc Gilberg stressed the need for proper procedures for sample collection and clean-up. The conservator Frank Preusser went further, commenting:

The main problem with historic textiles is the high possibility of contamination with old and/or new carbon. Therefore much depends on the sampling and sample preparation. Unfortunately people (conservators) often take samples that are too small for the required rigorous sample preparation and the associated losses, opening the door for all kinds of questions and criticisms. This is also one of the reasons that one of the first questions is "which laboratory did you use?" If funding allows, it often is advisable to send samples to two laboratories.¹³

It appears that even in the case of the Shroud of Turin, scientifically reliable reappraisals of the reliability of dating with radiocarbon revolve around these same points. In *Possibly the biggest radio carbon dating mistake ever*, Daniel R. Porter suggests that while there is no reason to doubt the results of the C14 dating, there may be reasons to question the sample collection.¹⁴ Apparently, X-ray analysis of the Shroud exposed differences in materials in the area sampled were taken from and in the main body of the shroud. Analysis of the colors, spinning, and bleaching processes also showed inconsistencies in chemical content that could only be explained by invisible mending by a process known as "French weaving," an art practiced in the medieval period. He stresses that sampling protocol requires multiple samples from different locations on the cloth.

Of note is that none of these people question the validity or accuracy of the C14 dating itself. Preusser concludes: "In summary, if proper sample procedures are observed, an experienced laboratory is used, and the samples are properly pre-treated prior to measurement, C14 dating is a very useful technique for the dating of historic textiles up to the seventeenth century. From the seventeenth century on it becomes difficult because you tend to get three different dates for a sample."¹⁵ Gilbert pushes the reliable

¹³ Letter, Dec. 2007.

¹⁴ Online article <<http://www.innoval.com/C14/>> accessed 2007,12,29.

¹⁵ Ibid Footnote 13.

date back to the 16th century. For archeological textile studies, however, it seems that radiocarbon dating is a standard procedure, used along with other methods of dating.

Finally, the results of testing must be collated with outside evidence, such as an intimate historical knowledge of fibers and their production, dyes and bleaching, weave structure, design motifs and surface decoration techniques. Conversely, any ancient or medieval textile that is C14 dated provides precious data for refining our picture of the historical periods of textile production in various areas. This in turn is a key to mapping the movement of textiles, dyes and thread as traded materials, and the travel routes for production techniques and design motifs.¹⁶

In the light of the various precautions necessary for accurate C14 dating, then, the two kesa dated at the Nagoya University Center for Chronological Research posed few impediments. As very small samples were necessary, fragments that had naturally loosened from the kesa could be easily procured without damage to the whole. Since both kesa had obviously been stored in airtight containers that had not seen much handling over the centuries, the fear of contamination was low, though consideration must be given to the handling of the storage box during the two fires at the convent. The question of mistaken samples due to previous conservation work appeared unlikely. In addition, the high reputation of the Nagoya Center for careful preparation and cleaning process insured the highest degree of accuracy possible. Since other evidence suggested the probable dates for the kesa to be earlier than the sixteenth century, the fear of wildly disparate dates due to man-made emissions of carbon were low. The results, which dated both kesa to a hundred year span that covers the life of the founder of Donge-in Imperial Convent, corroborated our other findings and reaffirmed that these two textiles do, indeed, date back six hundred years, making them precious treasures not only for the convent, but also as cultural relics. Their exact relationship to the founder and the implications thereof can now be researched with greater exactitude.

¹⁶ Robyn Maxwell in a report in the Minpaku Anthropology Newsletter (Number 8 (Jun.1999) , “Recent Scientific Dating of Indian Trade Cloth: Plans for international research cooperation” (available online at <http://www.minpaku.ac.jp/publication/newsletter/8_03.html#pos3>) proposes building a database of radiocarbon dated Indian textiles to reappraise the production and trade of Indian textiles.



Photo 1 Brown kesa stored in the founder's box.



Photo 2 Close-up of the brown kesa: simple gauze weave with backstitching in yellow silk.



Photo 3 The Green and Purple kesa in the founder's box.

袈裟関連資料の¹⁴C年代および較正年代

資料番号	炭化物の起源	d ¹³ C* (‰)	¹⁴ C age (BP)	¹⁴ C年代を較正した年代 (cal AD/BC) ±1 σの較正年代範囲** (可能性の確率)	¹⁴ C年代を較正した年代 (cal AD/BC) ±2 σの較正年代範囲 (可能性の確率)	実験室コード 番号 (NUTA 2-)
KJ-W	袈裟保存紙 (白)	-22 ±1	130 ±32	cal AD 1682-1707 (17%) cal AD 1719-1737 (13%) cal AD 1803-1826 (14%) cal AD 1832-1885 (38%) cal AD 1913-1936 (17%)	cal AD 1673-1778 (40%) cal AD 1799-1894 (44%) cal AD 1904-1942 (16%)	12321
KJ-B	袈裟 (茶)	-26 ±1	537 ±32	cal AD 1329-1339 (17%) cal AD 1396-1429 (83%)	cal AD 1316-1354 (29%) cal AD 1389-1439 (71%)	12323
KJ-P	袈裟 (紫)	-27 ±1	570 ±32	cal AD 1319-1351 (60%) cal AD 1390-1412 (40%)	cal AD 1303-1366 (60%) cal AD 1383-1424 (40%)	12320

Chart 1 Age calibration by c14 dating and corresponding calendar dates

図1. 古文化財“袈裟”関連資料の¹⁴C年代, および較正データセット(IntCal04)との比較.

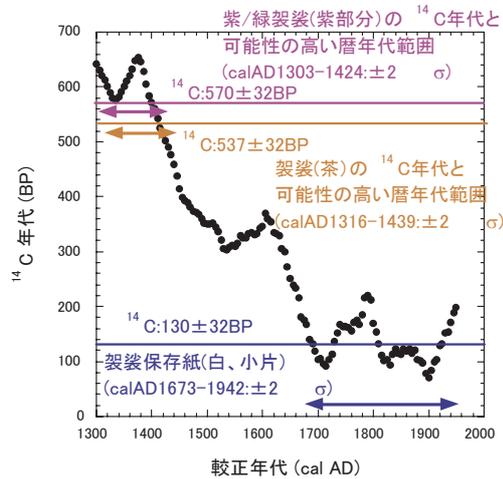


Chart 2 Graph of the C14 dating of the two kesa and wrapping paper with corresponding calendar dates



Photo 4 Close-up of the gauze weave structure of the purple cloth of the green and purple kesa: 3-element warp cross for the ground and twill (2/1) for the pattern (kenmonsha).



Photo 5 Peony arabesque pattern on the green fabric of the green and purple kesa.