

Architectural Development of the Japanese House and Wood Species Used for Construction

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1. Jomon Period (Pit Dwellings)

During the Jomon period, between 8000 and 300 BCE, the people of the Japanese archipelago hunted and fished with tools of stone or bone, and gathered wild millet and other plants. They lived in groups on sites near rivers, in pit dwellings.

The pit dwelling had an earthen floor dug approximately 30 centimeters below ground level, and covered with straw or leaves where people sat or lay on the floor. It was round with a diameter of five to ten meters, or rectangular, and set up as a single undivided space with a hearth at the center. The post holes at pit dwelling sites indicate that the roof was supported by four posts. The roof consisted of pieces of wood laid in a radial pattern with grass spread over them, with an opening to serve as a chimney.

2. Yayoi Period (Raised-floor Houses)

The Yayoi period, from the 3rd century BCE to the 5th century CE, saw the arrival of rice cultivation and the development of raised-floor houses as a means for storing rice where mice or other animals could not enter. The floor was made of boards. During the Asuka period (6th and 7th centuries), wood was used for about two thirds of the floor, with the remainder being earthen.

3. Nara Period (Large Palace and Temple Buildings)

Excavations at the Nara Palace site in Nara have so far uncovered more than 500 base sections of structural posts. In random samples of post bases from this and other sites dating from the Nara period (8th century), the following tree species have been identified:

Nara Palace site (114 posts): Japanese cypress (64), umbrella pine (45), fir (2), hemlock spruce (2), Japanese red or black pine (1)

Fujiwara Palace site including temples and shrines (7 posts): Japanese cypress (2), umbrella pine (4), evergreen oak (1)

Dazaifu site (6 posts): Umbrella pine (6)

Mikogaya site, administrative buildings (70 posts): Japanese cypress (52), Chinese black pine (12), yew (1), chinquapin (5)

As the figures show, the lumber used for the Heijo Palace buildings was about 60% Japanese cypress and 40% umbrella pine. Only six samples were available from Dazaifu, and they are all umbrella pine. Japanese cypress was the wood most commonly used for posts in excavated large buildings, and umbrella pine was also commonly used.

4. Heian Period

The *shinden* and *shoin* styles are the two major styles of traditional Japanese domestic

architecture. The *shinden* style was perfected in the mansions of the aristocracy during the Heian period (9th through 12th centuries).

The *Shinden* Style

The basis for this style was the grid pattern layout of the capital city of Heiankyo, with lots enclosed by small streets and measuring about 120 meters square, or in some cases two or four times that size.

The *shinden* (the main hall; literally, the "sleeping building") of the mansion was constructed in the center of the lot facing south, with attached pavilions and annexes standing to the east, west and north. Adjoining the *shinden* on the south was a garden, with a pond to its south. In contrast to the houses of previous times in which a single large room served for cooking, eating and sleeping, in the *shinden*-style mansions of the Heian period the living quarters stand independent of the other rooms. On the boarded floors of the *shinden*, rush mats were positioned for sitting, with two-section shelves (*nikaidana* or *nikaizushi*) standing nearby for storing personal effects. A *shinden*-style building was covered only by the roof, with no ceiling. As the interior had no built-in partitions, folding screens were placed for privacy.

In the medieval era, ceilings and various space partitions were added.

Samurai mansions of the medieval era were built in the *shuden* style, with the *shuden* ("main building") floor covered entirely with tatami mats. There was also an *oshiita* alcove, a forerunner of the *tokonoma*, for the display of a hanging scroll or some flowers. On the front side of the building was a *tsuke-shoin* or a low desk beneath a light-admitting window, and staggered shelving.

Outstanding examples of buildings in the *shinden* style include the Tosanjo Palace, the Shishinden Hall and Seiryoden Residence at the Kyoto Imperial Palace, the Main Hall of Ninnaji temple, the Enman'in at Onjoji (Miidera) temple, Rokuonji temple (Golden Pavilion), Itsukushima Shrine, and Shugakuin Imperial Villa.

5. Muromachi Period to early Edo Period

The *Shoin* Style

The *shinden* style evolved into the samurai mansion, which was the prototype for the contemporary Japanese house. The new style began in the Muromachi period (14th to 16th centuries) with the *shuden*-style homes constructed for families of the warrior class, and reached its final form in the 17th century, during the Edo period.

After the end of 12th century, when power passed from the imperial court to the warrior families, the Kamakura shogunate was established. During the Kamakura period (1192-1333) most of the samurai were of rural origin, and they lived in simple, country-style homes. But after Ashikaga Takauji established the Muromachi shogunate in Kyoto in 1338, the samurai began to adopt a more courtly lifestyle including *shinden*-style buildings. It became the custom for the shogun and other samurai to take religious vows and live as monks upon retirement, and gradually the design of the temple residence, with built-in display alcove, shelves and desk, was adopted. Thus was born the *shuden* style, which was the first stage of the *shoin* ("study") style.

The features of the Silver Pavilion and Togudo teahouse at Ginkakuji in Kyoto, built in the late 15th century, show that the progression from the *shinden* to the *shoin* style included the following changes.

1. From round posts to square posts
2. Space between posts reduced gradually from about 3 meters to about 2 meters
3. From one large room to several small rooms

4. From boarded floors to tatami-mat floors
5. From hinged wooden shutters and doors to double-sliding doors, including louvered doors and latticed paper screens (*shoji*)
6. From plain rooms to rooms with built-in features

From the 17th century the samurai exercised supreme political power, and the samurai mansion came to include a receiving room where the master met with groups of his retainers.

Accordingly the decorative alcove, desk and window alcove, and staggered shelving of the *shuden* style became a raised entryway platform called the *chodaigamae* along the front wall where groups of samurai could sit in full dignity. This "decorated tatami room" was a feature of the *shoin*-style samurai residence from the 17th century onward. Earlier, another distinctive feature of the *shuden* and *shoin* styles had evolved, the *shikidai* vestibule with a boarded floor at a slightly lower level than the tatami room. This is the origin of the contemporary *genkan* vestibule.

Examples of buildings in the *shoin* style:

The desk alcove and staggered shelving were first used in the Higashiyamadono (the precursor of Ginkakuji) and the Togudo teahouse at Jishoji (the formal name of Ginkakuji).

Other outstanding examples include the Kojoin Guest Hall and Kangakuin at Onjoji (Miidera) temple, the Omote Shoin in the Samboin at Daigoji temple, the Shiro Shoin and Kuro Shoin at the Nishi Honganji temple, the Kuro Shoin and Shiro Shoin in the secondary compound of Nijo Castle, the *shoin* group at the Katsura Detached Palace consisting of the Old Shoin, Middle Shoin and New Goten, and the Manshuin temple.

The *Sukiya* Style

Influenced by teahouse architecture, the *sukiya* style is a breezy variant of the *shoin* style.

The *shoin* style and the teahouse (for the tea ceremony) were both perfected in the Momoyama period in the latter half of the 16th century, but they are fundamentally very contrasting architectural forms. In the *sukiya* style, the posts are partially or entirely covered with their natural bark, while the alcove, shelving and desk elements are simplified and the wooden elements are slender and delicate compared to the classic *shoin* style.

Outstanding examples of the *sukiya* style include the Old Shoin, Middle Shoin and New Goten at the Katsura Detached Palace, and the Kuro Shoin at the Nishi Honganji temple.

Wood species used in the Katsura Detached Palace buildings:

Old Shoin: Japanese red or black pine (26 members), Japanese white pine (1), togasawara (2), Japanese cedar (5), fir (3), Japanese cypress (2), hemlock spruce (2), chestnut (1)

Middle Shoin: Japanese red or black pine (12 members), Japanese cedar (7), fir (5), Japanese cypress (1), hemlock spruce (1)

New Goten: Japanese red or black pine (27 members), Japanese cedar (12), fir species (13), Japanese cypress (7), hemlock spruce (4), umbrella pine (2), Japanese horse chestnut (1), sawara false cypress (1), hiba arborvitae (2)

Wood Species Used in Extant Ancient Temples and Shrines

Reports of microscopic analysis of wood include the following identifications:

Horyuji Temple: Original Inner Gate – Japanese cypress, 2 members; Main Hall – Japanese cypress, 2; Nishimuro – Japanese cypress, 5; umbrella pine, 2; Five-Storied Pagoda – Japanese cypress, 2; Bell Tower – Japanese cypress, 9; Japanese red or black pine, 2; Great East Gate – Japanese cedar, 1; Japanese red or black pine, 1; Kofuzo Storehouse – Japanese cypress, 8;

Japanese cedar, 7; Japanese red pine, 5.

Bannaji Temple: Miscanthus, Japanese cypress, Japanese cedar, 1 each

Jizo Hall of Shofukuji Temple: Japanese cypress, 11

Fukusaiji Temple: Japanese cypress, 2; pine, 1

Three-Storeyed Pagoda at Zenzanji Temple: Japanese cypress, 2; fir, 1

Kojin Shrine: Japanese cypress, 1

Kuzu Hachiman Shrine: Japanese cypress, 1

Sofukuji Temple: Broad-leaf Japanese cedar, 3; Japanese cedar, 1; togasawara (*Pseudotsuga japonica*), 1; Japanese cypress, 1

In temple and shrine buildings other than those listed above, according to various records (cited in "The trees that held up Horyuji"), species used in order of frequency were: Japanese cypress, 54; pine, 31; zelkova, 14; chestnut, 6; Japanese cedar, 6; hemlock spruce, 4; hiba arborvitae, 3; fir, 1.

6. Edo Period

During the Edo period (1603-1867), the wooden floor of the *oshiita* alcove was changed to tatami, and this feature became known as the *tokonoma*. Also, a raised area of the floor was added to serve as a seating area for people with higher status.

→ warrior tatami room

The homes of common people differed according to their status, but generally tended to be either a simplified version of the *shoin* style known as the *minka*, or the *machiya* townhouse which is derived from a Heian-period design as described below.

7. *Machiya* and *Minka*

The *shinden* and *shoin*-style homes were for the aristocracy and the warrior class. What kind of houses did common people dwell in during the Heian period?

The capital cities of Heijokyo and Heiankyo were both laid out in a grid pattern creating regular blocks of land. Each block, or *cho*, was usually 120 meters square. A block held numerous *machiya* (townhouses) adjacent to each other in rows. At the center of each block was an open area of common ground containing wells, toilets, gardens, etc.

Outside the cities, freestanding houses of farmers and merchants are called *minka*. There are many different designs corresponding to local geography and climate and different lifestyles.

Minka can be broadly classified into these five types:

- a) *Gassho-zukuri* (steep, high gabled roof) in areas with heavy snowfall
- b) *Magariya* (L-shaped) in northern Honshu, especially Iwate Prefecture
- c) *Suzume-odori* ("sparrow-dance" with large ornamental ridge) in Nagano Prefecture
- d) *Yamatomune* (thatch and tile combination roofs) in the Yamato valley in Nara and Osaka Prefectures
- e) *Kudo-zukuri* (separate roofs on adjoining wings) in northern Kyushu

Wood Species Used in *Minka*

From eight *minka* that were transported from various locations in Japan to the Open Air Museum of Old Japanese Farm Houses, sample chips were taken from sills, lintels, cross members, posts, floors, beams, girders, joists, groundsills, roofs and walls. The wood species from each location were identified, as follows.

1. Nanbu (former Fujiwara residence, late 18th century): Mostly Japanese red or black pine, Japanese cedar, Japanese cypress, chestnut, and poplar were heavily used.

2. Akiyama (former Yamada residence, late 18th century): Mainly beech, with some Japanese cypress, castor aralia, Japanese Judas and white oak.
3. Shirakawa (former Oi residence, late 18th century): Mostly Japanese red or black pine and Japanese cypress.
4. Tsuruga (former Yamashita residence, early 19th century): Much Japanese red or black pine, chestnut and zelkova, and some Japanese cedar and Japanese walnut.
5. Nose (former Izumi residence, early 17th century): Much Japanese red or black pine and chestnut, with some Japanese cypress and magnolia.
6. Totsugawa (former Maruta residence, mid-18th century): Much Japanese cedar and Japanese cypress, with some Japanese red or black pine.
7. Shodoshima (village kabuki stage, mid-19th century): Japanese cedar and Japanese red or black pine.
8. Shiibara (former Shiibara residence, latter half 18th century): Much Japanese red or black pine and Japanese cedar, some zelkova and Japanese cypress, and a little Japanese walnut.
9. Overall, the species that were commonly used in all eight structures, listed in order of the total number of members, were: Japanese red or black pine (170), Japanese cedar (125), Japanese cypress (92), chestnut (76) and zelkova (38). The other species included beech (15), Japanese walnut (11), poplar (10), white oak (7), magnolia (7), Japanese Judas (5), Japanese horse chestnut (5), and Japanese linden (5).

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