

Roof Typology and Composition in Traditional Japanese Architecture

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I- Introduction

The purpose of this study is to analyze the typology and the composition of the roofs in Japanese traditional architecture.

Japanese traditional architecture is well known for having a very interesting roof design. As we will see many buildings have a very complex roof form. A good example is the Shokintei teahouse, from Katsura Palace. The roof is a combination of hipped-gabled and gabled roofs and three different roofing materials: thatch, shingle and tile, are used. However this is a small building of approximately 10m by 12m, in which it would certainly be possible to shelter the whole structure under a single ridged roof. Structurally thinking there is no reason for using different roof forms and roofing materials. Therefore in the design of the roof other factors beside the solution of structural problems have been considered.

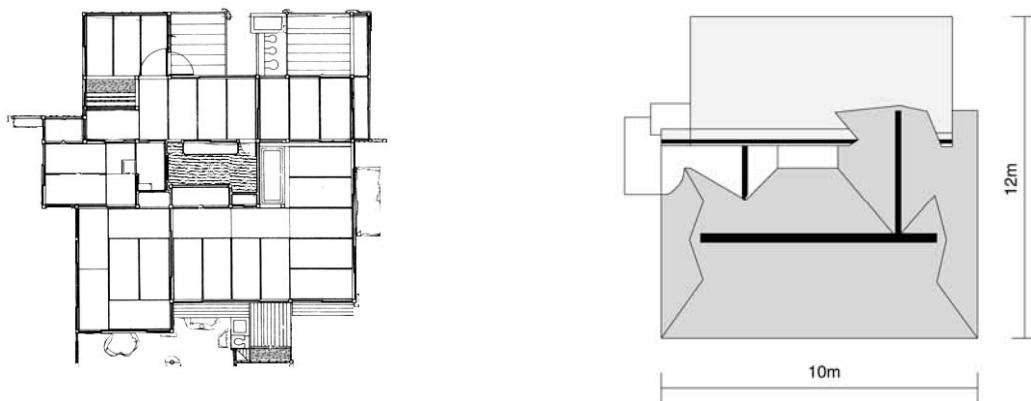


Fig. 1- Shokintei floor plan and roof plan¹

Initially we will see which are the basic roof forms, roofing materials and roof trusses normally used in Japanese traditional architecture. Later we will study the building types that exist in Japanese traditional architecture and how these building types and their roof forms have evolved historically. Then by comparing the floor plan to the roof plan we will analyze the relation between spatial organization of the floor plan and the roof form. We will identify how the different types of spaces are expressed in the roof design.

For this analysis 110 buildings were selected. The information is based on the Cultural Important Property Restoration Reports (重要文化財修理報告書) and the 7

¹ Eiji Musha, 1983, p126

volumes about Japanese traditional houses edited by Gaken (日本の民家、全7巻 1981 学習研究社). The buildings were selected by the complexity of the roof; consequently each of the buildings has a roof composed of a minimum of two ridgepoles. This survey includes several residences and shrines from all over Japan. The oldest building date from the beginning of the Edo period (1600-1868) and the newest date from before the Second World War.

II - Basic Roof Forms, Structures and Material

II-1 Basic Roof Forms

II-1-1 Kirizuma, Yosemite and Irimoya style

There are two basic roof forms, gabled roofs (*kirizuma*) and hipped roof (*yosemune*). The first one, is composed of two inclined planes, parallel to the ridgepole and the second one is composed of four inclined planes, with two of them parallel to the ridge pole and the other two, triangular shaped and perpendicular to the ridge pole.

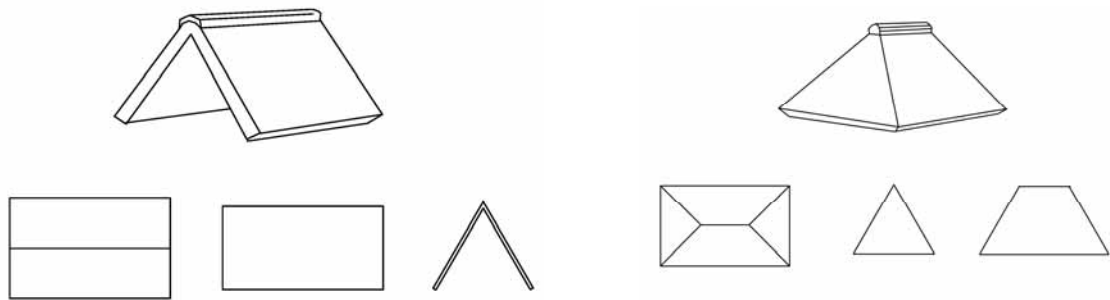


Fig 2- gabled roof (*kirizuma*) and hipped roof (*yosemune*)

All other roof forms derive from or are a combination of these two. For example, the *irimoya* roof, which has its upper part gabled, and its lower part hipped or the *kabuto* roof, which is the opposite, having the upper part hipped and the lower part gabled.

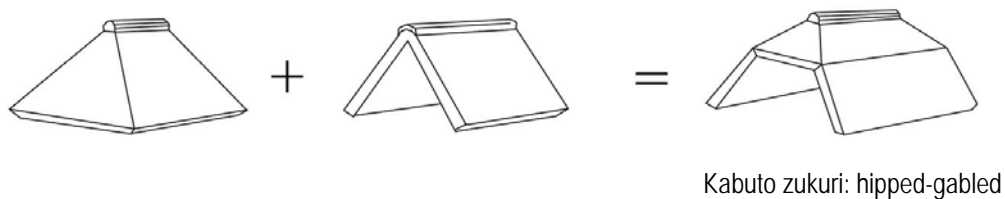
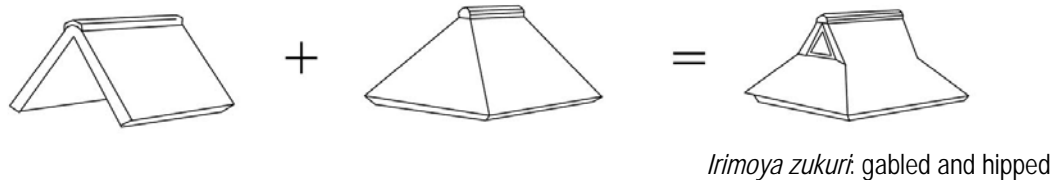


Fig 3- combination of gabled and hipped roofs

The most common roof forms found in Japanese traditional architecture are the gabled roof (*kirizuma*), the hipped roof (*yosemune*) and their combined form, the hipped-gabled roof (*irimoya*). All three types have a very long history as evidenced by

examples such as the house shaped clay figures, *haniwa*, excavated from burial mounds of the sixth and seventh centuries.



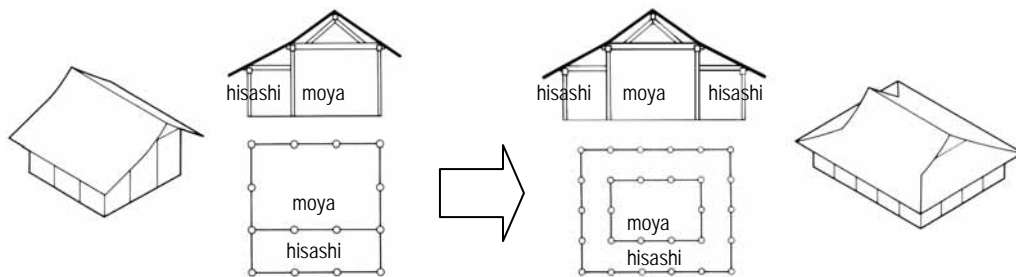
Gabled - roof pit dwelling, Inariyama tumulus, 5th cent, Fujioka, Gunma Pref.

Hipped roof. Sakurai, Nara Pref.

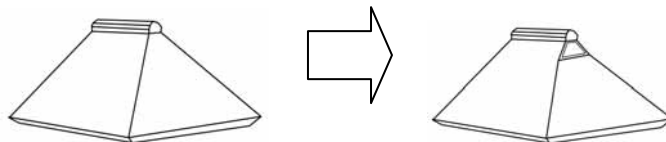
Hipped-gabled roof, Shiroshima, Nara Pref.

Fig. 4- roof shapes in ancient architecture as seen in house-shaped *haniwa*¹

The gabled roof (*kirizuma*) is often used in shrines and town houses. The hipped roof (*yosemune*) is mostly used in farmer's houses, while the hipped-gable roof (*irimoya*) is frequently used in temples and in the upper class houses (*shoin*). Therefore it is possible to find farmer's houses (*minka*) with hipped-gabled roofs, though there is a clear difference between them and the *irimoya* roof of temples or *shoins*. The temples and upper class *irimoya* roof come from the addition of *hisashi* around the *moya* while the *irimoya* roof of the *minka* is the result of opening windows under the ridgepole, on the upper part of a hipped roof (*yosemune*).



In temples and upper class houses, the *irimoya* roof is a consequence of adding *hisashi* around the *moya*.



In most farmers houses the *irimoya* roof is a consequence of opening windows under the ridgepole

Fig. 5- Comparison between upper class and popular *irimoya* roofs

¹ Kawashima, Chuji, 1990 p20

² Kazuo Hozumi, P.13

“The *irimoya* style was prohibited in certain regions, under sumptuary laws promulgated in the Edo period, as being an extravagance deemed unsuitable for farmers.”¹

“When the *shogunate* collapsed, all the restrictions it had imposed on building materials and styles were revoked. Formerly, in order to ensure that all people lived in houses reflecting their social status, the *shogunate* had set up a full code of architectural materials and elements that were permitted or forbidden to the individual classes. Feudal lords had to maintain mansions consonant with their authority and place. The things that formed part of these grand homes were not allowed in the dwellings of commoners, no matter how wealthy, except under very special circumstances.”²

Only the *minka* built at the end of Edo period may have an intentional *irimoya* style roof. Older or ordinary farmers’ house roofs are not *irimoya* style roof but a *yosemune* style roof with an opening under the ridgepole. With the end of the Edo period, social discrimination diminished and farmers’ houses with a proper *irimoya* style roof started to be built.

II-1-2 Combined Roofs

The two basic roof forms, gabled and hipped, can be combined in many different ways. The combination can occur vertically and at the same time horizontally, resulting in roofs in which the left and right end have different forms. We can find roofs with the left end hipped and the right end gabled, others where one side is hipped and the other is a hipped-gable, or roofs with a gabled end and a hipped-gabled end.

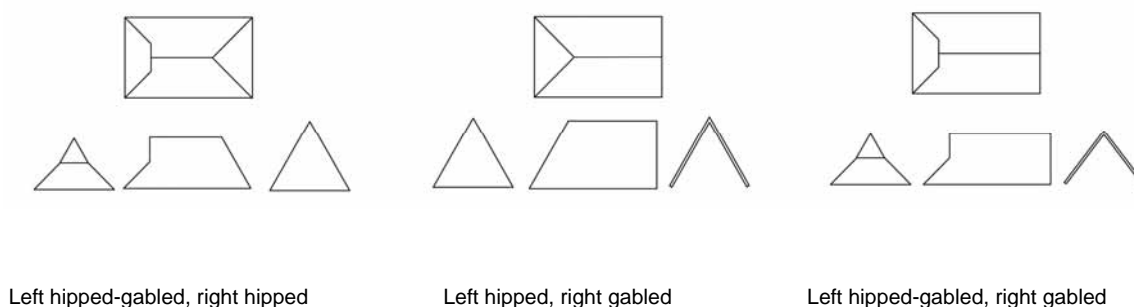


Fig 6- examples of roofs with different endings

¹ Kawashima, Chuji, 1990 p192

² Ito, Teiji, 1991, p2

II-2- Tsuma-iri and Hira-iri

According to where the main entrance is placed the building receives a different classification. The smaller face, perpendicular to the ridgepole is called a *tsuma* and the bigger face, parallel to the ridgepole is called a *hira*. When the main entrance of the building is placed on the *hira* side, this building is called a *hira-iri* (side-entered). If the entrance is on the *tsuma* side, it is called a *tsuma-iri* (gable-entered). *Hira-iri* buildings are more common than the *tsuma-iri* ones. It is said that in some cases placing the main entrance of the building on the *tsuma* side was a way of expressing social status.¹

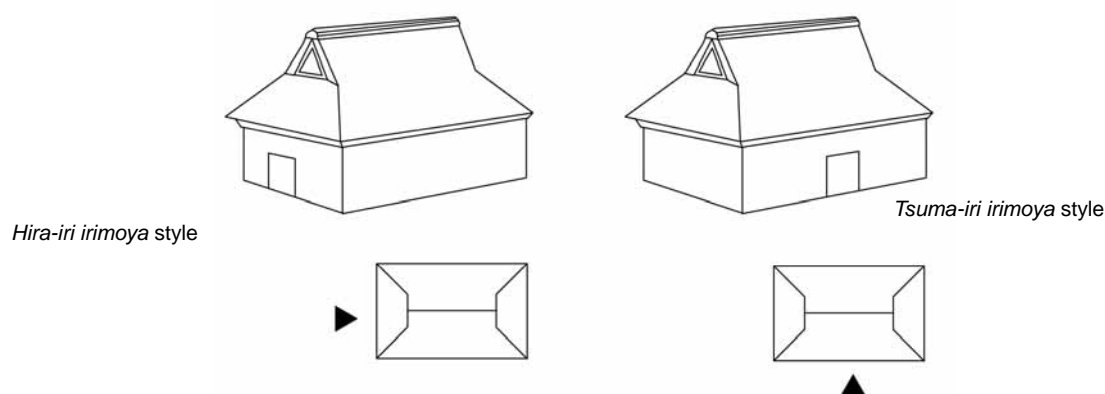


Fig. 7- Classification according to the main entrance position

II-3- Roofing Materials

There are four main types of roofing materials: tile, thatch, planks, shingle and bark.

II-3-1 Tiles

A tiled roof can have two different kinds of tiles, the concave and convex tile (*hongawara*) or the pan tile (*sangawara*). The concave and convex tile or *hongawara* was the first kind of tile used in Japan. It was introduced together with Buddhism around 538. The prototype form of this kind of tile was the bamboo roofing of India and southern China.

¹宮澤智士, 1993, p17

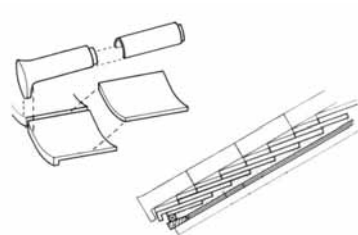


Fig 8- concave and convex tile (*hongawara*)

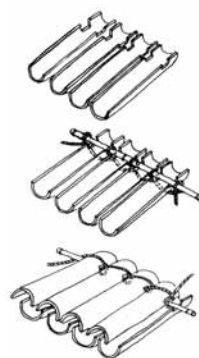


Fig 9- bamboo roofing¹

The base tiles (*hiragawara*) are lined up with the concave side upward, and semicircular cover tiles (*marugawara*) are placed face down over the adjoining edges of the base tiles. This kind of tile is quite heavy and requires a strong structure to support it.

The pan tile, or *sangawara* was developed during the 17th century in Kyoto. It is an S shape tile, which combines the functions of the base tile and cover tile. This kind of tile requires much less earth or clay to hold it in place than the concave and convex tile. So the roof with *sangawara* tiles, as a whole is much lighter than one tiled with *hongawara*. Since the beamwork of the roof does not need to be especially strong, houses that originally had shingled roofs can be reroofed with pan tiles without having to reinforce the roof framework.

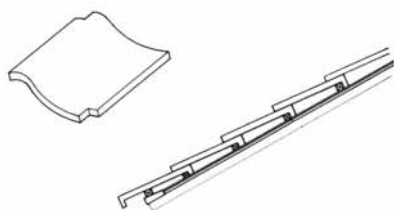


Fig. 10- Pan tile (*sangawara*)²



Fig. 11- Thatched roof

II-3-2 Thatch

¹ Kwashima, Chuji 1990, p24

² Kawashima, Chuji, 1990, p29

Thatch is the most widespread and common roofing material for farmers' houses. Originally it was an easy material to obtain. Since it is lightweight and does not require a heavy roof truss, thatch was the most economic roofing material. It also insulates the house against heat in summer and cold in winter, and muffles the sound of rain. First farmers would thatch their own roof, though special techniques and tools gradually emerged for constructing roofs and thatching became a skill requiring professional expertise. Today there are numerous styles of thatching that have been handed down in different parts of the country.

II-3-3 Wood Roofing: Planks, Shingle and Bark

Planks, shingle and bark are the three main types of wood roofing material. Planks are generally 6 to 18 millimeters thick, 9 to 15 centimeters wide and 45 to 60 centimeters long, and are placed perpendicular to the ridge. The most widespread method of securing planks is to lay logs horizontally over the roof to pin down groups of planks. The logs are held in place with heavy stones. This style of roofing is called *ishioki-ita-buki*. The pitch of such roofs is necessarily gentle, usually about 20 degrees, to prevent the stones and even the shingles themselves from slipping off.



Fig. 12 – Plank roof held with stones¹

Shingles are usually about 30 centimeters square and are fastened down with bamboo pegs. The cypress-bark shingle roof is believed to date from very ancient times, and is thought to have been the standard roofing material for the aristocratic dwellings of the *Heian* period (794-1185). The cypress-bark roofing is called *hiwada-buki* while

¹ Kawashima, Chuji 1990, p29

the shingle roofing is called *kokera-buki* or *koita- buki*.

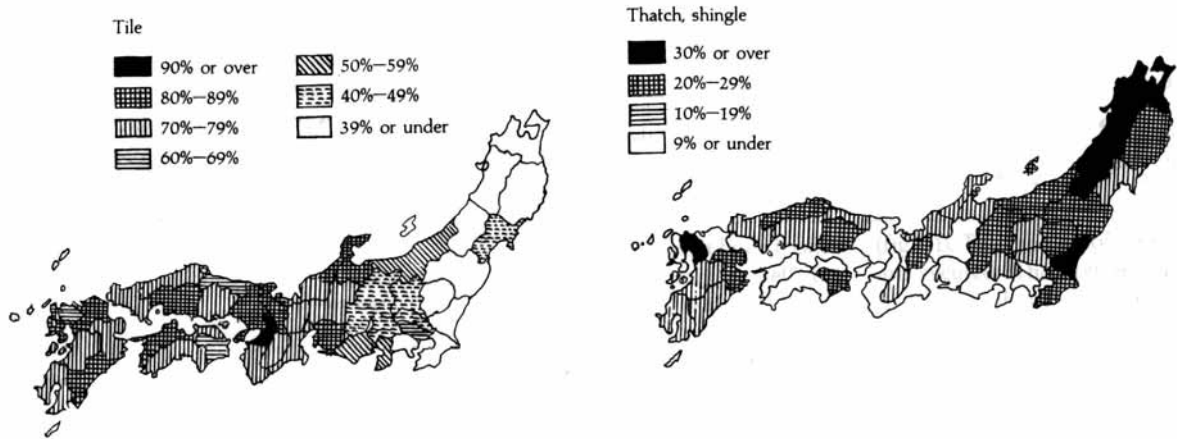


Fig 13- Predominant roofing materials in Japan ¹

The predominant roofing material for farmers' houses is thatch, while tiles were used in temple roofs and city houses (*machia*). We can see on the map that the Kansai area is where we can find most tiled roof buildings, while thatched roof building are found in rural areas like Akita Prefecture or Kyushu.

The inclination angles used in the roofs are various and usually change according to the roofing material. For the concave and convex tile roof (*hongawara*) the inclination is usually between 27° and 32°. For the pan tile roof it is between 22° and 27°. On thatched roofs normally the inclination is 45°, while the common inclination for bark and shingle roofs is 35°.

II-4 Beam Systems:

There are four main types of roof trusses, the *wagoya*, the *sasu*, the *shintosuka* and the *noboribari*. The beam system changes according to the roofing material and building type.

II-4-1 Wagoya

The *Wagoya-gumi* or Japanese truss (fig14)²,

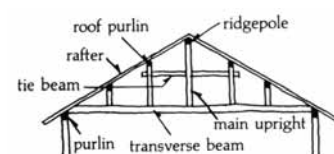


fig. 14 - Wagoya gumi

¹ Kawashima, Chuji, 1990 p24

² Kawashima, Chuji, 1990 p82

uses a series of vertical supports. It is mainly used for shingled or tiled roof and provides maximum support along the slope of the roof, preventing the braces from sagging.

II-4-2 Sasu-gumi

The *Sasu-gumi*, or brace truss (fig15), is a triangular structure often used for thatched roofs. Its braces cross and the ridgepole rests in the top of the fork.

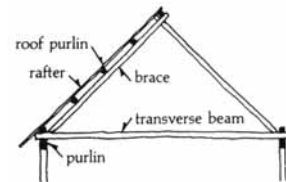


Fig. 15 - Sasugumi

II-4-3 Shintsuka-gumi

The *shintsuka-gumi* or king post truss (fig16) uses king posts, which are uprights below the ridgepole. This kind of truss is usually used for tiled and shingled roofs.

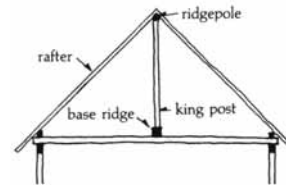


Fig. 16 - Shintsuka gumi

II-4-4 Noboribari-gumi

The *noboribari-gumi* or rising beam truss (fig17) is normally used for tiled and shingled roofs. It connects the transverse beams below the eave purlins, eliminating many vertical supports. This kind of truss makes efficient use of the space beneath the roof. The transverse beams penetrate the posts and *noboribari* or rising beams span the roof from the ridgepole to the tops of the posts.

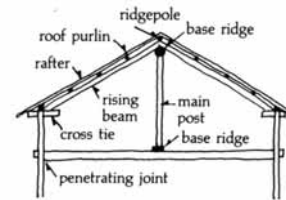


Fig. 17 - Noboribari gumi

II-4-4 Combined Systems

All of these systems may be combined, for example we may have a *sasu-gumi* plus a *shintsuka-gumi* (fig18) or *sasugumi* combined with a *wagoya-gumi*.

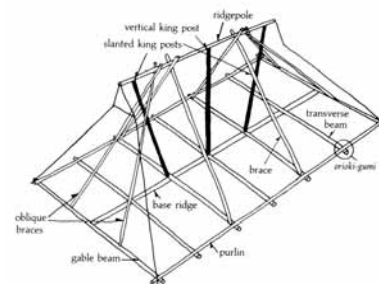


Fig. 18 - Combined roof truss, sasugumi + shintsukagumi

III Japanese Traditional Architecture

III-1 Prehistoric Dwellings and Antique Architecture

In Japanese traditional architecture there are four main building types: the Buddhist temples, Shinto shrines, aristocrats' houses and common people's houses. From these building types we can identify two distinct roots: prehistoric dwellings and Buddhist architecture that came from China. These two architectural currents are both very old and they finished by influencing each other and creating a mixed style, called *wayo* or Japanese style. Despite this mutual influence between Japanese indigenous architecture and that imported from China some basic concepts remained distinct.

Although the influence of Buddhism on the other three types of buildings was considerable, because of its non-Japanese origin it will be left out of this study for the moment. The other types of buildings: shrines, aristocrats' houses and common people's houses, aside from the influence of Buddhist architecture, are believed to derive from prehistoric dwellings. The Shinto shrines and the aristocrats' houses are thought to derive from the *takayuka jukyo* because of their raised plank floors and roof form. While the common people's houses, are thought to derive from a different kind of prehistoric dwelling called *tateana jukyo* because of their earth-floored working area and thatched hipped roof.

III-1-1 Tateana Jukyo

Knowledge about primitive architecture is still quite limited. The earliest type of house about which there is much information is the pit dwelling or *tateana jukyo*. It is supposed to had been built by digging a circular pit or rectangular one with rounded edges, fifty or sixty centimeters deep and five to seven meters in diameter, then covering it with a steep thatched hip roof. This kind of prehistoric building is believed to have been the prototype for the later common people's houses.¹

¹ 太田博太郎、1983、 p147, 148



Fig. 19- Tateana Jukyo reconstruction, Tsuyama city Okayama Prefecture.

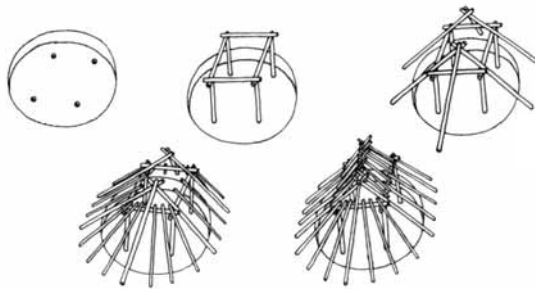


Fig. 20- Tateana Jukyo

III-1-2 Takayuka Jukyo

The Yayoi period brought with it wet-rice cultivation and advances in building techniques and the development of a second type of prehistoric building. This kind of building was elevated on posts and had a raised plank floor (*takayuka jukyu*). This raised floor building had a gabled roof and was first used as a storehouse. It is believed to have been the prototype form for aristocrats' houses and Shinto shrines.¹



Fig. 21 – Takayuka Jukyo²



Fig. 22 – Takayuka Jukyo reconstruction, Tsuyama City , Okayama prefecture

¹太田博太郎、1983、 p147, 148

² Hozumi, Kazuo, 1996, p54

III-1-3 Nara Period Residences

The aristocrats' houses are also thought to have derived from the second type of prehistoric dwelling, the *takayuka jukyo*, and to originally have had a gabled roof. This theory is based on the Dempodo, one of the buildings inside the Horiyujii temple complex. The presence of a wood-plank floor in the Dempodo betrays its domestic origins, as other temples of the period had floors of packed earth. The Dempodo is believed to be the only residential structure remaining from the Nara period. It was moved to the temple in 739.

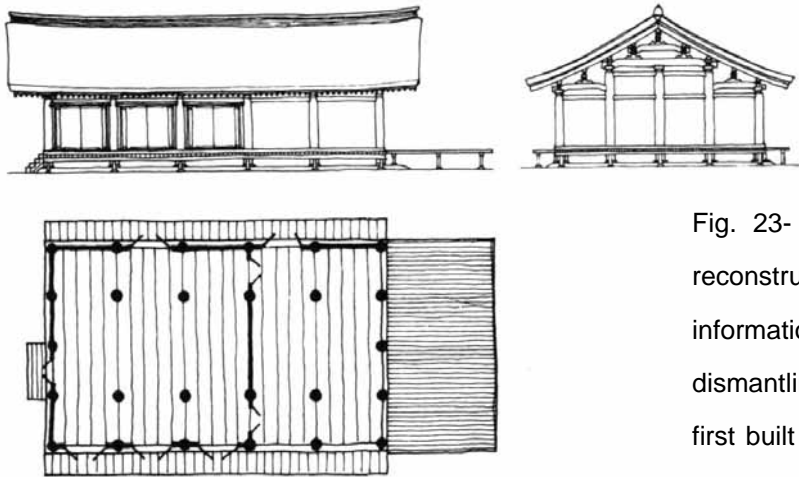
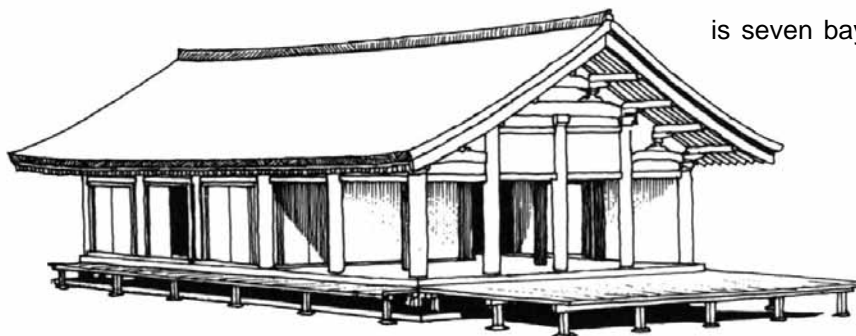


Fig. 23- the original Dempodo, reconstruction based on the information obtained during the dismantling for repairs. When first built the structure is thought to have been five bays long by four wide and was roofed with cypress bark.

The present Dempodo is seven bays long by four bays



1

¹ Hozumi, Kazuo, 1990, p60

Another example of a residence from the Nara period is the mansion of Fujiwara no Toyonori (c.704-65), which could be partially reconstructed thanks to a description in a collection of documents entitled *Shosoin Monjo*. Sekino Masaru thought the mansion to have been five bays wide by three deep, with an elevated plank floor and no fixed interior partitions, and two verandas (*hisashi*)

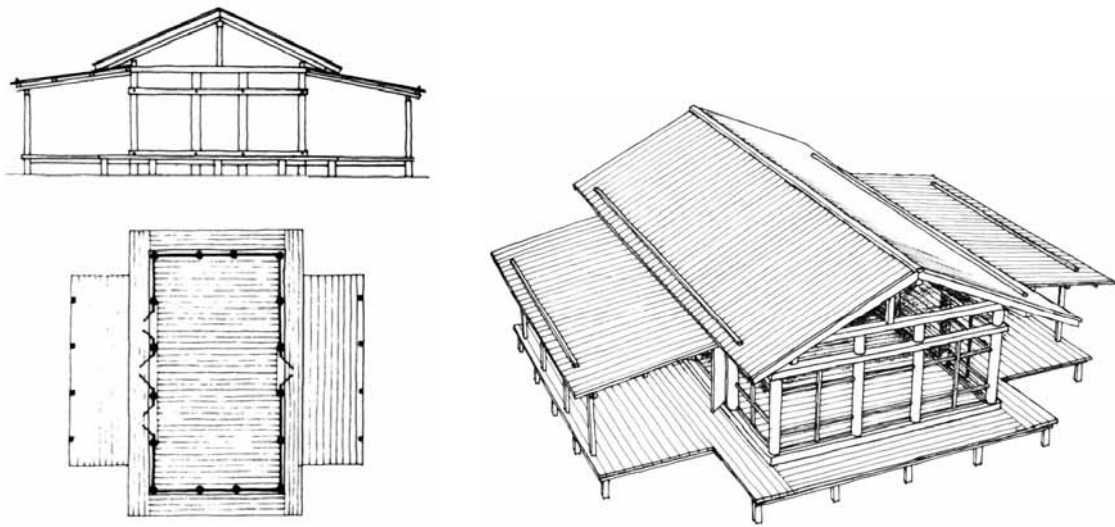


Fig. 24- Fujiwara no Toyonari's mansion¹

Though we cannot tell what functions the original Dempo and Toyonari mansion performed in their respective residential complexes, they clearly presage the development of the Shinden Style of the Heian period in their use of both open and closed spaces, elevated plank floors, and unpartitioned central sections.

Based on the Dempo we can presume that aristocrats' houses had gabled roof. The houses had a main space called the *moya*, which had no fixed partitions; instead of dividing the interior of the *moya* extra spaces were added in something similar to a veranda, called a *hisashi*. This system was called *kenmenkiho*, and the buildings were classified according to how many bays they had and on how many sides they had a *hisashi*.

¹ Hozumi, Kazuo, 1990, p60

III-1-4 Kenmenkiho

Kenmenkiho was a structural system developed from antiquity and applied in both aristocrats' houses and Buddhist temples. The system is based on a standard structure of one bay wide per one bay deep, which defined the boundary lines of the building's main space, called the *moya*. This standard structure was fixed in the beam direction (*hari yuki*), usually being one bay deep, although in the opposite direction (*keta yuki*), it could be infinitely extended by adding more bays.

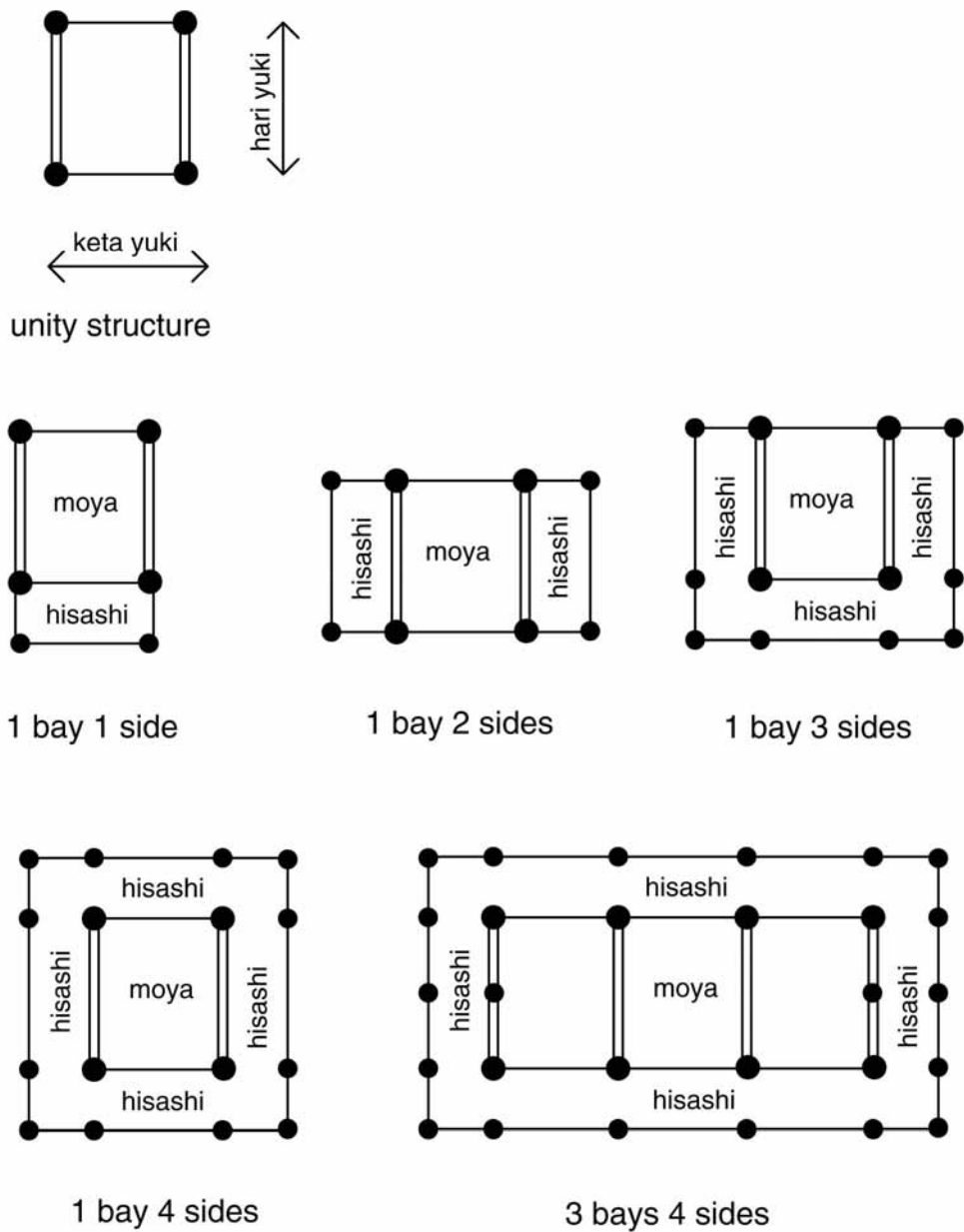


Fig. 25 – *Kenmenkiho* system

Another process adopted to enlarge the inner space was the addition of a substructure, a *hisashi*, around the *moya*. Based on this system the buildings were classified according to how many bays wide they were and on how many sides of the *moya hisashi* were added, with a fixed depth as mentioned. A consequence of this system was that very long buildings were built, the Sanjusangendo (33 bays hall) in Kyoto is a good example.

The addition of *hisashi* around the four sides of the *moya* resulted in an alteration to the original gable roof form. The addition of the *hisashi* roofs to the main *moya* gabled roof resulted in a hipped and gabled roof. This process can be recognized in the Kyoto Gosho palace roof, where we can see steps on the roof showing exactly the boundary lines of the *moya* and the *hisashi*. This kind of roof is called *shikoro-buki* because it resembles to a samurai's helmet (*shikoro*).



Fig. 26- Kyoto Gosho palace, Kyoto

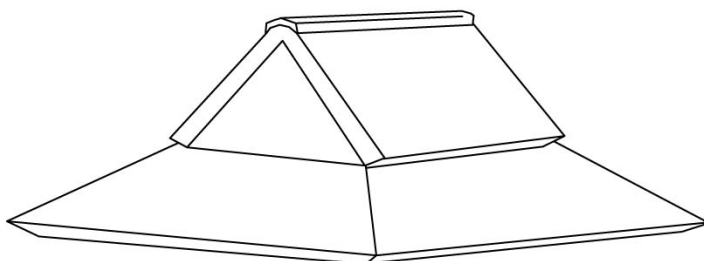
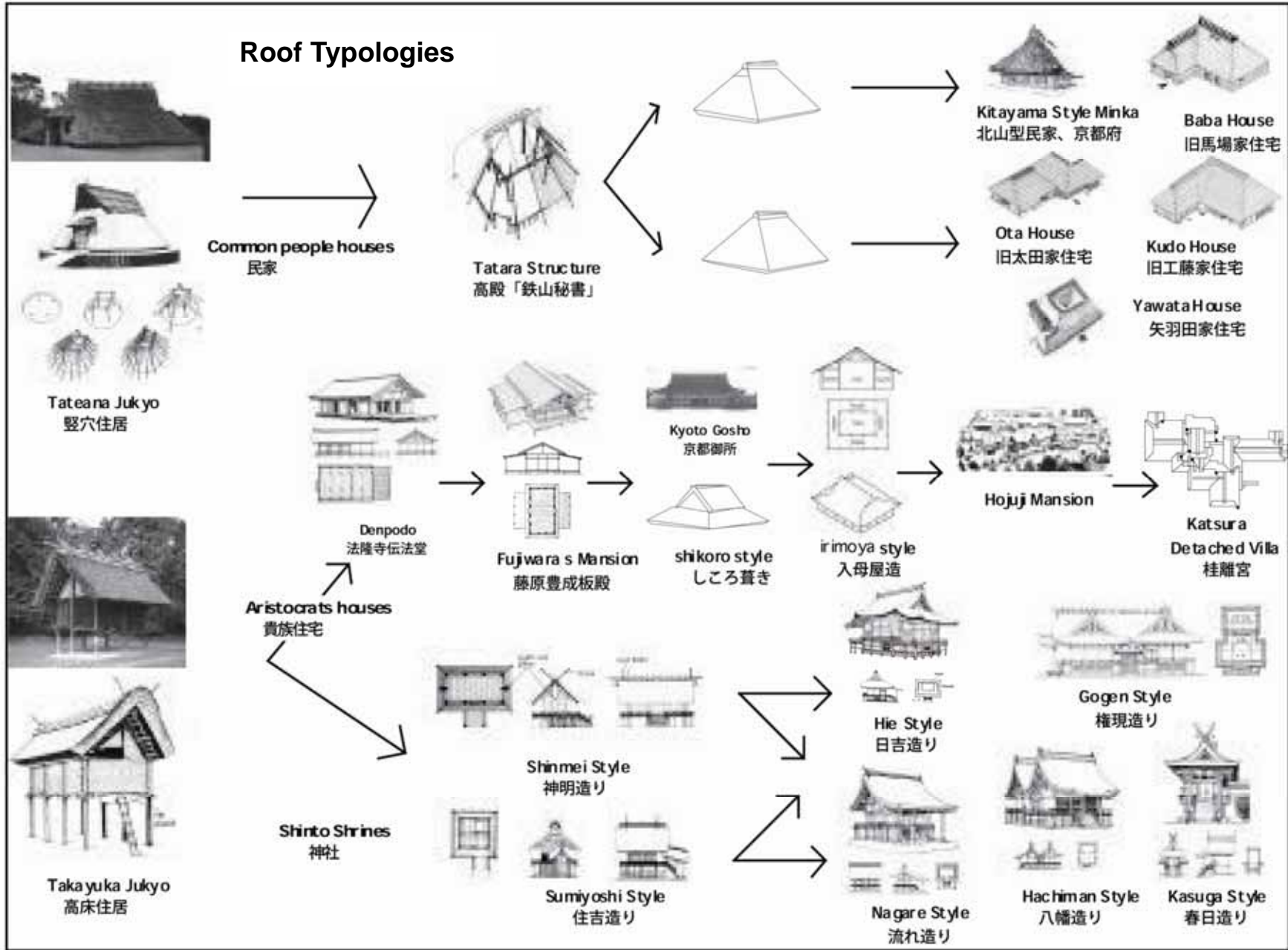


Fig. 27- Shikoro-buki

Roof Typologies



III-2 Shinto Shrines (*Jinja*)

Shinto is Japan's indigenous religion, and it involves the worship of elements of nature, especially certain mountains or trees. The configuration of the early Shinto shrines is unknown, but possibly resembled the portable shrines (*mikoshi*). Indeed, the arrangement of the foundation stones at *Kasuga* shrine and *Kamo* shrine suggest that their principal structures were originally movable. The shrine form is thought to derive from the *takayuka* type of prehistoric dwelling. However, the main types of Shinto shrines in use today took their final forms after the introduction of Buddhist architecture.

Therefore Shinto structures began very early in their development to adopt Buddhist temple characteristics. For example the straight eaves, which are thought to have been the norm for early Shinto roofs gradually adopted the gentle curve of Buddhist buildings roofs. Hipped roofs and tiles were not generally adopted though.

III-2-1 Shime, Taisha and Sumiyoshi Styles

Shime, Taisha and *Sumiyoshi* are the three oldest and most venerable of the *shinto* shrine styles. Each of these styles is identified with one famous *Shinto* complex.

The *shime* style is identified with the Ise Shrine (Ise city, Mie Prefecture). The Ise shrine consists of two shrine complexes, the Outer shrine (*Geku*) and the Inner shrine (*Naigu*). The most important structure is the main shrine of the *Naigu*. This building is side entered (*hira-iri*), has a raised plank floor and a gabled roof with straight eaves. The thatched (*kaya*) roof is topped by ten roof billets (*katsuogi*) and it has at either end of the roof-forked finals (*chigi*) that are extensions of the bargeboards. The building also has two massive pillars that support the roof ridge, called *munemochi-hashira*, which stand independently beyond the gable sides of the structure. The inner space has no partitions, and there is a kind of veranda (*mawari-en*) around it.

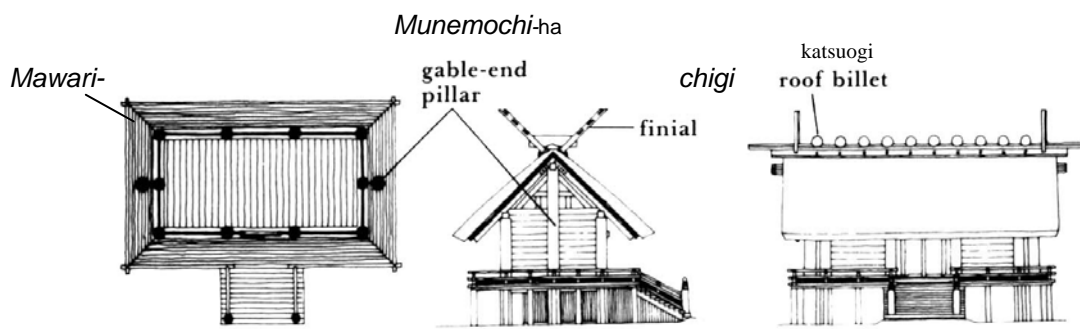


Fig 28 – Ise Main Shrine¹

The *Taisha* style is identified with Izumo shrine (Hikawa District, Shimane Prefecture). The Main Shrine (*honden*) is a raised floor gable-entered structure of impressive size. It has a shingled gabled roof with gently curved eaves, roof billets (*katsuogi*) and placed fork finial (*oki-chigi*), all of each was probably the result of later alterations. There is a porch roof over the stairs, which is independent from the main roof. In plan the present main shrine resembles that of the *Daigoe Shoden*, built for the accession of each new emperor. Therefore the main shrine at Izumo is thought to retain a floor plan characteristic of ancient domestic architecture. There is a partition in the interior space, which divides it into two rooms, *naijin* and *gaijin*, with a veranda (*mawari-en*) around it. This shrine was rebuilt twenty-five times, and the actual building dates from 1744.

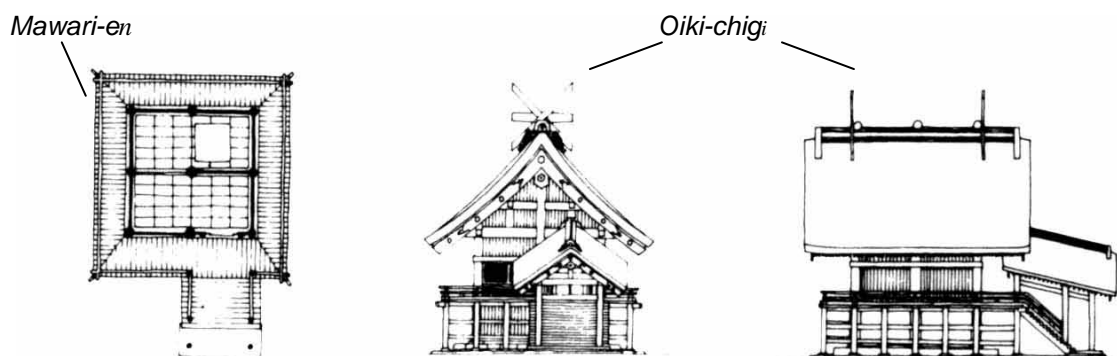


Fig 29- Izumu Shrine²

¹ Hozomi, Kazuo, 1996, p40

² same

The Sumiyoshi style is identified with the Sumiyoshi shrine (Osaka City). This shrine consists of four nearly identical gable-entered structures that originally overlooked the sea but today the site is surrounded by a modern urban neighborhood. The shrine is gable-entered, has a rise floor and a shingled gabled roof with straight eaves. There are oki-chigi and katsuogi placed over the roof ridge. The interior is divided in two rooms, naijin and gaijin, and there is no veranda (mawari-en) around it.

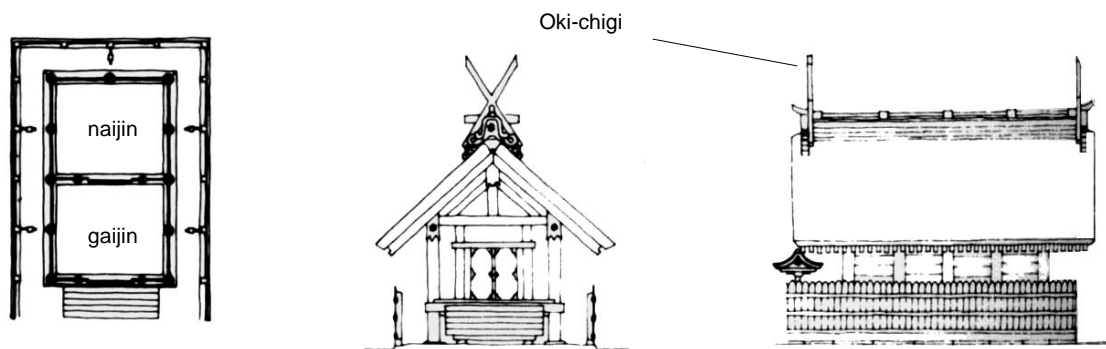


Fig. 30- Sumiyoshi Shrine¹

As a rule, the shrine buildings are rebuilt alternately on the contiguous lot every twenty years. The rebuilding process takes years to accomplish and is hugely expensive. Though the practice was common at many shrines in the past, nowadays Ise is the only shrine that is regularly rebuilt.

III-2-2 Nagare and Kasuga Styles

The *nagare* style is the most widely used shrine type and is characterized by a shingled gabled roof that slopes out over the entrance on the non-gable side of the structure and covers the stairs. The shrine has no interior partition. The best examples of this style are the two Main Halls (*honden*) of the Kamo Mioya Shrine and the Main Hall and Provisional Hall (*goden*) of the Kamo Wakeikazuchi shrine. Both shrines are in Kyoto City and were last rebuilt in 1863.

¹ Hozomi, Kazuoi, 1996, p40

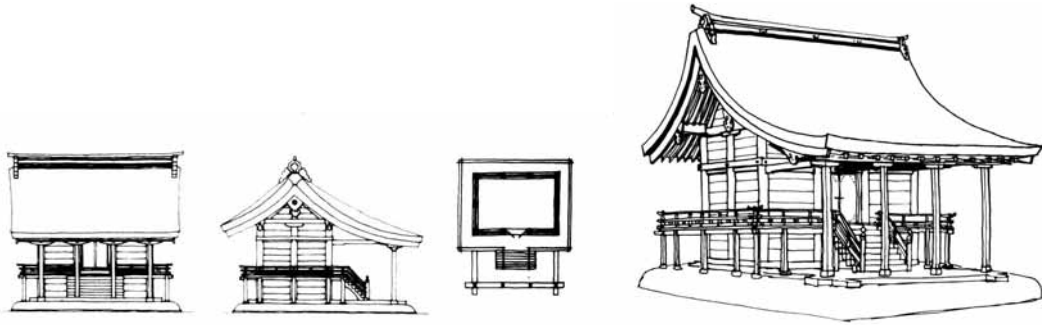


Fig. 31- Nagare Style : one of two Main Shrines at Kamo Mioya Shrine, Kyoto.¹

The *kasuga* style is the second most commonly used shrine type. It is one bay in plan, with the entry and stairs on the gable side and protected by a long porch roof, added onto the main roof. There are *oki-chigi* and *katsuogi* placed over the roof ridge. Kasuga shrine was first built in the 730's at the foot of Mt. Mikasa east of the Heijo capital. The shrine was rebuilt every twenty years until modern times, and the present main structure back to 1863. Other fine examples of the Kasuga style are the Kasugado and the Hakusando of Enjoji temple (Ninnikusendo, Nara city) built between 1197 and 1228. These are the oldest extant Kasuga style shrines and are thought to have been built originally as part of Kasuga shrine, then moved to their present location when Kasuga was rebuilt.

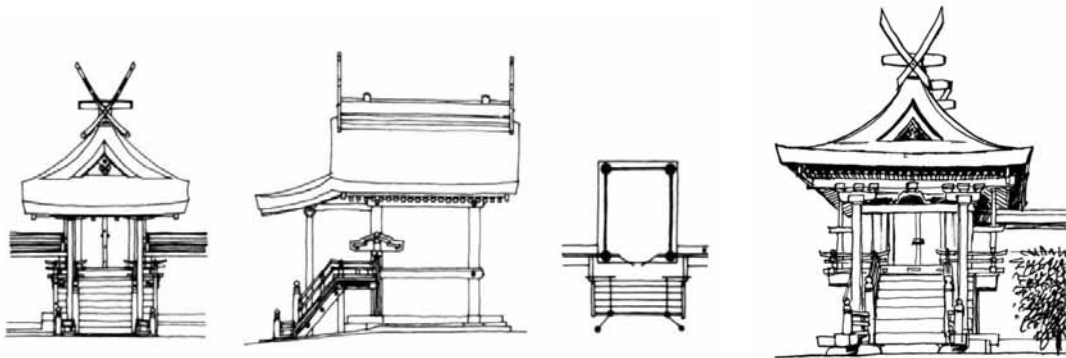


Fig. 32- Kasuga Style: front side, and plan of a Main Shrine, Kasuga Shrine.

Exterior of Kasugado, Enjoji;²

¹ Hozomi, Kazuo, 1996 p42

² Hozomi, Kazuo, 1996 p48

III-2-3 Later Styles

The Hachiman style was created by linking two nagare style shrines one in front of the other. The practice was first used in Buddhist structures to provide a separate space for worshippers, although the Buddhist structures were under a single roof. Both structures have a shingle gabled roof and are side-entered, with a gutter (*toi*) connecting them.

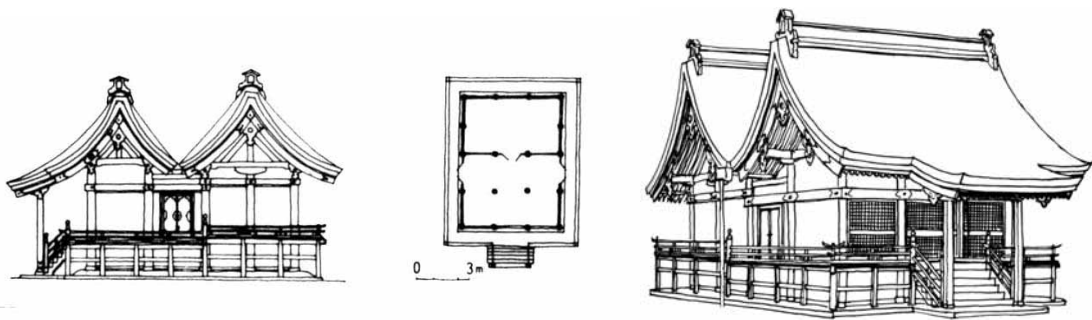


Fig. 33- Hachiman style: Main Shrine of Usa Shrine.¹

The Hie style is only found in the main shrine of the east precinct of Hie Shrine, on Hiezan Mountain in Shiga prefecture, Otsu City. This shrine was first built in 887 and the present buildings date from 1595. The design is the result of adding subsidiary spaces (*hisashi*) around all but the front side of the central core (*moya*) and extending the roof over those additions. This process is similar to that used in Shinden and Temples. The difference is that once there is no *hisashi* on the back of the Shrine, just the front part of the roof is in the *irimoya* style.

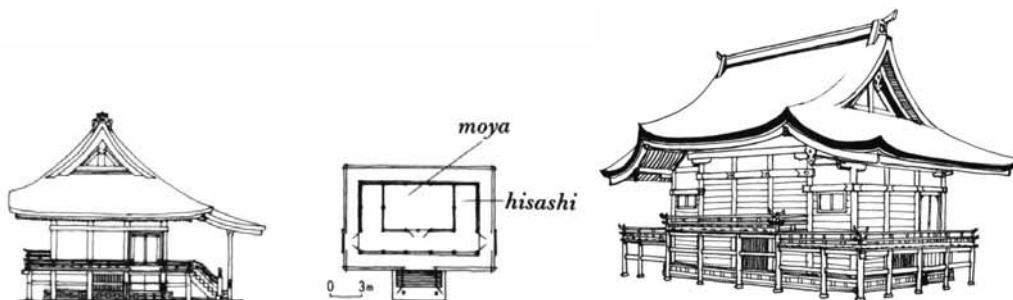


Fig. 34- Hie Style: Main Shrine of East Precinct, Hie Shrine²

¹ Hozomi, Kazuo, 1996 p48

² Hozomi, Kazuo, 1996 p43

Other interesting shrines are the Itsukushima shrine in Hiroshima Prefecture and the Kibitsu shrine in Okayama Prefecture.

Itsukushima shrine was first built on its present scale in 1168 by the great warrior Taira no Kyomori (1118-81). The shrine is built out over the water because the island is worshiped and nothing was supposed to touch the sacred ground. The shrine is a complex of several buildings connected by corridors. The *honden* buildings have a gable roof and are side-entered, the *haiden* have hipped-gabled roofs and are side-entered, while the *harau-den* also have a hipped-gabled roof but are gabled entered. The use of connecting corridor may be reminiscent of the Shinden style of aristocratic domestic architecture.



Fig. 35- Itsukushima shrine, Miyajima, Hiroshima prefecture

Kibitsu shrine was built in 1425, Okayama prefecture. This shrine combines its main hall (*honden*) and worship hall (*haiden*) under one hipped-gabled roof. Even though the *honden* and *haiden* are placed under the same roof the gables are doubled to indicate the two spaces beneath.

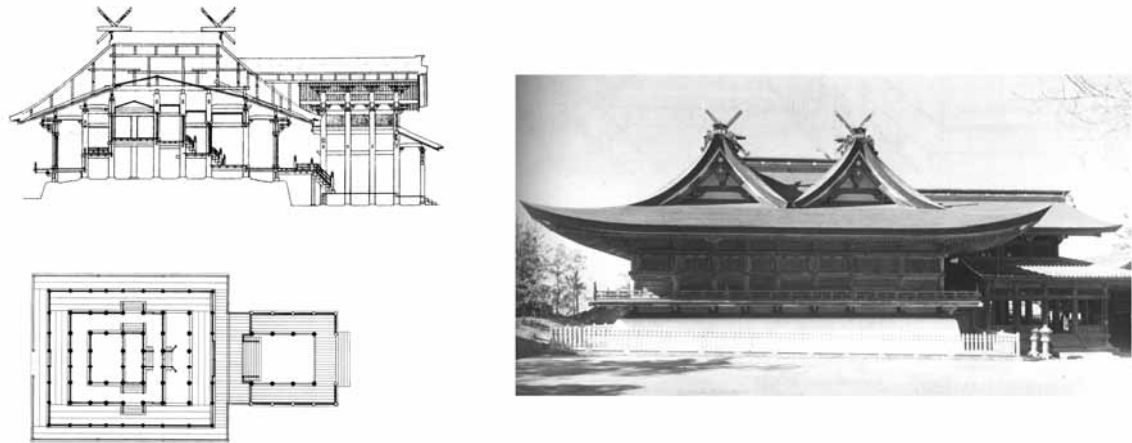


Fig. 35- Kibitsu Shrine¹

By the end of the Heian period in the 12th century the major shrine styles had reached maturity. Further developments were limited to minor variations in configuration or style of ornamentation.

¹ 日本建築学会日本建築史図集、1996、p55

III-3 Aristocrats' Houses

III-3-1 Shinden Style

The house style of the aristocracy had been the *shinden-zukuri* since antiquity and from the middle ages to *Kinsei* (1568-1868) it developed into the *shoin-zukuri*. Even though there is not much information about the Shinden style, its probable composition and appearance could be established based on written sources, specially “The Picture Scroll of Annual Rites and Ceremonies”.

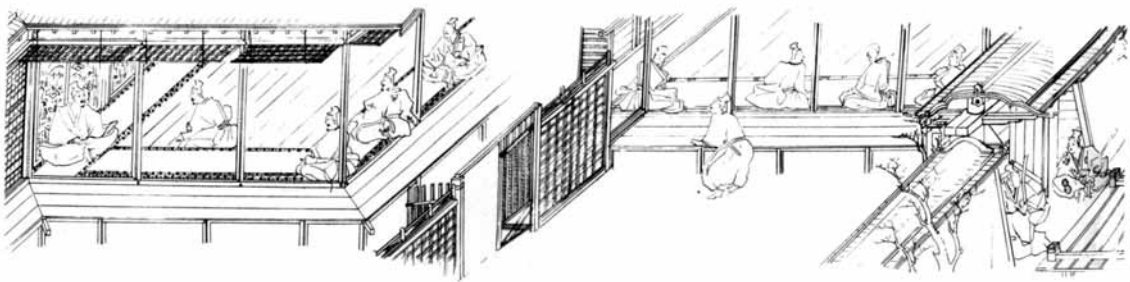


Fig. 37- Picture from the Picture Scroll of Annual Rites and Ceremonies¹

The *shinden* complexes are thought to have usually faced south over a courtyard where ceremonies and entertainment were performed. South of the courtyard a pond was dug with a central island reached by bridges. The *shinden* hall was the residence of the master of the house and the place where he met guests and officiated at rites and festivities. Projecting from one or more sides of the *shinden* hall were hallways (*wataridono*) leading to subsidiary spaces called *tainoya*, mostly allotted to family members and their servants. Corridors (*ro*) led from these *tainoya* to the pond, where they ended in small fishing pavilions (*tsuridono*) or fountain pavilions (*izumidono*). Midway along these southern corridors were inner gates (*chumon*) through which one entered the complex and the corridors were accordingly called inner gate corridors (*chumonro*). These were quite spacious corridors and are thought to have contained the offices of the household staff.

Shinden residences were usually built on one-block lots (120 square meters). The lot was surrounded by thick earth walls (*tsujibe*), which were faced with planks on both sides and topped by tiled roofs. Gates were set into the eastern and western walls,

¹ 日本建築学会日本建築史図集、1996、p56

one being the Main Gate (*seimon*) and the other the Rear Gate (*uramon*). The arrangement of spaces progressed east to west though the buildings faced south.

Hojiuji mansion is an example of a Shinden complex. This mansion was reconstruct by historians based on the Picture Scroll of Annual Rites and Ceremonies. The mansion was built in what is now southeast Kyoto by chancellor (*daijo daijin*) Fujiwara no Tamemitsu (942-92).



Fig. 38- The Hojuji mansion¹

As we can see in figure 38 the Shinden was a residential complex in which each functional space was under an independent structure. Those structures are believed to have had hipped-gabled (*irimoya*) roofs, resulting from the addition of *hisashis* around the *moya*. These *shinden* halls were connected by corridors or hallways.

When the warrior class ascended to power they used the aristocracy house as a model for their own residences.



Fig. 38 Middle ages samurais' house (法然上人絵伝)²

¹ Hozumi, Kazuo, 1996, p64-65

² 日本建築学会日本建築史図集、1996 p56

III-3-2 Shoin Style

Though the upper-level samurai adopted the *shinden* style for their own mansions, including the garden complex, the *shinden* style itself began to change in the medieval period. One major development was the division of the *moya*. Divisions were made according to function, with more fixed partitions between public and private spaces in the main hall and additional separate structures built for different purposes. The main hall *moya* was not wide enough to accommodate all of these new kinds of spaces. Due to the necessity for more functionally specific spaces the interior space expanded out from the main hall. Consequently the corridors were enlarged to shelter those new spaces.

The *shoin* style of residential architecture gradually developed during the Muromachi period (1338-1573) out of the *shinden* style. With the division of the interior from one room to two or more the corridors ended up being incorporated into the buildings. So the residence complexes changed from being halls connected by corridors into halls connected to halls.

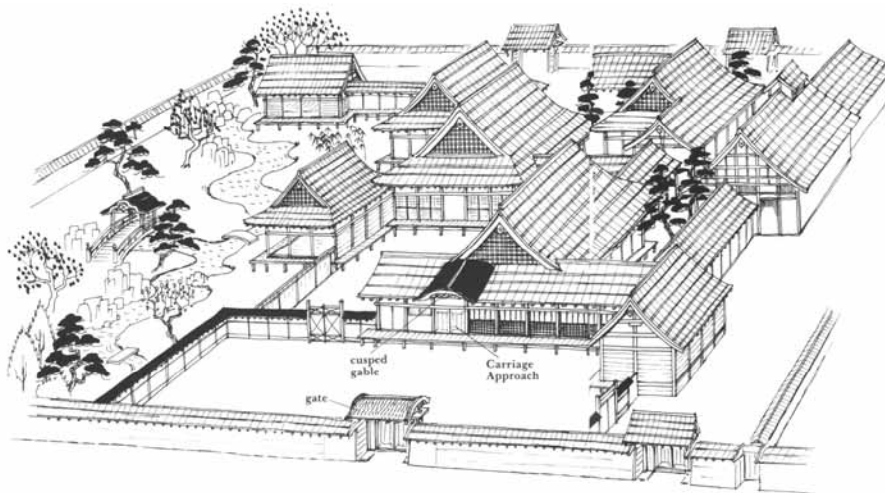


Fig. 40- Mansion of the Hosokawa family in Kyoto¹

Besides the decrease in the number of corridors, another characteristic of the *shoin* style is that the most formal room in a *shoin* structure typically contained a decorative alcove (*tokonoma*), staggered shelves (*chigaidana*), built-in desk (*tsukueshoin*), and decorative doors (*chodaigamae*). However, relatively few *shoin*

¹ Hozumi, Kazuo, 1996, p70

structures contain all four elements.

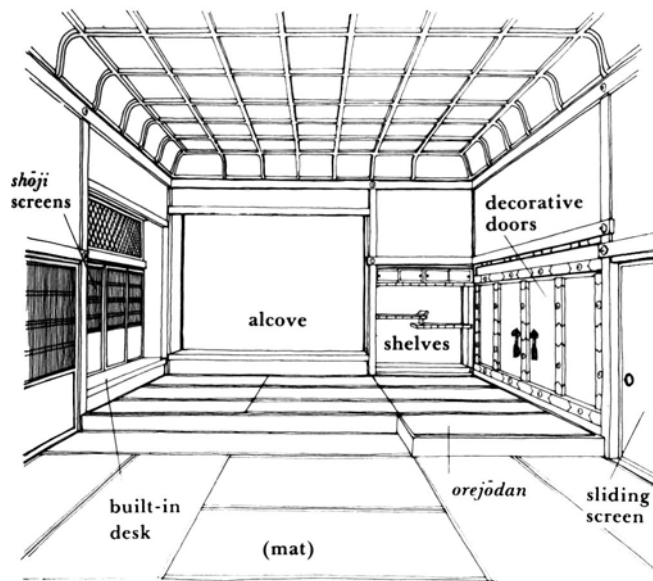


Fig. 41- Shoin zashiki, Nishi Honganji.¹

The *shoin* style is also characterized by having *tatami* mats over the entire floor, square posts with slightly beveled corners, coved ceilings, *fusuma* - plain or painted sliding screens - between interior spaces, and *shoji* - white translucent paper screens reinforced with wooden lattice - on the exterior, protected by heavy sliding panels (*amado*) which were moved in front of them at night or in inclement weather.

The *shoin* style kept the *shinden* concept of open buildings, connecting the outside space and inner space.

¹ Hozumi, Kazuo, 1996, p75

III-4 Common People's Houses: Minka

The second kind of residential architecture is the common people's houses. These houses are called *minka*, this expression include all classes of people's houses. It is a general designation for residences of farmers, fishermen, merchants, tradesmen, craftsmen and even masterless samurais. The *minka* is thought to have derived from the prehistoric pit dwellings (*tateana jukyo*) and in contrast to the upper class *shinden* style it is very closed. From antiquity until the middle ages the *minka* had few openings to make the interaction between outer and inner space. However from the Kinsei period it receives the *shoin* influence and started to change from the closed structure into a more open structure. "Installing many doors and windows increased the amount spent on fixtures. That is why during the Edo period most feudal clans forbade the construction of *minkas* with too many doors and windows. On the other hand this fact shows that there was a desire to have more doors and windows."¹

III-4-1 Structure

Most of the *minka* that exist today date from the Edo period. This fact is a consequence of fundamental structural changes that happened during that period. The structural system changed from one of posts fixed directly into the ground to one of posts resting on stone bases. Up until the Edo period the wooden posts were put inside holes in the ground (*hottate-bashira*). Since the stone-based wooden post were not directly exposed to the ground humidity they did not rot easily. Therefore the stone-based wood posts had a longer lifetime than posts fixed directly into the ground. Consequently only the *minka* that were built with stone-based posts remain.

Another structural advance was the development of a substructure (*geya*) around the main structure (*joya*). The relation of the *joya* and *geya* structure is similar to that of the Aristocrats' house *moya* and *hisashi* relation.

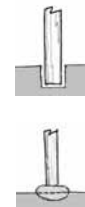


Fig 42- *Hottate-hashira* and *Ishiiki-hasira*

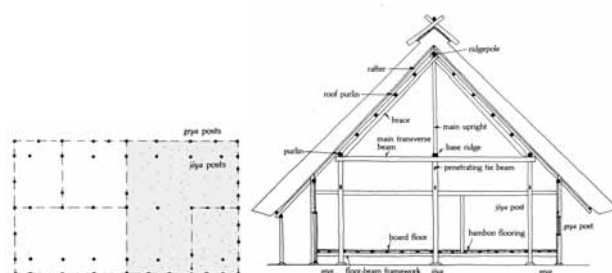


Fig43 Joya and Geya structures²

¹ 宮澤智士、1993

² Kawashima, Chuji, 1990 p79

III-4-2 Types of spaces

The *minka*'s principal characteristic is that besides the living quarters it has an indoor service area. This part of the dwelling is called the *doma*, and it has an earth floor of packed clay mixed with charcoal and bittern. This is the place where indoor farm tasks are performed. Most *minka* also have a stable (*umaya*) in one corner of the *doma*.

Adjoining the *doma* is the main room of the house, typically with a plank floor and a sunken hearth (*irori*), where the family gathered for meals and talking. This room called the *hiroma* has fixed customs regarding the seating around the *irori*.

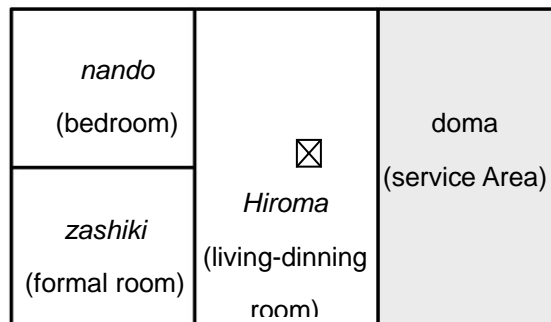


Fig. 44- *Minka* basic plan, *hiroma* type

The etiquette manners of receiving guests and seating around the *irori* differ from the rules of the *zashiki* with a *tokonoma*. The *hiroma*'s most exalted seat, the *kamiza*, is that of the master of the house, who faces the *doma*. Opposite this seat, nearest the entrance is the place reserved for guests, the *shimoza* (lower seat). The *shoin zashiki tokonoma* is usually in the wall behind the seat of honor, which faces the front of the house, and is reserved for guests. Therefore with the *minka hiroma* sitting rules the seat of honor (*kamiza*) is reserved for the master of the house while in the *shoin zashiki* sitting rules the seat of honor is reserved for the guests. This difference in the rules made necessary to have a *shoin* style *zashiki*, in order to be able to properly receive government representatives, samurais or upper class guests.

III-4-3 Plan Evolution

The floor plans of the *minka* are believed to have evolved from the division the raised floor multipurpose room into separate rooms. The simplest type of plan has the *doma* part plus a multipurpose room. This multipurpose space was divided until it reached its most developed form of four rooms. Therefore the *minka*'s plan are

classified according to how many rooms the raised floor area was divided into.


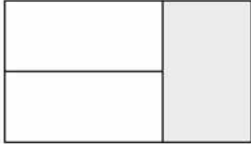
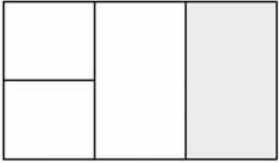
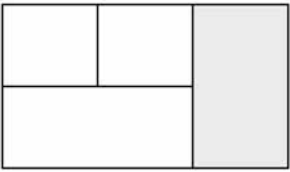
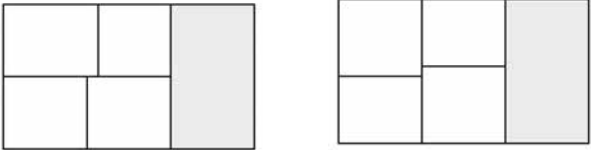
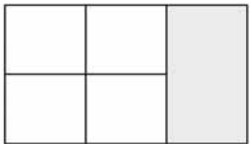
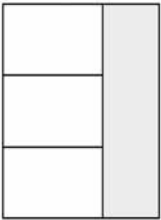
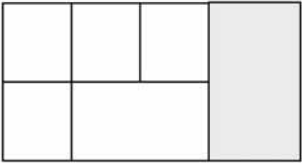
<p>1 Room Type</p> <p>One-room dwelling, half earth, half raised.</p> 	<p>2 Rooms type</p> <p>Two-room 鉞 raised floor plan formed by subdivision or addition to create a sleeping area. The living space is divided in front and back</p> 
<p>3 Rooms Type</p>  <p><i>Hiroma</i> Type plan with subdivision for front formal room</p>  <p>This type is found in the old Minkas of the Kinki area</p>	<p>4 Rooms Type</p>  <p>Vertically or horizontally nonaligned-quadrant floor plan: development of formal room and vestibule</p>  <p>Regular-quadrant floor type,</p>
 <p>The rooms arranged vertically is typical of the city dwellings (<i>machiya</i>)</p>	<p>Large plan type</p> <p>Two-rooms are added to a <i>Hiroma</i>-type plan</p> 

Fig45- *Minka* floor plan evolution

The developed plan form of a minka has three types of spaces: service space (*doma*), living space (*hiroma and nando*) and the formal space reserved for the reception of guests (*zashiki*). Spatial differentiation created a hierarchical axis in the plan. The upper end, or *kamite* is the part of the house farthest from the *doma* where the formal rooms or *zashiki* are placed. The lower end, or *shimote* is the humbler part of the dwelling, where the *doma* is located. Perpendicular to this upper-lower axis there is a front-back (*omote-ura*) side axis. The entrance used daily is placed on the front side of the *doma*.

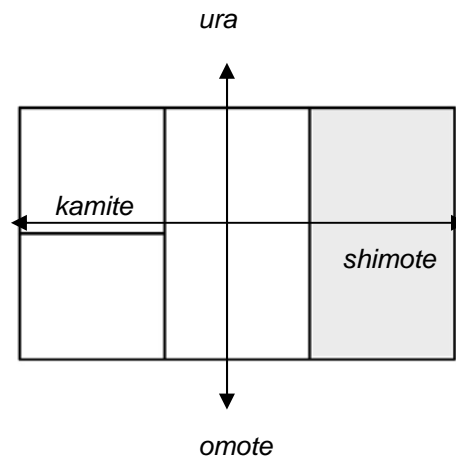


Fig.46- hierarchical axis in the plan

III-4-4 Building Restrictions

At first the *shoin* style *zashiki* was not allowed in commoner houses. Later it started to be built as a separate structure, independent from the main house (*omoya*). It changed gradually until finally the *zashiki* came to be built inside the *omoya*. The *zashiki* was a room not usually allowed to be entered and was reserved for special occasions and special guests. The daily guests were received in the *hiroma*, around the *irori*.

The *shogunate* had imposed restrictions on building materials and styles. In order to ensure that all people lived in houses reflecting their social status, the *shogunate* had set up a full code of architectural materials and elements that were permitted or forbidden for the individual classes. Feudal lords had to maintain mansions consonant with their authority and place. The objects and building elements that formed part of these grand homes were not allowed in the dwellings of commoners, no matter how wealthy, except under very special circumstances.

Sometimes clan lords in financially straitened circumstances borrowed large sums from merchants. For this they had to devise some kind of compensation that, while keeping the donors moderately happy, cost the lords themselves as little as

possible. Generally this took the form of symbolic gestures, like granting commoners the right, ordinarily denied them, of entertaining samurai, wearing swords and certain kinds of garments – also ordinarily forbidden- or using some of the architectural elements reserved for samurai in their homes, like spacious entrance vestibules (*shikidai*) or sitting rooms with raised honorary zones (*zashiki*).¹

In 1867 when the *shogunate* collapsed, all of the restrictions it had imposed on building materials and styles were revoked.

III-4-5 Diversity of Styles

III-4-5-1 City Dwellings (*machiya*)

There are some differences between the farmers' *minka* and the city *minka*, know as *machiya*. Since in the city dwelling there is no need for an indoor space for farm tasks, the *doma* has a different function. It is where the main entrance is placed and works as a corridor connecting the front part of the house to the back part. *Machiya* usually have a tiled gable 鷗 roof.

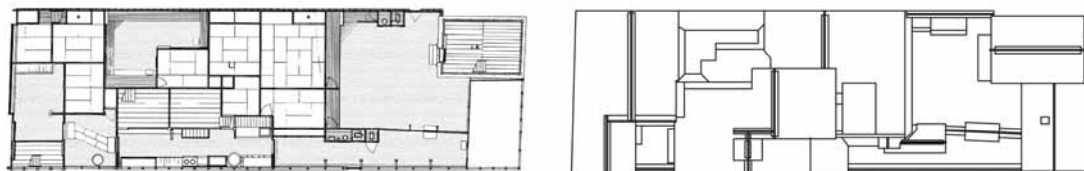


Fig.47- *Machiya* plan, former Ogata house, Osaka City¹

There is a rich diversity of farm houses styles. The numerous types of farmers' *minka* can be grouped into three types according to the form of the roof: single ridged roof, structurally independent connected roofs and multi-ridge roofs.

III-4-5-2 Single Ridge Roof Styles of Minka

The simplest kind of single ridge minka is called a *sugoya*. This kind of minka is characterized by usually having a thatched single ridge roof. This is the most common kind of minka and it is found throughout Japan.

¹ Teiji Ito, 1991, p2

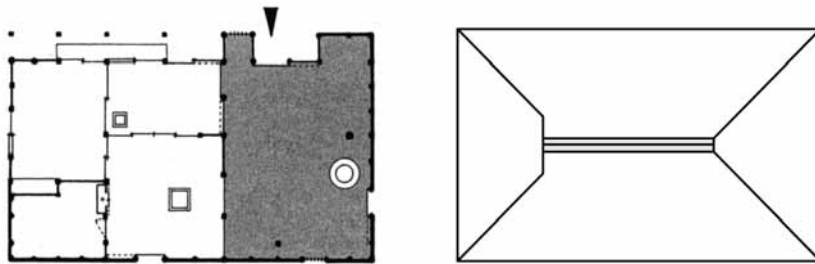


Fig. 48- Sugoya²

The *yamato-mune zukuri* is a style widespread in Minami Kawaguchi- Osaka and Nara prefecture. In fact, this style of house has two aligned ridgepoles, at different heights. This is visible from the facades but when seen from the roof plan it can be placed in the single ridge minka group. This style is characterized by the tiled roof of the working and cooking area (*kamaya* or *doma*) which is attached to the thatched gable roof of the main dwelling (*omoya*). The *kamaya* has a lower roof line than the *omoya*, a smoke turret (*yagura*) and a plastered wall which is called a *takahe* (high wall) built between the *omoya* and the *kamaya* roof to prevent fire. Consequently the *yamato-mune zukuri* is also called *takahe-zukuri*. The *kamaya* lower roof is usually gabled, although there are many examples in which it is hipped-gabled.

The *yamato-mune* was initially a style reserved only for the upper stratum of farmers, but by the end of the Edo period it became more popular. Even though this style came about in the 18 century, when restoration on this kind of minka was done, it was discovered that the buildings which were originally built in the *yamato-mune* style dated from the 19th century or later. All the older *minkas* suffered reforms in the middle of the 18th century. During these reforms the *takahe* wall and the *kamaya* roofline were built. All the houses transformed into the *yamatomune* style belonged to a very high class of farmers. It seems that ordinary farmers refrained from using the *yamato-mune* style in their houses. This fact shows that this style of roof was used to express social power.

¹ 修理工事報告書

² 吉田靖他、1991

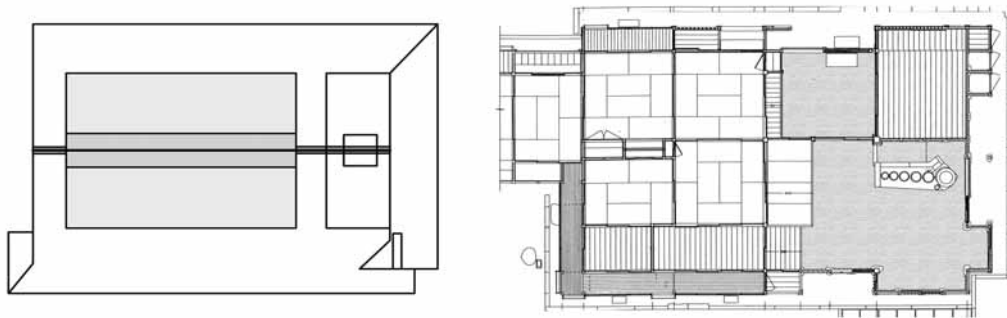


Fig. 49- Yamato-mune tsukuri¹

The *honmune-zukuri* style is found in central Japan. It is characterized by its big scale, shingled (*ishi-oki*) gabled roof, and by being gabled entered. This style developed around the end of the 17th century. The *honmune-zukuri* style was used in village headmen's (*shoya*) houses, land lords' (*meishu*) houses or officially appointed inns (*honjin*). This style, as with the *yamato-mune*, was only used in high-class farmers' houses. It was used to express the family social status.

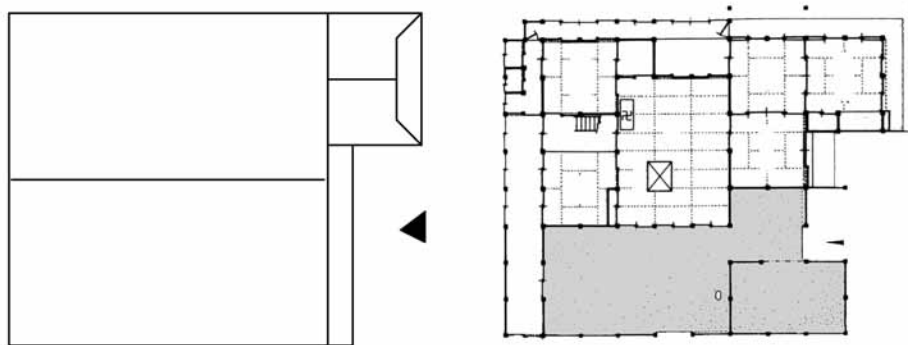


Fig. 50- Honmune Tsukuri²

III 4-5-3 Structurally independent connected roofs styles of minka.

In the *bunto zukuri* style each functional part of the house -living quarters, cooking area, sheds, stable and so forth- was under a separate roof. During the Edo period this kind of minka was widely distributed around Japan. Archeological investigations found that in the middle ages (1192-1568) the number of *bunto-zukuri*

¹修理工事報告書

²吉澤政、1996、p21

style houses was bigger and the area where they were distributed wider than in the Kinsei period (1568-1868). From the Kinsei period the raised floor building and the *doma* building started to be unified in one structure. By the end of the Edo period the *bunto-zukuri* style *minka* was a recessive form compared to the not divided houses and gradually disappeared. Consequently the *bunto-zukuri* style can be considered as an old style of *minka*. As we have seen the idea of having functionally different spaces under independent structures goes back to the *shinden* style of the Heian period.

The earth-floored building (*doma*) was placed at the lower end (*shimote*) of the raised floor building (*omoya*). The *omoya* building usually had a *joya* and a *geya* structure (*geya tsukuri*), while the *doma* was structurally simpler and only had the *joya* structure. The age of the *omoya* and the *doma* often differ, the *doma* normally being newer.

The *bunto-zukuri* style *minka* can be classified in four major categories, according to the way the *omoya* and the *kamaya* or *doma* are connected:

1) Two structurally independent buildings standing side by side



2) Two structurally independent buildings with eaves touching and a connecting corridor.



3) Two structurally independent buildings with unified interior.



4) Two structurally independent buildings with a linking structure.



Fig 51- Bunto-zukuri, ways of connecting the *omoya* and *kamaya*¹

¹ Kawashima, Chuji, 1990, p166

There is a regional diversity of types of *bunto-zukuri* style *minka*.

In the south islands (Okinawa prefecture) the representative *bunto-zukuri* style is made up of the *ubuya* (main house or *omoya*) and the *donguwa* (cooking area). Compared to the *ubuya* the *donguwa* is smaller and architecturally simpler. This style is characterized by having short ridgepoles. The *ubuya* ridgepole is parallel to the *donguwa* ridgepole. Occasionally there is a third structure to shelter the formal rooms.

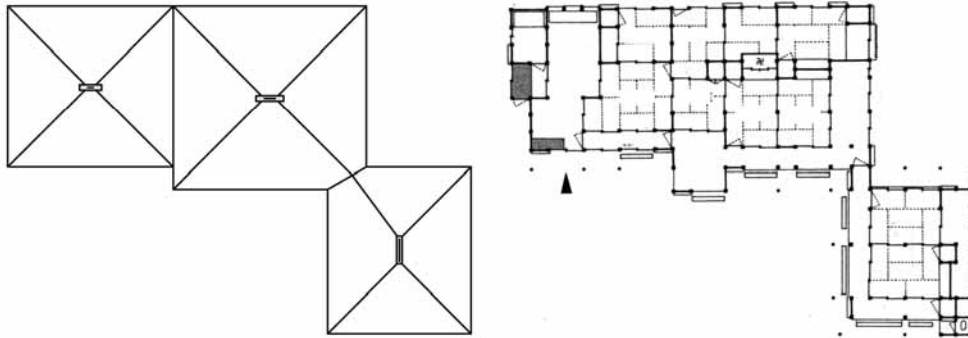


Fig. 52- Bunto-zukuri from Okinawa, Nakamura's house¹

The representative *bunto-zukuri* style of Kagoshima prefecture belonged to the Satsuma clan (Kagoshima prefecture and the south part of Miyazaki prefecture). This kind of house was composed of two structures, the *ie* or *omote* and the *nakae*. The *ie* or *omote* is the building that houses the living quarters and the formal rooms. It has a raised floor and each room is functionally divided. It uses a *shoin* style design for the formal rooms. The *Nakae* is the adjoining building. It has an earth-floored cooking area and a room where the family dined. It is a room with a raised floor and a sunken hearth (*irori*). This room was used for eating and for the reception of daily guests. It worked like a multipurpose room, and sometimes it was even used as a bedroom. The *nakae* has a *minka* style design. The *omote* and the *nakae* are connected by a structure called a *tenoma*, which is a plank-floored corridor. Therefore these kinds of *bunto-zukuri* style *minka* differ from the other regions' *bunto-zukuri* style *minka*, because they house a *tatami* mats floors space under one structure (*omote*), while the plank floored and earth floored spaces are arranged together under the other structure (*nakae*). In the other regions the *bunto-zukuri* style houses have the plank floored space and the *tatami* mat floored space together under the same building structure and the earth-floored space in a

¹宮澤智士、1977

separated structure. The *nakae*'s ridgepole is placed perpendicular to the ridgepole of the *omote*.

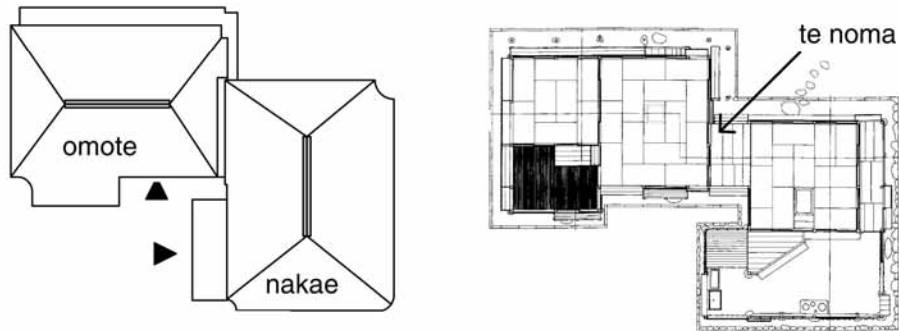


Fig. 53- Satsuma clan's bunto tukuri, Nikaido's house, Kagoshima Prefecture¹

In the Tokai region, Shizuoka and Aichi prefectures the *bunto-zukuri* style minka are called *kamayadatte* or *shumoku-zukuri*, because the ridges of the two roofs are at a right angle. The cooking area (*kamaya*) and the raised floor area (*omoya*) are divided into two separate buildings. The gabled-entered *kayama* is connected on the right side (*shimote*) of the side-entered *omoya*. A gutter (*toi*) is placed at the connecting part to collect the rainwater. The oldest structures in this area date from the mid 18th century. The plan was already in a developed form (the quadrant type). The *omoya* usually had a regular quadrant floor plan with the raised floor living quarters regularly divided into four rooms. The plan itself does not differ from the plan of the area's *sugoya* style houses. The age of the *omoya* and the *kamaya* differ, the *omoya* is often older than the *kamaya* which normally has been rebuilt at least once.

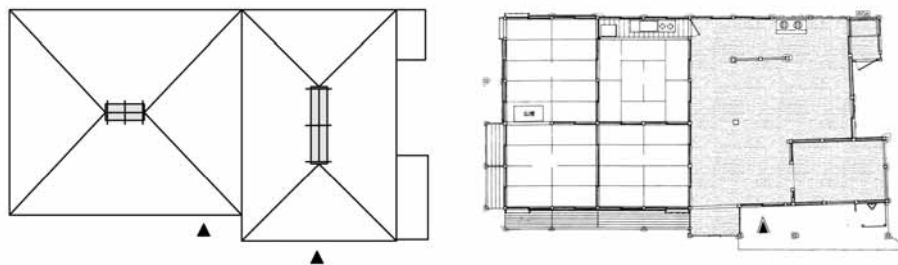


Fig. 54- *Kamayadatte*, Mochitsuki's House Aichi Prefecture²

¹修理工事報告書

² 宮澤智士、1980

The typical *bunto-zukuri* style of the Boso peninsula has the raised floor area and the *doma* built independently, and connected by a corridor. In the area around Tateyama city, in the southern part of the Boso peninsula, there are many *bunto-zukuri* style minka which have a dining area, called the *katte*, linking the *omoya* to the *kamaya*. In these houses we observe that, apart from the corridor, the basic plan does not differ much from the *sugoya* style houses of the same region.

In the east and south part of Chiba prefecture, Ibaragi prefecture and central Miyagi some examples of *bunto-zukuri* style houses can still be found. There are about 30 *bunto-zukuri* style houses remaining in the Kanto and Tohoku. Some of them date from the end of the 17th century. This fact demonstrate that the *bunto-zukuri* style is an old style, which developed during the 17th century and was very fashionable until the 18 century, when it was not built anymore. In the Former Ota house the *omoya* raised floor building dates from the second half of the 17th century, while the *doma* dates from the end of the 18th century.

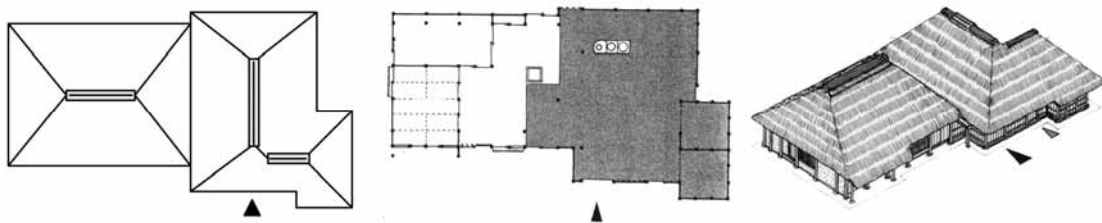


Fig. 55- A *bunto-zukuri* of the Boso Peninsula, former Ota's House¹

We can perceive that the *bunto-zukuri* style minka has a similar floor plan composition to the *sugoya* style. Thus it is not possible to distinguish one from the other only from the floor plan, although the roof structure is different.

In Kumamoto prefecture most of the *bunto-zukuri* style *minkas* are composed of two structurally independent buildings with a unified interior. This style is called *futsumune-zukuri* (two ridges), or *futatsu-yane*. It has an almost square plan. The *doma* is placed on one side of it and the raised floor rooms are placed the other. Each of these parts is covered by an independent roof, connected at the eaves. These roof structures have the ridgepoles parallel to each other. This kind of minka is similar to two

¹ 大野敏、1993

gable-entered (*tsuma-iri*) connected buildings, with the ridgepoles parallel to each other. The plan of the *futatsumune-zukuri* houses is similar to the *sugoya* type, and having the earth-floored and the raised floor parts under the same roof did not functionally interfere in the internal space organization.

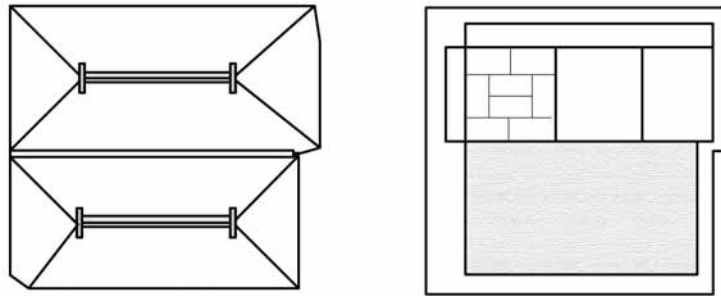


Fig. 56- Futatsumune-zukuri

III-4-5-1-4 Multiple Ridge Styles of Minka

In this last group are some of the styles of minka that have roofs with more than one ridgepole, occasionally resulting in very complex roof plans.

The *kudo-zukuri* style characteristic is the “U” shaped ridgepole. It is mostly found in Saga prefecture and northwestern Kyushu. According to the shape of the ridge the house receives a different classification. When it has a “U” shape it is called *ushiro-gata*, if the ridge has a “∩” shape it is called *maetani-gata* and when it is “C” or “D” shaped it is called *yokotani-gata*. All of the *kudo-zukuri* minka have a roughly rectangular plan, and the concave side of the “U” is called the *tsubo* (bowl). The roof is thatched and hipped. At the back of the house, the middle of the two protruding parts is covered with a flat tiled roof. However instead of making an independent roof for the *tsubo*, occasionally the eaves of the projecting thatched roof on either side are extended over the open space and a gutter (*toi*) is suspended where the eaves meet to collect the rainwater.

In Fukuoka prefecture many of the houses have the valley part on the front side, and sometimes there are more protruding parts and the roof becomes even more

complex. A variant of the *kudo-zukuri* is the *mitami hanashigi-zukuri* (3 valleys and 7 peaks style). In this style the ridgepole has an “h” shape, with a hooked wing protruding from the corner of a straight section. It seems that all these configurations of the *kudo-zukuri* are the result of connecting originally separated *omoya* and *kamaya*. The *futatsumune-zukuri* style and the single ridge style have mixed and formed a hybrid style. Consequently the *kudo-zukuri* may derive from *bunto-zukuri* style minka.

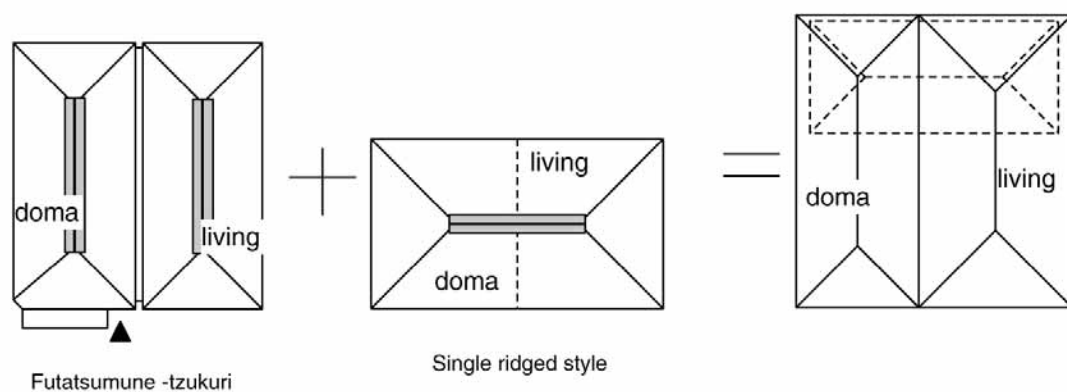


Fig. 57- Diagram: combination of the futatsumune- tsukuri and the sugoya

Another possible explanation is that, especially in the Saga prefecture, the laws regarding the size limit for beams were very strict. Since the two-span beam restriction was respected the only possible manner to increase the built area was to add protuberances (*tsuno*) to the main house (*omoya*). So according to this theory the *kudo-zukuri* came from the addition of two protruding parts to the back of a side-entered *omoya*. Consequently the ridge gets a “U” shape. However to transform a *sugoya* style minka into a *kudo-zukuri* style one, the main building should be 5 spans long, by 2 spans wide. The two protuberances on the back are 2 spans by 1.5 spans each. The back *tsubo* part has 1 span and a tiled roof. Though it may be possible to transform a single ridged house into a *kudo* style one, it would have to be at least 5 spans long. It would also need to have relatively high eaves, otherwise the tilled *tsubo* roof would become too low. If the house has high eaves this means that it is relatively new, showing that this kind of house probably did not evolve from the necessity of enlarging the plan. The

design of the roof itself was probably intended to be in the *kudo-zukuri* style from the beginning.

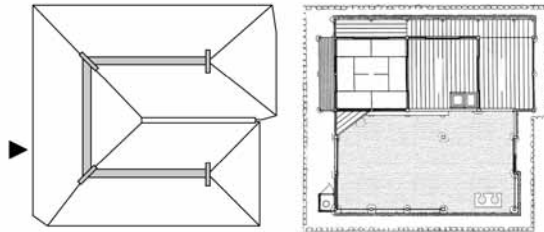


Fig. 58- *Kudo-zukuri* , Sakai house, Kumamoto prefecture.¹

Another variation of the Kudo style is the *roto* (funnel) style. In this kind of house the ridgepole is “□” shaped, and the center of the roof resembles a funnel. The oldest examples of the *roto-tsukuri* date from the mid 18th century and the plan has a developed form.

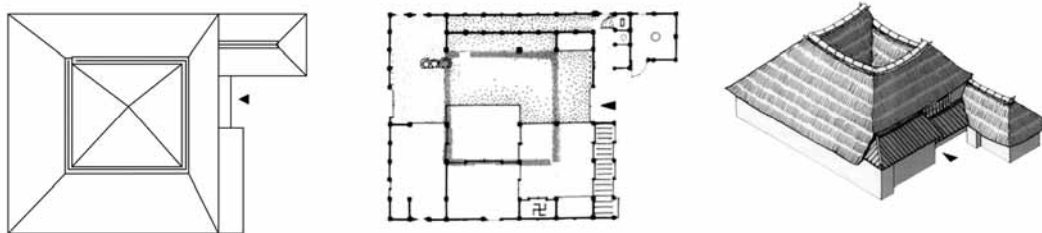


Fig. 59- *roto-tsukuri*, Yamaguchi house, Saga prefecture.²

The *kagi-ie* is another style that may have derived from the *futatsumune-tsukuri*. The living quarters and the *doma* are placed parallel and then connected. As we can see the *bunto-zukuri* style seems to have evolved into styles with very complex roofs.

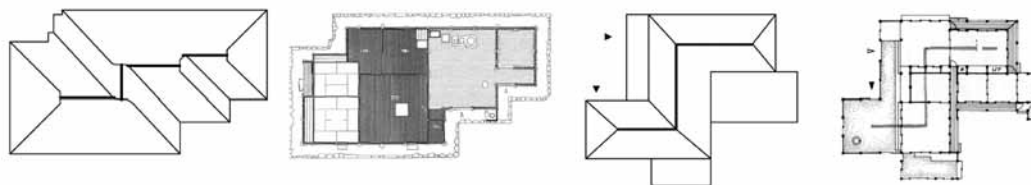


Fig. 60- *Kagi-ie*, Kamio house, Oita prefecture and Ota house, Kumamoto prefecture¹

Finally the “L” shaped plan styles: *magariya*, *chumon* and *tsunoya*.

¹修理工事報告書

²修理工事報告書

The *magariya* style is a consequence of the integration of stables into the main house. These stables, which were quite well built, were attached to the house, protruding from its lower end (*shiomte*), at a right angle. This style is common in Iwate prefecture, which has a well known history of horse breeding, and where the number of horses per household was relatively large. The oldest examples of houses in this style date from the end of the 18th century, although most of the *magariya*'s houses were built around the mid 19th century and the beginning of the 20th century.

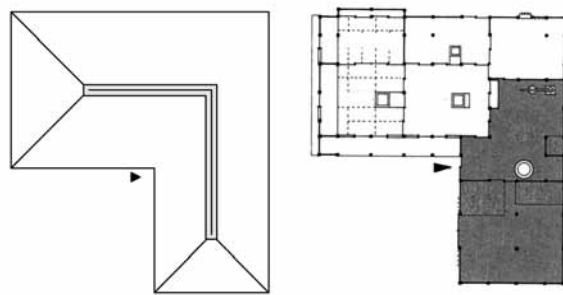


Fig. 61- Magariya style house ²

The *magariya* style houses are known to have been the result of reforms. Many of the *magariya* houses from the end of the 18th century have a roof structure similar to that of the *bunto-zukuri* style houses. Indeed some of *magariya* style houses are thought to be the result of connecting two originally independent roof structures. However in the area where the *magariya* were distributed, it is also known that many single ridged houses existed before the mid 18th century. Therefore the *magariya* style result from both adding protuberances to single ridged houses, and connecting independent roofs of *bunto-zukuri* style houses.

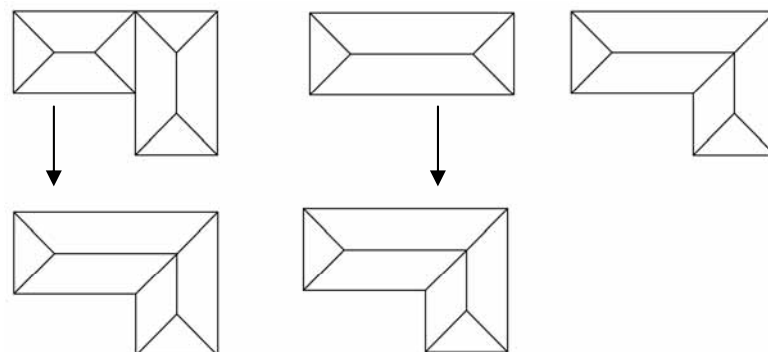


Fig. 62- Magariya

¹ 宮澤智士、1993

² 吉田靖他、1980

development process: bunto-magariya, sugoya-magariya, and originally magariya.

The *Chumon* – zukuri also has “L” shaped floor plans. However the protruding wing is shorter than that of the *magariya*, and the entrance is always located at the end of this wing. This style’s prototype seems to have been the *yuki-amaya* (snow shed), a temporary *chumon* wing built between the house and the road for the duration of the winter.

The *chumon* style is often found in the Japan Sea side of Honshu. This style is believed to have appeared around the mid 17th century, and from the examples we can see that the front *chumon* was developed by the until mid 18th century, and the back *chumon* was developed later.

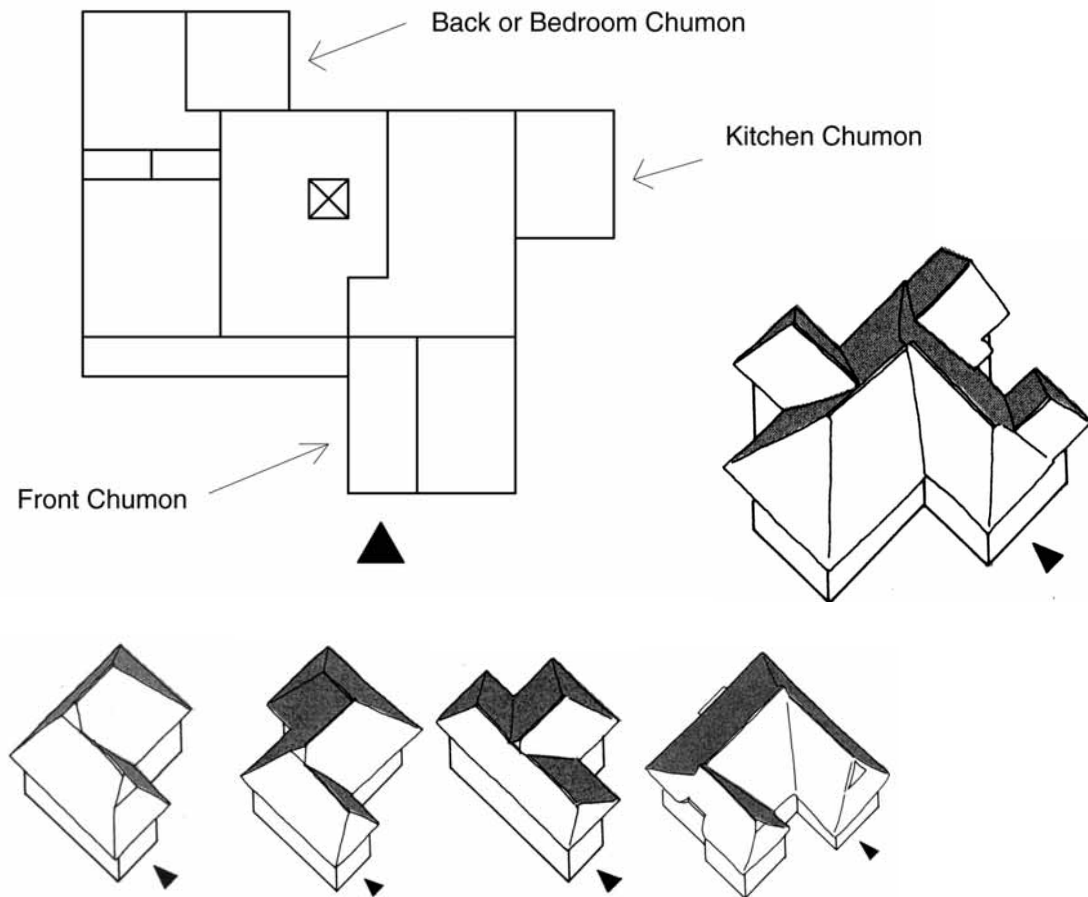


Fig.63- Types of chumon¹

¹吉田靖他、1980

There are three types of *chumon*: the front *chumon*, the kitchen *chumon* and the back or bedroom *chumon*. The first type to be developed was the *shimote* (lower end) *chumon*. In this type a stable (*umaya*) is added to the *doma* of the main house. The *umaya-chumon* style is common in northern Nagano, Niigata, Fukushima, Yamagata and Akita prefectures. The dwelling's main entrance was placed in this *chumon* wing. Often when the *omoya* had a hipped roof, the front *chumon* roof would be hipped-gabled, to make the entrance appear respectable and admirable. Therefore the front *chumon* was gable-entered and was used to express the social status of the family. Another variant of the front *chumon* is the *kamite* (upper end) *chumon*, which houses the *zashiki* (formal rooms). When the house has *chumon* at the upper and lower end it is called *ryo-chumon*. The later type of *chumon* to be developed was the back *chumon* or *nema* (bedroom) *chumon*. Therefore the addition of many *chumon* may result in houses with very complex roofs.

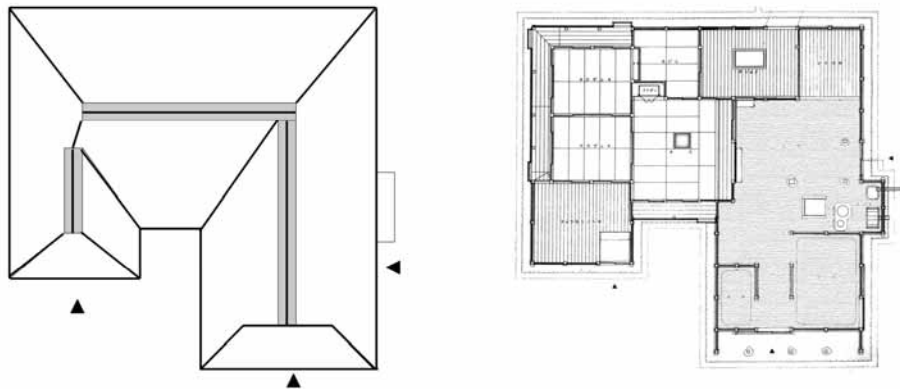


Fig. 62-*Ryo-chumon*, or two front *chumon* house¹

The *tsunoya* is a style that, as the *chumon* style and the *magaiya* style, results from adding protuberances to the main house. This style was centered in Fukui and is also found in Toyama, Aichi and parts of Gifu prefecture. The *tsunoya* style appeared around the 17th century, and one of the oldest *tsunoya* style houses, dating from 1718, is the former Igarashi's house, in Fukushima prefecture. In the *tsunoya* style the parts of

¹吉田靖他、1980

the house that protrude are the *zashiki*, kitchen and stable. When the houses are gable-entered, the stable is added to the *shimote* corner of the house, and the kitchen is added to the other corner, while the *zashiki* protrudes from the back. In side-entered houses the *zashiki* also protrudes from the back of the house while the kitchen is added to the front of the house. Occasionally the protruding parts may end up being bigger than the original house itself.

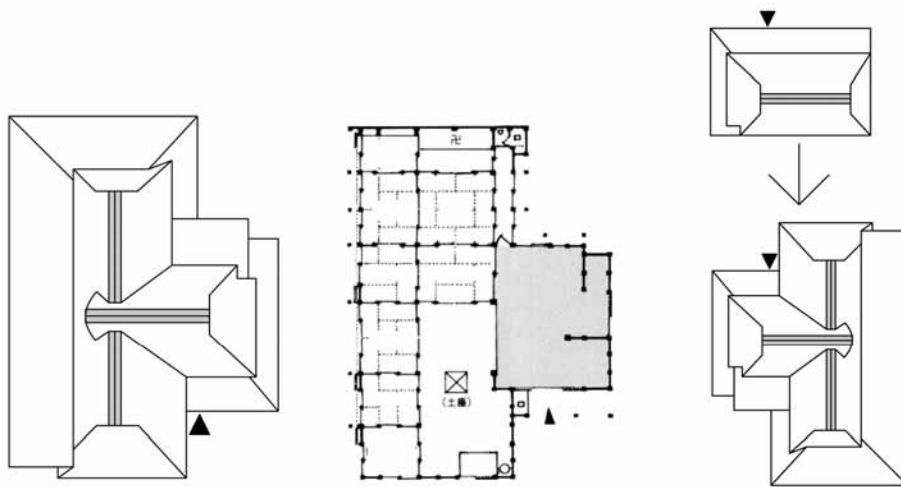


Fig. 63- Tsunoya zukuri; Taniguchi's house, Fukui prefecture.¹

As mentioned before, the development of the *chumon* and *tsunoya* was earlier than that of the *magariya*. All three styles have protrusions on the front side. In the *magariya* the stables protrude, while in the *tsunoya* style the kitchen protrudes out from the front side of the house, though the entrance remains in the main building. However in the *chumon* style the entrance is placed at the end of the *chumon* wing, emphasizing the front of the house and the entrance area. Another difference between the *chumon* and the *tsunoya* style is that in the *tsunoya* style the part of the house that protrudes at the back is the *zashiki* with its status expressed in the design, while in the *chumon* the bedroom protrudes at the back, and the *zashiki* is placed in a front *chumon*.

Finally the last of the multiple ridged style is the *yatsume zukuri*, or eight-ridge

¹吉田靖他、1981

style, it was popular in the 17th century and employs a number of ridges and ornamental gables to create an impressive silhouette that advertised the standing of the wealthy merchant or landowner living under its roof. Only a few of these buildings remain today; the Imani residence in Imai, Nara prefecture, the Okuni residence in Wake, Okayama prefecture, and the Toshima house in Matsuyama, Ehime prefecture.

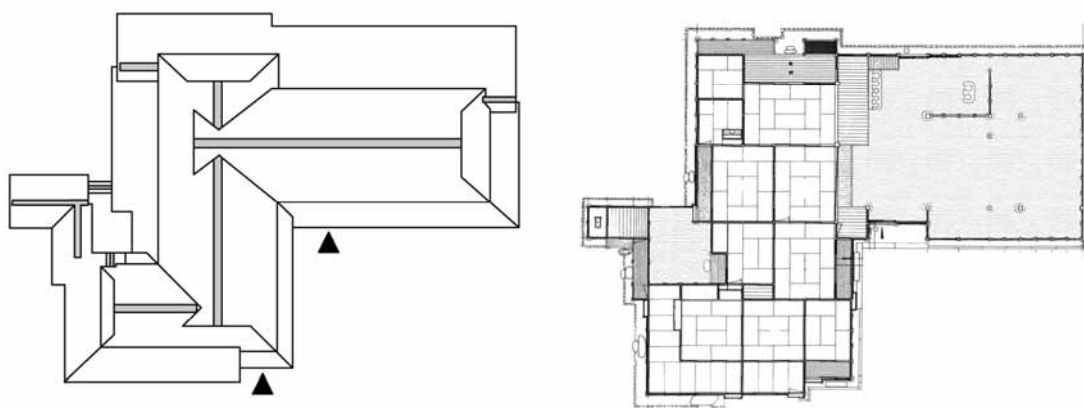


Fig. 64- Yatsumune-zukuri; Toshima house, Matsuyama, Ehime prefecture¹

¹ 修理工事報告書

IV - Relation Between Different Functional Spaces and the Roof Forms

As we have seen the first residential complexes had different functional spaces under independent roof structures. This happened in the aristocrats' houses and in the common people's houses too. The aristocrats' houses *shiden* style was characterized by the halls connected by corridors, and each of these halls held a single functional interior space. The same process can be identified in the common people's houses (*minka*) *bunto-zukuri* style. These residences also have functionally different spaces housed under independent roof structures.

Based on that, we will see how the floor plan spatial organization can interfere with the roof form. To analyze it 110 buildings were selected. The information is based on the Cultural Important Property Restoration Reports (重要文化財修理報告書) and the 7 volumes about Japanese traditional houses edited by Gaken (日本の民家、全7巻 1981 学習研究社). The buildings were selected by the complexity of the roof; consequently each of the buildings has a roof composed of a minimum of two ridgepoles. This survey includes several residences and shrines from all over Japan. The oldest building date from the beginning of the Edo period (1600-1868) and the newest date from before the Second World War.

The analysis will consist of comparing the roof plan to the floor plan of the building, in order to see how the spatial organization of the floor plan is related the form of the roof.

The buildings were grouped according to similarities in the roof form and in the spatial organization of the plan. We will start the analysis from the simpler buildings and progress to the more complex ones.

These are the simplest examples:

Tachikawa clan's shoin was built in 1797 in Kochi prefecture. This is a side-entered building and has a thatched hipped roof. A smaller hipped-gabled roof emphasizes the entrance.

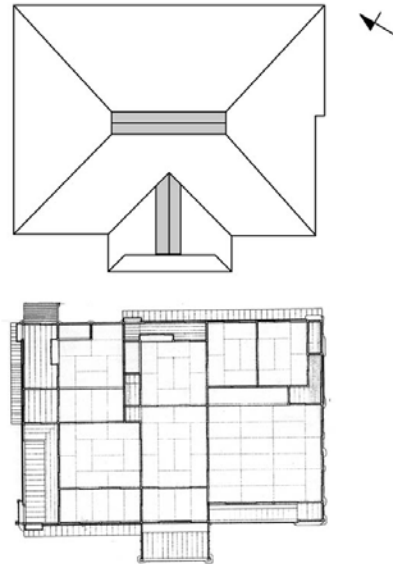


Fig. 67- Tachikawa clan's shoin

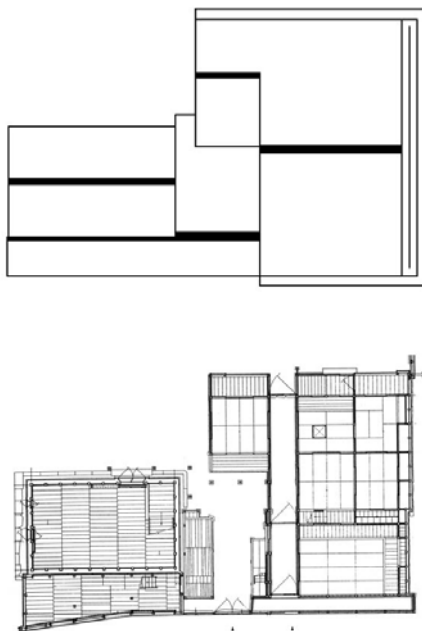


Fig. 68- Former Nakamura house

Former Nakamura house was built in 1861 in Iwate prefecture. This is a side-entered *machiya* and has a tiled gabled roof. There is an entrance hall on the back part of the main building, which is emphasized by a smaller gabled roof. This smaller roof was combined to the *omoya's* roof. The house faces east and the *kamite* is on its south side. It was restored in 1973.

In the examples the roof design was used to emphasize the entrance of the building.

IV-1 Type 1

IV-1-1 Type 1-A

Former Ota house was originally built in Ibaragi prefecture, during the second half of the 17th century. The *doma* was rebuilt during the second half of the 18th century, when the stables were probably added. The *omoya* and the *doma* are sheltered under independent roof structures, which are connected at the eaves, and have the ridgepoles at a right angle. This house is a good example of a *bunto-zukuri* style *minka*. Both roof structures are thatched and hipped. The *omoya* has a *joya* structure and a *geya* structure, while the *doma* is architecturally simpler, with a *joya* structure only. The *omoya* is side-entered while the *doma* is gable-entered, and this is where the main entrance of the house is placed. The house faces south and the *kamite* is on its west side.

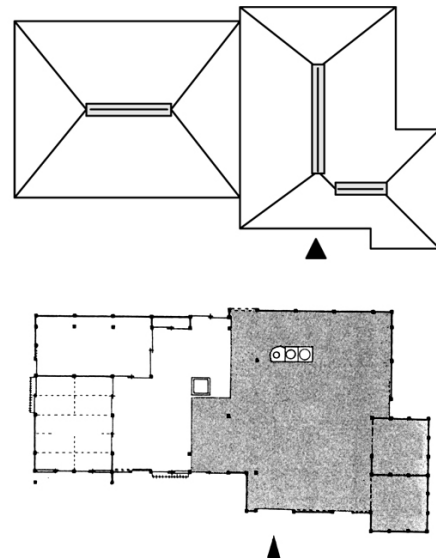


Fig 69- Former Ota house

Mochizuki house is a *kamayadatte* style building, a variation of the *bunto-zukuri* style. It was built in Aichi prefecture, during the second half of the 18th century. The *doma* was rebuilt at the beginning of the 19th century. The *omoya* and the *doma* are sheltered under independent roof structures, which are connected at the eaves, with the ridgepoles at a right angle. Both roof structures are thatched and hipped. The *omoya* has a *joya* and a *geya* structure, while the *doma* is architecturally simpler, with a *joya* structure only.

The *omoya* is side-entered and the *doma* is gable-entered. The house faces south with the *kamite* on its west side.

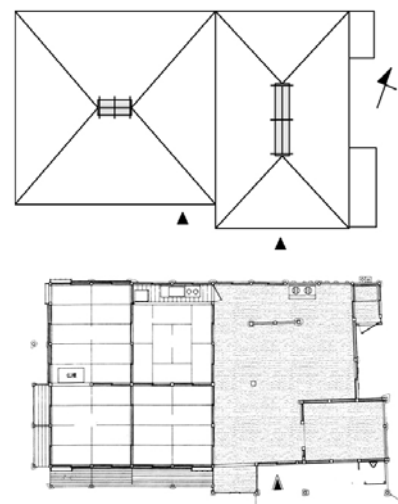


Fig 70- Mochizuki house

Ogata house was built in 1728, in Chiba prefecture. This house is a typical *bunto-zukuri* of the *Boso* peninsula. The *omoya* and the *doma* are sheltered under independent roof structures, which are connected at the eaves, with the ridgepoles at a right angle. Both roof structures are thatched and hipped. The *omoya* has a *joya* and a *geya* structure, while the *doma* is architecturally simpler, with a *joya* structure only. The *doma* is gable-entered and the *omoya* is side-entered. The house faces south and the *kamite* is on its east side.

The *doma* may have been rebuilt.

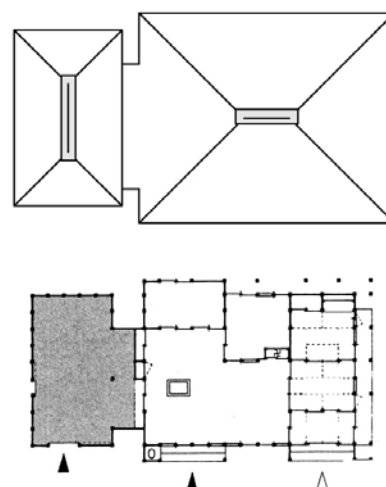


Fig 71- Ogata house

These three *bunto-zukuri* style houses the *omoya* roof and the *doma* roof were built independently, with the ridgepoles at right angle. These houses have thatched hipped roofs. In all of the examples the gable-entered *doma* is newer and structurally simpler than the side-entered *omoya*, with the *kamite* on its west side, except for the Ogata house, which has the *kamite* on its the east side

Nikaido house belonged to the Satsuma clan, and was built in 1810 in Kagoshima prefecture, Kyushu. The informal space -a *doma* plus a multipurpose raised floor- and the formal space are sheltered under independent thatched hipped roof structures. The informal space is called *nakae* and the formal space is called *omote*. A corridor called *tenoma* connects the two structures. The ridgepole of the *omote*'s roof is at a right angle to the ridgepole of the *nakae*'s roof. There is no differentiation between *joya* and *geya* structure. There is only a *joya* structure in both buildings. Since it has been rebuilt, the *nakae* is newer. It is also architecturally simpler than the *omote*, which has a *shoin* style design. The *omote* is side-entered, while the *nakae* is gable-entered. The house faces east and the *kamite* (*omote*) is on its south side.

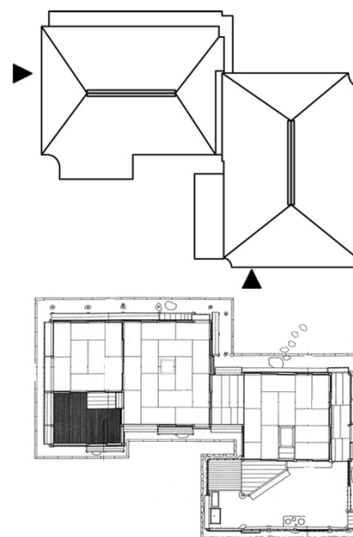


Fig 70- Nikaido house

Former Kuroki house also belonged to the Satsuma clan and was built in 1835, in Miyazaki prefecture, Kyushu. The Kuroki house design resembles to the Nikaido house design: the informal space (*nakae*) and the formal space (*omote*) are sheltered under independent thatched hipped roof structures, with a corridor (*tenoma*) connecting the two structures, and the ridgepoles of the *nakae* and *omote* are at a right angle. However, the *omote*, *tenoma* and *nakae* structures of the Kuroki house have a raised floor that differ in height, the *omote's* floor is 15 cm higher than the *tenoma's* floor, which is 15 cm higher than the

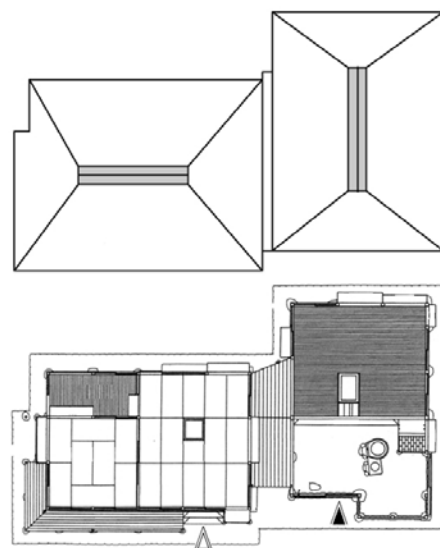


Fig 73- Kuroki house

nakae's floor. The *omote* and the *nakae* have the same kind of structure, but the *nakae* is architecturally simpler than the *omote*, which has a *shoin* style design. The *omote* is side-entered and the *nakae* is gable-entered. The house faces south and the *kamite* (*omote*) is its west side. The building was restored and moved into a museum in Miazaki City. The *omote* roof was tiled before the restoration, which was a consequence of later alterations, and the *nakae* may have been rebuilt.

These two groups of houses, the Ota, Mochizuki, Ogata houses group and the Nikaido and Kuroki houses group differ in some aspects. In the first group the space is divided in an earth-floored (*doma*) service space and a raised floor living space, while in the Satsuma clan houses the service or informal space has an earth-floored part and a raised floor part. Another difference is that in the first group the hierarchical discrimination of the spaces is made structurally – the *doma* has a simpler structure than the *omoya*- while in the Satsuma clan's houses both buildings (*omote* and *nakae*) use the same kind of structure, although the discrimination is made in the design, the *omote* has more sophisticated *shoin* style design. Despite these differences, all of these houses resemble in that fact that they have two distinct functional spaces housed under independent roof structures. These two different types of spaces are discriminated; the hierarchically lower space is architecturally simpler.

For that reason these houses will be classified as type 1-A. In this type the houses have their interior space divided into two functionally different spaces -a servant space and served space- and each of this spaces is sheltered under independent roof structures.

IV-1-2 Type 1-B

Kuwahara house was built between 1818 and 1830, in Kumamoto prefecture, Kyushu. The house has an “L” shaped plan because the *doma* protrudes at a right angle from the *shimote* side of the *omoya*. The house thatched hipped roof is also “L” shaped. Despite the actual united form of the roof, the *omoya* has an independent roof structure from the *doma* roof structure. It seems that this building was originally a *bunto-zukuri* style house, with the *omoya* and the *doma* sheltered under independent roof structures. The actual roof form is

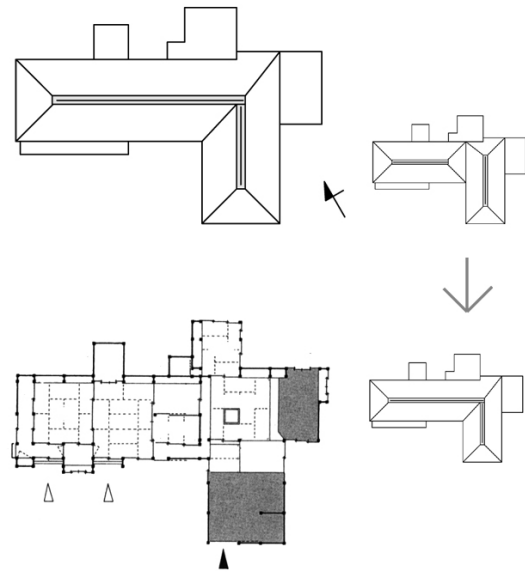


Fig. 74- Kuwahara house

probably a consequence of later alterations, in which the *omoya* and the *doma* were unified under a single “L” shaped thatched hipped roof, though structurally they remained independent. Consequently the roof design is the result of unifying two formerly independent thatch-hipped roofs with the ridgepoles at a right angle. The gable-entered *doma* is structurally simpler (*joya* structure only) than the side-entered *omoya*. The house faces south, and has the *kamite* on its west side.

Kusanagi house was built between 1830 and 1843, in Akita prefecture. This is a *magariya* style house. The floor plan and the roof have an “L” shape because the *doma* and stables protrude at a right angle from the *shimote* side of the *omoya*. Despite of the actual form of the roof, originally this building was a *bunto-zukuri* style house. The *omoya* and the *doma* formerly had independent thatched hipped roofs, with the ridgepoles at a right angle. The independent roofs are though to have been unified during a huge

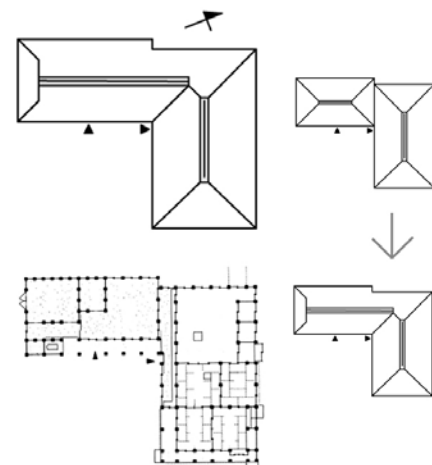


Fig. 75- Kusanagi house

reform done in *Meiji* period, when the *doma* was rebuilt. In this reform, besides unifying the roofs, the *doma* roof was also altered into a hipped-gabled roof. The *doma* and the *omoya* are side-entered. The *doma* has a simpler structure (*joya* only) than the *omoya* (*joya* and *geya*). The house faces south and has the *kamite* on its west side.

Hanawa house was built in Ibaragi prefecture and dates from mid 18th century. It is a *bunto-zukuri* style house with the *omoya* and the *doma* sheltered under independent thatched hipped roof structures. In 1983 it was restored into the original form. However, before the restoration, the house was in a *magariya* style: the *omoya* and *doma* were housed under a unified “L” shaped roof. The alteration of the original structure into the *magariya* style dates from mid 19th century. The *doma* and the *omoya* are side-entered. The house faces south with the *kamite* on its west side.

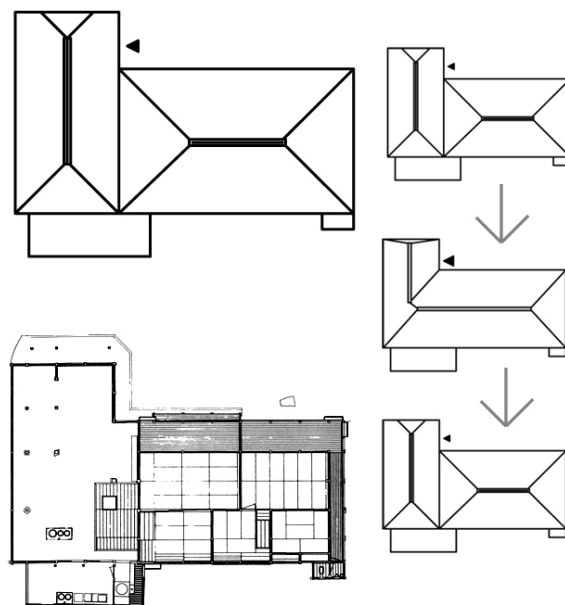


Fig. 76- Hanawa house

Yokoji house was built at the beginning of the 18th century, in Fukuoka prefecture, Kyushu. It has an “L” shaped roof and floor plan because the *doma* protrudes at right angle from the *omoya*. Considering that in this area there are many examples of *bunto-zukuri* houses, and that the ridgepole of the *doma* is lower than the *omoya* ridgepole, it is possible that this house originally had the *doma* and the *omoya* sheltered under independent roof structures.

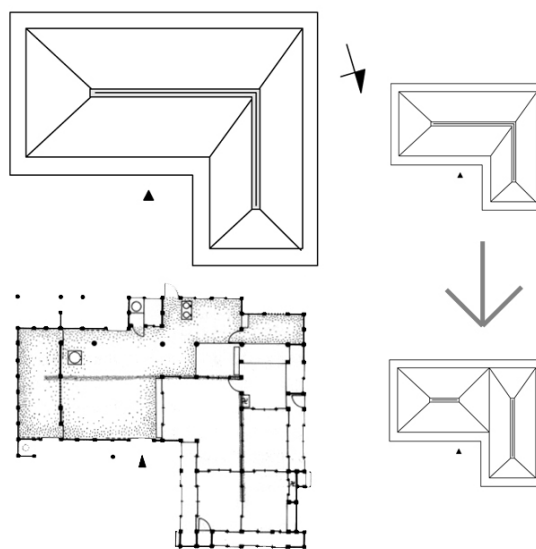


Fig. 77- Yokoji house

All the houses in this group except for the Hanawa house, which has been restored, have the floor plan and the roof in a *magariya* (“L” shape) style. They have a side-entered *doma*, which originally was under a roof structure independent from the *omoya*’s roof. All the houses had their roofs altered at the end of the 19th century.

Uezu House was built in Okinawa prefecture and is thought to be the oldest *minka* in the prefecture. The *omoya* was built in 1754, though the *doma* was rebuilt some years later. In this area the *omoya* is called *ufuya* and the *doma* is called *donguwa*. In the *donguwa*, besides the earth-floored *doma* there is also a multipurpose raised floor room, similar to the floor plan of the *Satsuma* clan's house *nakae*. The house now has a tiled hipped roof but originally the roof was thatched. The unified *doma* and *omoya* roofs

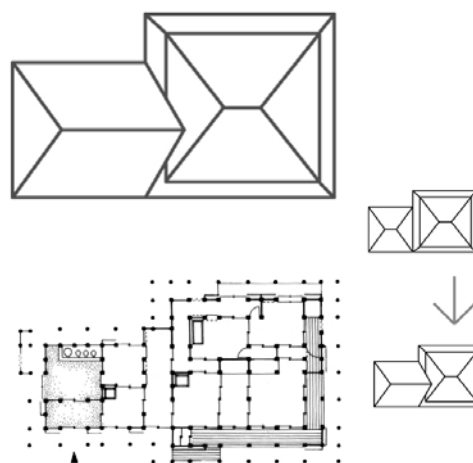


Fig. 78- Uezu house

seem to be a consequence of later alterations. In its original form this house had the *omoya* and the *doma* sheltered under independent roof structures, which were connected at the eaves, with their ridgepoles parallel to each other. Since the ridgepoles were in the same direction, when the roofs were united the house did not become a *magariya*. The house faces south with the *kamite* in its east side. The *donguwa* and the *ufuya* structures are side entered.

Matsumoto house was built in Miyazaki prefecture in 1750. Here again the *omoya* and the *doma* were originally built under separated roof structures, which were connected at the eaves. The roofs were thatched and hipped with the ridges parallel to each other. During the mid 19th century the *doma* was rebuilt and its roof was unified to the *omoya*'s roof. The *omoya* has a *joya* and a *geya* structure, while the *doma* is simpler (a *joya* structure only) and smaller than the *omoya*. Both buildings (*omoya* and *doma*) are side entered, and the house faces south with the *kamite* on its west side.

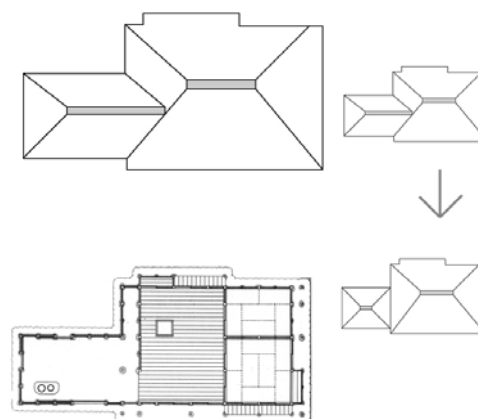


Fig. 79- Matsumoto house

In these two houses, Uesu and Matsumoto the roof form is a consequence of unifying the *omoya* and the *doma*, which formerly had independent roof structures.

Sakuta house was built in Chiba prefecture during the second half of the 17th century. The house was restored into its original *bunto-zukuri* style roof. The *omoya* and the *doma* are sheltered under independent thatched hipped roofs, which are connected at the eaves. However before the restoration, the *omoya* and the *doma* were under the same single ridged hipped roof. The independent roofs of the *omoya* and *doma* were transformed into a single roof in alterations done during the second half of the 18th century. The side-entered

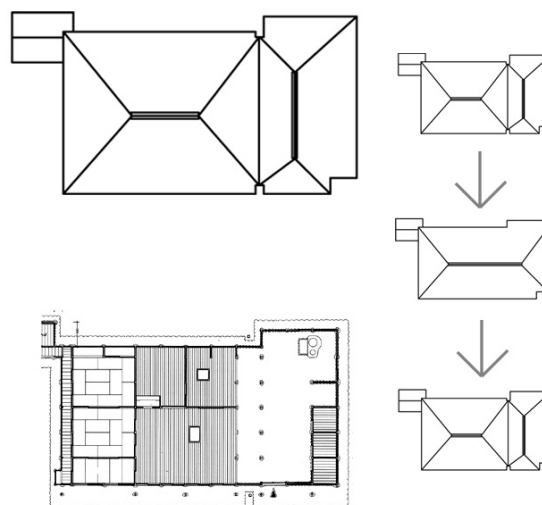


Fig. 80- Sakuta house

omoya is composed of a *joya* and a *geya* structure, while the gable-entered *doma* is simpler and has only a *joya* structure. Since the house was moved into a museum in Kawasaki city its original orientation has changed, though it probably faced south with its *kamite* on the west side.

These groups of houses resemble in the fact that the original independent roofs of the *omoya* and *doma* were unified into one roof. In the first group, Kuwahara, Kusanagi, Hanawa and Yokoji houses, since the original roof structures had their ridgepoles at a right angle, unifying the roofs resulted in creating an *magariya* style “L” shaped roof. In the second group, Uesu and Matsumoto houses, since the roof structures had their ridgepole parallel to each other, when the roof structures were unified it did not result in a *magariya* style roof. Neither did the Sakuta house, in spite of the fact that the independent roof structures of the *omoya* and *doma* had their ridgepoles at right angle. When this house was reformed, it had the *omoya* and the *doma* roofs united in a single hipped roof.

In view of these facts these houses will be classified as type 1-B. In this type the house has its interior spaces divided into two functionally different spaces -a servant space and served space- which originally were sheltered under independent roof structures, and later unified in one structure.

IV-3 Type 1-C

Subara house was built during mid 18th century, in Iwate prefecture. It was originally a *sugoya*. It became a *magariya* because the stables and the *doma* extension were added in 1852.

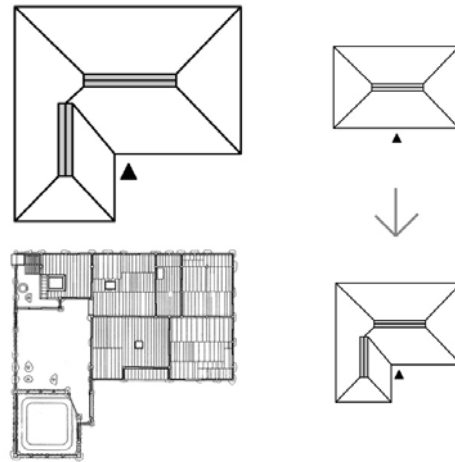


Fig. 81- Subara house

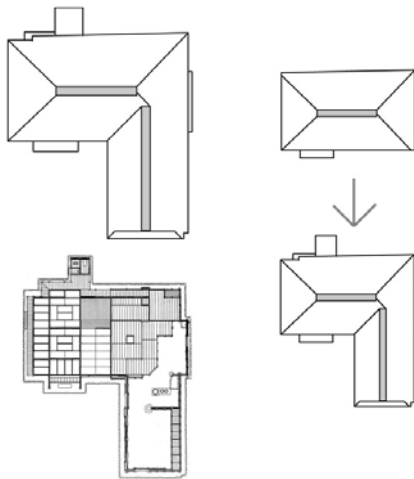


Fig. 82- Ichinoe house

Kikuchi house was built during the second half of the 18th century, in Iwate prefecture. Between the end of the 18th century and the beginning of the 19th century the stables were added to the former *sugoya* structure.

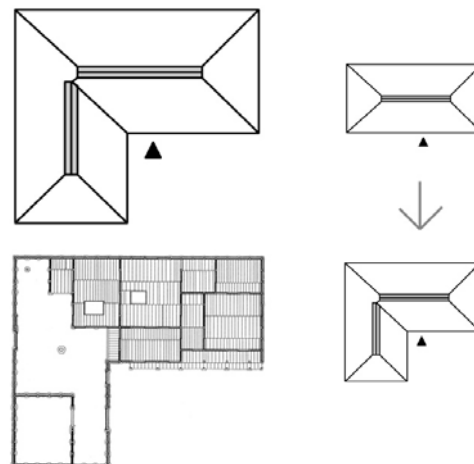


Fig. 83- Kikuchi house

These three houses have the roof and the floor plan in an “L” form because the stables and part of the *doma* protrude at a right angle from the main house. This kind of floor plan is typical of the *magariya* style. All of the houses have thatched hipped roofs, although the roof of the protruding part of the Ichinoe house is hipped-gabled. These

houses were built in a simple *sugoya* style at the beginning of the 18th century and later, during the second half of the 18th century till the mid 19th century, they suffered modifications. In these reforms the stables and an extension of the *doma* were added to the main house. In conclusion in these examples the roof form is a consequence of the addition of extra service spaces to the main house.

Former Inukai house was built in Okayama prefecture, during mid 17th century. The roof is tiled. The ridgepole of the *kamaya* (service area) is lower than the one of the *omoya* (raised floored living space). The *kamaya*'s roof is hipped-gabled while the *omoya* roof is just gabled. In spite of the present roof form this house originally was a *sugoya*, with a single ridged tiled gable roof. The present roof is a consequence of alterations that happened during the mid 18th century.

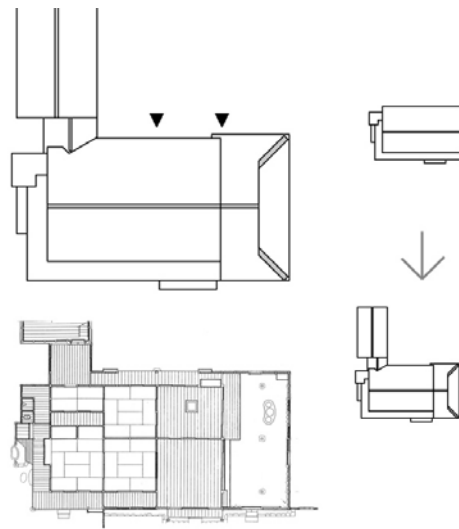


Fig. 84- Inukai house

In this group of houses the space is divided into an earth-floored (*doma*) service space and a raised floor living space. These two distinct functional spaces are housed under the same roof structure. Even though the functionally different spaces are not sheltered under independent roof structures as in the types 1-A and 1-B, they can still be identified through the roof form. For example in the Subara, Ichinoe, and Kikuchi houses the *doma* and the *omoya* have independent ridgepoles at a right angle, consequently the roof has an “L” form. The Inukai house uses a different process. The *kamaya* ridgepole was built lower than the *omoya* ridgepole, and the roofs have a differentiated style: the *omoya* roof is gabled while the *kamaya* roof is hipped and gabled.

Considering these facts this kind of house will be classified as type 1-C. In this type the house has the interior space divided in two functionally different spaces - a servant and a served space- which is a consequence of the addition of new spaces or alterations the house went under during the years. These different spaces can be identified through the roof design because, although the roof structure is the same, each of the space has an independent ridgepole.

IV-4 Type 1-D

Former Kudo house was built between 1751 and 1763, in Iwate prefecture. The house floor plan and roof have an “L” shape because the stables and the *doma* protrude at a right angle from the *shimote* side of the *omoya* (main house). The *magari* part (protruding part) is side entered, has a simpler structure (*joya* structure only) and its ridgepole is lower than the *omoya*'s one. This house was restored and moved to a museum in Kawasaki city.

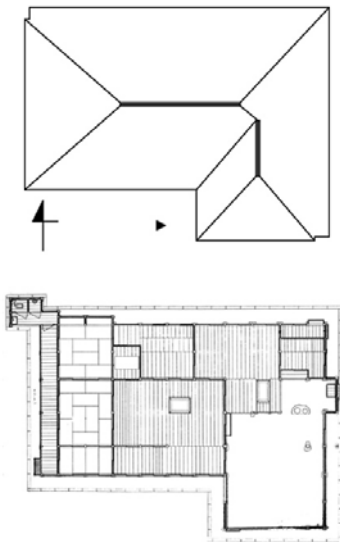


Fig.86- Yamamoto house

Tobita house was built during the first half of the 18th century, in Ibaragi prefecture. The house floor plan and roof have an “L” shape because the stables and the *doma* protrude at a right angle from the *shimote* side of the main house. The *magari* part is side entered and has been rebuilt. It has a simpler structure (*joya* structure only) and the ridgepole lower than the *omoya*. The house faces south and the *kamite* is on its east side.

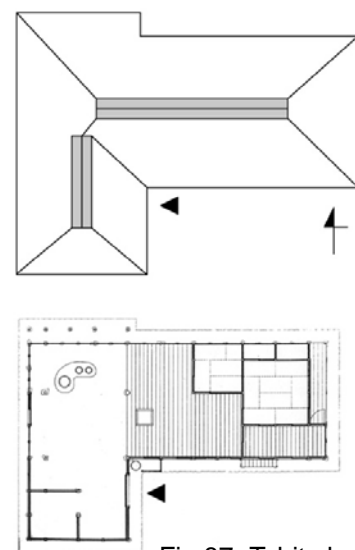


Fig.87- Tobita house

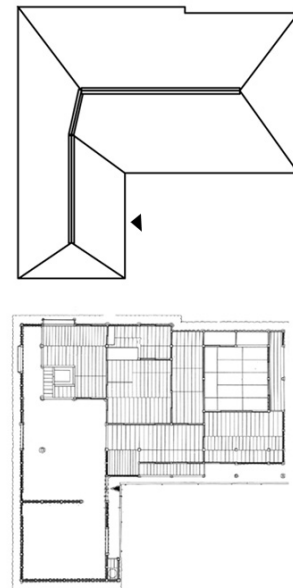


Fig.85- Kudo house

Yamamoto house was built in Ibaragi prefecture during the first half of the 18th century. The house floor plan and roof have an “L” shape because the stables and the *doma* protrude at a right angle from the *shimote* side of the *omoya*. The *magari* part (protruding part) is side entered, has a simpler structure (*joya* structure only) and its ridgepole is lower than the main house one. The house faces south and the *kamite* is on its west side.

Former Sasaki house was built in 1877, in Iwate prefecture. The house floor plan and roof have an “L” shape because the stables and the *doma* protrude at a right angle from the *shimote* side of the main house. The *magari* part has a simpler structure (*joya* structure only) than the *omoya*. The ridgepole of the *omoya* and the *magari* part are at the same height and the *magari* part is as big as the *omoya*. The house faces east and the *kamite* is on its south side.

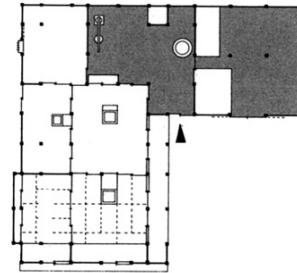
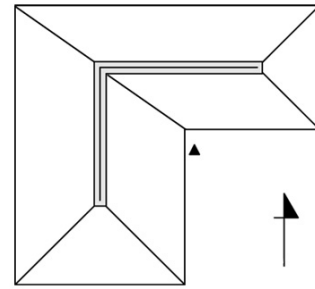


Fig.88- Sasaki house

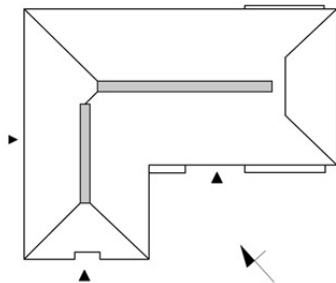


Fig.89- Oyama house

Oyama house was built during the mid 19th century, in Akita prefecture. The house floor plan and roof have an “L” shape because the stables and the *doma* protrude at a right angle from the *shimote* side of the main house. The *chumon* wing (protruding part) is gable-ended. It has a simpler structure (*joya* structure only), and the ridgepole lower than the *omoya*. The house faces south and the *kamite* is on its east side.

Sato house was built in 1738, in Akita prefecture. The house floor plan and roof have an “L” shape because the stables and the *doma* protrude at a right angle from the *shimote* side of the main house. The *chumon* wing is gable-ended. It has a simpler structure (*joya* structure only) and the ridgepole lower than the *omoya*. The *chumon* wing has been rebuilt at the end of the Edo period (c.1860). The house faces south and the *kamite* is on its west side.

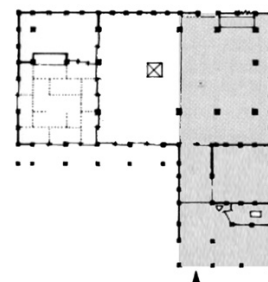
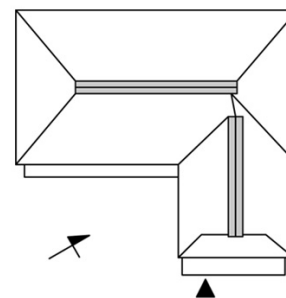


Fig.90- Sato house

Former Baba house was built during the first half of the 18th century, in Fukushima prefecture. The house floor plan and roof have an “L” shape because the stables and the *doma* protrude at a right angle from the *shimote* side of the main house. The *chumon* wing is gable-entered. It has a simpler structure (*joya* structure only) and the ridgepole lower than the *omoya*. The *chumon* wing was rebuilt at the end of the Edo period. The house faces south with the *kamite* on its west side.

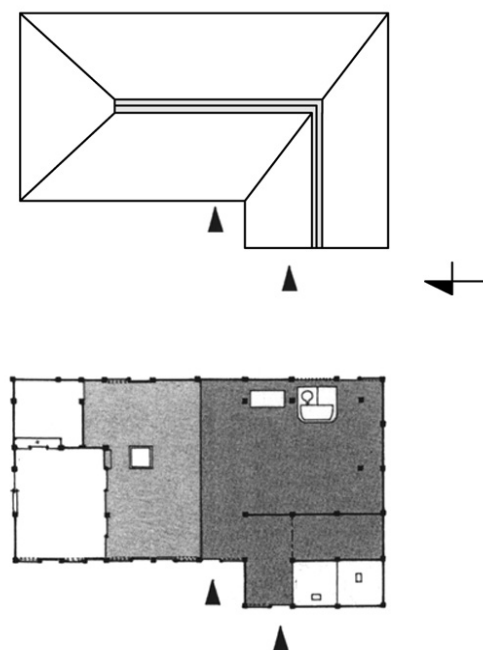


Fig.91- Baba house

Yamada house was built during the mid 18th century, in Nagano prefecture. The house floor plan and roof have an “L” shape because the stables and the *doma* protrude at a right angle from the *shimote* side of the main house. The *chumon* wing is gable-entered. It has a simpler structure (*joya* structure only) and the ridgepole lower than the *omoya*. This house has no raised floor area and the walls as well as the roof are thatched. The house faces south with the *kamite* on its east side.

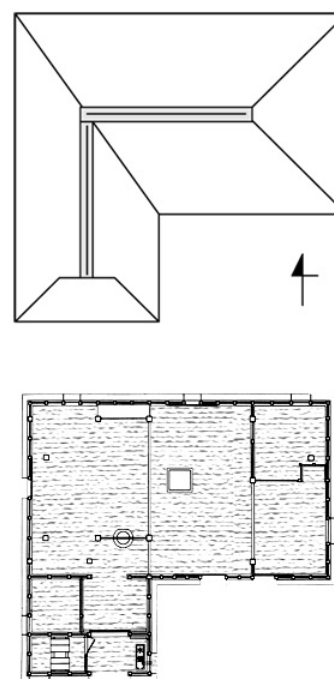


Fig.92- Yamada house

Former Yagi house was built during mid 18th century, in Yamagata prefecture. The house floor plan and roof have an “L” shape because the stables and the *doma* protrude at a right angle from the *shimote* side of the main house. The *chumon* wing is gable-entered. It has a simpler structure (*joya* only) and the ridgepole lower than the *omoya*. The *chumon* wing was rebuilt in the first half of the 19th century. The house faces south with the *kamite* on its east side.

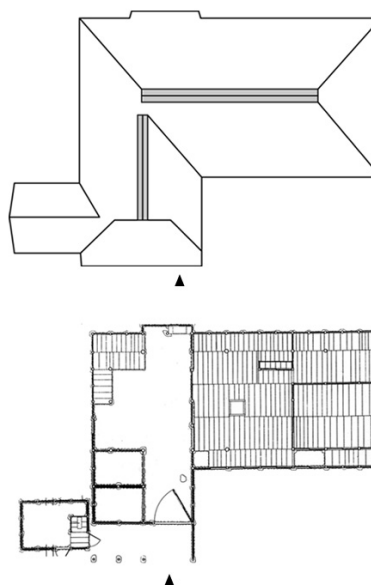


Fig.93- Yagi house

This group of *magariya* and *chumon* style houses resembles in many aspects. All of the houses have a thatched hipped roof, were built between 1700 and 1850, and have a service space that protrudes at a right angle from the main building. This protruding part is structurally simpler and has its ridgepole lower than the *omoya*. The only exception is the Sasaki house, which the protruding part and the *omoya* have their ridgepoles at the same height. This house is also the newest of the group.

Sakai house was built in 1830, in Kumamoto prefecture. This is a *kudo-zukuri* style house of the *ushiro-tani-gata* type. The building is composed of two independent roof structures connected at the front part of the house by a third ridgepole. Consequently when the house is seen from the front façade it resembles to a *sugoya*, although when it is seen from the back it looks like a *futatsumune*, a variant of the *bunto-zukuri* style (p40). This kind of house is thought to have evolved from the *futatsumune* style. It is a kind of a hybrid version of the *futatsumune* with the *sugoya* style. This building has not suffered any significant alterations and maintains its original form. The house faces south with the *kamite* on its west side.

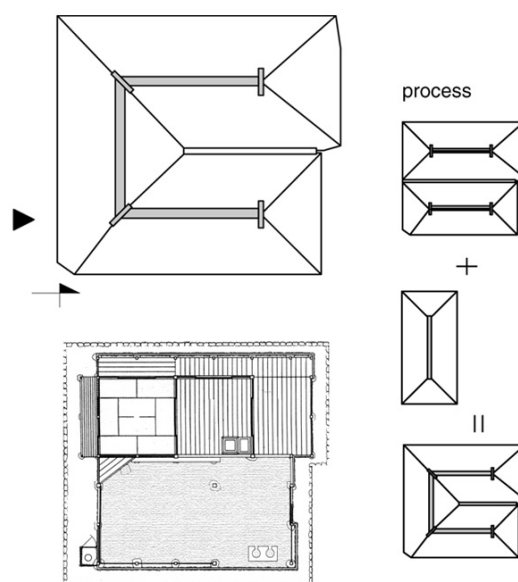


Fig.94- Sakai House

Hirakawa house was probably built before 1820, in Fukuoka prefecture. This building resembles the Sakai house. It is also a *kudo-zukuri* style house but of the *maetani-gata* type. The *zashiki* (formal room) was added later resulting in an enlargement of the raised floor area, consequently the raised floor area's ridgepole became higher than the others. Later another structurally independent service area building was added to the *shimote* side of the house. Therefore the house is composed of three independent roof structures, the two service areas, which are connected at the eaves, while the older service area and the raised floor area are connected at the back part of the house by a third ridgepole. The house faces south with the *kamite* on its west side.

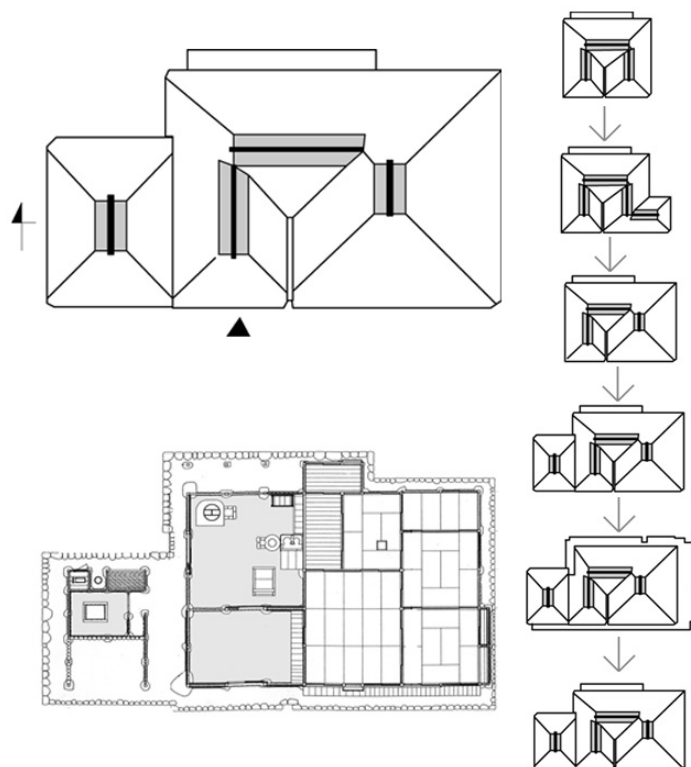


Fig.95- Hirakawa house

Yamaguchi house was built during the second half of the 19th century, in Saga prefecture. This is a *roto-zukuri* (funnel) style house with the ridgepole in a “ ” form. The main house roof form is the original one, although the stables are a later addition. The building is composed of a *joya* and *geya* structures. This kind of house is also thought to derive from the *futatsumune* style, though from the façades the house seems to be single ridged. The house faces north with the *kamite* on its east side.

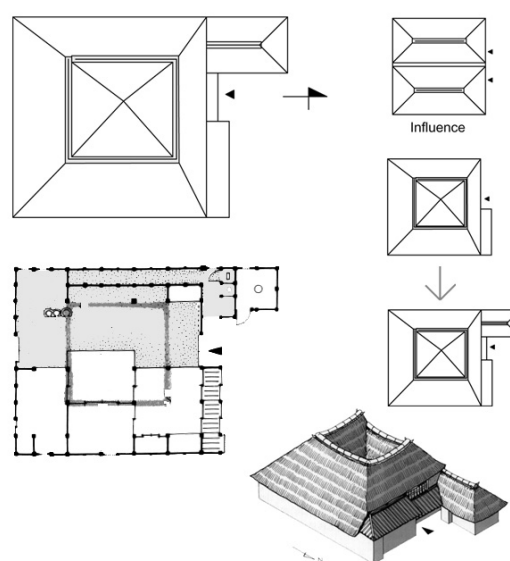


Fig.96- Yamaguchi House

In these three houses we can see that the bunto-zukuri style independent roof structures of the servant space and the served space have evolved into a unified roof form. The roof was designed in a manner that each functionally different space kept an independent ridgepole.

Towa' house was built between the end of the 18th century and the beginning of the 19th century, in Yamaguchi prefecture. It was restored into its original form in 1979. The *doma* area is very small because this building belonged to a mid class samurai. The *omoya* part of the house has a tiled hipped-gabled (*irimoya*) roof on its *kamite* side and on the *shimote* side the roof is just gabled. However, the roof of the service area is hipped-gabled on the *shimote* side, where the entrance of the house is placed. The house faces east with the *kamite* on its south side.

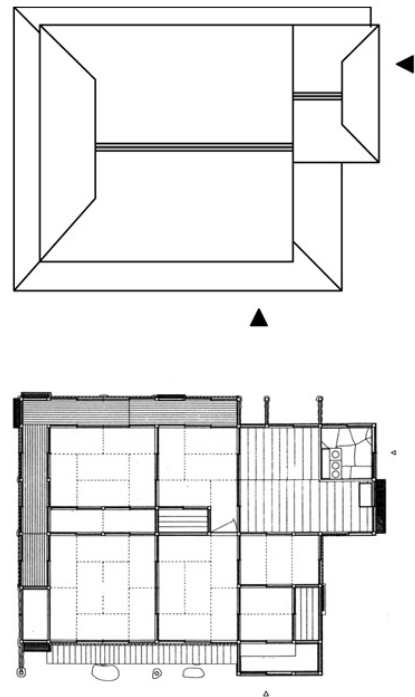


Fig.97- Towa house

Katsura Rikyu Imperial villa originally belonged to the Hachijo-no-mia Imperial Family. The old *shoin* was the first of the palace sections to have been built. It was built at the beginning of the 17th century and was designed by Prince Toshihito. The middle *shoin* was an addition made to the old *shoin* at the time of the wedding of the Hachijo Prince Norita, in 1642. This building joins the west side of the old *shoin* and connects directly with the hearth room. The musical instruments' room, and the new palace were added in, on the occasion of a visit to *Katsura* by the cloistered emperor Gomizu-no-o.¹

The *Katsura* palace roof is composed of cypress-shingled and tiled hipped-gabled roofs. The servant quarters' buildings have a tiled roof while the old *shoin*, musical instruments room and the new palace have a cypress-shingled roof.

¹ Tadashi Yokoyama, 1983, *Katsura* Shinken-chiku

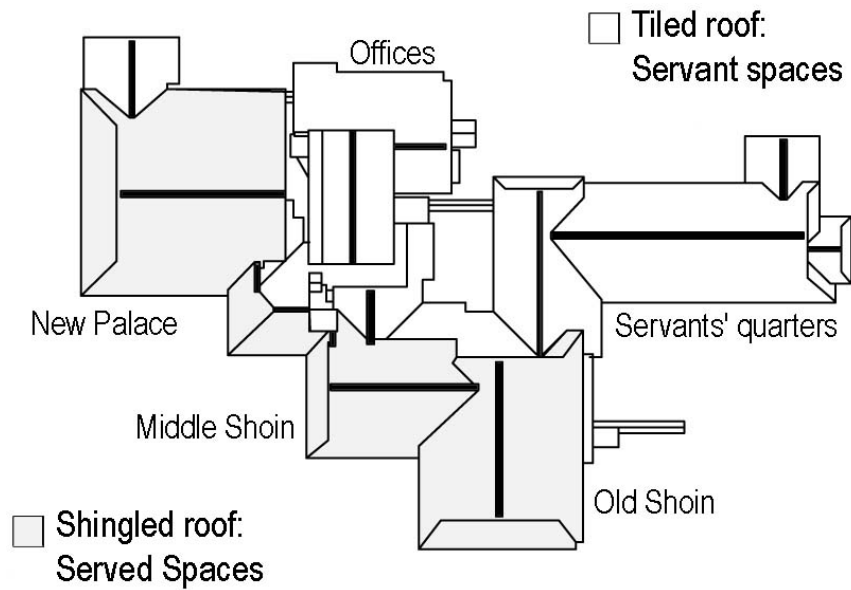


Fig.98- Katsura Rikyu Imperial Villa

Itsukushima shrine was first built in 1168 and has been rebuilt many times after that. It is composed by several halls connected by corridors, in a design that reminds the *shinden* style residences. There are four types of halls: the *haraiden*, the *haiden*, the *heiden* and the *honden* (main hall). There is also a No stage, two smaller shrines and a building called Chozaya. All of the roofs are shingled and have a hipped -gabled roof, except for the *honden*, the no-stage and the Daikoku-shrine, which have a gabled roof.

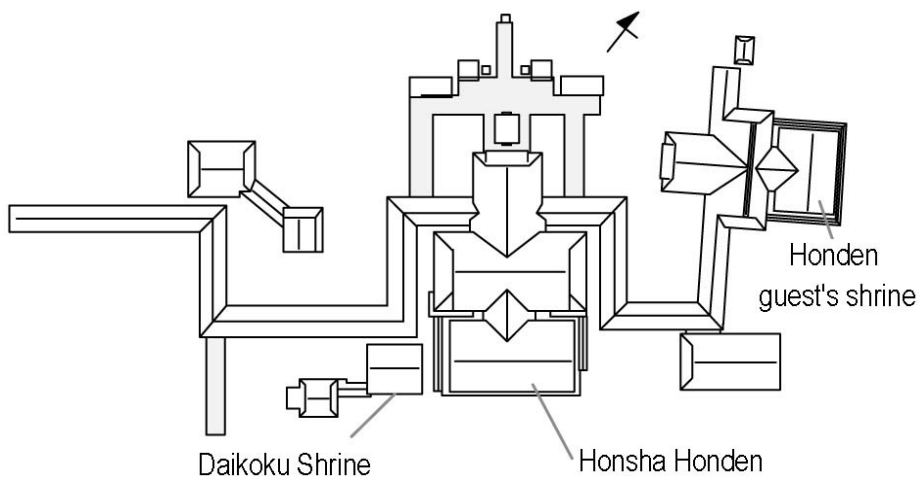


Fig.99- Itsukushima Shrine

Regarding these facts this group of houses will be classified as type 1-D. In this

type the houses have not suffered any alterations and keep their original design. The interior space is divided into two functionally different spaces, the servant and the served space. Despite the fact that the structure is united or partially united, the roof of each space was distinguished with independent ridgepoles. In these houses the roof was intentionally designed to characterize each space.

Resuming, the type 1 consists of houses in which the servant (*doma*) space and the served (raised floor part) space have a distinct roof form. In this type we can identified four kinds of design processes. The type A consists of sheltering the functionally different spaces under independent roof structure. In the type B the roof form is consequent of unifying the original independent roof structures. The type C results from the addition of new spaces in the former structure. The type D consists of houses that have a distinct ridgepole for each of the two different types of spaces. Despite its complex roof form the D type house has not suffered any alteration, maintaining its original form. The houses of this type are usually newer than the ones from the other three types.

A	Mochizuki	Ogata	Nikaido	Ota	Kuroki
	Yokoji	Matsumoto	Kusanagi	Uezu	
B	Sakuta	Hanawa	Kuwahara		
	Kikuchi	Subara	Ichinoe	Inukai	
D	Kudo	Baba	Yanagi	Towa	Oyama
	Yamada	Katsura			
	Itsukushima shrine	Tobita	Yamaguchi	Hirawa	Sasaki
	Sakai	Yamamoto	Sato		

Fig 100– Type 1 comparative table

IV-2-1 Type 2-A

Kataoka house was built in 1670, in Nara prefecture. This house belonged to a very high-class farmer. Formerly the *omoya* and the *zashiki* were built separately and were later connected by a corridor. The *omoya* is side entered with a thatched hipped-gabled (*irimoya*) roof. The *zashiki* is gable-entered and its thatched roof has its front part hipped-gabled, although its back part is only gabled. In 1782 the *zashiki* was rebuilt. The house faces south with the *kamite* on its west side. The house's design has not suffered any significant alterations, maintaining its original form.

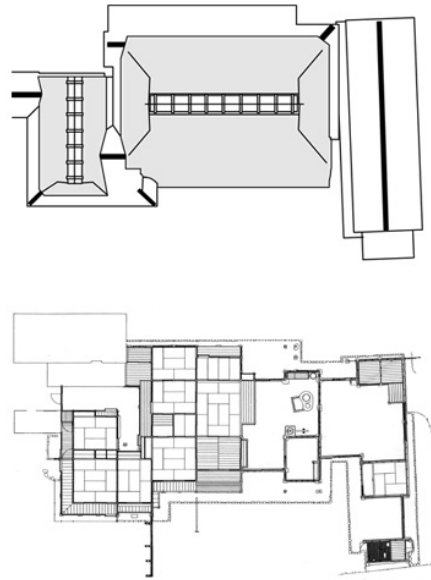


Fig. 101- Kataoka house

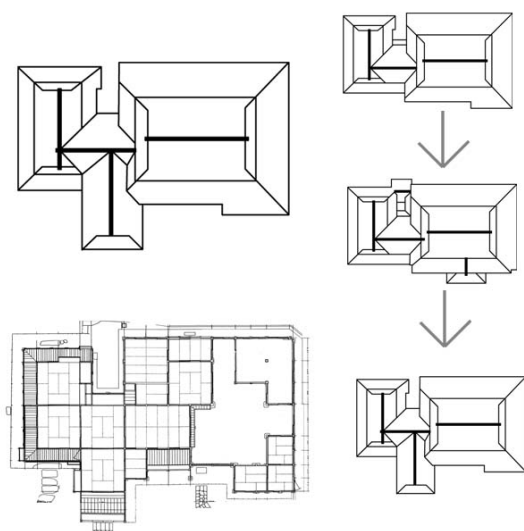


Fig. 102- Masuda house

Masuda house was built in 1706, in Wakayama prefecture. The *omoya* and the *zashiki* were built separately and were later connected by a corridor (*naka-no-ma*) but the roof of the entrance is a later addition. The *omoya* is side entered and has a tiled hipped-gabled (*irimoya*) roof. The *zashiki* is gable-entered and its tiled roof is hipped-gabled. The house faces south with the *kamite* on its west side. It was restored in 1986.

Ishikura house (former Sabaminami Honjin) was built during the beginning of the 19th century, in Ishikawa prefecture. This building was an official inn for feudal lords during the Edo period. The *omoya* and the *zashiki* are separate structures which are connected at the eaves. The *omoya* is gable-entered and has a tiled (*sangawara*) gabled roof. The *zashiki* is also gable-entered with a tiled gabled roof. The front gable wall of the *omoya* shows the structural elements such as rainbow beams, *funahijiki* etc., in a design style similar to a temple's *kuri*. This kind of design was used to express the social status of the family. The house faces east and has the *kamite* on its north side. It was restored in 1967.

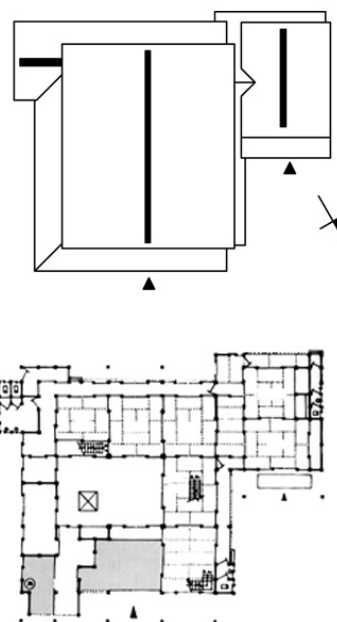


Fig. 103- Ishikura house

Kitada house was built during the first half of the 18th century, in Osaka prefecture. However it has suffered a few alterations, the house maintains its original design. The *omoya* and the *zashiki* are separate structures which are connected at the eaves. The *omoya* is side entered and originally had a thatched hipped-gabled (*irimoya*) roof. The gable side of the roof faces the garden. Later the *omoya* roof became tiled, and in the 1984 restoration it was changed to a lighter roofing material. The *zashiki* is gable-entered and faces the garden. It has the ridgepole parallel to the *omoya* and has a tiled hipped-gabled the roof.

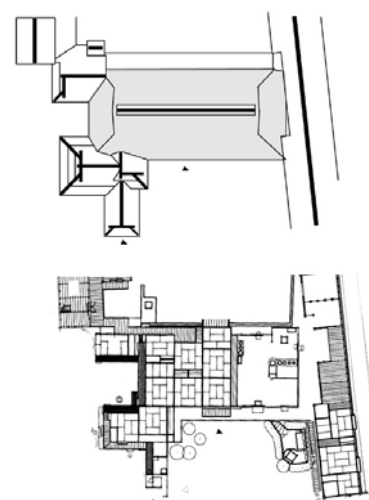


Fig. 104- Kitada house

The house faces south with the *kamite* on its west side.

This group is characterized by houses that have the formal space (*zashiki*) and the informal (*omoya*) under independent roof structures, connected by corridors or connected at the eaves. Except for the Ishikura house, which the *omoya* and are gable-entered *zashiki*, in most of the building the *omoya* structure is side-entered while the *zashiki* is gable-entered.

Haneyu house was built during the end of the 17th century, in Ibaragi prefecture. Despite of the formal space inside the main building, during the mid 19th century an extra *zashiki* was built, completely separate from the *omoya*. The *omoya* is side entered and has a thatched hipped roof. The *zashiki* is gable-entered with a thatched hipped roof. The house faces south with the kamite on its west side.

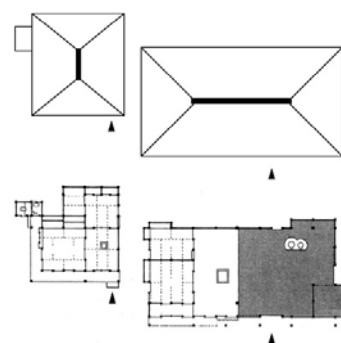


Fig. 105- Haneyu house

Yokoda house was built in 1794, in Nagano prefecture. The *doma* is small because this house belonged to a middle class *bushi*. The *omoya* is side-entered, it has a thatched hipped roof, and it has a *joya* and a *geya* structures with a *sasu-shintsuka gumi* type of roof truss. A smaller thatched hipped roof protrudes at a right angle from the main house façade and emphasizes the entrance. Despite the existence of formal rooms inside the main house, extra formal space was built separately (*kageisho*). This structure has a thatched hipped roof and is composed of a *zashiki* and a *tearoom*, which have distinct ridgepoles at a right angle to each other.

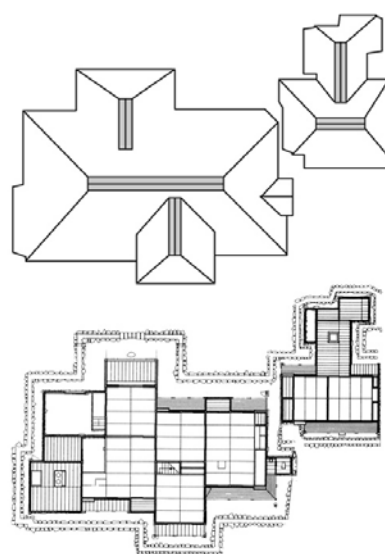


Fig. 106- Yokoda house

The *zashiki* part is side-entered and its ridgepole is higher than the tearoom ridgepole. The tearoom roof follows the irregularity of its plank-floored plan design. All the formal rooms, including those inside the *omoya*, face the lake.

In these examples extra formal rooms were built completely separated from the main house.

We can observe that in this group of houses the space was divided into two functionally different spaces -the formal space and the informal spaces- which were sheltered under independent roof structures. The service space was included in the informal space. For these reason this type we will call 2-A. In most of the examples the informal space and the formal space have a similar roof form and use the same roofing material. The discrimination between these two spaces is done trough the direction of the building. Usually the *omoya* (informal space) is side-entered while the *zashiki* (formal space) is gable-entered.

IV-2-2 Type 2-B

Yokoyama house

(former Takizawa Honjin) was built in 1678, in Fukushima prefecture. This building was an official inn for feudal lords during the Edo period. The *omoya* and the *zashiki* originally had independent roof structures, both of them thatched and hipped.

During the first half of the 19th century the *zashiki* was rebuilt, and the *kamite* side of the *omoya* roof extended and altered into a gable roof (*kirizuma*). Therefore the side-entered *omoya* has a combined roof, with one side hipped and the other side gabled. The *zashiki* has its ridgepole parallel to the *omoya*'s ridgepole. The house faces south and its *kamite* and gardens are on the east side. It was restored in 1950.

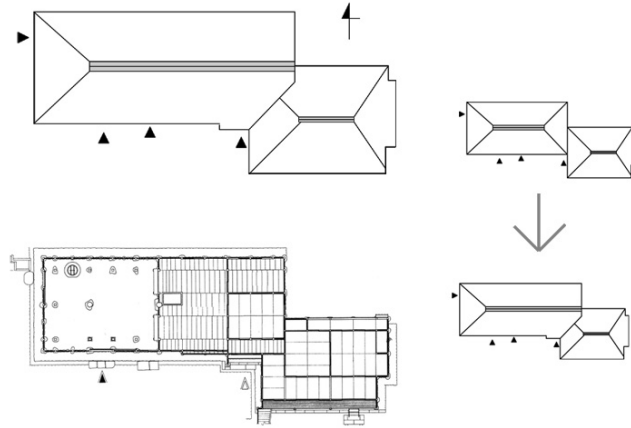


Fig 107- Yokoyama House

Daikokuya, or former Kurino house, was built in 1761, in Yamagata prefecture. The *shoin* style *zashiki* building was bought and moved to the site, when the *omoya* was newly built. The *omoya* ridgepole was connected at a right angle to the recycled *zashiki* ridgepole. Both buildings have a thatched hipped roof. The *zashiki* is side entered while the *omoya* is gable-entered.

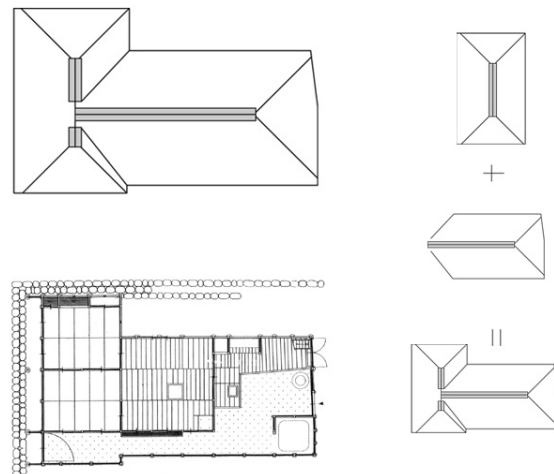


Fig 108- Daikokuya House

It is typical of the houses of this region to be gable-entered.

The house faces west and the *kamite* is on its north side.

This group of houses will be classified as type 2-B. In this type the formal and the informal spaces were originally built under independent roof structures, which were later unified in one structure.

IV-2-3 Type 2-C

Hayashi house was built in 1703 in Hiroshima prefecture, Miyajima Island. This house belonged to a Shinto priest of the Itsukushima Shrine. Therefore it has a small *doma* area. The *omoya* is gable-entered and has a tiled (*sangawara*) hipped-gabled roof. A smaller gabled roof, in the *chidorihafu* style emphasizes the entrance. During the end of the 18th century, part of the house was lost in a fire. After that, a huge reform occurred, and extra formal space was added. The formal space is gable-entered and protrudes from the back part of the house. Its ridgepole is parallel to the *omoya* ridgepole. The house faces west and has the *kamite* on its south side. It was restored in 1983.

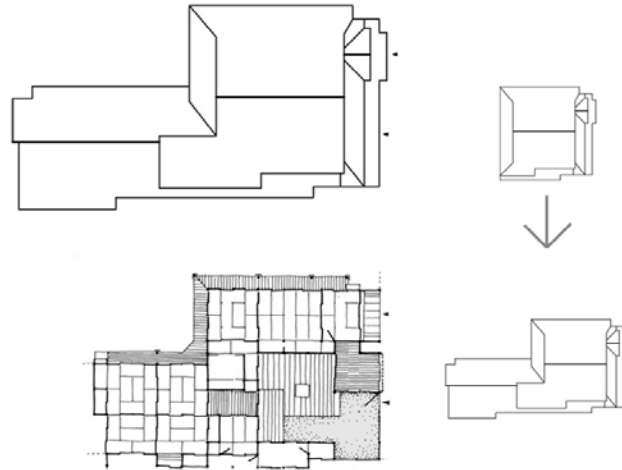


Fig. 109- Hayashi house

Imose house (or former Nade Honjin) was built in 1718, in Wakayama prefecture. The main house has a tiled hipped roof and is side-entered. A smaller hipped-gabled roof emphasizes the entrance. The *zashiki*, or private reception quarters, was added in 1745. It has one end of the tiled roof hipped-gabled and on the side it connects to the *omoya* the roof is only gabled. The *zashiki* ridgepole makes a right angle to the *omoya* ridgepole. The house faces south and the *kamite* is on its east side. It was restored in 1991.

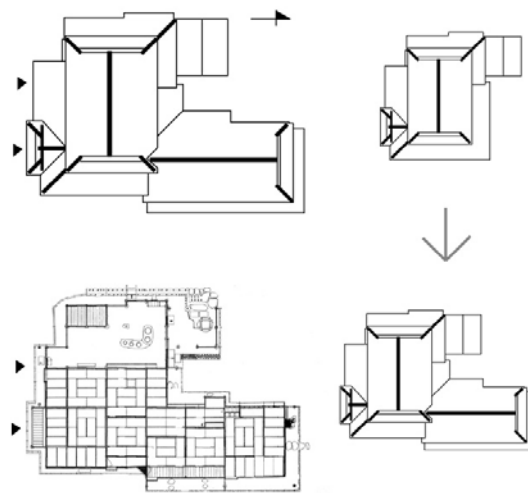


Fig. 110- Imose house

Machi house was built in 1744, in Mie prefecture. The main house is side-entered and has a tiled hipped and gable roof. It has a *geya* structure only on its front side and on the rest of the house it has just a *joya* structure. The roof truss is of the *wago* type. The *zashiki* was built later, at the end of the 18th century, when the family regained the title of samurai. The new *zashiki* building is composed of three different spaces: sitting rooms, entrance hall and entrance; and each of this space has an independent ridgepole. The sitting room's

(*zashiki*) ridgepole is connected at a right angle to the entrance hall's (*genkan*) ridgepole, which is lower than the first one. The entrance (*shikidai*) ridgepole makes a right angle to the *genkan* ridgepole and is even lower and smaller. Another new *zashiki* room was also added directly to the main house, with its ridgepole parallel to the *omoya* ridgepole. All roofs are tiled hipped-gabled.

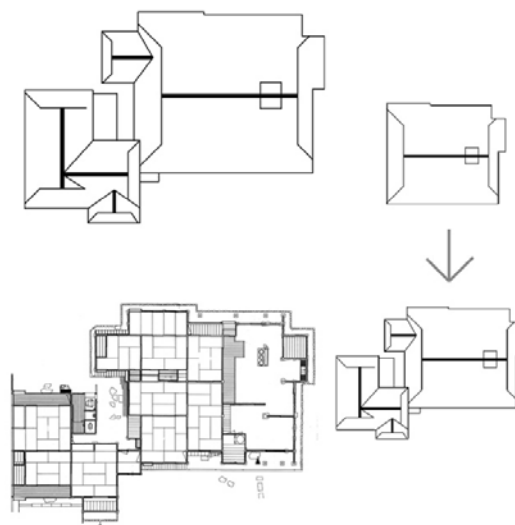


Fig. 111- Machi house

Wagatsuma house was built in 1753 in Miyagi prefecture. The *omoya* is side entered and has a thatched hipped roof. The *zashiki* was built a little later than the *omoya*. It is side-entered and has a thatched hipped roof. The ridgepoles of the *omoya* and the *zashiki* are parallel. The house faces south and the *kamite* is on its west side. It was restored in 1980.

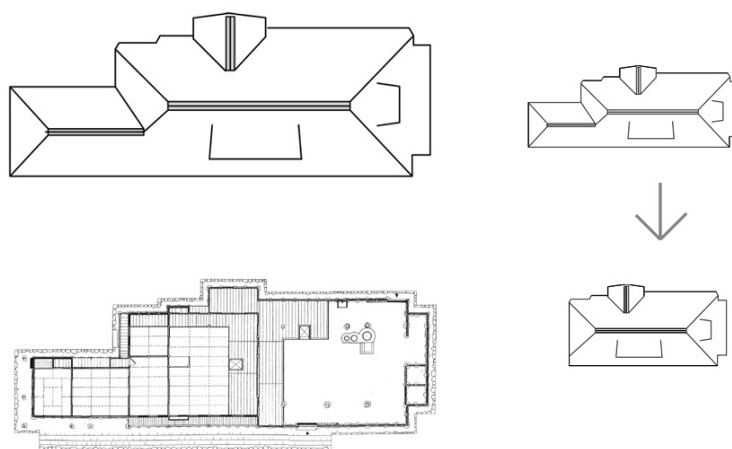


Fig. 112- Wagatsuma house

Former Takeda house was built in 1759, in Yamagata prefecture. The original house had a thatched hipped roof and was gable-entered. The *zashiki*, which was added later, has a thatched hipped roof and its ridgepole is at a right angle to the *omoya* ridgepole. The stables are also a later addition. The house faces east and the *kamite* is on its front south side.

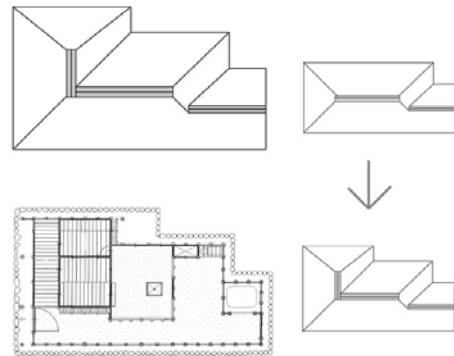


Fig. 113- Takeda house

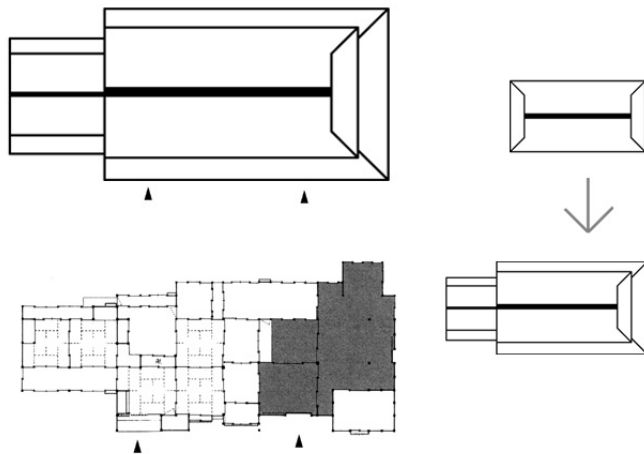
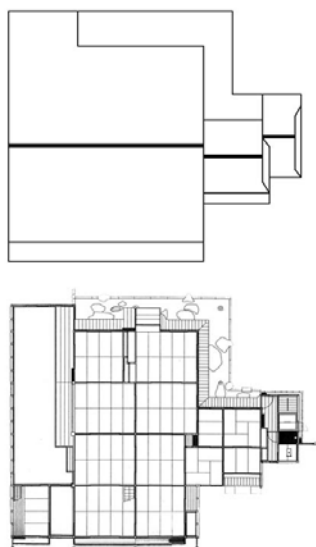


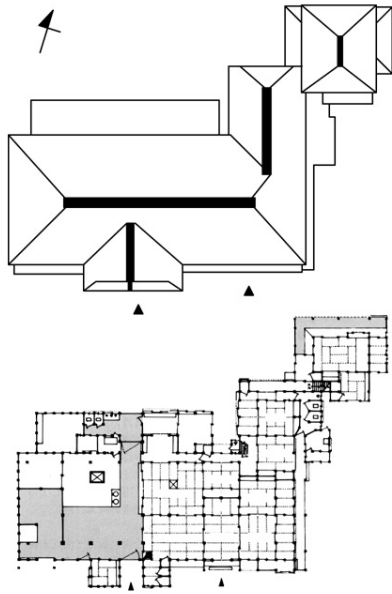
Fig. 114- Okuda house

Okuda house was built during the second half of the 17th century in Osaka prefecture. The original house had a thatched hipped and gabled roof and was side-entered. When the *zashiki* was added the *kamite* end of the *omoya's* roof was became gabled. The *zashiki* has a cooper gabled roof and its ridgepole is parallel to the *omoya* ridgepole. The house faces north and the *kamite* is on its east side.



Kumagaya house was built in 1768 in Yamaguchi prefecture. This house belonged to a wealthy merchant. It is a side-entered structure and has a tiled gabled roof. The projecting part, which includes the tearoom and the entrance hall (*genkan*), was added to the east part of the main house soon after it was built. Later a bathroom was also added. Each of these structures is side-entered and has a hipped-gabled roof. The house faces north and the *kamite* is on its east side. It was restored in 1980.

Fig. 115- Kumagaya house



Meguro house was built in 1797 in Niigata prefecture. The *omoya* has a thatched hipped roof, with the entrance (*iriguchi chumon*) emphasized by a thatched hipped-gabled roof. Two bedrooms (*nema chumon*), which are later addition, protrude from the back *kamite* side of the *omoya*. These rooms are sheltered under a thatched hipped roof. In 1901 a new *zashiki* was built and was connected to the eaves of these rooms. The new *zashiki* has two floors and a thatched hipped roof. The house faces south and has the *kamite* on its east side.

Fig. 116- Meguro house

This group of houses will be classified as type 2-C. In this type the formal and informal spaces have independent ridgepoles and distinct roof forms, which are a consequence of later additions done to the main house. The formal space was added to the *omoya* with its ridgepole at a right angle in some examples, an in others, it was added with its ridgepole parallel to the *omoya's* ridgepole.

IV-2-4 Type 2-D

Okuda house was built between 1673 and 1681, in Osaka prefecture. The *omoya* and the *zashiki* were built simultaneously. The *omoya* is side entered and has a thatched hipped and gabled roof. The *zashiki* is side-entered with a thatched hipped and gabled roof and has the ridgepole parallel to the *omoya's* ridgepole. It is connected to the *kamite* side of the *omoya*. The house faces south and the *kamite* is on its east side.

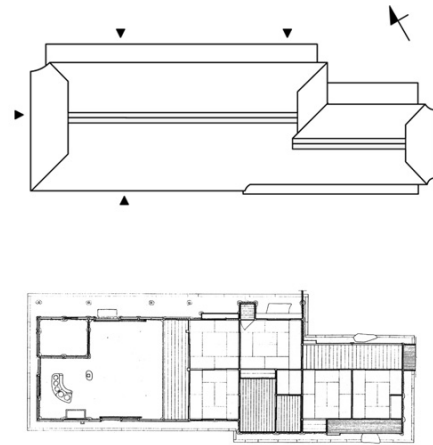
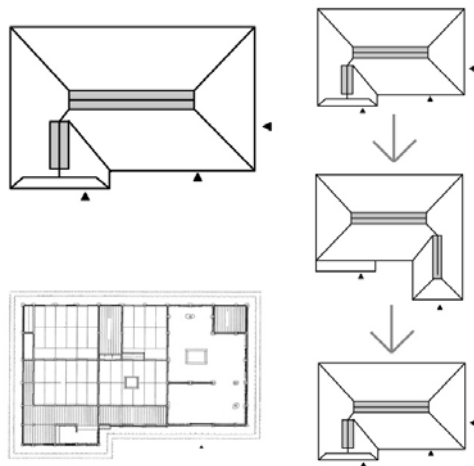


Fig. 117- Okuda house



Tsuchida house was built in 1678, in Akita prefecture. This is a *zashiki chumon* style house, in which the *zashiki* protrudes at a right angle from the *omoya's kamite* side. The *omoya* and the *chumon* were built simultaneously. The *omoya* is side entered and has a thatched hipped roof. The *zashiki* is gable-entered with a thatched hipped and gabled roof and has the ridgepole parallel to the *omoya's* ridgepole. The house faces south and the *kamite* is on its west side. It was restored in 1985.

Fig. 118- Tsuchida house

Yamazoe house was built in 1708, in Osaka prefecture. The *omoya* and the *zashiki* were built at the same time. The *omoya* is side entered and has a thatched hipped roof. The *zashiki* is side-entered and has a thatched hipped roof with the ridgepole parallel to the *omoya's* ridgepole. The *zashiki* is connected to the *kamite* side of the *omoya*. The house faces south and the *kamite* is on its east side.

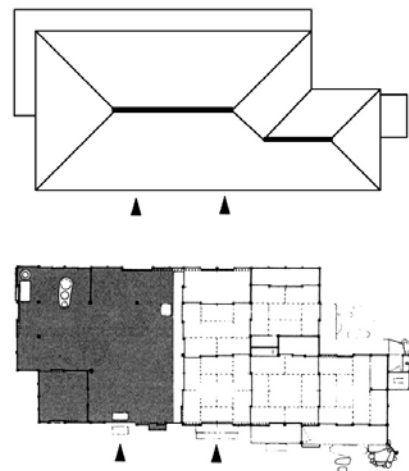


Fig. 119- Yamazoe house

Shimazaki house was built between 1716 and 1736, in Nagano prefecture. The *omoya* and the *zashiki* were probably built simultaneously. The *omoya* is gable-entered and has a stone held shingled (*ishioki*) gabled roof. The *zashiki* protrudes from the front side of the house. It is gable-entered with the same kind of shingled roof, although the roof is hipped and gabled and has the ridgepole parallel to the *omoya's* ridgepole. The house faces east and the *kamite* is on its south side. This house was restored in 1987.

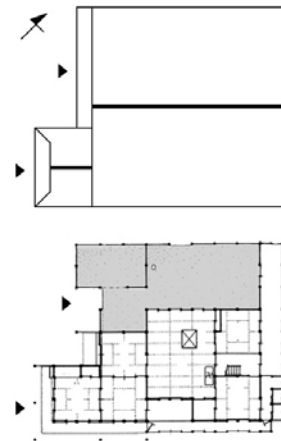
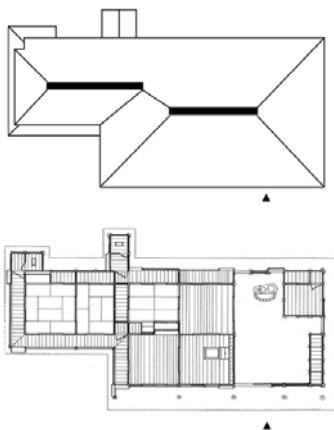


Fig. 120- Shimazaki house



Hayashi house was built in 1844, in Chiba prefecture. The *omoya* and the *zashiki* were built simultaneously. The *omoya* is side entered and has a thatched hipped roof. The *zashiki* is side-entered and has a thatched hipped roof with its ridgepole parallel to the *omoya's* ridgepole. It is connected to the *kamite* of the *omoya*. The house faces south and the *kamite* is on its west side.

Fig. 121- Hayashi house

Sato house was built in 1765 in Niigata prefecture. Except from the new *zashiki*, that as the name says was built later, the house has not suffered any other alterations on its original design. The house is composed of an *omoya* building and a *zashiki* building, which have their ridgepoles at a right angle. The *omoya's* ridgepole is higher than the *zashiki* ridgepole. This kind of roof design is called *shumoku-zukuri* and is typical of the region. The gable-entered *omoya* and side-entered *zashiki* have a thatched hipped roof. The house faces south and has the *kamite* on its west side.

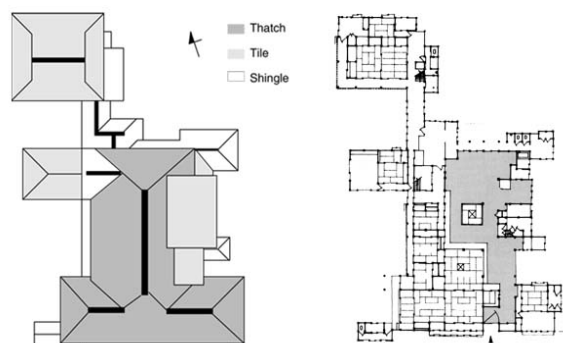


Fig. 120- Sato house

Watanabe house was built in 1788 in Niigata prefecture. Except for the new *zashiki*, that was built later, the house has not suffered any other alterations on its original design. The house is composed of an *omoya* building and a *zashiki* building, which have their ridgepole at a right angle. The *omoya* ridgepole is higher than the *zashiki* ridgepole, giving the impression that house have a hipped-gabled roof. This kind of roof design is called *shumoku-zukuri*. The gable-entered *omoya* and the side-entered *zashiki* have a stone held shingled (*ishioki*) gabled roof. The house faces south and has the *kamite* on its east side.

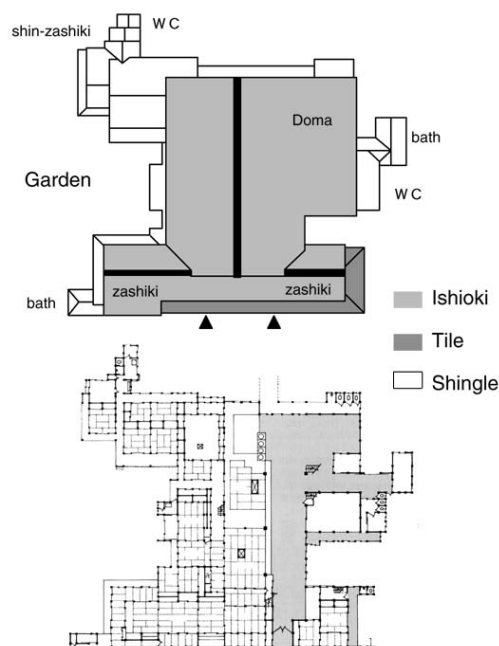


Fig. 123- Watanabe house

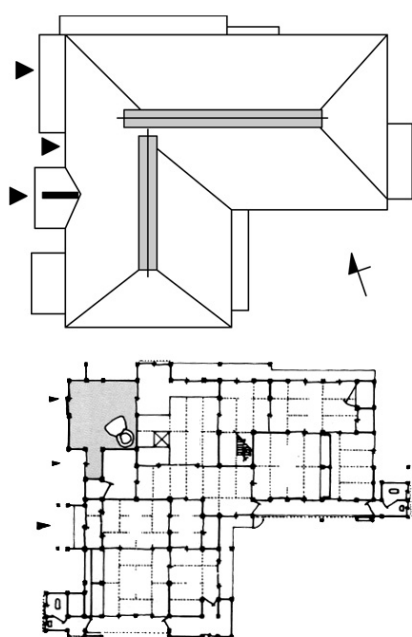


Fig. 124- Wakabayashi house

Wakabayashi's house was built in 1769 in Niigata prefecture. The *doma* area of the house is small because it belonged to a samurai family. The *omoya* is gable-entered and has a thatched hipped roof. The *zashiki* is side-entered and has a thatched hipped roof, with its ridgepole at a right angle to the *omoya's* ridgepole. It has an independent entrance, which is emphasized by a smaller tiled gabled roof. The *zashiki* has the interior with a more sophisticated design than the *omoya*. The house faces west and the *kamite* is on its south side. It was restored in 1989.

Gyotoku's house was built in 1842, in Oita prefecture. This is a *kagi-ie* style house, and it was the residence of a physician. The *zashiki* protrudes at a right angle from the back part of the main house. On the front façade of the house a small tiled hipped and gabled roof emphasizes the entrance. The *zashiki* and the *omoya* were built simultaneously. The *omoya* is side entered and has a thatched hipped roof. The gable-entered *zashiki* has its ridgepole at a right angle to the *omoya's* ridgepole, and has a thatched hipped roof. There are tiled *hisashi* on the front and on the back of the building. The house faces south and the *kamite* is on its west side. This house was restored in 1991.

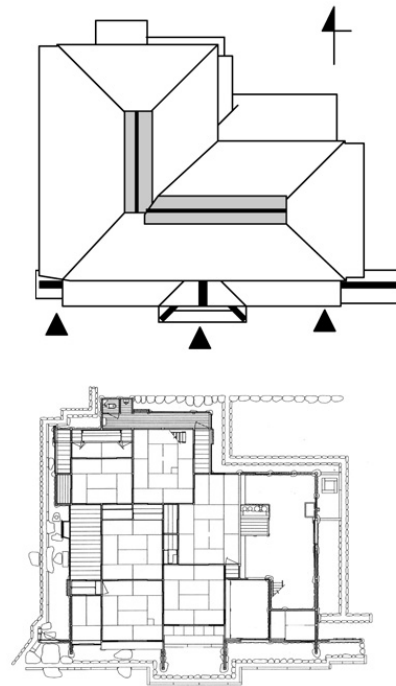


Fig. 125- Gyotoku house

This group of houses will be classified as type 2-D. In this type of house the formal space and the informal space were built simultaneously and did not suffer any significant alterations in the design, though each of the spaces has an independent ridgepole. In conclusion these houses were intentionally designed with distinct ridgepoles for each space. In some examples the formal and informal spaces' ridgepoles are parallel to each other, though in other examples the ridgepoles of the informal and formal spaces are at right angle.

Resuming, the type 2 consists of houses in which the informal (*doma* and living quarters) space and the formal (guests reception quarters) space have a distinct roof form. In this type we can identified four kinds of design processes. The type A consists of sheltering the functionally different spaces under independent roof structures. In the type B the roof form is consequent of unifying the original independent roof structures. The type C results from the addition of new spaces in the former structure. The type D consists of houses that have a distinct ridgepole for each of the two different types of spaces. Despite its complex roof form the D type house has not suffered any alteration, maintaining its original form.

A	Ishikura	Haneyu	Kitada	Masuda	Yokoda	Kataoka
B	Daikokuya	Yokoyama				
		$+$		$=$		
C	Wagatsuma	Hayashi	Imose	Kumagaya	Meguro	
D	Gyotoku	Okuda	Hayashi	Shimazaki	Watanabe	Satos
	Tsuchida	Wakabayashi	Yamazoe			

Fig. 126- Type 2 comparative table

IV-3 Type 3-A

Kedoin house was built during the second half of the 18th century, in Kagoshima prefecture. The house is composed of three independent structures, the *omote*, the *nakae* and the *usuniwa*. The *omote* has a raised floor covered with *tatami* mats, and it houses the formal rooms and the bedrooms. It is side-entered with a thatched hipped roof. The *nakae* is a kind of multipurpose room, with an *irori* and a raised floor covered with *tatami* mats, this is an informal space, which works as a transitional space from the formal space (*omote*) and the service space (*usuniwa*). The *nakae* is side entered and has a tiled (*sangawara*) gabled roof. However until the first half of the 19th century it had a thatched hipped roof. The *usuniwa* is the service space, with an earthed floor and a thatched hipped roof. Despite the alterations the house went under, it maintains its original composition. The house faces south and the *kamite* is on the west side.

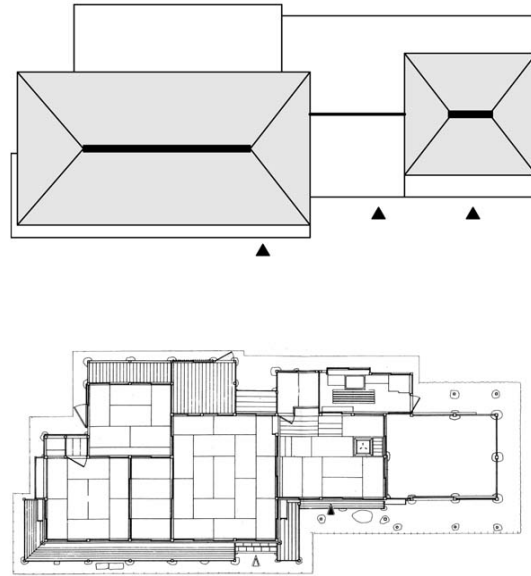


Fig. 127- Kedoin house

Nakamura house was built during the mid 19th century in Okinawa prefecture. The building is composed by three structures, the *donguwa*, the *ufuya* and the *azagi*. The *donguwa* has an earth floored service area plus a raised floor informal space, it is side-entered and has a tiled hipped roof. The *ufuya* has a raised *tatami* mats floors and it is where the formal space is sheltered. It is side-entered and has a tiled hipped roof. The *azagi* has a raised *tatami* mats floor and is a side-entered structure with a tiled hipped roof. It is where the extra formal rooms are sheltered. The *ufuya* is the largest structure. The *ufuya*'s and

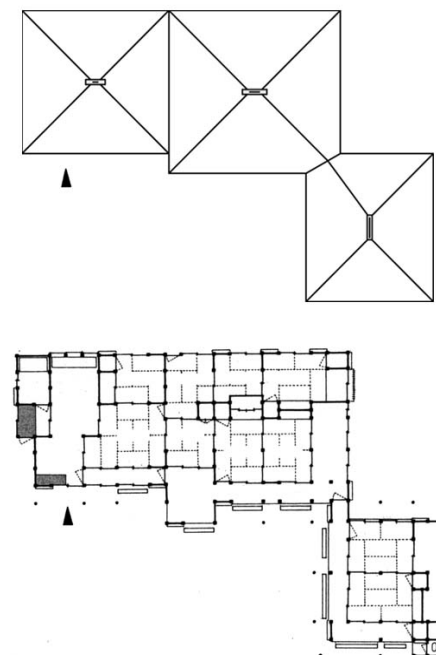


Fig. 128- Nakamura house

the *donguwa*'s ridgepole are parallel to each other. However the *azagi*, which is connected to the *ufuya* at the east corner of its eave, has its ridgepole at a right angle to the other two structures' ridgepoles. The Nakamura's house originally had a thatched roof. This Okinawa version of *bunto-zukuri minka* is characterized by the short ridgepoles.

This group of buildings will be classified as type 3-A. In this type we can identify three functionally different spaces - formal, informal and service -which are sheltered under independent roof structures and connected at the eaves.

IV-3 Type 3-B

Kurozawa house was built during the end of the 17th century, in Akita prefecture. This house has a very small *doma* area because it belonged to a *samurai*'s family. The house is composed of three parts: the *daidokoro* (kitchen), the *shoin* and the *koza* (a small sitting room). All of the structures have a shingled gabled roof. The *shoin*, which is the main part of the house, is gable-entered. The *koza* is side-entered while the kitchen is gable-entered. The entrance is emphasized by a smaller gabled roof.

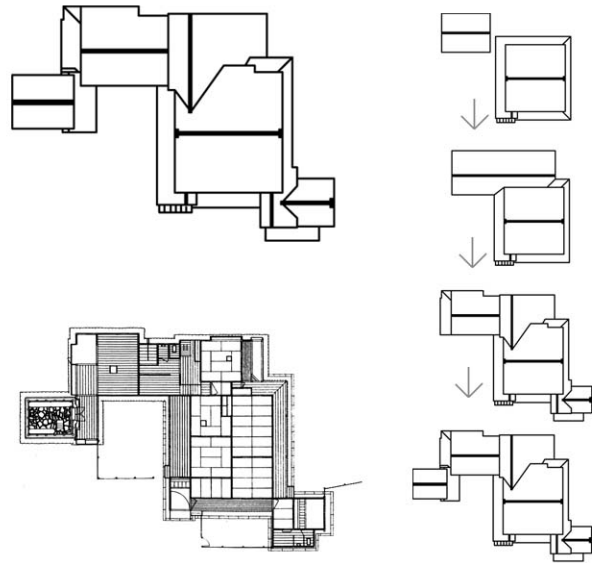


Fig. 129- Kurozawa house

Originally the *daikoro* was an independent structure, built behind the *shoin*. The *koza* ridgepole was an extension of this structure. In 1835 the ridgepole was cut and the *kosa* was rebuilt. Later the *daidokoro* was rebuilt too. The residence faces east and the *kamite* is on its north side. It was restored in 1991.

Yawata house was built at the beginning of the 19th century in Ota prefecture. This is a *kudo-zukuri* style house of the *maetani-gata* type. The roof is a combination of four thatched hipped roofs. This kind of house is thought to derive from the *futatsumune* style¹. The *doma* (service space) and the *ishitsu* (informal space) are sheltered under independent roof structures connected at their back part by a third ridgepole. The *zashiki* protrudes at right angle from the informal space part. Despite the actual roof form, before it was restored in 1984

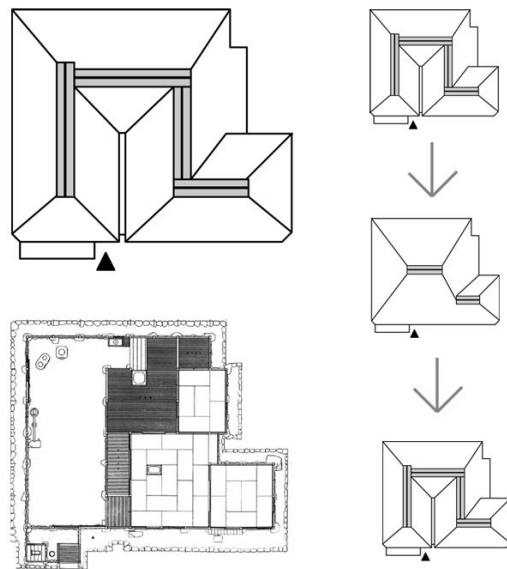


Fig. 130- Yawata house

¹ See page 40

the *doma* and the *ishitsu* were sheltered under a huge single ridged roof structure. This alteration in the roof probably happened in 1887 when the house went under a great reform. In this reform the *doma* and the informal space area were housed under the same hipped roof, although maintaining the original independent roof structure. The house faces south and the *kamite* is on its east side.

Mekaru house was built in 1906, in Okinawa prefecture, on Izena Island. The house is composed of three structures: the *donguwa*, the *ufuya*, and the *azagi*. The *donguwa* is the service space and has an earth-floored part and a raised floor part. The *ufuya* shelters the informal and the formal spaces, the floor is raised and most of it is covered with *tatami* mats. The *azagi* houses the extra formal space and has a raised floor covered with *tatami* mats. All three structures are side entered and have a tiled hipped roof.

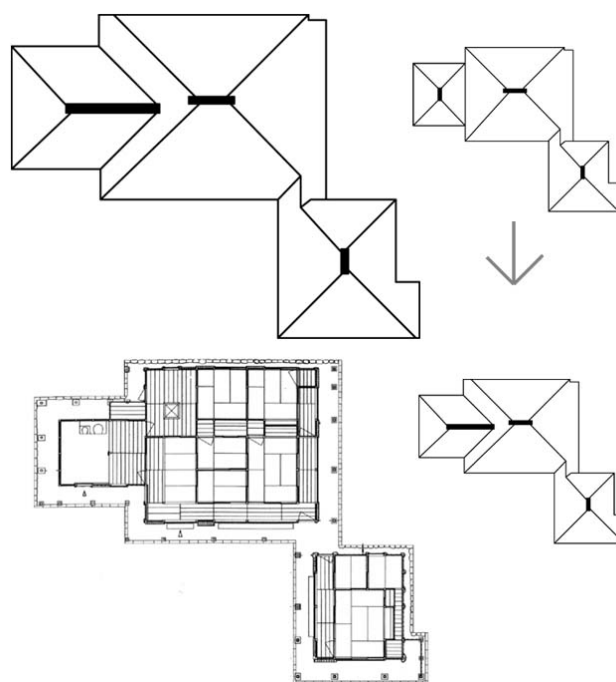


Fig. 131- Mekaru house

The *donguwa* and the *ufuya* ridgepoles are parallel to each other and the *donguwa*'s roof is unified to the *ufuya*'s roof, although originally they were independent structures. The *azagi* has its ridgepole at a right angle to the other two structures, and is connected at its eave corner to the corner of the *ufuya*'s eave. The house faces south and the *kamite* is on the east side.

This group of houses will be classified as type 3-B. In this type each of the different functional spaces – service, informal and formal – were originally under completely independent roof structures, which were later unified, or partially unified into a single roof structure.

IV-3-3 Type 3-C

Takahashi' house was built between 1573 and 1592, in Osaka prefecture. This house has a *yamato-mune* style roof, though originally it was a *sugoya* (single ridged house) with a thatched hipped roof. The house has suffered many reforms during the period between 1688 and 1718. In the first reform the *kamite* end of the *omoya* roof was altered into a gabled roof, in order to add the formal rooms. Later the house was reformed again, and the *shimote* end of the

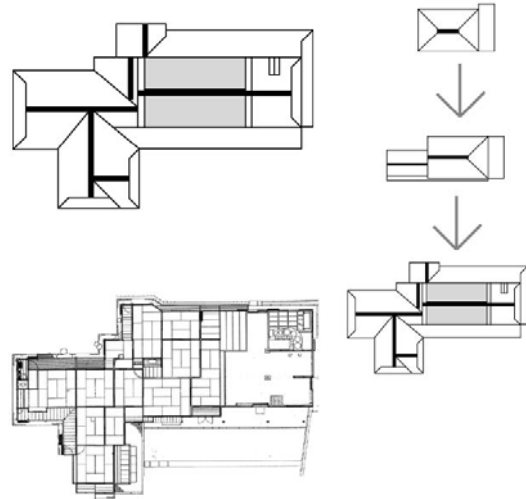


Fig. 132- Takahashi house

omoya became gabled and the tiled hipped-gabled roof of the *kamaya* was added. The formal space roof was changed to a hipped-gabled roof, and more rooms were added to it. An entrance hall (*genkan*) and an entrance (*shikidai*) were added to the former *zashiki*. Each of this space has an independent ridgepole. The *zashiki* ridgepole is connected at a right angle to the entrance hall's (*genkan*) ridgepole, which is lower than the first one. The entrance (*shikidai*) ridgepole makes a right angle to the *genkan* ridgepole and is the lowest and smallest. All these three structures have a tiled hipped-gabled roof. The *omoya* thatched gable roof is higher than the others tiled hipped-gabled (*irimoya*) roofs. There are tiled hisashi all around the *omoya* and the *kamaya* part of the house. The house faces south with its *kamite* on the west side. It was restored in 1979.

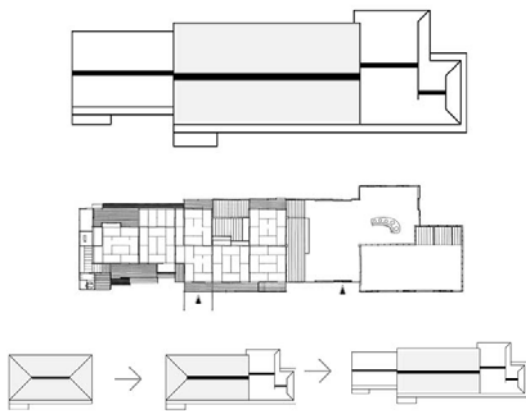


Fig. 133- Yoshimura house

Yoshimuras house was built at the beginning of the 17th century, in Osaka prefecture. This house has a *yamato-mune* style roof. Originally the *omoya* had a thatched hipped-gabled (*irimoya*) roof. Its exactly date of construction is unsure but the *zashiki* was probably built a little later than the *omoya*, and during the years between 1789 and 1801 the house was reformed into the *yamato-mune* style. Each functionally different space of the house

has an independent ridgepole, and these ridgepoles are all aligned. The whole structure

is side-entered. The *zashiki* has a shingled gabled roof. The *omoya* has a thatched gabled roof and the ridgepole is higher than the other structures. The service space has two ridgepoles, one for the *kamaya* and other for the *naya*, and both roofs are tiled hipped-gabled (*irimoya*). The house faces south with its *kamite* on the west side. It was restored in 1953.

Fujita house was built at the end of the 17th century, in Nara prefecture. This house has a *yamato-mune* style roof, though originally the *omoya* had a thatched hipped-gabled (*irimoya*) roof. During the first reform in 1680 the east gable-end (*shimote*) of the *omoya* roof was altered into a gable roof, and the lower tiled gabled roof of the *kamaya* was built. Later the house was reformed again, and the west gable-end (*kamite*) of the *omoya*'s roof was changed into a gable roof, and the formal rooms were added. Consequently each functionally different space of the house has an independent ridgepole, and these ridgepoles are all parallel. The whole structure is side-entered. The *zashiki* and the *kamaya* have a tiled gabled roof. The *omoya* has a thatched gabled roof and the ridgepole is higher than the other structures. The house faces south with its *kamite* on the west side. It was restored in 1953.

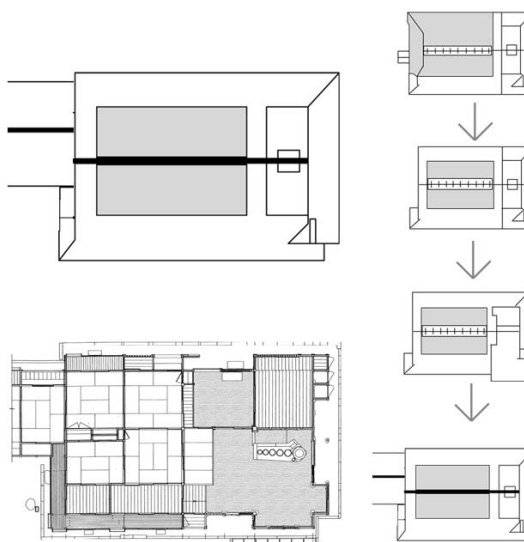


Fig. 1324- Fujita house

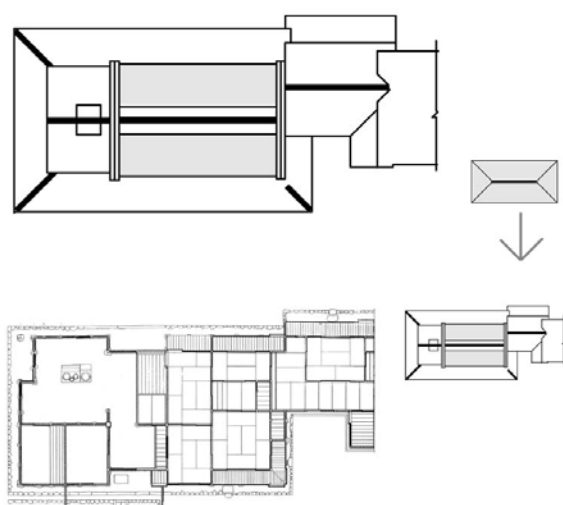


Fig. 133- Morishima house

Morishima house was built in 1706 in Nara prefecture. This house was reformed into the *yamato-mune* style roof in 1839. The original building was probably dismantled and part of the old materials was reused to rebuild the residence. The house is composed of three parts: the *kamaya* (service space), the *omoya* (informal space) and the *zashiki* (formal space). The residence is side-entered. The

omoya has a thatched gabled roof with a *takahe* (highwall) on both gables end. On its east side (*shimote*) is the *kamaya*, which have a lower ridgepole and a tiled (*sangawara*) gabled roof. Since the house has tiled *hisashi* all around it, from the facade the *kamaya* looks like if it had a hipped-gabled roof. On the west side of the *omoya* is the *Kurazen-zashiki* (sitting rooms before the store house), which has a tiled gabled roof. There is also another *zashiki* building, which is a complete separated structure. It is gable-entered, and on the entrance side the roof is hipped-gabled (*irimoya*) while on the back it is just gabled. The house was restored in 1987, it faces north and the *kamite* is on its west side.

Naka house was built between 1764 and 1770 in Nara prefecture. This house is in the *yamato-mune* style roof, though originally it had a thatched hipped-gable roof. In 1770 it was reformed. During this reform the *omoya* roof was altered into a gable roof, and the lower tiled gabled roof of the *kamaya* was added to its west side (*shimote*). Later in 1819 the house was reformed

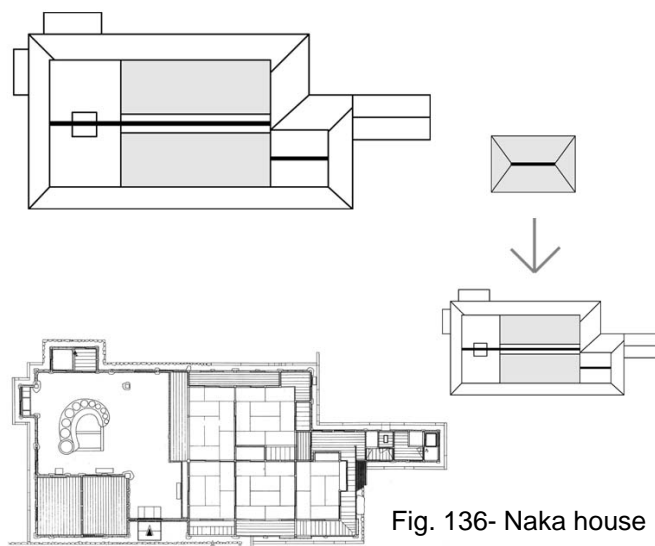


Fig. 136- Naka house

again and the formal rooms were added. Therefore each of the functionally different space of the house has an independent ridgepole, and these ridgepoles are aligned. The whole structure is side-entered. The *zashiki* and the *kamaya* have a tiled gabled roof. The *omoya*, which has the ridgepole higher than the others, has a thatched gabled roof. There are tiled *hisashi* all around the house. The residence faces south with its *kamite* on the east side. It was restored in 1974.

In this group all of the houses have the roof in the *yamato-mune* style. This roof is the product of alterations in the original structure. The original single ridged roof evolved to a more complex, multi-ridge roof form. The original building had the same ridgepole for all functionally different types of spaces. The houses went under reforms,

and through these reforms the internal space was more clearly divided. This process evolved until the point that each functionally different space received an independent ridgepole. This occasionally resulted, as in the Takahashi house for example, in very complex roof forms. Consequently in this group of houses the complex roof figuration is a direct consequence of the floor plan organization. As the floor plan evolved to a more functionally divided space the roof became more complex.

Susuki house was built during the second half of the 17th century. Originally it was a side-entered *sugoya* and had a thatched hipped roof. In 1734 the *shimote chumon* was added to the *omoya*. The *chumon* wing, was built to shelter the stables and the entrance, has a thatched gabled and hipped roof. Later a *zashiki chumon* was added on the *kamite* side. The *zashiki chumon* had a thatched hipped roof. Despite the fact that the *shimote chumon* is hierarchically lower than the *zashiki*, since it is where the main entrance is placed, the roof is hipped-gabled.

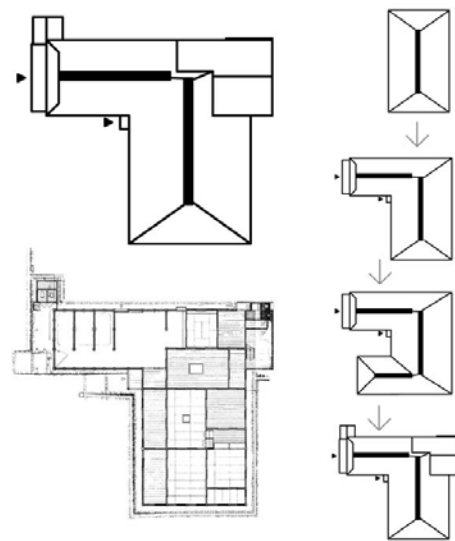


Fig. 137- Suzuki house

When the house was restored in 1972, the *zashiki chumon* was judged as a later addition, therefore the house was rebuilt without it. The house faces north with its *kamite* on the west side.

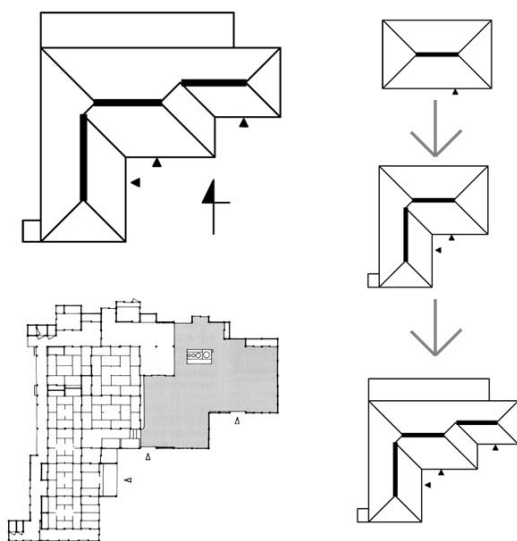


Fig. 138- Sano house

Sano house was built at the beginning of the 18th century, in Ibaragi prefecture. During mid 19th century the *doma* and the *zashiki chumon* were added to the originally side-entered thatched hipped *sugoya*. The *doma* has a thatched hipped roof and its ridgepole is parallel to the *omoya* ridgepole. It is side-entered, and it is where the house main entrance is placed. The *zashiki* is side-entered and has a thatched hipped roof, with its ridgepole a right angle to the *omoya* ridgepole. The house faces south and the *kamite* is on its

west side.

Taniguchi house was built in 1808 in Fukui prefecture. The building was originally a thatched hipped-gabled *sugoya*. During the Meiji period the service space and formal spaces were added. These *tsuno* (protruding parts), as the *omoya*, have a thatched hipped-gabled roof. The ridgepoles of the *tsuno* are lower than the *omoya*. This kind of building is called *tsunoya*. The house faced south and had the *kamite* on its west side. In 1978 it was moved and restored.

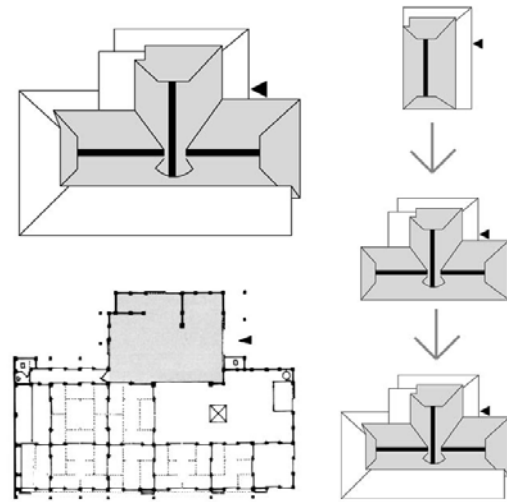


Fig. 139- Taniguchi house

In this group of houses the roof form is a consequence of adding new spaces to the original single ridged house (*sugoya*). In contrast to the former *yamato-mune* style houses, in these cases the formal spaces and service spaces protrude at a right angle from the *omoya*. Therefore the formal space and the service space not only have an independent ridgepole but the roof structure itself is partially independent.

Oku house was built in 1616 in Osaka. The house probably had a thatched roof, which must have been hipped or hipped-gabled. In 1727 the house was reformed into its actual tiled hipped-gabled roof form. The *omoya* is side-entered and has a hipped-gabled roof. The formal space (*zashiki*) is gable-ended and has a hipped-gabled roof, with a smaller hipped-gabled roof protruding from its gable end to emphasize the entrance. The *doma* is placed on the back part of the house and has a hipped-gabled roof. The *nando* and the *daikoro* rooms are under the same hipped-gabled roof. The *okunando* and the *butsuma* rooms are also under an independent hipped-gabled roof. In conclusion the house roof form results from the combination of five hipped-gabled roofs. Since the *omoya* is the only side-entered structure, the other spaces have their roofs at a right angle to it. The house faces south and the *kamite* is on

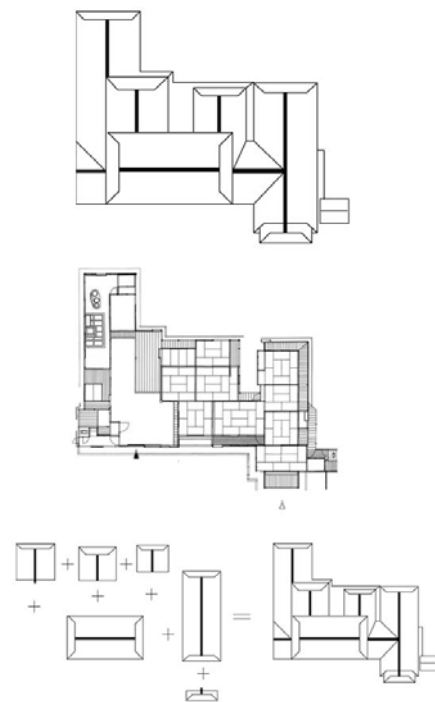


Fig. 140- Oku house

its east side. It was restored in 1971.

Former Sugiyama house was built during the 17th century, in Osaka prefecture. This is a city dwelling (*machiya*), although it has a *doma* as large as a farmer's house. Originally it was a thatched hipped *sugoya*. During mid 17th century the *doma* part of the roof was reformed to a tiled hipped-gabled roof. Later, at the beginning of the 18th century the raised floor part of the house was rebuilt. The *zashiki* room was built later, in 1784. Therefore the roof form became more complex as the floor plan grew bigger.

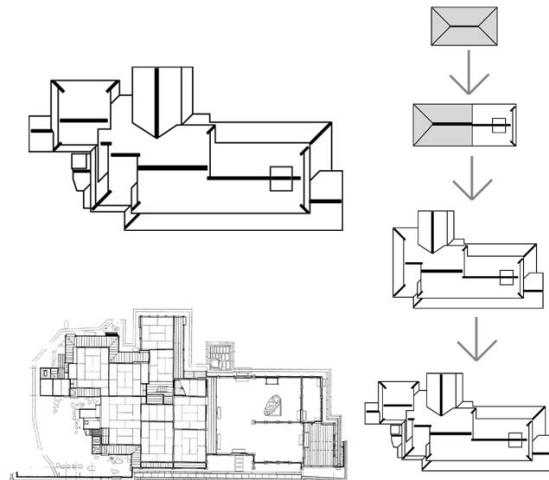


Fig. 141- Former Sugiyama house

The roof evolved to a complex combined form, in a way that practically each room of the house is under a distinct hipped-gabled roof (except for the back *tsuno* room, which has gabled roof). The whole structure is side-entered, and the ridgepoles are all parallel (except for the back *tsuno* ridgepole). It faces south and the *kamite* is on its west side. It was restored in 1983.

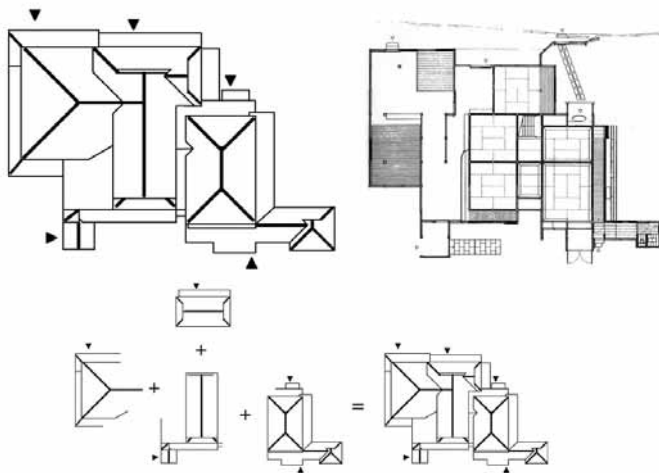


Fig. 142- Shimomura house

The store part of the house was built in 1898, when Kojin's father went bankrupt and the house was sold. Therefore the house is composed of these three functionally different spaces, each of them with an independent tiled roof. The service space is side-entered and has a hipped roof. The informal space (*chanoma*) is composed of two hipped-gabled roofs, at a right angle to each other: the side-entered *maenoma*'s roof and the

Shimomura house was built during the Meiji period in Saga prefecture. This house was where the poet, Shimamura Kojin was born and spent part of his childhood. The house is composed of a *chanoma*, *zashiki* and a store (*mise*) space. The *chanoma* building dates from before 1824, and was later moved the present site, when the *zashiki* was newly built. The

gable-entered *chanoma* and *nando's* roof. The formal space (*zashiki*) is gable-entered and has a hipped roof. In conclusion this complex roof situation is a consequence of the reutilization of an older building structure and the addition of new spaces. The house faces east and the *kamite* is on its south side.

Hosokawa house was built in 1860, in Kumamoto prefecture. Originally this house was a *sugoya* (single ridgepole) and had a shingled hipped roof. Later it was reformed into a tiled (*sangawara*) roof, and the other structures were added. Here again each space of the house is under a distinct roof structure. Most of these roofs are gabled, except for the *shumatsukaku* rooms (formal rooms) and the front side of the tearoom, which have a hipped roof. The house faces west and the *kamite* is on its south side.

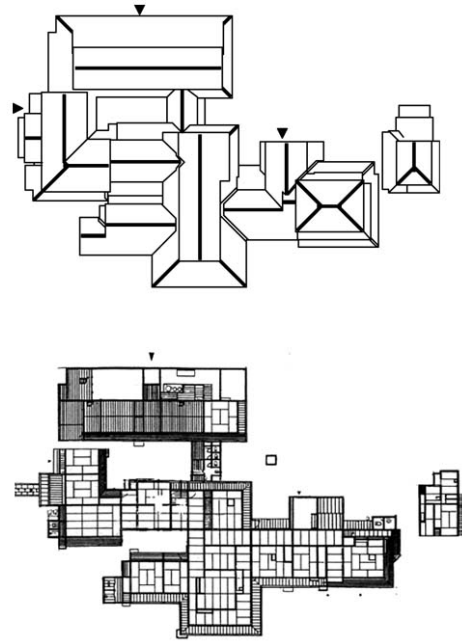


Fig. 143- Hosokawa house

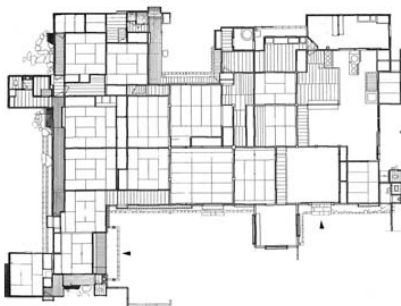
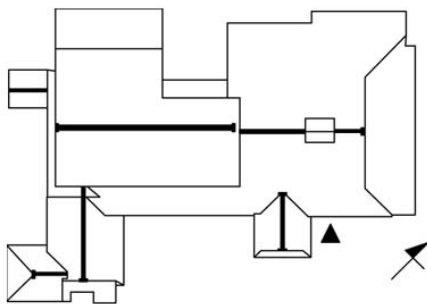
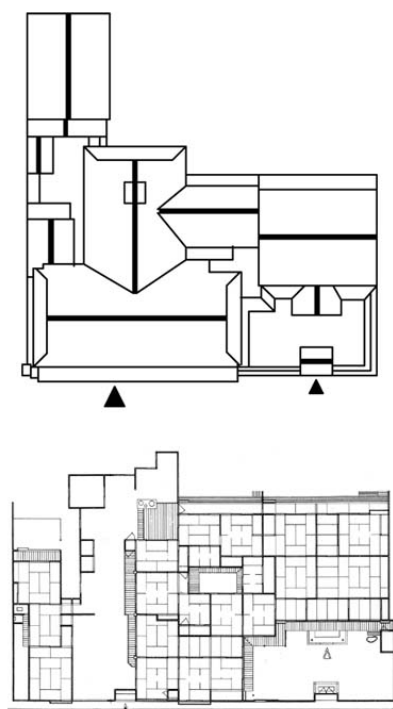


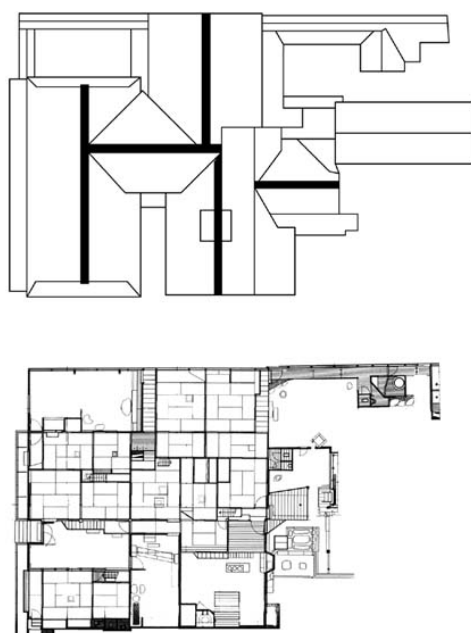
Fig. 144- Kuwahara house 1981.

Kuwahara house was built in 1733 in Gifu prefecture. Formerly this house was a side-entered, thatched *sugoya*. In 1844 the *doma* roofing material changed to tile (*sangawara*). In 1868 the *kamite* part of the house also got a tiled roof, and later the tearoom was added. The house was reformed in a way that each functionally different space had an independent ridgepole. The formal space (the tearoom) has a hipped roof. The entrance is emphasized by a hipped-gabled roof. The informal spaces (*omoya*) have a gabled roof, while the service space (*doma*) has a hipped-gabled roof. The house faces south and the *kamite* is on its west side. It was restored in

Ishi house (or former *Yakage honjin*) was built at the beginning of the 18th in Okayama prefecture. This building was an official inn for feudal lords during the Edo period. It is composed of four structures: the *mise* (shop), the *daidokoro* (kitchen), the *ishitsu* (living quarters) and the *zashiki* (guests reception rooms). The *mise* building is side-entered and has a tiled (*hongawara*) hipped-gabled roof. This part of the house is the equivalent of the *omoya*, and the floor is part earth-floored and part raised. The *daidokoro* structure is gable-entered, has a hipped-gabled roof, which is connected at a right angle to the back part of the *mise*. The *ishitsu* is side-entered with a gabled roof and protrudes at a right angle from the west side of the *daidokoro*. This structure also works as a connection between the *daikoro* and the *zashiki*. The *zashiki* is side-entered,



and has a gabled roof, with a smaller gabled roof to emphasize the entrance. The *zashiki* was rebuilt in 1832, though the *omoya* reconstruction started 23 years later, in 1855, and was finished in 1881. The house faces north with the *kamite* on its west side. It was restored in 1991.



Takakusa house (or former *Yakage waki-honjin*) was built in 1843 in Okayama prefecture. This house was a supporter facility of the *Yakage honjin*. Thus it was also an inn for feudal lords during the Edo period. It has a tiled (*hongawara*) roof and was built in the *omoteya* style. The *omote* building was rebuilt in 1854. It is side-entered and has a hipped-gabled roof. The floor plan is composed by an earth-floored part (*watari-doma*) in the center part of the building, and on its west side there are the tearoom and the garden, while in its east side

Fig. 146- Takakusa house

there is a *zashiki*. The back parts of the house (*kami-zashiki* and *doma*) are connected to the *omoteya* by a gabled roof structure, which shelter a *tatami* mats floor room, with an *irori* (sunken hearth). The *kami-zashiki* is side-entered and has a gabled roof. This building was the guests' reception quarters. It faces the garden and was rebuilt in 1843. The *doma* has a distinct ridgepole from the *zashiki*. It is also side-entered with a gabled roof and was rebuilt in 1848. There is an independent structure on the east side of the house, which is called *kurazen-zashiki* and was built in 1872. This building is gable-entered and has a combined roof, with its front gable end gabled and the back gable end hipped-gabled. This residence faces south and the *kamite* is on its west side. It was restored in 1986.

In this group of houses the complex roof forms is a consequence of the addition of new spaces to the original structure. Beside this fact we can also identify a clear intention in the design to place each functionally different space –occasionally each room of the house- under distinct roof structures, or at least with a distinct ridgepole. Therefore the roof form is directly related to the spatial organization of the floor plan.

Goto house was built in 1714 in Totori prefecture. This is a city dwelling (*machiya*), although it has a *doma* as large as a farmers' house. The *doma* is gable-entered and has a tiled gabled roof. The informal space (*ishitsubu*) is gable-entered and a tiled gabled roof with an independent ridgepole. Part of the *ishitsubu* has a second floor. The *zashiki* was originally a separate structure, and in 1753 it was rebuilt and connected to the main house,

when the *genkan* was newly built. Each of these parts of the house is gable-entered and has a gabled roof with independent ridgepoles.

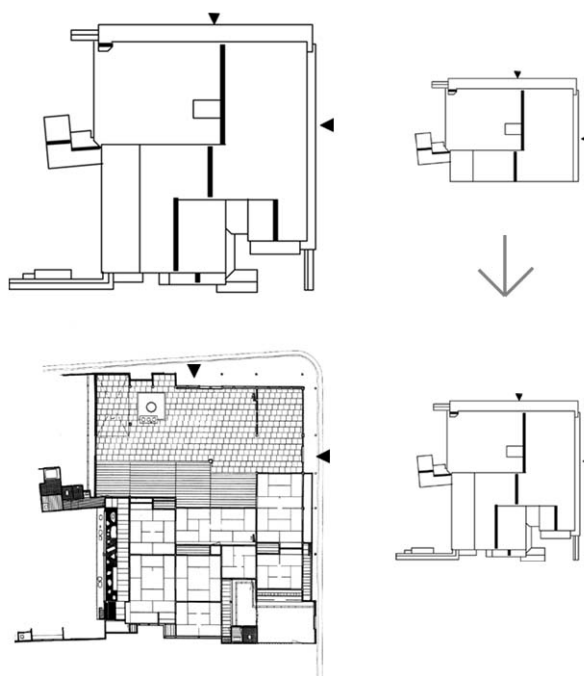


Fig. 147- Goto house

Ogawa house was built at the end of the 18th century in Kyoto city. This *machiya* was an inn for feudal lords during the Edo period. It was built near Nijojo castle. Part of it was reformed during the Taisho period. The house plan is like a labyrinth and consequently it has a very complex roof form. The roof is a combination of gable-entered, tiled gabled roofs. Here again was tried to give an independent ridgepole for each room of the house, resulting in a complex, quite confusing roof plan, and part of it is the product of later alterations.

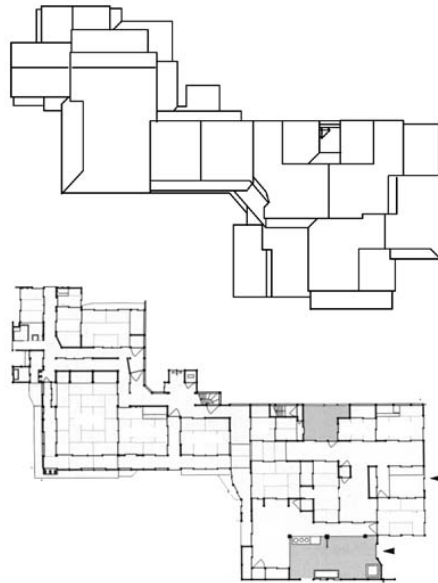
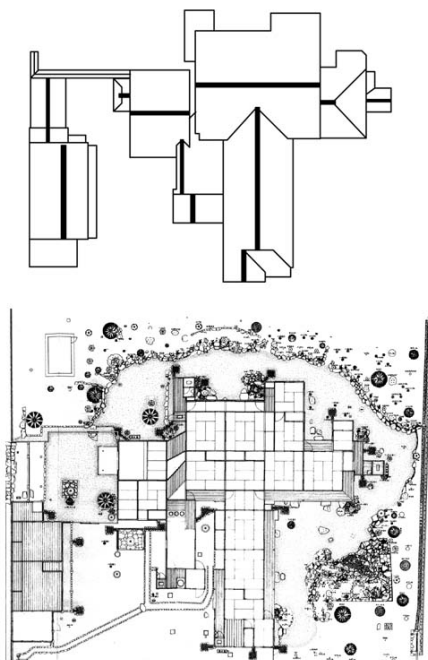


Fig. 148- Ogawa house



Rikisha was built in 1759, inside the Hikone castle's grounds in Shiga prefecture. The original structure was gable-entered and had a tiled gabled roof. To this structure were added a *genkan* building (entrance), a *zashiki* building, a kitchen building (*doma*) and a back *zashiki*. Beside the back *zashiki*, which has a hipped roof, and the entrance hipped-gabled roof, the other structures have a gabled roof. The *genkan* and the main building (*ishitsu*) are gable-entered, while the *zashiki* and the *daidokoro* are side-entered.

Fig. 149- Rikisha

Koan Ogata house was built in 1782 in Osaka prefecture. Originally it was a merchant house (*machiya*), and was reformed in 1843 to house a medical clinic plus a students' dormitory and the Ogata's family quarters. The former house was diminished and transformed in an *omoteya* (front building), where the clinic space was placed in the first floor and the students' dormitory on the second floor. Behind this building were built the kitchen, the family's living quarters, and a *zashiki*. Each of this space has an independent ridgepole. All the structures are side-entered and have gabled roofs.

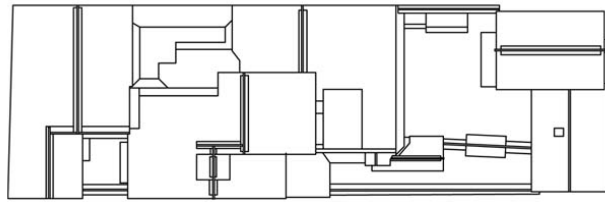


Fig. 150- Ogata house

In this group of *machiya*, despite the site size limitation, we can observe that they went under the same transformation process as the farmers' houses. As the interior space became more functionally divided the roof form became more complex. Each of this new space is placed under an independent ridgepole, and the connection of these gabled roofs results in a very complex roof form.

This group of buildings will be classified as type 3-C. In this type the complex roof forms is consequent of the addition of new spaces to the original structure. There is a clear intention in the design to place each functionally different space: formal, informal and service (occasionally each room of the house) under distinct roof structures, or a distinct ridgepole. Therefore the roof form is directly related to the spatial organization of the floor plan.

IV-3-4 Type 3-D

Kawauchi house was built at the first half of the 18th century in Saga prefecture. This is a *kudo-zukuri* style house of the *ushirotani-gata* type. The *doma* and the stables (service space) are under the same thatched hipped roof. The *zashiki* (formal space) is under a smaller thatched hipped roof, while the *daidokoro* and the *nando* (informal space) are under a hisashi like tiled roof. This is an old example of the *kudo-zukuri* style *minka*. The house has not suffered any significant reform and maintains its original design.

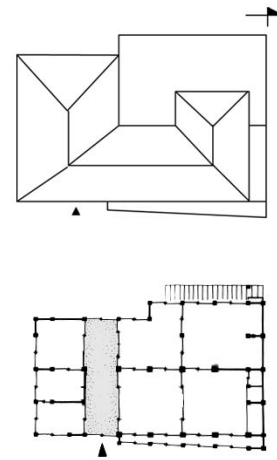
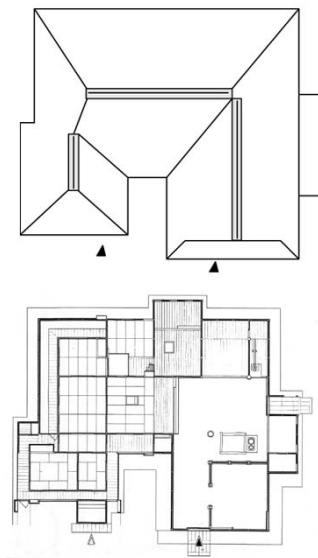


Fig. 151- Kawauchi house



Nara house was built between 1751 and 1764 in Akita prefecture. This is a *ryo-chumon* style house, with two front *chumon* wings, one at the *shimote* side (*doma*) and the other at the *kamite* side (*zashiki*). The house has a thatched roof. The *shimote chumon*, where the main entrance of the house is placed, has a hipped-gabled roof, and its ridgepole is almost at the same height as the *omoya*. The *kami-chumon* has a hipped roof. Both *chumon* protrude at right angle from the front side of the side-entered *omoya*. The house faces east and the *kamite* is on its south side.

Fig. 152- Nara house

Saga house was built during the first half of the 19th century in Akita prefecture. This is also a *ryo-chumon* style house. The main entrance is on the *shimote chumon*, which have a hipped-gabled roof. The *zashiki-chumon* has a hipped-gabled roof and has been rebuilt. The house faces west and the *kamite* is on its north side. It was restored in 1975.

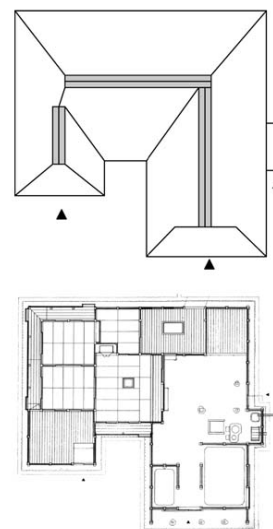


Fig. 153- Saga house

Ogata house was built during the 17th century in Yamagata prefecture. This *ryo-chumon* style house has a *shimote* front *chumon* and a *kamite* back *chumon*. The entrance is placed on the *shimote-chumon*, which has a thatched gabled roof. The back *kamite-chumon* has a thatched hipped roof; it faces the garden and has a *sukiya* style interior design. The *omoya*, from which the *chumon* wings protrude at a right angle, is a side-entered structure. It has a thatched hipped roof. The house faces south and the *kamite* is on its west side. It was restored in 1976.

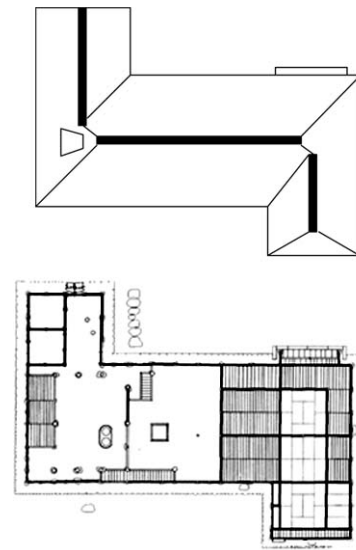


Fig. 154- Ogata house

In this group of houses the *chumon* wings were built simultaneously with the *omoya*. We can see that the space is divided in three functionally different types: formal, informal and service. Each of this space is under a distinct roof.

Ukida house was built in 1828 in Toyama prefecture. The side-entered *omoya* has a thatched hipped roof. The service space protrudes at a right angle from the back side of the *omoya*, in a *tsunoya* style. It has a stone held shingled (*ishioki*) gabled roof. The formal space (*zashiki*) and the tearoom structure, which was added later, is side entered and has a shingled (*kokera*) roof. In this house the different types of spaces are not only differentiated through the roof form, but through the roofing material too. The house faces east and the *kamite* is on its south side. It was restored in 1983.

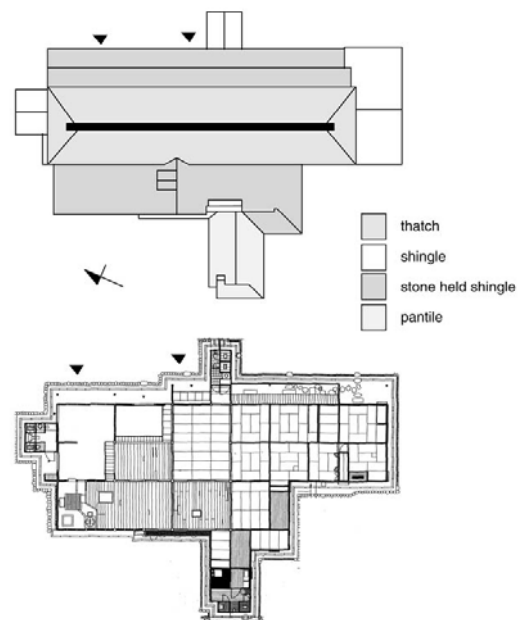


Fig. 155- Ukida house

Hasegawa house was built in 1716 in Niigata prefecture. The house is composed of four structures, which were all built simultaneously. Each of the functionally different spaces -formal, informal and service- is under an independent side-entered thatched hipped roof. A fourth gable-entered hipped roof connects them. The house faces west and the *kamite* is on its north side. It was restored in 1989.

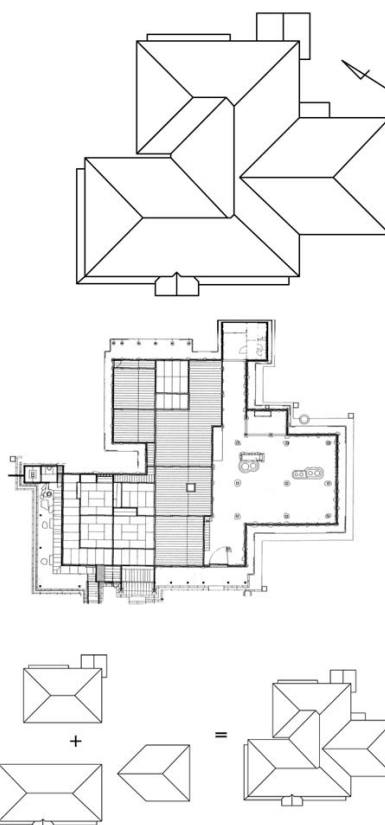


Fig. 156- Hasegawa house

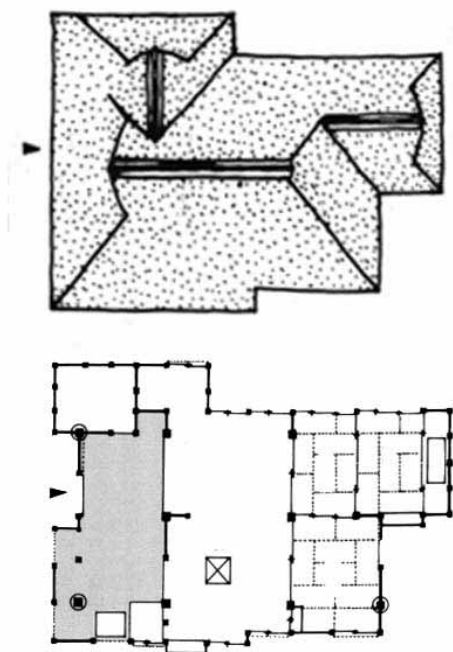


Fig. 157- Tsubokawa house

Tsubokawa house was built during mid 17th century in Fukui prefecture. This is a *tsnoya* type house, though the protruding parts seem to have been built at the same time as the *omoya*. The *omoya* is gable-entered and has a thatched hipped-gabled roof. The service space (stables) has a hipped-gabled roof, and its ridgepole is at a right angle to the *omoya* ridgepole. The formal space (*butsuma* and *zashiki*) has a hipped-gabled roof, and its ridgepole is parallel to the *omoya* ridgepole. The house has a *joya* and a *geya* structure, and the roof truss is of the *sasu-gumi* type. The house faces south and the *kamite* is on its west side. It was restored in 1968

Kamio house was built in 1771 in Oita prefecture. This is a *kagi-ie* style house. It is composed of four combined hipped roofs. The formal space has a raised *tatami* mats floor (*zashiki* and *butsuma*). The informal space has a raised plank floor. The service space has an earth floor and is composed of two

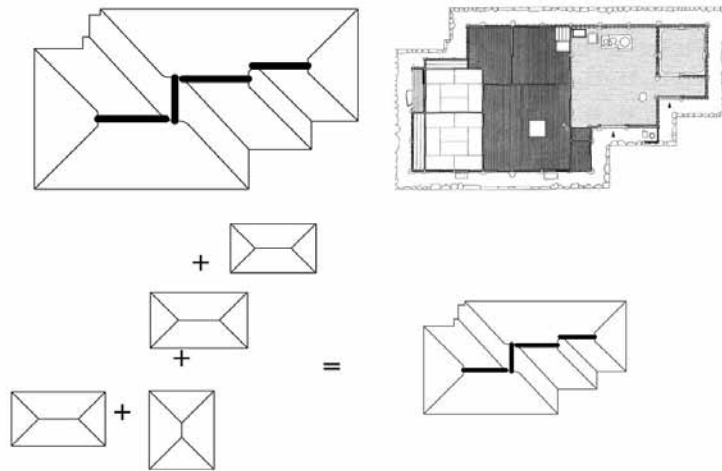


Fig. 158- Kamio house

structures, the *doma* and the stables. The hipped roof of the formal space is at a right angle to the informal space roof, which is at a right angle to the *doma* service space roof. The stables roof ridgepole is parallel to the *doma's* roof ridgepole. This house suffered few alterations, and maintains its original design. The house faces south and the *kamite* is on its west side. It was restored in 1980.

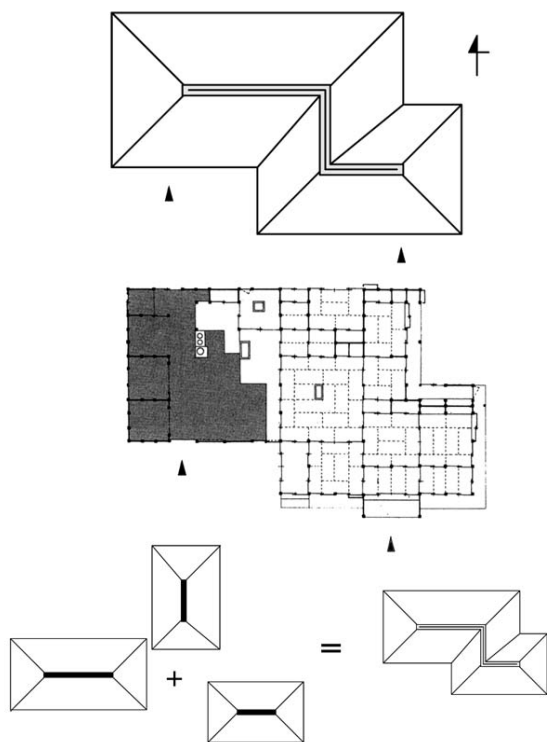


Fig. 159- Okamoto house

Okamoto house was built during the second half of the 18th century in Tochigi prefecture. The roof is composed of three hipped roofs combined. There is one ridgepole for each of the functionally different spaces: formal, informal and service. The formal space ridgepole and the service space ridgepole are parallel to each other, and are connected by the informal space ridgepole, which is at a right angle with them. The house faces south and the *kamite* is on its east side.

Irino house was built in 1836 in Tochigi prefecture. The roof is a combination of three thatched hipped roofs. There is one ridgepole for each of the functionally different spaces: formal, informal and service. The service space ridgepole is at a right angle to the informal space one, which is a bit lower. The formal space ridgepole makes a right angle to the informal, and is much lower than it. The house faces south and the *kamite* is on the east side.

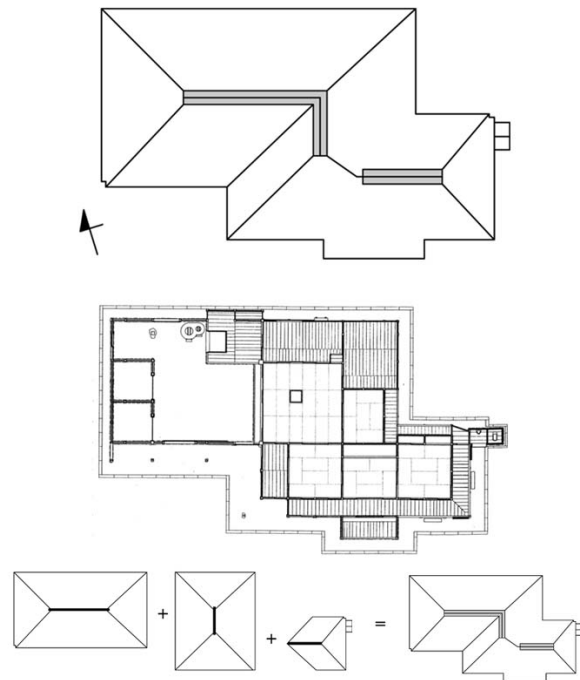
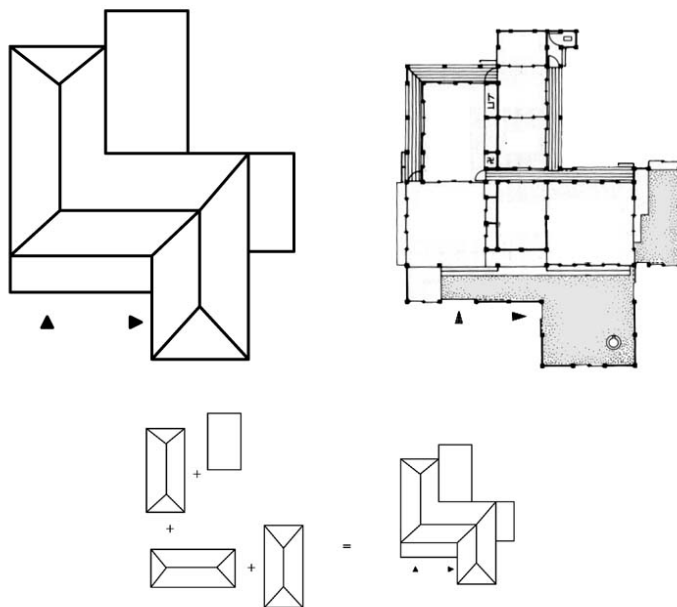


Fig. 160- Irino house

Ota house was built during mid 19th century in Kumamoto prefecture. The roof



is composed of three hipped roofs combined. The informal space (*omoya*) is side-entered. The service space protrudes at a right angle from the front *shimote* side of the *omoya*. The formal space protrudes at a right angle from the back *kamite* side of the *omoya*, and part of this space is under a tiled *hisashi*. The house faces south and the *kamite* is on its west side.

Fig. 161- Ota house

Toshima house was built during mid 17th century, in Ehime prefecture. This house has a *yatsumune* style roof. The roof consists of the combination of three thatched hipped-gabled roofs. Therefore each of the functionally different spaces of the house has a thatched hipped-gabled roof. The service space structure is side-entered and its

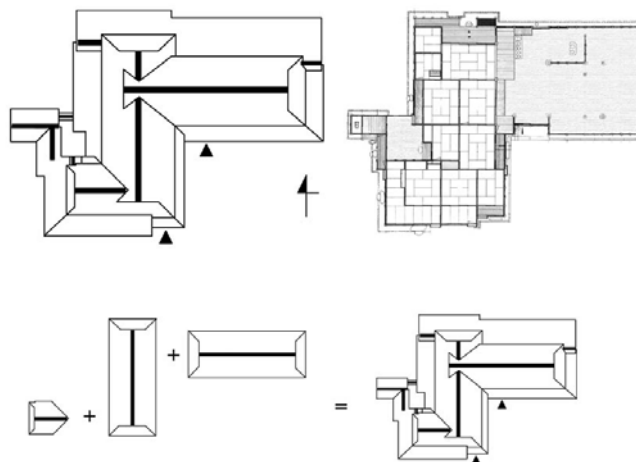


Fig. 162- Toshima house

ridgepole is the highest. The informal space structure is gable-entered; its ridgepole makes a right angle to the service space ridgepole and is lower than it. The formal space structure is side-entered, its ridgepole is at a right angle to the informal service ridgepole, and is the smallest and lowest ridgepole of the whole structures. There is a tiled hisashi all around the house. The house faces south and the *kamite* is on its west side.

Sasakawa house was built in Niigata prefecture. The omote-zashiki construction finished in 1826 while the omoya was finished in 1821, though the date of construction of these buildings differ both were projected simultaneously. The omote-zashiki structure is side entered, and has a thatched hipped roof. The entrance is

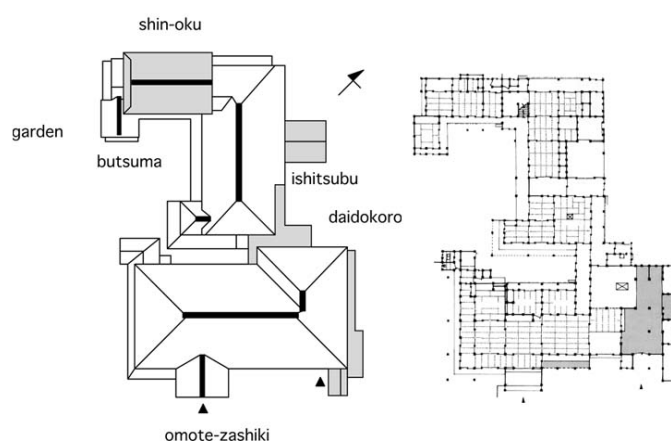
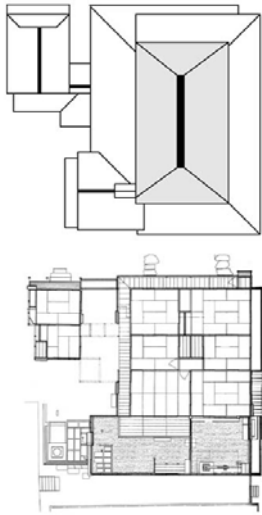


Fig. 163- Sasakawa house

emphasized by a smaller gabled roof. The daidokoro (kitchen) protrudes at a right angle from the back shimote side of the omote-zashiki. The omoya or ishitsubu structure is gable-entered and has a hipped roof. This structure is connected by a hisashi to the daidokoro. Extra formal spacess (shin-oku and butsuma) protrude from the back corner of the ishitsu structure. The shin-oku has two floors. Its roof is tiled and the gable-end that face the garden is hipped-gabled, while the other end is just gabled. Its ridgepole is

at a right angle to the omoya ridgepole. The butsuma has an independent gabled roof and its ridgepole is at a right angle to the shin-oku ridgepole. The house faces south and the kamite is on its west side. It was restored in 1958 and 1977.

Tanaka house



was built in 1865 in Tokushima prefecture. The house is composed of three parts: a doma, an omoya and a tearoom. The doma is the service space. It is a gable-entered structure and has a tiled gabled roof. The omoya is the informal space. It is a side-entered structure and has a thatched hipped roof plus a tiled hisashi. The tearoom is the formal space. It is a gabled-entered structure and has a tiled roof. The gable end of the roof that faces the garden is hipped-gabled, while the other end is just gabled. This house has suffered few alterations, such as augmentation of the hisashi, though it maintains its original design. It faces north and has the kamite on its east side, where is the garden.

Fig. 164- Tanaka house

Kokian and its gardens were built in Odawara, Kanagawa prefecture, in 1909 by Yamagata Aritomo. However the building was completely destroyed during the Great Kanto Earthquake in 1923. Therefore most of the present structure dates from 1939, and was projected by the architect Moriyama Matsunosuke. This house has a very complex roof form, which combine hipped, gabled and hipped-gabled roof. The house was designed in a manner so that practically each room of the house is under a distinct roof.

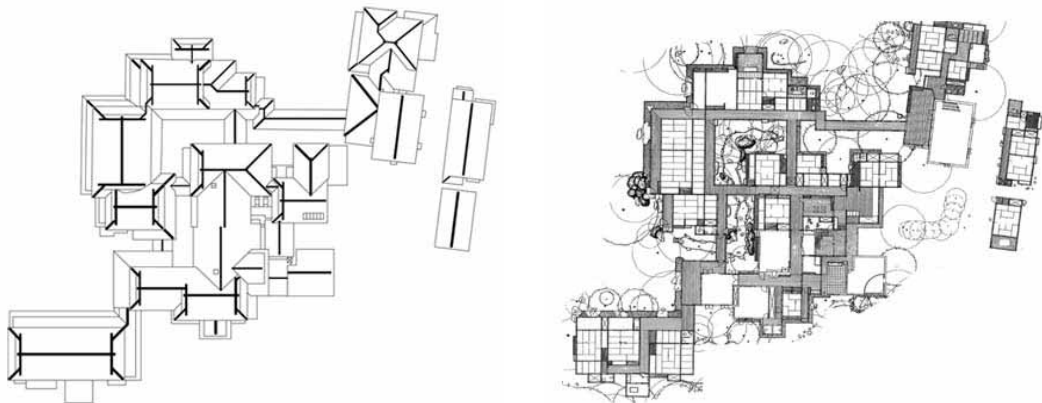


Fig. 165- Kokian house

In this group of houses we can see

that the roof form is clearly related to the spatial organization of the floor plan. There is three defined type of spaces- formal, informal and service. The roof form results from the combination of the roofs of each space.

Shupukan or Rai house was built in 1855 in Hiroshima prefecture. This *machiya* roof form is the consequence of combining three of tiled gabled roofs. There are three ridgepoles one for each of the functionally different spaces of the house. The formal space is divided under two ridgepoles, one for a tearoom and a *zashiki*, other for another *zashiki*. The third ridgepole is for the informal space of the *omoya*. The service space is under a *hisashi* that was added in the front *shimote* side of the *omoya*. The house faces north and the *kamite* is on its east side. There is a garden on the back (south) side of the house. It was restored in 1997.

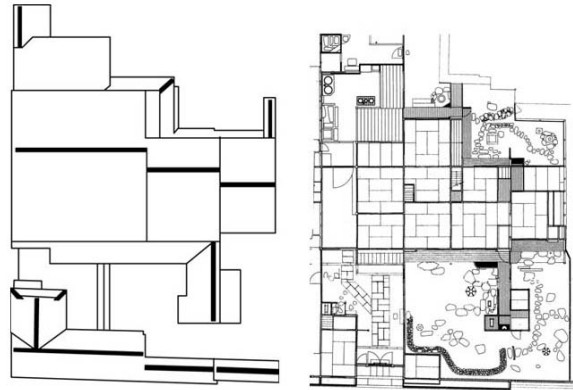


Fig. 166- Shunpukan



Fig. 167- Fukokan

and has a hipped-gabled roof. The informal space (*omoya*) and the service space (*doma*) are placed on the back part of the site. This is a side-entered structure with a gabled roof. The *genkan* (entrance) is gable entered and is at a right angle with the other two structures connecting them.

Fukokan or Rai house was built in 1859 in Hiroshima prefecture. This *machiya* and the Shunpukan belong to the same family, although the design of both houses differs in many aspects. The Fukokan was built in the *omoteya* style. The *omoteya* building shelters the formal space. It is side-entered

In this group of *machiya* we can see that, since the site are was limited, was not

possible to give a separated roof to each of the functionally different space. However the different kind of spaces were expressed in the roof form through giving each of them an independent ridgepole.

Shokin-tei, it is the oldest of the *Katsura* tea ceremony pavilion. Its roof is composed of four roofs. A thatched hipped and gabled roof that shelter the rooms 1 and 2, while a thatched gabled roof that shelters the anteroom and has its ridgepole at a right angle to the main roof. The tea-ceremony room is under a wood shingled roof, while the service space is under a tiled (*katanagare*) roof.

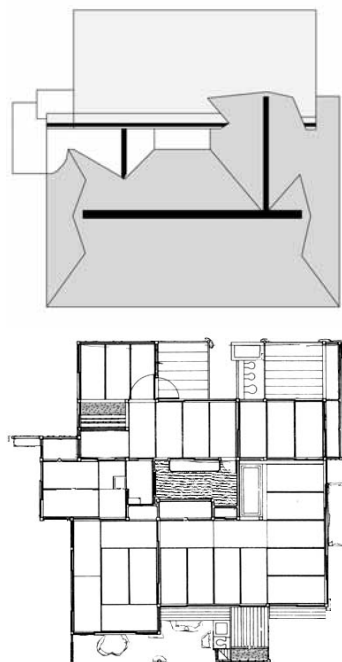
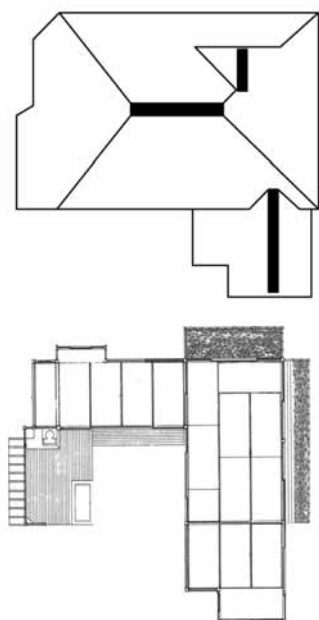


Fig. 168- Shokin-tei



The *Geparro*'s roof is composed by three kinds of roofs: a hipped roof, a hipped and gabled roof and a gabled roof. The hipped roof shelters the room 1 and the food preparation zone. The room 2 has a hipped and gabled roof, however, since it was combined to the room 1 roof, just one of its gable and can be identified. The entrance is sheltered under a distinct gabled roof.

Fig. 169- Geparo

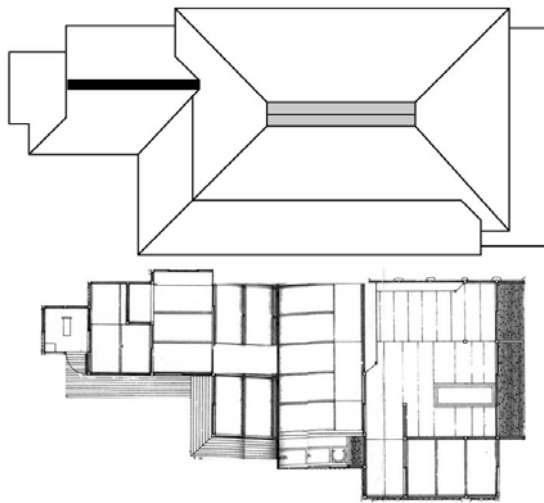


Fig. 170- Shoin-ken

The *Shoin-ken* is the newest of the three teahouses at *Katsura*. It has the simplest roof composition: a thatched hipped roof plus a shingled partially hipped and gabled roof. The thatched roof shelter the rooms 2 and 3, and the food preparation zone. The shingled roof shelters the room 1, which has a *shoin* window desk, and the toilet. This roof front corner is hipped and gabled while its back part is just gabled.

Rishukaku is thought to have been built in 1649 in Wakayama prefecture. At the end of the 19th century it was both by Sankei Hara and was moved to the Sankei garden, in Yokohama, Kanagawa prefecture. This building was a *Chaya*, and was reserved to the reception and entertainment of guests. It seems that it was designed to fit the original site landscape, and that originally the roof was tiled. Actually the building has a shingled hipped-gabled roof. The service space (toilets and kitchen) has distinct roofs. Since the building function is to receive guests, all the spaces beside the service are formal and there is no informal spaces. However the building is divided in 4 spaces. The space A is a two store structure and has a hipped roof. The space B has a *tatami* mat floored *zashiki* with a *tokonoma*, and the roof is hipped-gabled. The space C is composed by two *tatami* mats rooms, which don't have a *tokonoma*, and the roof is hipped-gabled. The space D has four rooms with *tatami* mats floor and the roof is hipped and gabled. These roofs are connected to each other at a right angle. It was restored in 1978.

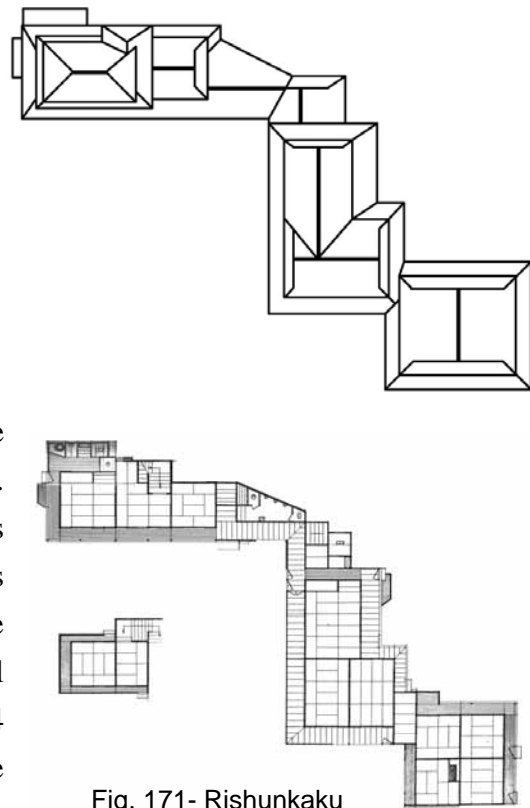


Fig. 171- Rishukaku

Kiriso was built at the beginning of the 18th century in Kagawa prefecture. Originally it was a teahouse (*chaya*) of the Matsuhira clan. In 1875 the building and its gardens became a municipal garden. The structure has several *zashiki* and tearooms. The roof is composed of six shingled hipped roofs connected at a right angle.

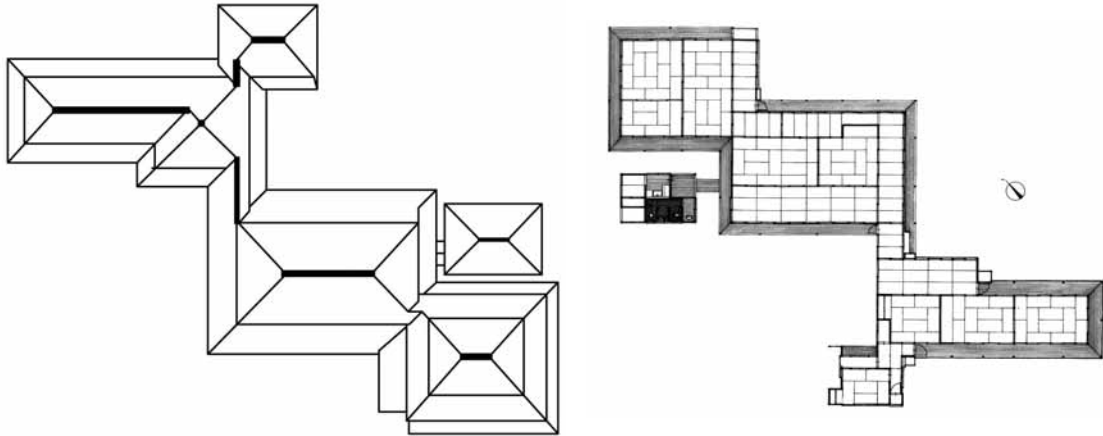


Fig. 172- Kuriso

In these teahouses (*chaya*, *chashitsu*), the functional difference of the spaces is not as clear as in the residential buildings. The service space can be identified, but instead of formal and informal spaces there are various formal spaces. However each of these formal space has a distinct roof. The roof design was used to characterize each these spaces. For example the roof distinguish the *zashiki* with *tokonoma* from the *zashiki* with out *tokonoma*.

Resuming, the type 3 consists of houses in which the servant (*doma*) space and the served (raised floor part) space, which is divided in an informal and a formal space have a distinct roof form. In this type 3 we can identify four kinds of design processes. The type A consists of sheltering the functionally different spaces under independent roof structure. In the type B the roof form is a consequence of unifying the original independent roof structures. The type C, the roof form results from the addition of new spaces in the former structure. The type D consists of houses that have a distinct ridgepole for each of the three different types of spaces. Despite its complex roof form the D type house has not suffered any alteration, maintaining its original form. The houses of this type are usually newer than the ones from the other three types.


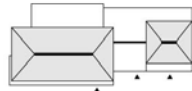
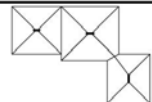
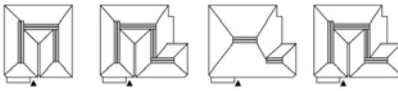
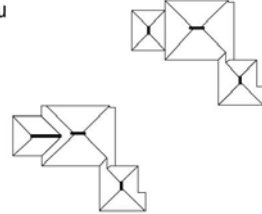
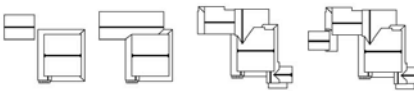


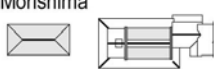
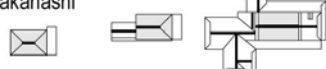
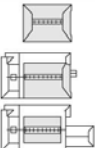
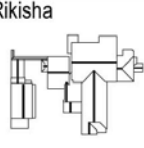
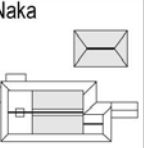
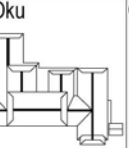

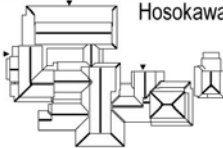
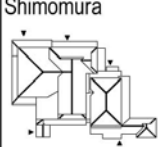

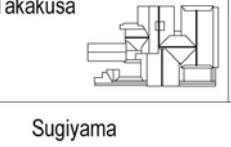
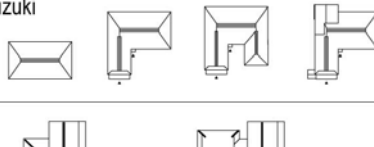
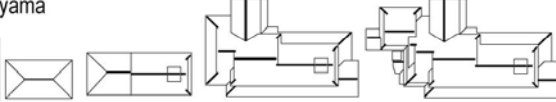
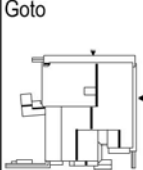
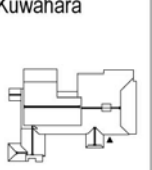
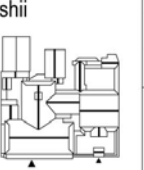
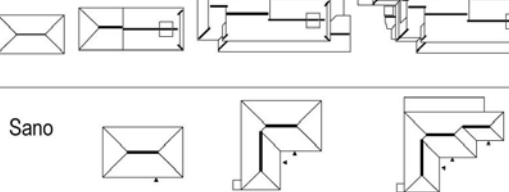
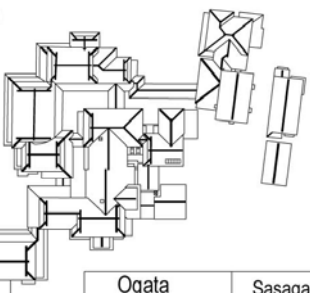


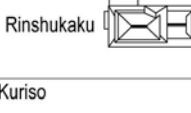
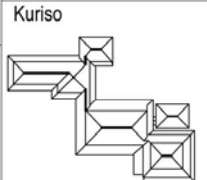
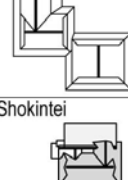
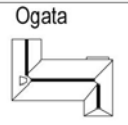
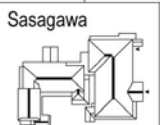

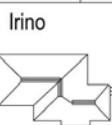
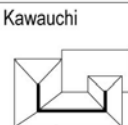
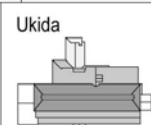


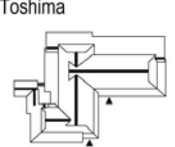
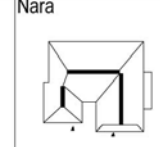


A	Kedoin 		Nakamura 					
	Yawata 	Mekaru 						
B	Kurozawa 							
	Yoshimura 	Taniguchi 	Morishima 					
C	Takahashi 	Fujita 	Rikisha 	Naka 	Oku 	Ogata 	Hosokawa 	
	Shimomura 	Ogawa 	Takakusa 	Suzuki 	Sugiyama 			
	Goto 	Kuwahara 	Ishii 	Sano 				
	D	Kokian 	Kamio 	Tsubokawa 	Rinshukaku 	Kuriso 		Shokintei 
		Ogata 	Sasagawa 	Ota 	Irino 	Kawauchi 	Ukida 	
		Fukokan 	Shunpukan 	Toshima 	Nara 	Saga 	Okamoto 	

Fig. 173- Type 3 comparative table

In conclusion, we can establish a relation between the roof forms and the spatial organization of the plan. In the simplest cases the roof design is used to mark the main entrance, while in the most complex cases there is an independent roof structure for each room of the house.

In this analysis was possible to identify three types of division of the interior space. In the type 1 the space is divided into a served space and a servant space. In type 2 the space is divided into a formal space and an informal space. In type 3 the space is divided in a formal space, an informal space and a service space.

We also observed that in each of these spatial organization types four kinds of design process were used. The process A consists of sheltering the spaces under completely independent roof structures. In the process B the spaces, which originally were sheltered under completely independent roof structures, were unified into a single structure. The process C consists of adding spaces to the original structure. Finally in the process D the roof was intentionally designed to characterize each space.

Consequently combining the spatial organization types to the different kinds of design processes:

Type 1-A: the space is divided into a served space and a servant space, and these spaces are sheltered under completely independent roof structures.

Type 1-B: the space is divided into a served space and a servant space, which originally were sheltered under completely independent roof structures, were unified into a single structure

Type 1-C: the space is divided into a served space and a servant space, which is a consequence of the addition of spaces to the original structure.

Type 1-D: the space is divided into a served space and a servant space, and the roof was intentionally designed to characterize each space.

Type 2-A: the space is divided into a formal space and an informal space, and these spaces are sheltered under completely independent roof structures.

Type 2-B: the space is divided into a formal space and an informal space, which originally were sheltered under completely independent roof structures, were unified into a single structure.

Type 2-C: the space is divided into a formal space and an informal space, which is a consequence of the addition of spaces to the original structure.

Type 2-D: the space is divided into a formal space and an informal space, and the roof was intentionally designed to characterize each space.

Type 3-A: the space is divided in a formal space, an informal space and a service space, and these spaces are sheltered under completely independent roof structures.

Type 3-B: the space is divided in a formal space, an informal space and a service space, which originally were sheltered under completely independent roof structures, were unified into a single structure.

Type 3-C: the space is divided in a formal space, an informal space and a service space, which is a consequence of the addition of spaces to the original structure.

Type 3-D: the space is divided in a formal space, an informal space and a service space, and the roof was intentionally designed to characterize each space.

Roof Typology and Composition

	Type 1- Service space and Servant space	Type 2- Formal space and Informal space	Type 3- Formal space, Informal space and Service space
A	Mochizuki 	Ogata 	Ota
	Nikaido 	Kuroki 	Ishikura
B	Yokoji 	Matsumoto 	Uezu
	Sakuta 	Kuwahara 	Kusanagi
C	Kikuchi 	Subara 	Ichinoe
	Inukai 	Wagatsuma 	Hayashi
D	Itsukushima shrine 	Oyama 	Yamada
	Kudo 	Tobita 	Yamaguchi

V- The Hierarchy of the Spaces and the Roof Design

We observed in chapter III that the developed plan form of a *minka* has three types of spaces: service space (*doma*), informal space (*hiroma* and *nando*) and a formal space (*zashiki*). The service space is an indoor space for far tasks; the informal space is the daily living space; and the formal space is reserved for the reception of guests (*zashiki*). This spatial differentiation created a hierarchical axis in the plan. The upper end, or *kamite* , is where the formal spaces are placed and the lower end or *shimote* is where the service spaces are placed. Therefore there is a hierarchy between the different spaces, in which the formal spaces are ranked higher than the informal spaces, and the service spaces are the lowest in the ranking.

In this chapter we will analyze the relation between the hierarchy of the spaces with the roof form and the roofing materials.

Katsura Rikyu Imperial villa belonged to the Hachijo-no-mia Imperial Family. The old *shoin* was the first of the palace sections to have been built. It is oriented southeast and the gable faces the same direction. In its original form the old *shoin* was a complete functioning residential unit. It has a cypress-shingle, hipped-gabled roof, slightly curved. The gable design style is called *kitsune-goshi* or fox lattice. The old *shoin* was built at the beginning of the 17th century and was designed by Prince Toshihito.

The middle *shoin* was an addition made to the old *shoin* at the time of the wedding of the Hachijo Prince Norita, in 1642. This building joins the west side of the old *shoin* and connects directly with the hearth room. The middle *shoin* is orientated south, though it does not face the pond.

The musical instruments room, in which musical instruments were at one time stored, and the new palace were added in, on the occasion of a visit to *Katsura* by the cloistered emperor Gomizu-no-o. The gardens adjacent to these two parts of the building were planned at the same time as the architecture and differ in mood from the more decorative garden spaces of the old and middle *shoins*.¹

The *Katsura* palace roof is composed of cypress-shingled and tiled hipped-gabled roof. The servant quarters' buildings have a tiled roof while the old *shoin*, musical instruments room and the new palace have a cypress-shingled roof. Therefore the servant space and the served space are clearly discriminated by the roofing material. Each of the formal spaces –old *shoin*, middle *shoin*, musical instruments room and new palace- have distinct hipped and gabled roofs because they were not built at the same time. The old *shoin* is the oldest structure and was built at the beginning of the 17th century, while the new palace, which is the newest structure was built at the end of the 18th century. As can observe the complex roof form is a consequence both of separating the formal and informal spaces under different roof structure, of adding new structures.

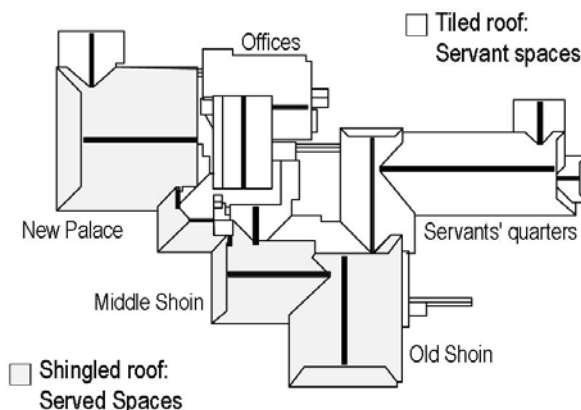


Fig. 174- Katsura Rikyu

¹ Tadashi Yokoyama, Katsura 1983 Shinken-chiku

Katsura Tea Ceremony Pavilions:

Shokin-tei, though later additions may have been made to it, in basic form, it is the oldest of the *Katsura* tea ceremony pavilion. It is an important feature in the view from the old *shoin* and from the *Gepparo*, both of which face it across the pond. All of the spaces on the south side of the building are devoted to cooking, dishwashing and similar tasks. The hipped and gabled main roof is thatched. It is combined in a complicated way with a wood shingled roof over the tea-ceremony room and a tile roof over the spaces for domestic service.²

Therefore the *Shokin-tei* roof is composed of four roofs. A thatched hipped and gabled roof that shelter the Rooms 1 and 2, while a thatched gabled roof that shelters the anteroom and has its ridgepole at a right angle to the main roof. The tea-ceremony room is under a wood shingled roof, while the service space is under a tiled (*katanagare*) roof. Here again the complex roof form is a product of giving different kinds of roof for each of the functionally diverse spaces. These roofs are differentiated through the roofing materials and through the roof form.

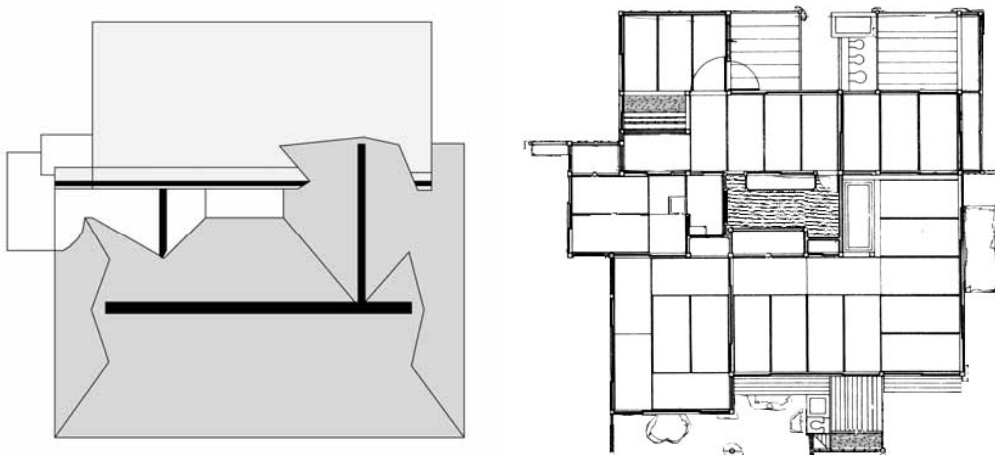


Fig. 175- Shokintei

The *Geparo*, although the whole building has a wood shingled roof, the

² Tadashi Yokoyama, 1983

functionally different spaces have distinct roof forms. The roof is composed by three kinds of roofs: a hipped roof, a hipped and gabled roof and a gabled roof. The hipped roof shelters Room 1 and the food preparation zone. Room 2 has a hipped and gabled roof, however, since it was combined to the Room 1 roof, just one of its ends and can be identified. The entrance is sheltered under a distinct gabled roof.

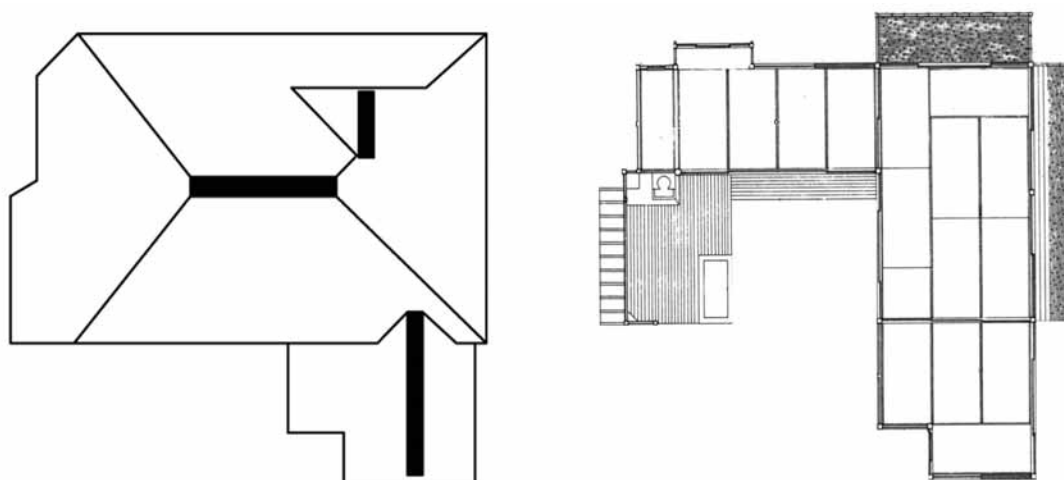


Fig. 176- Geparo

The *Shuoi-ken* is the newest of the three teahouses at *Katsura*. It has the simplest roof composition: a thatched hipped roof plus a shingled partially hipped and gabled roof. The thatched roof shelter the rooms 2 and 3, and the food preparation zone. The shingled roof shelters the room 1, which has a *shoin* window desk, and the toilet. This roof front corner is hipped and gabled while its back part is just gabled.

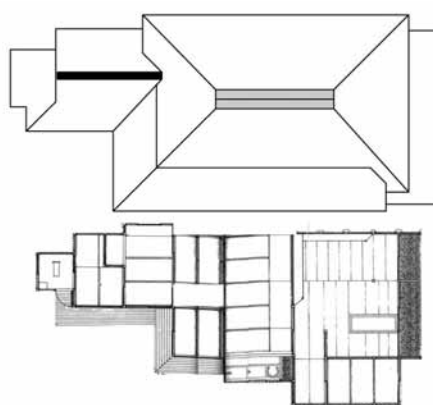


Fig. 177- Shoin-ken

In conclusion, all the buildings at *Katsura* clearly use the design of the roof to express the floor plan different types of spaces and as an element of the landscape view. The main *shoin* structure uses different kind of materials to discriminate the servant

space from the service space. In the teahouses the hierarchy of the spaces is not so strongly expressed, though each functional space has a distinct roof form or uses a different roofing material. Despite this fact, in the teahouses, how they integrate the view from the other structures is also considered in the roof design. For example the *Shokin-tei* 's roof is the most complicated on the side that is visible from the old *shoin* and the *Gepparo*. The same happen to the *Shoin-ken* shingle roof part, which is hipped and gabled only on the front corner of the roof. Since the back corner is not visible it is only gabled.

Yoshimuras house was built at the beginning of the 17th century, in Osaka prefecture. This house has a *yamato-mune* style roof. Originally the *omoya* had a thatched hipped-gabled (*irimoya*) roof. Its exactly date of construction is unsure but the *zashiki* was probably built a little later than the *omoya*. Each of the functionally different spaces has an independent ridgepole, and these ridgepoles are all aligned. The whole structure is side-entered. The *zashiki* has a shingled gabled roof. The *omoya* has a thatched gabled roof and ridgepole is higher than the other structures. The service space has two ridgepoles, one for the *kamaya* and other for the *naya*, and both roofs are tiled hipped-gabled (*irimoya*).

In these house roof design the gabled roof was used in the hierarchically higher spaces (*zashiki* and *omoya*), while the hipped-gabled roof was used in the hierarchically lower spaces (*kamaya*). Different roofing materials were used to characterize each of the spaces. The formal space (*zashiki*), which is the highest space in the rank and has a shingled roof, the informal space (*omoya*), which is the intermediate space in the rank, has a thatched roof, and the service space, which is the lowest space in the rank, has a tiled roof.

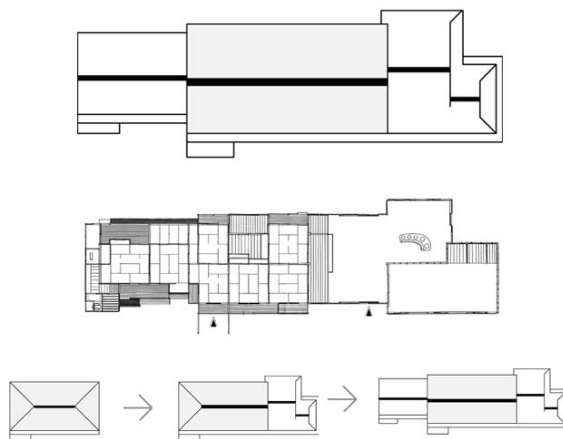


Fig. 178- Yoshimura House

Therefore in this example the hierarchically highest form of roof is the gabled, followed by the hipped-gabled. The hierarchically highest kind of roofing material is shingle, followed by thatch and the lowest kind of roofing material is tile.

Itsukushima shrine was first built in 1168 and has been rebuilt many times after that. It is composed by several structures connected by corridors, in a design that reminds the *shinden* style residences. There are four types of structures: the *haraiden*, the *haiden*, the *heiden* and the *honden* (main hall). There is also a No stage, to smaller shrines and a building called Chozaya. Except for the *honden*, the no-stage and the Daikoku-shrine, which have a gabled roof, all of the other structures have a hipped and gabled roof. All of the roofs are shingled. Therefore from this fact we can see that the gable roof is used on hierarchically higher buildings.

However the Chozaya roof has only its front end hipped and gabled. The back end, which is hidden by the mountain, is just gabled. Here the gable roof has not the hierarchical meaning as the *honden* structures. Since the mountain hides this part of the roof, it was treated as simple as possible.

Therefore the gable roof is at the same time the hierarchically higher form of roof, and for being the simplest form, is used when the roof end is hidden.

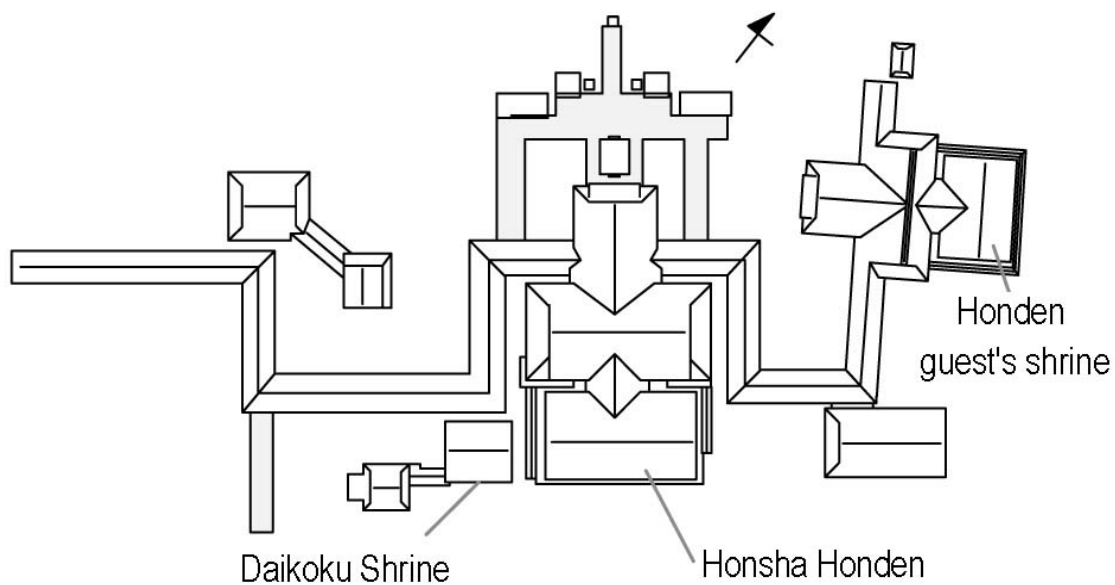


Fig. 179- Itsukushima Shrine

Kokian and its gardens were built in Odawara, Kanagawa prefecture, in 1909

by Yamagata Aritomo. However the building was completely destroyed during the Great Kanto Earthquake in 1923. Therefore most of the present structure dates from 1939, and was projected by the architect Moriyama Matsunosuke. This house has a very complex roof form, which combine hipped, gabled and hipped-gabled roof. The house was designed in a manner so that practically each room of the house is under a distinct roof.

The house is composed of several rooms, and the roof has a complex design. The entrance (1) has a hipped-gabled roof. The waiting room (2) has a hipped roof, which was combined with the inner entrance hipped-gabled roof (3). These structures are connected by a corridor to the storehouse and the butler's quarter (4 and 5). The storehouse structure is constituted of a plank floored front storehouse, which has a hipped roof, and an earth floored storehouse which have a gabled roof (7). The butler's quarters is composed of two 6 *tatami* mat floored rooms, with a hipped roof (4); a plank floored room with a distinct hipped roof (5) combined at a right angle to the former room's roof, and a 4.5 *tatami* mat floored room which has a gabled roof (6). Behind these buildings there are two independent structures, servants' quarters and storehouses and each of them has a gabled roof (7).

Back to the main entrance there is another corridor that connects the inner entrance to the *washitsu* B and C. The *washitsu* B has a hipped-gabled roof (17) and the *washitsu* C has a hipped roof (10). Behind these rooms and connected at a right angle to them there are the *washitsu* A and the dining room (12), with a distinct ridgepole for each of them. A corridor links the *washitsu* C to the kitchen, which has its roof's front end hipped-gabled and its roof back end gabled (9). On the back at a right angle to the kitchen ridgepole there is a servants' room, which have a hipped roof (8).

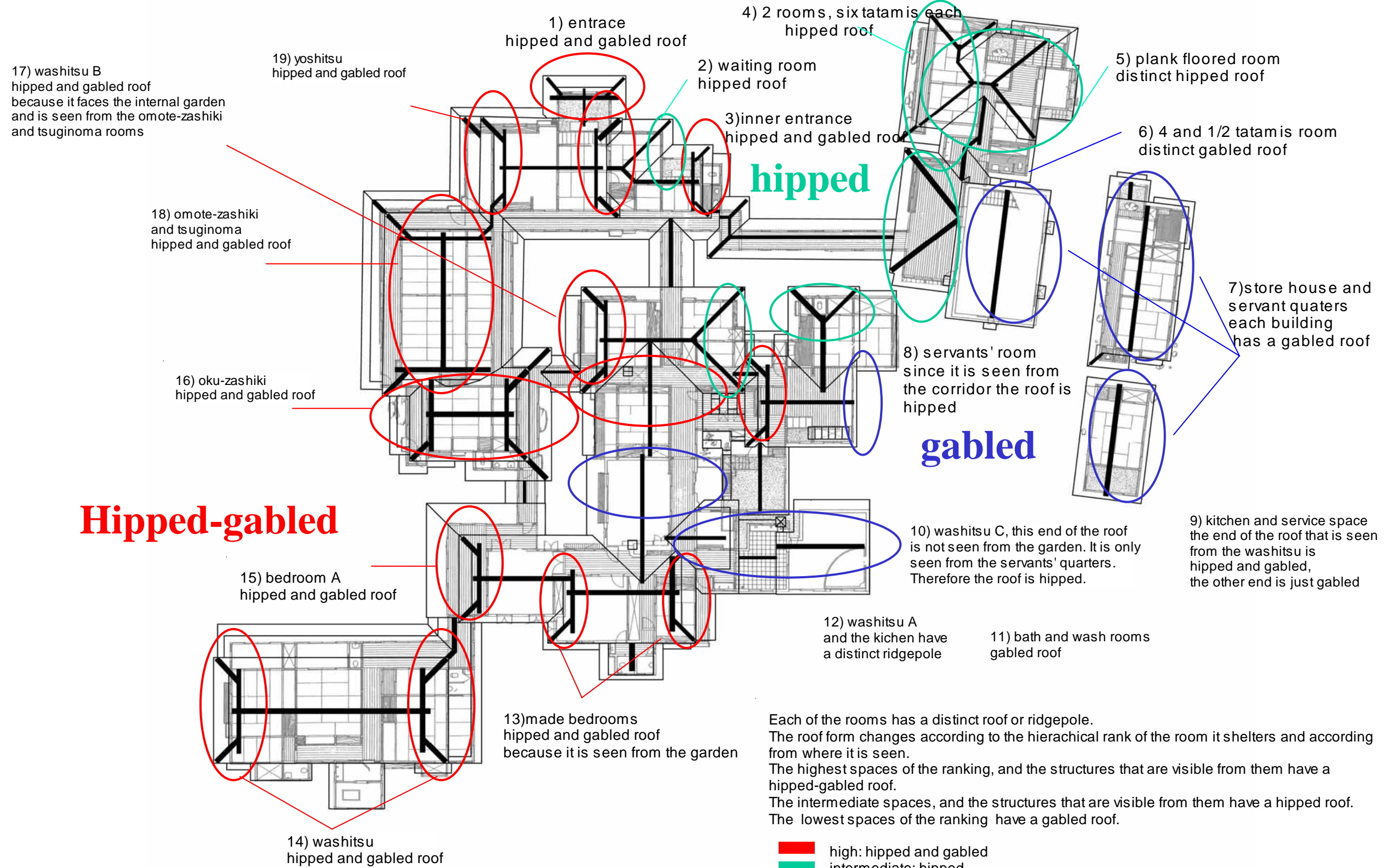
The main entrance is connected to a western style room, *yoshitsu*, which have a hipped-gabled roof (19). This structure south side is connected at the eaves corner of this room and with its ridgepole at a right angle to it there are the *tsugi-no-ma* and the *omote-zashiki* which are both under the same hipped-gabled roof (18). The *oku-zashiki* (16) has a hipped-gabled roof and its ridgepole make a right angle to the *omote-zashiki* ridgepole. One of its sides is connected to the *omote-zashiki* and the other side is connected by a corridor to the bedroom A, which has a hipped-gabled roof (15). The bedroom A has its ridgepole parallel to the bedroom B, which is under the same hipped-gabled roof as the maid's room (13). The maid's room is connected, at a right angle, to the dining room, and to the wash rooms, changing room and bathroom, each of these rooms has a distinct gabled roof (11). A corridor links the bedroom A to a hipped-gabled structure, which shelter three *washitsu* rooms (14).

We can perceive that the house was designed in a manner that practically each of

its rooms has a distinct roof or a distinct ridgepole. The south side of the house shelters the served space and the north side of the house is the servant space. We can identify three different kinds of spaces. In this hierarchical system the *zashiki*, the *washitsu* and the bedroom are the highest space. The waiting room and the butler's quarter are the intermediate space and the servant quarters, kitchen, bathrooms, storehouses, machine room, are the lowest spaces in the ranking. We can observe that all the highest spaces have a hipped-gabled roof, the intermediate spaces have a hipped roof and the lowest spaces have a gabled roof.

There are some exceptions to this rule, as the *washitsu A*, which differ from the *washitsu C*, and instead of a hipped roof has a hipped-gabled roof. The maid's room, whereas it is a service space, instead of a gabled roof has a hipped-gabled roof. The same occurred to the kitchen, which has one end of the roof hipped-gabled and the other end gabled, and the servants' room, connected to the kitchen, which instead of a gabled roof has a hipped roof. Here we can notice that the *washitsu B* roof hipped-gabled end is visible from the *omote-zashiki*, and integrate the view from this room (17). The same happened to the kitchen's roof, which the hipped-gabled end is the one visible from the *washitsu A*, while the other end that is not visible is gabled (9). The servant's room that has a hipped roof, is visible from the corridor that link the inner entrance to the butler's quarter (8).

In conclusion the highest spaces of this hierarchical system have a hipped-gabled roof, and the roof of the rooms that are visible or integrate the view from these spaces also have a hipped-gabled roof. The same happens with the intermediate spaces, which have a hipped roof, and the hierarchically lower rooms visible from these spaces also get a hipped roof.



From these examples we can observe that the roofing materials and the roof form are used to discriminate the spaces. There are three hierarchical systems, one involving the different kinds of roofing materials and two involving the different roof forms.

In the roofing materials hierarchical system the highest material of the rank is shingle, followed by thatch, and the lowest material of the rank is tile.

In the roof forms we can identify two different hierarchical systems. In the first one the hierarchically highest spaces have a gabled roof, then the second has a hipped and gabled roof and the hierarchically lowest spaces have a hipped roof. The second system the hierarchy goes from the most complicated form to the simplest. Consequently the hierarchically highest form is the hipped and gabled, followed by the hipped and the hierarchically lowest is the gabled.

「奈良時代の言葉に、真屋と東屋というのがある。いずれも屋根の形を表す語で、マヤは切妻造、アズマヤは寄棟あるいは入母屋のことである。マヤは文字通り「本当の」という意味で、東屋は東国風のということであり、都風のものに対して田舎風の意味である。これは要するに、屋根の形そのものを指した言葉ではなく、その形のもとを示し、また価値評価を示す言葉である。仏教建築では入母屋や寄棟は金堂その他の立派な建物に用いられ、切妻は門その他の程度の低いものに用いられている。しかし仏教建築以前、古墳時代には切妻（マヤ）の方が立派な屋根だった。これは神社建築を見れば、神社本殿には寄棟のものは全くなく、入母屋も後世のものにあるだけで、一般的な本殿形式は切妻造りである。」¹

Considering this first system may be related to the prehistoric dwellings roof form. There are two types of prehistoric buildings, the gabled roof one which was used as a treasure house and the hipped roof building which was used as a residence. If we consider that the hipped and gabled roof derives from adding hisashi around the gabled roof, it is very logical that the highest form would be the gabled roof, the second the hipped and gabled and the lowest the hipped roof.

The second system may be related to the influence of Buddhist architecture. However in this system the most complicated form is the highest (hipped-gabled) and the simplest is the lowest. Therefore this system may also come from the simple idea that a more complicated roof form looks more luxury than a simpler form.

¹ 1983、太田博太郎 p147、148

Conclusion:

Considering these facts it is clear that the design of the roof is used to emphasize and to discriminate the functionally different spaces in the building. In the simplest case the roof design is used to mark the main entrance of the building, while in the most complex case there is an independent roof structure for each room of the house.

As we have seen, in chapter IV the functional division of the interior space is expressed in the roof design. There are three types of division of the interior space. In type 1, the space is divided in a served space and a servant space. In type 2, the space is divided into a formal space and an informal space. In type 3, the space is divided into three functionally different spaces, a formal space, an informal space and a service space. In each of these spatial organization types four kind of design process were used:

- A) Spaces are sheltered under completely independent roof structures.
- B) Spaces, which originally were shelter under completely independent roof structures, were later unified into a single structure.
- C) Spaces were added during the reforms the building went under.
- D) The building's roof was intentionally designed to characterize each space.

Therefore the different roof forms and roofing materials are used to characterize each of the functionally different spaces. As the floor plan becomes more functionally divided, the roof composition becomes more complex.

There exist a hierarchy between functionally different spaces. The formal space, which is reserved for the reception of guests, is hierarchically higher than the informal space. The informal space includes the bedrooms and living rooms (raised *tatami* mat or plank floor) and is hierarchically higher than the service space (kitchen etc.), which usually have an earthen floor. The hierarchical level of each of these different spaces is expressed through the roof form. There are two hierarchical systems used in the roof forms.

In the first system the gabled roof is the hierarchically highest, followed by the hipped-gabled roof, and the hipped roof, which is the lowest. This fact may in some extent be related with prehistoric dwellings. As mentioned in chapter II-1, there are two types of prehistoric buildings, the *tateana-jukyō*, which has a hipped roof and is earth floored; and the *takayuka-jukyū*, which has a gabled roof and a raised floor. This prehistoric architecture is thought to have been the prototype form for Japanese domestic architecture. The *takayuka-jukyū* type was used as a treasury house, and consequently was hierarchically higher than the *tateana-jukyū*, which was used as a

dwelling. Thus we can conclude that the gabled roof is hierarchically higher than the hipped roof. The fact that the gabled roof has been used in shrine architecture whereas the hipped roof has not been used reconfirm this theory. As mentioned in chapter I the hipped-gabled roof result from the addition of *hisashis* around the gabled roof, therefore it derives from the gabled roof. Since the hipped roof has a humbler origin it is consequently the lowest form. Itsukushima shrine illustrates this system. In this complex several halls are connected by corridors, and all the halls have a hipped-gabled roof, except for the main halls (*honden*), which have a gabled roof. The hipped form is not used at all.

In the second hierarchical system the highest form of roof is the most complex one, while the lowest form is the simplest. Therefore in this system the hierarchically highest form is the hipped-gabled roof and the lowest is the gabled roof. The origin of this system may be related with the influence of Buddhist architecture, in which the main buildings (*butsuden*, *kondo*, *hato*) have hipped or hipped-gabled roofs while the secondary structures (gates, storehouses etc.) have a gabled roof.

A similar hierarchical system can be identified through the roofing materials. The hierarchically highest roofing material is the shingle, followed by the thatch and the lowest is the tile. We have seen in chapter V that in some examples of the *yamato-mune* style house, the formal rooms have a shingled roof, the informal space has a thatched roof, while the service space has a tiled roof. This system is also clear in the Katsura Rikyu teahouse *Shokintei*, in which the tearooms have a shingled roof, the two *zashiki* rooms have a thatched roof, while the service space (kitchen) has a tiled roof.

Another important fact that is taken in consideration in the roof design is how this roof integrates the view from the garden and from the main spaces. A good example illustrating this point is the building called *Kokian*, analyzed in chapter V. This building was designed in a manner so that a distinct roof form characterizes each of the functionally different spaces. The formal rooms (*washitsu* and *yoshitsu*) have a hipped-gabled roof. The informal spaces have a hipped roof and the service spaces have a gabled roof. All of the roofs are tiled. However when a service space integrates the view from the garden or from a formal room, instead of a gabled roof it has a hipped-and gable roof. The same happens when it integrates the view from an informal space, instead of gabled the roof is hipped. The roof form is used to characterize each of the different spaces of the building and at the same time it makes part of the landscape.

Therefore the complex roof form in Japanese traditional architecture is a consequence both of using the design of the roof to distinguish the different spaces of the building, and of using the roof as an element of the landscape design. The concept of

sheltering different spaces under different roof structures has a long history in Japanese architecture. It goes back to the *Shinden* style residences, which had each room of the complex under an independent roof structure.