ARRANGEMENT AND TERMINOLOGY OF THE MAIN STRUCTURAL
MEMBERS OF THE UNDERSTRUCTURE
IN JAPANESE AND BRITISH VERNACULAR HOUSES

Comparative studies in the terminology of traditional timber construction Part 2

日本とイギリスの民家における軸部主要部材の配置と用語法

伝統木造用語に関する比較研究 その2

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This study aims to identify the semantic range and differences in terms for the main structural members of vernacular timber houses in Japan and Britain, focusing on the understructure. Analysis of terms in glossaries and publications identified key characteristics of arrangement and terminology. The terminology of posts (*hashira*) and plates (*keta*) varies depending on the nave (*jo*)-aisle (*geya*) arrangement. Due to the truss arrangement, British beams are basically set crosswise, whereas Japanese beams are set crosswise and lengthwise and have various names. In Britain, curved timbers are framed symmetrically in a truss, whereas in Japan they are used supplementarily.

Keywords: vernacular houses, terminology, nave (*jo*), aisle (*geya*), truss, bay

民家, 用語法, ネイブ(上屋), アイル(下屋), トラス, ベイ

1. Motive and purpose of this study

Traditional buildings provide evidence of architectural techniques and cultures of previous eras, and significantly affect how architecture is practiced today and the future. Architectural terms describe the most fundamental concepts for understanding both traditional and modern building systems. However, as discussed below, there is no well-established terminology of Japanese traditional architecture (especially architecture rooted in native culture, hereinafter referred to as *vernacular architecture*); and translation of such terminology into other languages, especially English, has not yet been considered.

To address these issues, this study focuses on vernacular houses in Japan and Britain,^{*1)} because such structures share significant common ground, as they are constructed of timber frame, use exposed framing members as decorative elements, and are characterized by the traditional feature of a spacious central room (Japanese *hiroma* / British “hall”), which sometimes opens up to the roof. It is thus considered that terminology representing common architectural concepts may be grasped easily and effectively through comparison of the respective construction methods in the two countries, which themselves have a number of similarities.

A review of the extant studies on Japanese architectural terminology conducted by Japanese scholars reveals that there are no established standards for the terminology of timber members (the major components of these structures) or construction methods, compared with planning and architectural design, which are relatively easy to comprehend. In research on Japanese vernacular houses called *minka*, the pioneering guidebook *How to Look at and Survey Minka*, edited by the Japanese Agency for Cultural Affairs,¹⁾ provides a certain level of standards for related knowledge and skills. However, the glossary in the book does not contain a sufficient number of terms, and has not been revised for about 50 years. There are a number of other specialized glossaries (as described below), each with advantages and disadvantages, but no comprehensive compilation as of yet.

In Britain, *Recording Timber-Framed Buildings: An Illustrated Glossary*, published by the Council for British Archaeology²⁾ (hereinafter referred to as ‘the CBA glossary,’ ‘CBA,’ or ‘C’ in the tables in this paper), is the most practical and authoritative source, as it shows the relationship between terms and building systems, and clearly illustrates the members as components of a building.^{*2)} However, there are slight differences

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in terminology in well-known publications, such as those by Brunskill and Harris (described below), and a comparative study would be of value.

More important to our study is the question of which English terms correspond to terms unique to Japanese. Existing English glossaries contain few translated terms for Japanese traditional architecture,^{*3)} though there are numerous English books on traditional Japanese architecture, and English translations of excellent Japanese books on the topic. However, in the latter, translators often do not choose the best English words for Japanese terms, in the context of the vernacular building system.^{*4)}

In this study, we focused on several reliable native-language glossaries compiled in the two countries (the Japanese glossaries contain supplementary materials to illustrate vernacular terms), avoiding overreliance on translated books and words. We identified images illustrating key terms describing the physical make-up of the respective buildings in each country, attempting thereby to avoid superficial correspondence between respective terms in the two countries. In short, this approach asks “What is this member called?” instead of “What does this word mean?”

The study discusses the main structural timber members of vernacular houses in Japan and Britain, which are fundamentally involved in the formation of structure and space, with the aim, first, of identifying the semantic range of terms for such timber members (not fully defined in previous studies), and

differences in the respective semantic ranges of similar Japanese and English terms; and second, of characterizing the arrangement of structural members and technical terms, based on the respective building systems.

Since this study deals with a very broad range of issues, the analysis divides buildings into several sections. This paper focuses on the main structural members of the understructure, also called the main structure, of one-story houses. The members of two-story houses, and of roof structures, will be discussed in subsequent papers.

2. Method

2 (1) Procedure for selecting materials for analysis

Table 1 is a list of glossaries and publications to be analyzed. We first selected the above-mentioned CBA glossary, as the most authoritative British glossary, and then selected three other important sources: Brunskill’s *Timber Building in Britain* ⁷⁾ (hereinafter referred to as ‘Brunskill,’ or ‘B’ in the tables), which has an excellent illustrated glossary; Walker’s glossary in his *The English Medieval Roof – Crownpost to Kingpost* ⁸⁾ (referred to as ‘Walker’ or ‘W’); and Harris’ *Discovering Timber-Framed Buildings* ⁹⁾ (‘Harris’ or ‘H’), whose full text is valuable and respected source.

For Japanese technical terms, we selected four trustworthy glossaries for analysis: *Kenchiku Daijiten* [*Encyclopedia of Architecture and Building*] ¹⁰⁾ (referred to as ‘Daijiten’ or ‘D’), the

Fig. 1 Arrangement of a nave (joya) and aisles (geya)

Fig. 2 Arrangement of trusses and bays

	abbrevi-	Writer / Editor	Source	Year	Ref. No.*
Britain	Glossary	C Alcock, et.al (Council for British Archaeology)	Recording timber framed buildings: an illustrated glossary	1996	2
		B Brunskill, R.W.	Glossary in "Timber building in Britain"	1985	7
		W Walker, J. (ed.)	Glossary in "The English Medieval Roof – Crownpost to Kingpost"	2011	8
	General	H Harris, R	Discovering Timber-Framed Buildings	1978	9
Japan	Glossary	D Shokokusya	Kenchiku Daijiten, 2nd ed.	1993	10
		M Kusano, K. et.al	Nihon Minka Goikaisetsujiten	1993	11
		J Nakamura, T.	Nihonkenchiku Jii	1906	12
		K Takei, T	Kokenchikujiten	1994	13
		1 Ota, H. et.al	Minka no Mikata Shirabekata	1967	1
		2 Yoshida, Miyazawa and Kudo et.al	Nihon no Minka vol.4, Gakken	1980-81	
	General	3 Kawashima, C.	Horobiyuku Minka – Madori, Kozo, Naibu	1973	
		4 Shibuya, G. and Nagao, K.	Nihon Kenchiku, new ed, first volume	1954	
		5 Ohno, S.	Explanatory material of Nihon Minkaen	1996	
		6 Miyazawa, S.	Nihonretto minka nyumon	1993	
		7 Sugiyama, H.	Jishin to Mokuzo Jutaku	1996	18
		8 Nakayama, Yamato and Watanabe	Jitsurei ni Manabu Minka, Details for conservation and Renovation	2002-04	
		9 Ogura, T.	Tohoku on Minka	1955	
		10 Tanaka, F.	Daifumi Oboegaki I, Higashi-Kanto no Kinsei Minka Kako no Hensen	2008	
		11 Isshiki, F.	Toride Shishi, Minka hen	1980	
		12 Nakayama and Shirai	Sunagawa no Minka, I	1983	
		13 Sakamoto, T.	Yamanashi no Kusabuki Minka	1996	
		14 Odaira and Okawa et.al	Kamijo syuraku no Kirizuma Minka gun	2005	
		15 Kawamura, R	Aichi no Minka	1984	
		16 Hayashino, M	Iyo no Minka	1971	

*Reference No. corresponds to the end of this article

Fig. 3 Correspondence between timber-frame types in Britain and Japan

most general dictionary; *Nihon Minka Goikaisetsujiten* [Glossary of Japanese Vernacular Houses (*minka*)]¹¹⁾ ('Minkagoijiten' or 'M'), which contains a wide variety of terms for *minka*; *Nihonkenchiku Jii* [Japanese Terminological Dictionary of Architecture]¹²⁾ ('Jii' or 'J'), an established glossary of traditional architecture as a whole; and *Kokenchikujiten* [Terminological Dictionary of Historic Architecture]¹³⁾ ('Kokenchikujiten' or 'K'), which covers traditional architecture in general, with concise text. However, as these glossaries do not provide sufficient information linking terms to illustrations, we also selected illustrations from 16 publications listed in Table 1.

2 (2) Definition of terms and framework typology

Before analyzing the meanings of framing-member terms, we must define the essential terms for frameworks and spaces, and outline the typology of diverse framing systems, in order to comprehend the relationship between the framework and the spatial configuration.

First, we will define the English *nave* (Japanese *joya*) and *aisle* (Japanese *geya*) (Fig. 1) as common concepts of framework and space. The nave (*joya*) denotes the central space and structural core of the building, formed by vertical members to support the roof structure. The aisle (*geya*), which is a side compartment running along the length of, or sometimes around the nave, denotes the area extending beyond the nave, under the eaves. Consequently, the uprights forming the structural framework of the aisle are lower in height than those for the nave. We also define the border of the framework. The Japanese *gawa* is the perimeter of the entire frame, while the Japanese *irigawa* which literally means "one row inside of the perimeter" corresponds to the British term "arcade," and means border between the *joya* (nave) and the *geya* (aisle).

Second, we define a *truss* and a *bay* as follows (Fig. 2). A truss is a rigid transverse framework spanning the roof at certain intervals. A British truss is typically a pentagonal structure which includes an understructure and a roof frame. In some cases, it is a triangular structure with a roof frame only. A Japanese truss is often not considered to be strongly connected to the understructure, but thought of instead as a roof-frame structure only.^{*5)} In this study, to compare Japanese and British frames, a Japanese truss is considered, in a broad sense, as a pentagonal structure that includes the members of the understructure.

A bay is the space between trusses in a timber-framed building. The Japanese bay, called *hashira-ma*, literally the "space between posts," resembles the British bay, but differs significantly in its use.^{*6)} Since British bays are sized appropriately for the room (usually a room is one or two bays wide), the bays are not necessarily of equal length (Fig. 2). Japanese bays, on the other hand, are of equal length, and work as a 'module' or unit of measurement for a room layout.

Next, we must describe the different types of framework, to determine how the respective members are defined in the given framework. Figure 3 compares common types of trusses in both countries.^{*7)} British timber frames are usually divided into cruck and box frames, with box frames subdivided into aisled and non-aisled frames (Fig. 1). For the purposes of this study, we divide them into three primary groups^{*8)}: aisled frames (A), box frames (B), and cruck frames (C). Additionally, we define an aisled derivative (AB)^{*9)} as the intermediate type between the aisled frame (A) and box frame (B), and a cruck derivative (BC)^{*10)} as the intermediate type between the box frame (B) and cruck frame (C).

In Japan, there are basically three structural types: *joya*-only, *joya* and *geya* (a structure with a lean-to periphery), and the so called *geya-zukuri* (a structure with a linked periphery),^{*11)} which correspond to the British box frame, aisled, and aisled derivative, respectively (Fig. 3). There is also a further frame type only in Japan (Type O in Fig. 3), by definition a type of box frame, but with several longitudinal uprights rising to the ridge piece in the roof frame. It is thought that originally the uprights rose from the ground to integrate the understructure and roof structure. A framing system using "longitudinal trusses" is essentially different from other framing systems.

3. Comparison between the English *post* and Japanese *hashira*

3 (1) Single terms for *post* and *hashira*

As defined in the three Japanese glossaries in Table 2, the function of the *hashira* is not merely to support the roof and floor loads but also to transfer these loads to the foundation; the *tsuka* is defined as a shorter upright than the *hashira*. Thus, the Japanese word *hashira* clearly denotes something "long" and "rising from the ground."

The English *post*,^{*12)} meanwhile, is defined as a vertical member, a rigid structural member, or a load-bearing member, all of which apply to the Japanese *hashira*. However, the British glossaries do not state that the post must rise from the ground. In fact, vertical members, such as the hammer posts (No. 4 in Table 2) in a hammer beam truss are also termed posts, but do not rise from the ground. This indicates that the English "post" is used in a broader sense than *hashira*. Therefore the English *post* essentially corresponds to the Japanese *hashira* and *tsuka*.

Interestingly, Harris says that posts rise the full height of the frame. His definitions of posts and studs are very similar to the Japanese definitions of *hashira* and *tsuka*, in that a "post" is differentiated from a "stud" by its greater length. However, he also notes that a post is "in a wall frame," yet refers to an "inner post" isolated from the wall, which would appear to be contradictory. More importantly, the basic image of the British frame is a "wall" anchored by several "posts," whereas the Japanese frame does not involve the concept of a wall anchored

in this manner.

3 (2) Compound terms with the English *post* and Japanese *hashira*

In this section, we discuss the meaning of compound terms with “post” and *hashira*. Table 2 shows that British wall and arcade posts correspond to various types of Japanese *hashira*. British arcade posts are used in a double structure composed of a nave (*joya*) and aisles (*geya*), shown as A and AB in Figure 3, and always stand inside. Wall posts, on the other hand, always stand outside a single structure (composed of a nave (*joya*) only) or a double structure.

The Japanese *joya-bashira*, a very commonly used term, is defined as a post supporting the main transverse beam which supports the roof. As a structural member, both the outside post in a single structure and the inner post in a double structure are called *joya-bashira*. Therefore, it is logically accurate to say that

arcade post/wall post is more equivalent to *irigawa-bashira/gawa-basira* than *joya-bashira/geya-basira*, the more commonly used term pair.

Fig. 4 Difference in the nave-aisle concept in Britain and Japan

Table 2 Terminology of posts (*hashira*) and their correspondence

English				Japanese				
Name of member	Section type (Fig. 1)	Meaning []: source (Table 1)	Schematic diagram	Name of member (kanji juxtaposed for clarity)	Section type (Fig. 1)	Meaning []: source (Table 1)	Ref. publication (Table 1)	Schematic diagram
Post		1) a vertical timber member [C, B, H] 2) usually substantial and usually forming part of the main framework [C] 3) intended primarily to carry a load imposed on its top [B] 4) rising the full height of the frame (shorter uprights are known as studs) [H] 5) In wall frames [H]		<i>Hashira</i> (<i>Bashira</i>)/ <i>Tsuka</i> (<i>Zuka</i>) 柱/束		a) <i>Hashira</i> : a vertical timber member to support the roof and floor load, and transfer it to the foundation [D, J, K] b) <i>Tsuka</i> : a short vertical member [D, M, J, K]		
(1) Wall post *	A, AB, B, BC, C	1) Post in the wall of a framed building [C, B] 2) usually carrying a tiebeam [C] 3) external wall posts [H*]		outer member (1a) <i>Gawa-bashira</i> 側柱 (1b) <i>Geya-bashira</i> 下屋柱 (1c) <i>Joya-bashira</i> ▲ 上屋柱	O, A, AB, B	<i>Hashira</i> on the perimeter of a building [D, J, K] <i>Hashira</i> in the <i>geya</i> (a space under a shed roof that is in contact with the <i>joya</i>) [M] <i>Hashira</i> to support the end of the <i>koya-bari</i> (the main transverse beam to carry the roof) [M]	11, 14, 16 2, 3, 5, 6, 7, 8, 9, 11, 12, 15	
(2) Arcade post *	A	1) one of the posts running between the nave (central space of an aisled building) and its aisles (the side compartments) [C, B, W] 2) carrying an arcade plate [B, W] 3) carrying a tie-beam [B] 4) internal arcade posts [H*]		inner member (2a) <i>Irigawa-bashira</i> 入側柱 (2b) <i>Joya-bashira</i> ▲ 上屋柱	A	<i>Hashira</i> located one row inside of the perimeter [D, J, K] <i>Hashira</i> around the <i>joya</i> in a <i>joya-geya</i> structure [after Parent (1983)] <i>Hashira</i> to support the end of the main transverse beam to carry the roof [M] (both on the perimeter of the <i>joya</i> (the central structure), and inside the <i>joya</i> , are called <i>joya-bashira</i>)	16 2, 3, 5, 6, 7, 8, 9, 11, 12, 14, 15	
(3) Aisle post *	(A)	1) = arcade post [C, B, H] 2) = wall post [W]		N/A				
(4) Hammer post	AB	A vertical timber resting on a hammer beam (a short beam cantilevered from the top of the outside wall) and forming a triangle between it and a principal rafter [C, B, W, H*]		(4) (<i>Koya-zuka</i>) 小屋束	AB	<i>Tsuka</i> consisting of the roof structure [D, M, J, K]	3	
(5) Corner post	A, AB, B	a post at the corner or at the wing of a building [B, H*]		(5) <i>Sumi-bashira</i> 隅柱	O, A, AB, B	<i>Hashira</i> at the corner of the building [D]		
(6a) Principal post	A, AB, B	1) one of the posts at corner or bay intervals marking one of the main structural divisions of a building [B] 2) vertical timber, usually substantial, and usually forming part of the main framework of a truss [W]		N/A				
(6b) Main post	A, AB, B	1) = principal post [B] 2) rising the full height of the frame at the bay divisions [H]		N/A				
(7) Intermediate post	A, AB, B	one of the posts rising the full height of the frame within the bay [H]		N/A				
(8) Spere post	A	a pair of posts forming a spere truss as a screen between the hall and the passage. [B]		N/A				
N/A				(9) <i>Daikoku-bashira</i> 大黒柱	O, A, AB, B	1) A central post, usually located at the border between the raised and earth-floored parts of a house 2) A key supporting post 3) Often the thickest post [D, M, J, K]	3, 7, 8, 12, 16	

▲ The same term is used in several locations. * Different term share the meaning. []: source which does not define but indicates the meaning in the context.

This difference in meaning between the English arcade post/wall post and Japanese *joya-bashira/geya-basira* is due to the difference in the concept of a frame and space shown in Figure 4. In the British concept of a framework, walls are defined first, after which the other members, as well as their related terms, are defined. Japanese carpenters, on the other hand, do not think about walls in the first place. They take into account the possibility of setting *mata-geya* beyond the *geya* further outside. Subsequently they image an onion-like, multi-layered structure, built by adding aisles around a central core even in a simple frame consisting of a *joya*-only structure. (Fig. 4d).

Now let us consider an important post in spatial organization. As shown in No. 5 in Table 2, the most fundamental post is the British corner post and Japanese *sumi-bashira*. Both stand at the corners of a house or wing (the corner section of the house, adjacent to the main building). Neither of these are posts at the corners of a room. As shown in Nos. 6a and 6b in Table 2, the second most important post in Britain is the “principal post” or “main post” in a bay and truss system. There are no corresponding terms for these in the Japanese glossaries, indicating that Japanese carpenters do not have a specific concept of posts related to trusses, but instead the concept of a “universal” post alone (Fig. 2). In English, a less important post is defined as an “intermediate post” (No. 7 in Table 2) set between bays. The Japanese glossaries contain no vernacular terms for the intermediate post, though the term is used by Japanese scholars in the academic context.

Finally, let us consider symbolic posts standing in particular positions. British spere posts (No. 8 in Table 2) are a pair of posts that form part of a spere truss as a divider between the hall and the passage. Occasionally, similar posts are erected in Japan, but their name has not been identified. The Japanese *daikoku-bashira* is a central post, usually located between the raised floor like *hiroma* and an earth-floored part of the house. There is no such central post, or name for such, in Britain.

4. Comparison between the English *plate* and Japanese *keta*

4 (1) Single terms for *plate* and *keta*

The English *plate*^{*13)} and Japanese *keta* (*geta*) denote fundamental horizontal members in these houses. The terms correspond to each other, yet are very hard to define precisely, as each is used in a broad sense in their respective country.

Here we discuss the *keta*, using Table 3 and Figure 5. In Daijiten and Minkagōjiten, which give the narrowest definition of the term, it is defined as a member set on top of the *gawa-bashira* (perimeter post; A in Fig. 5). In Kokenchikujiten, it is defined as a member on top of the understructure, and its planar position is not specified. In a double structure, the *keta* can appear at both the *gawa* (A) and *irigawa* (B) positions, as shown in Figure 5. In Jii, which gives the broadest definition, it

can be placed on top of the *hashira*, *tsuka*, or wall, and the height of the *keta* is not specified. The *keta* can even be placed at positions C or D (the top of the roof), as shown in Figure 5.^{*14)} The broader definition of the term renders the concept of *keta* complex, because specifying the *gawa* position (perimeter) is clearly contradictory to allowing the *keta* to be placed anywhere along the roof slope.^{*15)} With the broader interpretation in Jii, the *keta* is allowed to be placed on top of a free-standing post or wall, without being placed along the wall or roof slope (E in Fig. 5).

The English “plate” is notably different from the Japanese *keta*, in that it is used in a broader sense. The definition of the plate is given in three publications. Only CBA defines the plate as a longitudinal timber member, likely because CBA has gable roofs in mind, which are common in Britain; whereas Brunskill and Harris seem to allow the plate to be placed crosswise, likely because they have radial roof structures such as hip roof and gambrel roof in mind. Interestingly, in CBA, the plate can be located only on top of the wall or in the roof truss. Brunskill and Harris do not specify the position of the plate. Harris clearly states that the plate can be located either at the head or foot of the frame, in distinct contrast to the definition in CBA, revealing a fundamental inconsistency in the understanding of the term “plate” in the British framing system.

Concerning the cross-sectional dimensions of the plate, Brunskill notes that the plate is usually rather wider than deep in proportion, a reasonable assertion given that the plate is, unlike the beam, actually supported by several vertical members, and thus not required to bear a superimposed load. As an additional specification concerning the placement of this member, CBA points out that it is set square to the ground, while a purlin is set in the plane of the roof slope; an important distinction for understanding the characteristics of the plate as a member of the understructure, as opposed to the purlin as a member of the roof.

^{*16)}

4 (2) Compound terms with *plate* and *keta*

Now let us consider compounds based on the terms “plate” and *keta*. Table 3 shows that the arcade plate is located inside, and the wall plate outside, regardless of whether the frame is aisled or non-aisled; in the same manner as the use of “wall” and “arcade” in the compounds with “post” (and Japanese correlatives with *hashira*).

As with the “post” compounds, the Japanese *joya-geta* and *geya-geta* do not necessarily correspond to the British terms “arcade plate” and “wall plate”. As shown in Table 3, the Japanese terms corresponding to the British “wall plate” are: (1a) the single term *keta* with no prefix, (1b) the compound term *gawa-geta* (*gawa* means “perimeter”), (1c) the compound term *geya-geta* (*geya* is equivalent to “aisle”), and (1d) the compound term *noki-geta* (*noki* means “eaves”).

Some confusion is apparent in the terminology, but in sum there are two main options for how to use the single term *keta* in a double structure: consider the inside member as the *keta*, with emphasis on the *joya* (nave), or consider the outside member as the *keta*, with emphasis on the *gawa* (perimeter).

In fact, there are many different Japanese combinations corresponding to the English terms “wall plate” and “arcade plate,” making it difficult to identify especially significant compounds. In this paper, as with the “post” compounds, the prefix *gawa* (perimeter) is used to indicate that the *keta* is located outside, and the prefix *irigawa* (inside) is used to indicate that the *keta* is located inside. We specify the *gawa-geta* as a wall plate, and the *irigawa-geta* as an arcade plate (the latter is not found in the glossaries in Table 3, but in Parent (1983)⁶⁾).

The British “template” and “sole plate” (Nos. 4 and 5 in Table 3) are both used when the timber roof structure rests on masonry walls; and there are no corresponding members in Japan, where the understructure is constructed of wood. It is interesting that the sole plate runs crosswise because of the wall thickness, whereas the plate is normally set longitudinally. In this case, the characteristic of the plate, as “rather wider than deep in

proportion” (Brunskill), is emphasized.

While the compound terms “post plate” (or “bottom plate”) and “roof plate” (or “top plate”) (Nos. 6 and 7 in Table 3) incorporate Harris’ notion of the plate “at the head or foot of a frame,” the latter is also called a “sill beam,” with the root word “beam,” though it should be logically called a “plate” because a structural member (the post) rises from it.

Fig. 5 Position of plates (*keta*) suggested by the glossaries

Table 3 Terminology of plates (*keta*) and their correspondence

English				Japanese				
Name of member	Section type (Fig. 1)	Meaning []: source (Table 1)	Schematic diagram	Name of member (kanji juxtaposed for clarity)	Section type (Fig. 1)	Meaning []: source (Table 1)	Ref. publication (Table 1)	Schematic diagram
Plate		1) structural timber laid horizontally [B, H] 2) Longitudinal timber [C] 3) on the top of a wall or in a roof truss [C] 4) at the head or foot of a frame [H] 5) set square to the ground [C] 6) usually rather wider than deep in proportion [B]		<i>Keta</i> (Geta) ▲ 桁		Horizontal timber a) Located on top of the <i>hashira</i> , <i>tsuka</i> , or wall [J] b) supporting beam and <i>taruki</i> (a kind of rafter) on top of the understructure [K] c) carrying the <i>taruki</i> , located on top of the <i>gawa-bashira</i> (perimeter post) [D, M]		
(1) Wall plate *	A, AB, B, BC, C	Plate 1) on top of a wall frame or a masonry wall [C, W] 2) on the wall [B, H] 3) on which roof trusses rest [C, W] 4) receiving the ends of common rafters [B]	 box frame const.	outer member (1a) <i>Keta</i> ▲ 桁 (1b) <i>Gawa-geta</i> 側桁 (1c) <i>Geya-geta</i> 下屋桁 (1d) <i>Noki-geta</i> 軒桁	O, A, AB, B	Horizontal timber to carry the <i>taruki</i> , located on top of the <i>gawa-bashira</i> [D·M] Same as the <i>noki-geta</i> [M] <i>Keta</i> spanning the <i>geya-bashira</i> [M] Horizontal timber located on the top of the external wall along the eaves [D, M, J, K]	1, 3, 11, 16 2, 5 2, 5, 9 3, 4, 8, 12, 14	 Keta Gawa-geta Joya-geta Noki-geta Joya only const.
(2) Arcade plate	A, AB	Plate set along the tops of arcade posts in an aisled building [C, B, H, W]	 aisled const.	inner member (2a) <i>Keta</i> ▲ 桁 (2b) <i>Joya-geta</i> 上屋桁 (2c) <i>Moya</i> 母屋 (2d) <i>Irigawa-keta</i> 入側桁	O, A, AB, B	Horizontal timber supporting beams and <i>taruki</i> on top of the understructure [K] <i>Keta</i> located above or under the end of the main transverse beam to carry the roof [M] Horizontal timber to carry the <i>taruki</i> , running parallel to the ridge and <i>noki-geta</i> [D, M, J] <i>Keta</i> placed above the <i>hasira</i> around the <i>joya</i> in a <i>joya-geya</i> structure [after Parent (1983)] (<i>Keta</i> located one row inside of the perimeter)	6, 7 2, 5, 9, 12, 14 8, 11	 Keta Gawa-geta Joya-geta Noki-geta Joya & Geya const.
(3) Aisle plate *	A	wall plate of an aisled building [C]		N/A				
(4) Template	BC	Timber placed horizontally 1) to support the foot of a post or cruck blade [C] 2) to support the end of a beam, principal rafter or blade [B]	 Template	N/A				
(5) Sole plate	BC	Short timber set across a wall, to take the foot of 1) a rafter and an ashlar piece [C] 2) a principal rafter or blade [B]	 Sole plate	N/A				
(6) Post plate *	A, AB, B, BC, C	a sill from which structural timbers rise (=bottom plate) [B]		(6) <i>Dodai</i> 土台		See <i>dodai</i> in Table 4		
(7) Roof plate *	A, AB, B, BC, C	a horizontal timber along the top of a timber-framed wall, receiving the tops of studs and carrying the feet of common rafters. (=top plate, wall plate) [B]		N/A				

▲ The same term is used in several locations. * Different terms share the meaning.

5. Comparison between the English *beam* and Japanese *hari*

5 (1) Single terms for *beam* and *hari*

Like *plate* and *keta*, the English *beam*^{*17)} and Japanese *hari* (*bari*) are fundamental terms for horizontal members. Table 4 shows the definition of a beam in two British glossaries. In the glossaries, a beam is defined as a major horizontal structural member tying two members together and bearing a superimposed load, but there is no description of the beam height or joints. The semantic range of the Japanese *hari* differs among the glossaries. There, the *hari* (as a single term), like the English

“beam,” bears a general load, as well as the load from the roof structure; but the *hari* is specifically placed on top of the *hashira* (post) (Fig. 6a), on the side of the upper part of the *hashira* (Fig. 6b), or on the *keta* (plate) (Fig. 6c). Thus, the Japanese *hari* is

Fig. 6 Positional relationship of the *hari* (beam) and other

Table 4 Terminology of beams (*hari*) and their correspondence

English				Japanese				
Name of member	Section type (Fig. 1)	Meaning []: source (Table 1)	Schematic diagram	Name of member (kanji juxtaposed for clarity)	Section type (Fig. 1)	Meaning []: source (Table 1)	Ref. publication (Table 1)	Schematic diagram
Beam		Major horizontal timber [C, B] 1) tying together two parts of a structure [B] and /or 2) carrying a superimposed load [B]		<i>Hari (Bari)</i> ▲ 梁		Horizontal timber 1) carrying a superimposed load [J, K] 2) carrying the roof structure [K] 3) located on the top or side of the upper part of the <i>hashira</i> [D] 4) placed on the <i>keta</i> [K]		
(1) Sill beam *	A, AB, B, BC, C	Horizontal timber at the bottom of a framed wall into which posts and studs are framed [C, B, W, H]		(1) <i>Dodai</i> 土台	O, A, AB, B	Horizontal timber 1) supporting the bottom of the <i>hashira</i> [D, M] 2) at the bottom of the building [D, J, K] 3) carrying superimposed load [D, M]	1, 4, 5, 8	
N/A				(2) <i>Ashitagame</i> 足間め	O, A, AB, B	Horizontal timber 1) tenoned into the lower side of the <i>hashira</i> [D, M, J] 2) under the ground floor [J, K]		
(3) Tie beam	A, AB, B, BC, C	1) Main transverse timber connecting the tops of walls or arcade posts and plates [C, B, W, H] 2) Main transverse timber of a cruck truss [C, W, H]		(3a) <i>Hari</i> ▲ 梁		Horizontal timber to carry a superimposed load, located on top of the <i>hashira</i> or <i>keta</i> [K]	2, 14	
				(3b) <i>Koya-bari</i> 小梁		<i>Hari</i> at the bottom of the roof structure [D, J, K]	3, 4, 8, 9, 16	
				(3c) <i>Joya-bari</i> 上屋梁	O, A, AB, B	1) transverse timber across the <i>joya</i> in the central structure [D] 2) The main transverse beam to support the end of <i>sasu</i> (a kind of the principal rafter) [M]	1, 3, 5, 6, 7, 8, 11, 12	
(4a) Strainer beam	A	Transverse timber in aisled construction, joining aisle posts below tiebeam level, either to allow rearing of pairs of posts or to hold the posts apart without relying only on the tiebeam [C]		(4a) <i>Hari</i> ▲ 梁		Horizontal timber to carry a superimposed load, located on the top or side of the upper part of the <i>hashira</i> [D]	1	
(4b) Anchor beam	A, AB, B	beam whose end passes through a post and is pegged beyond it [C]		(4b) <i>Do-bari</i> 胴梁	O, A, AB, B	Central transverse timber set below the top of the <i>joya-bashira</i> , tying two <i>joya-bashira</i> [after Sugiyama(1996)]	7, 15	
(5) Axial beam	A, AB, B	Ceiling beam along the length of a house [C]		(4c) <i>Shinshi-bari</i> シンシ(織子)梁		1) The main curved beam [D, J] 2) A beam located under the <i>joya-bari</i> [M]	8, 10, 11, 12	
N/A				(5a) <i>Ushi-bari</i> 牛(丑)梁	O, A, AB, B	1) A long, large central beam set longitudinally to carry the main transverse beam to support the roof frame [D, M, J, K] 2) A large beam to support a heavy load [D, J]	3, 5, 7, 9, 12, 16	
				(5b) <i>Nakabiki-bari</i> 中引梁		ditto	3, 4, 7, 8, 10	
(7) Aisle tie	A	Horizontal timber tying the wall of an aisle to an arcade post [C, H]		(6) <i>Hiki-mono</i> 引物	O, A, AB, B	A large longitudinal beam under the ridge [M]	7, 15	
N/A				(7) <i>Tsunagi-bari</i> 繋梁	A	Horizontal timber to tie two uprights such as <i>hashira</i> and <i>tsuka</i> [C, H] (In a broad sense, only one end needs to be tied to the upright. One common type is a beam spanning the side of the <i>joya-bashira</i> and the top of the <i>geya-bashira</i> .)	1, 5, 8, 12, 13	
N/A				(8) <i>Hikae-bari</i> 控梁	AB	A type of <i>tsunagi-bari</i> : its inner end is supported by a post standing in a position further inside than the usual position directly below the end of the <i>joya-bari</i> . [after Sugiyama (1996)]	7, 8	
				(9) <i>Nagekake-bari</i> 投げ掛梁	AB	An extended derivative of the <i>hikae-bari</i> : the inner end is supported by the central post or longitudinal beam [D, M, J, K]	9	
(10) Hammer beam	AB	A short beam 1) cantilevered in from the top of the outside wall and braced against it [C, B, H] 2) a tiebeam whose central section is omitted [C, W, H] 3) receiving the end of a principal rafter [B] 4) carrying a short post called hammer post [C, B, W, H]		N/A				
(11) Stub tie beam	BC	Block in the position of a tiebeam; also sole piece [C]		(11) <i>Makuragi</i> 枕木	A, AB, B	A short beam 1) placed on the top of the <i>hashira</i> , carrying the <i>keta</i> and <i>sasu</i> (a kind of the principal rafter) [D, M] 2) carrying all the superimposed load [J]	3	

▲ The same term is used in several locations. * Different term share the meaning.

characterized by its relationship with other members supported by it, whereas the English “beam” is more simply defined.

5 (2) Compound terms with *beam* and *hari*

Now let us consider relevant compound terms. As previously mentioned, Brunskill defines the “sill beam” (No. 1 in Table 4) as a type of plate. This member is well translated by the single Japanese term, *dodai*, which is not a compound rooted in “beam” or “plate.” The term “*ashigatame*” (No. 2 in Table 4) is seemingly akin to *dodai* but the former is set on the lower side of the post usually under the ground floor. We cannot find such a member in the British glossary.

The most important “beam” compound is “tie beam”^{*18)} (No. 3 in Table 4), a difficult term, with two different meanings depending on the frame type. In types A, AB, and B (Fig. 3), it means the main transverse timber tying together walls, arcade posts, and arcade plates. In this case, it is considered as a member bordering the roof structure and understructure. While there is no description of the height of the main beam in a cruck truss, which appears in BC and C (Fig. 3). A beam set below the top of the wall plate, as shown in No. 3 in Table 4, is also called a tie beam;^{*19)} and this fact suggests that tie beams are framed without a height limit, because the cruck frame is a framework in which the understructure and roof structure are not separated.

Japanese compound terms corresponding to the first sense of “tie beam” are diverse (Nos. 3a, 3b and 3c in Table 4). The English term may simply correspond to *hari* with no prefix, to the Japanese *koya-bari* (*koya* means a roof frame), or to *joya-bari* (*joya* originally meant the span of the main roof). On the whole, we consider *joya-bari* the best correlative, because *hari* is ambiguous and *koya-bari* does not always indicate the top of posts but is rather higher or lower in some cases.

The British “strainer beam” (No. 4a in Table 4), also called an anchor beam, is a transverse beam whose end is tenoned into the side of the upper part of a post. This member is very popular in Japan. It corresponds to the *hari* with no prefix, or the *do-bari* or *shinshi-bari* (Nos. 4a, 4b and 4c in Table 4).

In Japan, there are several types of beams set longitudinally, to tenon the side of the upper part of a post. The central beam is called the *ushi-bari* or *nakabiki-bari* (Nos. 5a and 5b in Table 4). It supports a heavy load, and often joins the *daikoku-bashira* and the same types of post together. There is no English term that exactly corresponds to the Japanese *ushi-bari* or *nakabiki-bari*. The British “axial beam”, a type of floor beam, is laid in the same position; however, the Japanese beam in this position typically does not support the floor, but merely carries the roof frame. This difference in framing method leads to significant spatial appearance between vernacular houses in Britain and Japan.^{*20)}

Another beam, called the *hiki-mono* (*mono* basically means *hari*) (No. 6 in Table 4), is located on the border between the *joya*

and *geya*, far from the backbone of the framework. There is no such beam type, or term, in the British framing systems.

Now let us consider the variation in the form of the nave and aisles in aisled construction. The British “aisle tie” (No. 7 in Table 4) is an abbreviation for “aisle tie beam,” which acts like a “tie beam” spanning the width of the aisle. The corresponding Japanese term, *tsunagi-bari*, is used in a much broader sense, with its function simply being to tie together two uprights, regardless of its height and placement. One common type, spanning the *joya-bashira* and *geya-bashira*, is equivalent to the British aisle tie; but another type, called *hikae-bari* (No. 8 in Table 4)^{*21)}, is longer because its inner end is supported by posts standing further inside than the usual position directly below the end of the *joya-bari*. A more advanced type is the *nagekake-bari* (No. 9 in Table 4), whose inner end reaches the central post or a beam called the *ushi-bari* (mentioned above). It is noteworthy that diverse Japanese techniques, such as those involving the *hikae-bari* (a type of *tsunagi-bari*) and *nagekake-bari* (an extended derivative of the *hikae-bari*), which are often referred to as “taking *geya* inside” to make structure with a liked priphery, are not used in Britain.

In the above, we gave an example in which arcade posts are moved inward. Now, we shall give an example in which arcade posts are eliminated. The British “hammer beam” (No. 10 in Table 4) is a short beam cantilevered in from the top of the outside wall, and braced against it in order to eliminate an arcade post. It is also regarded as a tie beam whose central section is omitted. In Japan, there is no similar frame member to the hammer beam. However, there is a shorter hammer beam, called a “stub tie-beam” (No. 11 in Table 4), which is a block in the position of a tie beam; and this corresponds to the Japanese *makuragi*, which is a very short member like the stub tie-beam, and carries the roof truss.

6. Comparison between British and Japanese curved timbers

A *cruck* is the most well-known British curved timber. Its definition, however, is complicated, as shown in Table 5. All four glossaries describe a pair of long opposing timbers being framed together; beyond this, however, the details differ.^{*22)}

The most essential definition of the cruck is given by Harris, who describes its placement simply as “rising from ground level,” and notes, in terms of the framing system, that it is “joined by a tie beam or collar^{*23)} (a transverse timber set in the roof truss) and “supports the roof purlin^{*23)} (a longitudinal timber set in the plane of the roof slope). This description reflects precisely its characteristic of being a member of both the understructure and roof structure.

Both joined and base crucks (Nos. 1 and 2 in Table 5) are forms unique to Britain, where further short-cut timbers are combined to create a cruck-like shape. The compound term

“jointed cruck,” shown as type BC in Figure 3, denotes two timbers joined together by a joint in the roof frame. The “base cruck,” (No. 2 in Table 5) is regarded as one of the “aisled derivative,” shown as type AB in Figure 3, because it is placed to omit an arcade post. It appears a cruck whose blades reach as high as the first transverse member, usually a tie beam.

Such framing forms are rarely found in Japan. The Japanese *mata-bashira* (No. 2 in Table 5) is similar to the British base cruck, but different in detail. The base crucks are usually framed together transversely in pairs, and the horizontal distance between the bottom and top of the curved timber is quite long. The *mata-bashira*, on the other hand, is used alone and curved in the longitudinal direction, and the distance between the bottom and top of the curved timber is very short.

When we look at a curved timber close to a beam, we can find the Japanese *chona-bari*^{*24)} (No. 3 in Table 5), a transverse beam with a natural downward curve at the outer end. The *Chona-bari* is regarded as a type of *nagekake-bari* (No. 9 in Table 4). In Table 5, *Chona-bari* beams are arranged symmetrically in pairs, and can be placed alone on one side to omit a specific *irigawa-bashira* (arcade post).

A British framing member similar to the Japanese *chona-bari* is the “extended arch brace”^{*25)} (No. 3 in Table 5), which supports the roof load in place of arcade post. In this case, a brace, which is usually used as a reinforcement, is functioned as a beam.

7. Conclusions

We have identified key characteristics of the arrangement and terminology of British and Japanese vernacular timber house frames, based on the principles of the respective building systems, and these are summarized below.

The English “post” and Japanese *hashira* have similar but slightly different semantic ranges, with the latter, as a single

term, having a narrower sense. The meaning of English post covers those of Japanese *hashira* and *tsuka*. The English posts are basically regarded as the elements of the wall but Japanese *hashira* is free from the wall. Consequently there is a notable difference in meaning of compound terms in the case of a double cross-section.

The English “plate” and Japanese *keta* are similar in having a broad semantic range with more than one meaning. The Japanese *keta* means a horizontal member running along the top of the uprights either outside or inside of the building in the broadest sense, whereas the English term “plate” has a broader semantic range, which includes the member located either at the head or foot of the frame.

The English “beam” resembles the Japanese *hari*, but is used in a narrower sense. With regard to compound terms, the British beam is obviously part of a truss and essentially set only crosswise, while the Japanese beam spans both crosswise and lengthwise. Thus, there is a much wider variety of Japanese beams, and an equally wide variety of compound terms involving beams.

Comparing British and Japanese curved timbers, the former are typically framed symmetrically in pairs, with consideration of the shape of the truss as a whole; whereas the latter are typically arranged one by one in a supplementary manner, without consideration of the framework as a whole.

Notes

- *1) This paper focuses on England and Wales (hereinafter referred to as “Britain”), and excludes Scotland and Northern Ireland due to the relative scarcity of timber-framed buildings in these regions.
- *2) For this reason, the British academic journal *Vernacular Architecture* recommends that authors use this glossary.
- *3) Concerning *Japanese Scientific Terms, Architecture*³⁾, Hideo Moriya, who organized the preparation of the draft, has noted that, unlike other academic fields, governed by international standards, Japanese architecture tends to be influenced by the culture, nature, and society

Table 5 Terminology of curved timbers

English				Japanese				
Name of member	Section type (Fig. 1)	Meaning []: source (Table 1)	Schematic diagram	Name of member (kanji juxtaposed for clarity)	Section type (Fig. 1)	Meaning []: source (Table 1)	Ref. publication (Table 1)	Schematic diagram
Cruck (True cruck)	C	1) Long timbers, framed together in pairs [C, B, W, H] 2) straight or curved [C, W] 3a) rising from, or near, ground level [C, B, W] 3b) rising from ground level [H] 4) stretching to a point at or close to the apex of the roof [C, B, W] 5) joined by a tie beam or collar [H] 6) supporting the roof purlins [H]		N/A				
	(1) Jointed cruck BC	1) Two timbers are jointed together to form a composite member of cruck-like shape [C, B, W, H] 2a) with the joint near the wall head [C, W] 2b) with the joint well below collar level [B]		N/A				
	(2) Base cruck AB	1) Cruck whose blades reach a) only as high as the first transverse member [C, W] b) a heavy collar [B] 2) A large curved post inclined inwards to support the arcade plate [H]		(2) Mata-bashira 文柱	AB	<i>Hashira</i> with a forked trunk at the top: one branch is cut short to support the <i>gawa-geta</i> , and the other branch is extended upward to support the <i>irigawa-geta</i> or other beams at the end [M]	2	
(3) Extended arch brace	AB	Extended arch braces create the same effect achieved as with base crucks, but by means of long arch braces which rise from the aisle walls to the underside of the tie beam, truncating the arcade posts. [after Barnwell and Adams(1994)]		(3) Chona-bari 新梁	AB	Transverse beam with a natural downward curve at outer end [after Kawashima1986]	2, 5, 6	

of Japan; and he and the co-authors did not attempt to translate historical architectural terms. (Moriya(1991))⁴⁾

- *4) For example, Kawashima (1986)⁵⁾ seems to give useful information, but has some keywords mistranslated (how they have been mistranslated is interesting from a cultural perspective). While Parent (1983)⁶⁾ includes an excellent glossary of terms juxtaposing *kanji* for clarity. It focuses on Japanese temples and shrines, which are different in tradition from *minka*. Therefore, to avoid confusion, we did not use this work unless needed.
- *5) It should be noted that the concept of “truss” has been misinterpreted, due to misunderstanding or narrow understanding of the term by Japanese scholars and engineers.
- *6) Morris (1988)¹⁴⁾ refers to the difference in the use of the terms “bay” and *ken*.
- *7) This classification into the five categories has been verified by Horie (2009a)¹⁵⁾ in view of the cases of both Japan and Britain.
- *8) There is a slight difference in the wording between Figure 8 on page 11 of Harris (1973)⁹⁾ and Figure 2.1 on page 15 of Roberts (2003)¹⁶⁾; however, both books show the same classification of three types.
- *9) This term is quoted from page 76 of Smith (1955)¹⁷⁾ and page 7 of Roberts (2003).
- *10) This term is quoted from page 1 of Charles (1967)¹⁸⁾.
- *11) These three categories are based on Horie (2009b).¹⁹⁾
- *12) Japanese glossaries *Kenchiku Daijiten* and *Nihonkenchiku Jii* both indicate that Japanese *hashira* corresponds to “column” and “pillar” as well as “post”. However none of the three glossaries in Table 1 list these two terms as headwords. In addition Harris (1973)⁹⁾ always uses the term “post” for *hashira* over the entire page except at only two general descriptions in the beginning part where he used “column”. Therefore “column” and “pillar” do not have to be considered as technical terms for the vertical member in traditional timber-framed construction.
- *13) *Kenchiku Daijiten* shows that Japanese *keta* corresponds to “girder” as well as “plate”. However both glossaries of CBA and Brunskill regard “girder” as a member carrying the upper floor. It is considered to be Japanese *dozashi* rather than *keta*. Thus the term “girder” is not applicable.
- *14) In fact, there is wording such as *muna-geta* and *moya-geta*.
- *15) This is likely the reason why *keta* was translated as “purlin,” instead of “plate,” in Kawashima (1986)⁵⁾ and Parent (1983)⁶⁾.
- *16) This distinction will be discussed in detail in the next paper, which will focus on roof frames.
- *17) *Kenchiku Daijiten* also shows “girder” and “joist” as the English equivalent of Japanese *hari*. However both glossaries of CBA and Brunskill regard them as members that carry the floor, indicating a narrower sense than that of *hari*. Thus these terms are not applicable.
- *18) In the CBA glossary, the unhyphenated “tiebeam” is used, instead of “tie beam,” due to its significance.
- *19) We confirmed this through interviews with two well-known British researchers, R. A. Meeson, who was one of the compilers of In the CBA glossary, and Jane Grenville.
- *20) In the interview with R. A. Meeson, we found that the term “spine beam” (corresponding to the Japanese *ushi-bari* or *nakabiki-bari*) had once been used, but the term was too minor to be included in the glossaries.
- *21) Not explained in the four Japanese glossaries, but illustrated in other publications such as Sugiyama (1996)²⁰⁾.
- *22) A detailed explanation was required, from an academic perspective, to interpret a variety of frame forms based on “cruck.” See Ref. 21.
- *23) This is a member of the roof structure, and will be discussed in the next paper.
- *24) This wording is used in Kawashima (1986)⁵⁾.
- *25) This term is not contained in the glossaries used in this paper. Barnwell & Adams (1994)²²⁾ took notice of the term and used it.

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1. 研究の動機と目的

建築用語は、現代建築はもちろん伝統建築の構法を理解するうえで最も基底となる概念であるが、日本の伝統的建築の語彙は母国語での整備が遅れており、外国語とくに英語への翻訳という点での体系的な検討は手つかずになっている。こうした問題を解決する端緒として、本研究は、日英の伝統的民家の木造架構において、建築の構造や空間に深く関わっている主要構造部材を取り上げ、これまでの研究で十分に表現されていなかった部材用語の意味の範囲と食い違いを明らかにし、また建築構法に基づいた構造材の配置と術語の特質を解明することを目的としている。

2. 研究方法

(1) 分析資料の選出

イギリスの著名な用語集およびこれに類する文献計4点および日本の用語集4点を取り上げた。日本に関しては他に16文献から図説を補足資料として加えた。

(2) 基本用語の定義と日英の断面系統

共通する架構・空間概念として、まず建物の架構および空間が二重構造になっているものに関して、中央部分を上屋 (nave)、周縁部分を下屋 (aisle)とした。次いで、truss と bay に関して以下のように定めた。truss は一定間隔で棟木を横切って立ち上がる構造面であり、小屋組だけに偏りがちな日本語の「トラス」より広義に、軸組部分も含めたものとした。bay は truss 間に挟まれた部分で「柱間」に対応するが、日本の「柱間」が、イギリスの bay とは、その使い方の原理において異なることを示した。

3. 英語の「post」と日本語の「柱」の比較

post と柱はおおむね同義のものとして対応するが、若干意味の広さに違いが見られた。堅固な垂直材で荷重支持を旨とする点は共通するが、日本における柱はその定義において、長く、地面を起点にすることが強くイメージされている点が異なる。したがって post は柱と束を合わせた概念であるといえる。また英語の post は基本的に壁を構成する一要素としてとらえられているのに対し、日本の柱は壁の概念から無縁である。その結果として上屋 (nave)と下屋 (aisle)の二重構造になった場合の日英の名称にずれが生じている。

また平面上では、イギリスでは bay と truss のシステムに従い、階層的に名称が与えられるが、日本では架構区画の構面間に立つ柱は基本的に等価と見なされている。役柱に関しては、イギリスの spere post、日本の大黒柱のように、固有の背景から独自の柱とその名称が生じている。

4. 英語の「plate」と日本語の「桁」の比較

plate と桁は、両国それぞれにおいて辞書による語義の範囲の違いが大きく、意味の広さの解釈が難しい部材である。日本では最広義で垂直材の上辺を繋ぐ水平材までを含める解釈があった。日本の桁では、柱頭と屋根勾配面の各所において語義の多様性が生じており、その多様さの理解として、上屋を優先して内側にあるものに単純呼称「桁」を宛てる考え方と、側を優先して外側にあるものを「桁」と解釈する考え方の2種が併存していることがわかった。

英語の plate は、小屋組にあつては屋根勾配面に対する部材の置き方によってそのように呼ばれないこともあるが、一方で架構の上

端のみならず下端に設けられるものまでを含めるほどの語義の広がり認められた。

5. 英語の「beam」と日本語の「梁」の比較

英語の beam が繋ぎと荷受けという基本的な定義であるのに対して、日本の梁は他部材との取り付けや接合の点で、柱頭に直接または桁を介して載る、柱側面に取り合う、などの部材の位置関係の多様さを意識した定義がなされている。

梁の複合語については以下のような特質を指摘できる。ひとつは、梁行の最も基幹的な梁に対する概念に際立った違いがあった。イギリスの tie beam は様々なトラスのなかにあつて、とくに cruck 架構においてその高さが流動的である。一方、日本の上屋梁は軸・小屋を境界にあつて固定的である。

もうひとつは、bay と truss の配置の違いによる架構の多様さの違いである。イギリスには桁行梁がほとんど存在しないが、日本では桁行にも多様な梁が存在し、また名付けられている。またイギリスでは nave と aisle による二重架構における梁行方向の構成が単純だが、日本では上屋・下屋境以外の位置にも柱が立つことにより、種々の形態の梁が現れている。

6. 曲がり材に関する日英比較

曲がり材を比較すると、イギリスでは基本的に post の変種として側から棟に向けて長大な湾曲材を用いた cruck と呼ばれる構法をもとに、その湾曲材が様々な形で分節した変化形が展開している。このうち base cruck が、日本の又柱との類似性を示していた。また、柱由来とは異なる特殊形としてイギリスの extended arch brace や日本の鉾梁が挙げられる。

7. 結論

建築構法の原理に基づいた日英における伝統木造架構の部材配置と用語法の特徴が以下のように抽出された。

post と柱は、単純語においては、似ているが若干意味の広さに違いが見られ(後者のほうが狭い)、post は柱と束を合わせた意味といえる。また英語の post は基本的に壁を構成する一要素としてとらえられているのに対し、日本では壁の概念から無縁である。その結果として断面構成が二重の場合に複合語の意味のずれが生じている。

桁と plate の語義は、ともに意味が限定されず広い点が共通している。日本では最広義でも垂直材の上辺を繋ぐ水平材というところまでであるのに対して、イギリスではさらに広義に、架構の上端と下端までを含んでいる。

英語の beam は日本の梁より意味が狭い。複合語で見ると、イギリスでは beam がトラスの一部として位置づけられ、基本的に梁間方向にのみ現れている。一方、日本では梁が梁間、桁行両方向に現れる。それゆえ日本の梁の種類はイギリスよりずっと多く、また梁に関連した複合語も多様である。

曲がり材を比較すると、イギリスのものは、truss 全体の形状に合わせ対称的に架構されているのに対して、日本のものは、一箇所ずつで補足的に用いられる構法である。

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