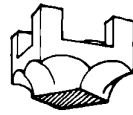
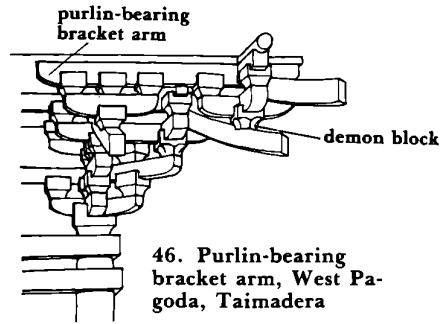


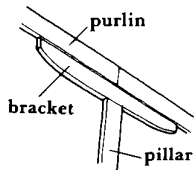
BUDDHIST ARCHITECTURE— STRUCTURE AND DETAIL



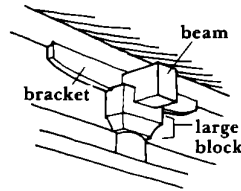
45. Demon block, West Pagoda, Taimadera



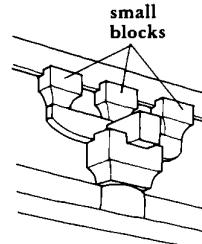
46. Purlin-bearing bracket arm, West Pagoda, Taimadera



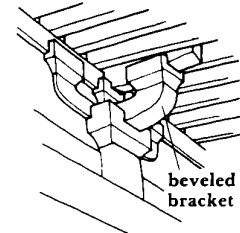
47. Boat-shaped bracket arm, Main Hall, Daitokuji



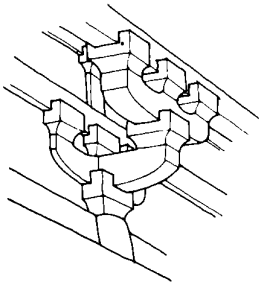
48. Large block and bracket arm, Dempodō, Hōryūji



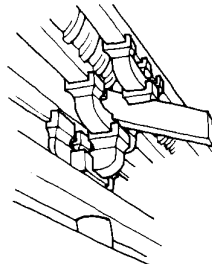
49. Flat three block, Great Lecture Hall, Hōryūji



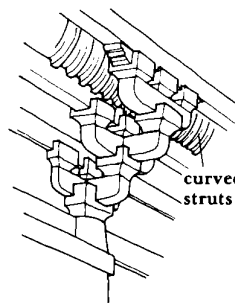
50. Projecting three block, Main Hall, Chōkyūji



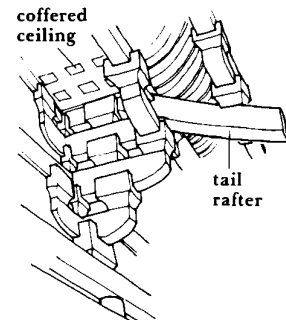
51. Projecting complex, Hokkedō, Tōdaiji



52. Two-step complex, Five-story Pagoda, Kaijūsenji



53. Two-step complex, Main Hall, Daizenji



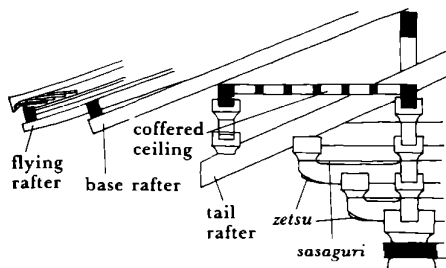
54. Three-step complex, West Pagoda, Taimadera

Bracketing The Buddhist temple has manifold uses—besides housing one or more images, it serves as a place for ritual and worship, and as a symbol of the Buddhist faith. To serve these purposes, it requires imposing and permanent structures. The grandeur of the temple is in large part created by the deep eave overhang of the dignified roof, and the course of bracketing that supports it beneath. The bracket system is thus one of the keys to both the structure and the ornament of the temple, and it has undergone a long series of refinements in consequence.

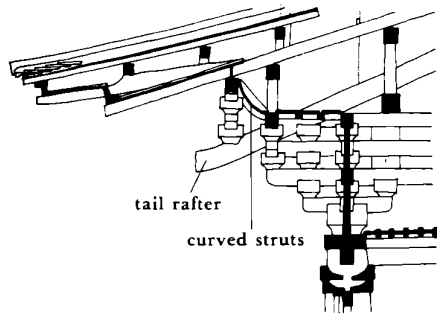
The bracket complex (*kumimono* or *tokyō*) consists

of two basic parts, the bearing block (*masu*) and the bracket arm (*hijiki*; fig. 48). The bearing block is basically a square or rectangular cube beveled at the bottom (the “block tail” or *tojiri*). When set directly on a column, this component is known as a “large block” (*daito*; fig. 48); on a bracket arm, it is called a “small block” (*makito*; fig. 49). Bearing blocks set on corner posts have more intricate bevel carving at the block tails and are called “demon blocks” (*onite* in consequence (fig. 45).

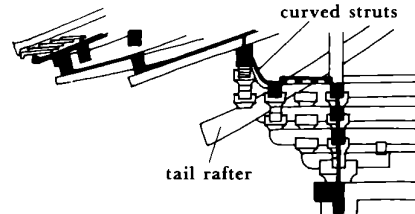
The outward support of the bracket complex is provided by bracket arms. They too are beveled at their projecting ends, making them resemble human



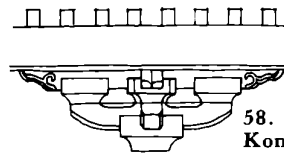
55. Three-step complex,
Three-story Pagoda, Yakushiji (730)



56. Three-step complex, Five-story Pagoda, Daigoji (952)



57. Three-step complex,
Three-story Pagoda, Jorakuji (1400)



58. Six-branch placement,
Kongodō, Enkyōji (1544)

Development of the Three-Stepped Bracket

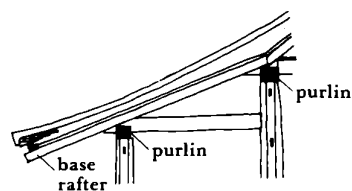
The three-step bracket is still at an early stage in its development at the Three-story Pagoda of Yakushiji (730; fig. 55). The design has not reached the point where all blocks are used in vertical rows of two or three. Bracket arms still retain the slight tongue-like protuberance (*zetsu*) on their lower corners and the understated concavity on their upper surfaces (*sasaguri*; fig. 55), both features of brackets at such early sites as Hōryūji. Later the *zetsu* and *sasaguri* cease to be used.

By the tenth century, all the blocks at the Daigoji pagoda appear in vertical groups (fig. 56), and curved struts (*shirin*) are fit between the second and third steps of the bracket complex. A final development occurs in the fourteenth and fifteenth centuries, when each of the uppermost three-block bracket arms has exactly six rafters above it, two per block (fig. 58). Though impossible to tell from figure 57, this is the case at the Three-story Pagoda at Jōrakuji. The system, called "six-branch placement" (*rokushigake*), effects a more organic relationship between the brackets and rafters.

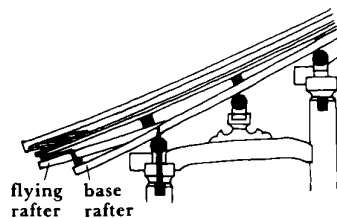
elbows (*hiji*), whence comes their Japanese name "elbow wood" (*hijiki*; fig. 50). When the uppermost bracket arm rests on the small blocks beneath and directly supports the purlin above without the agency of more small bearing blocks of its own, it is called a purlin-bearing bracket arm (*sane hijiki*; fig. 46).

Though the bracket complexes used in the Japanese, Great Buddha, and Zen styles are all different in configuration, that of the Japanese style is the most basic, and its general characteristics apply to the other two as well. We will therefore concentrate here on the Japanese-style bracket complex. The

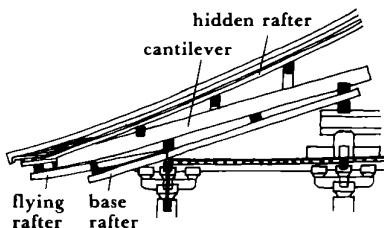
simplest of these is the "boat-shaped bracket arm" (*funahijiki*), which directly supports the beam above (fig. 47). When it rests on a large bearing block, it is called a "large block and bracket arm" complex (*daito hijiki*; fig. 48). Mounting three small blocks atop the bracket arm makes it a "flat three block" complex (*hiramitsudo*; *mitsudo* meaning "three blocks;" fig. 49). When a second bracket arm projects from this assembly perpendicular to the wall to support a rafter by means of a single bearing block, it is called a "projecting three-block" complex (*demitsudo*; fig. 50). Adding to that single block a second three-block unit under a purlin creates the "projecting com-



59. Single eave, Higashimuro, Hōryūji (late 7th cen., with later remodeling)



60. Double eave, Dempōdō, Hōryūji (739)

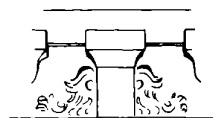


61. Double eave, Worship Hall, East Precinct, Hōryūji (rebuilt 1231)

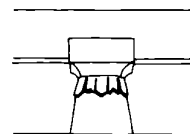
Eave Construction

Eaves are supported by rafters (*taruki*), which rest on purlins (*keta*) and are cantilevered over the bracket complexes. In early structures the load of the roof is supported directly by posts beneath. This is the case at the Higashimuro of Hōryūji (fig. 59) and the Dempōdō of Hōryūji (fig. 60), both dating from the Nara period (710–84). Later, however, the burden of supporting the roof was assumed primarily by a huge cantilever (*hanegi*) hidden from view. One example is the Worship Hall (Raidō) of the East Precinct (Tōin) of Hōryūji, rebuilt in 1231 (fig. 61). The Worship Hall uses two sets of rafters, the exposed base rafters (*keshōdaruki*) below and the hidden rafters (*nodaruki*) above them, carrying the roof materials. The weight-bearing cantilever in between enables the rafters to be made thinner and extended out further. The two sets of rafters allow the underside of the eave to have a more gentle pitch.

Note too the single-eave raftering (*hitonoki*) of the Higashimuro, which uses only base rafters (*jidaruki*; fig. 59), and the double-eave raftering (*futanoki*) of the Dempōdō and Worship Hall, both of which have base rafters and flying rafters (*hiendaruki*) projecting beyond them (figs. 60–61). Flying rafters increase the curve of the eave ends. It is interesting as well that the Higashimuro uses no bracketing at all (fig. 59). The Dempōdō has simple boat-shaped brackets not visible in the cross section.



62. Strut and block with filigree, North Octagonal Hall, Kōfukuji (1210)

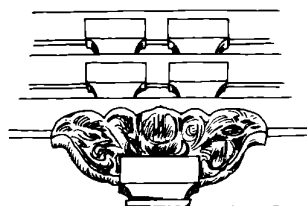


63. Collared strut, Main Hall, Umpōji (mid 15th to mid 16th cen.)

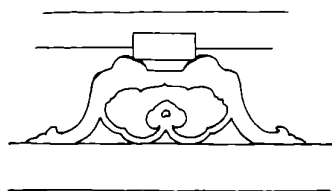
plex” (*degumi*) or “one-step complex” (*hitotesaki*; fig. 51). A bracket complex with a second such assembly projecting a second step outward to support a second purlin is called a “two-step complex” (*futatesaki*; figs. 52–53); with a third, a “three-step complex” (*mitiesaki*; figs. 54–57), and so on. In the case of the three-step complex, the third three-block assembly is usually supported by a “tail rafter” (*odaruki*) cantilevered out over another bracket arm beneath (figs. 54–57). A comparison of the illustrated examples of the three-step bracket complex shows the refinement the design underwent over time, from the Three-story Pagoda at Yakushiji (Nara City, 730; fig. 55), to the Five-story Pagoda at Daigoji (Kyōto City, 952;

fig. 56), to the Three-story Pagoda at Jōrakuji (Shiga Prefecture, 1400; fig. 57).

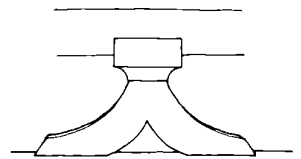
Intercolumnar Supports Additional support for the wall purlin is provided by intercolumnar supports (*nakazonae*) placed in the intervals between the bracket complexes that have posts supporting them. In Zen-style structures, entire bracket complexes are used in these intercolumnar spaces as well as above the posts themselves (see fig. 23), but in other styles simpler members are used. The most basic of these simpler elements is the “strut and block” (*kentozuka*), seen, for example, on the Phoenix Hall of the Byōdōin (see fig. 11). Ornamental variations of this include the strut and block with filigree (*oigata*; fig. 62)



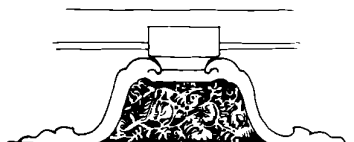
64. Floriate bracket arm,
Two-story Gate, Enjōji
(1468)



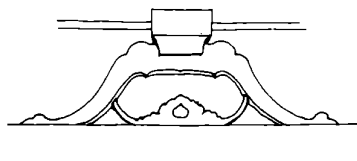
67. Open frog-leg strut,
Jizōdō, Shin Yakushiji
(1266)



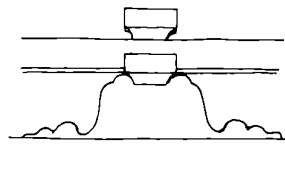
65. Split strut, Golden
Hall, Hōryūji (c.
680-94)



68. Open frog-leg strut,
Jizōdō, Hōryūji (1372)



66. Open frog-leg strut,
Main Hall, Ujigami
Shrine (late 11th to ear-
ly 12th cen.)



69. Closed frog-leg strut,
Second Main Hall,
Udamikumari Shrine
(1320)

and the “collared strut,” named *minozuka* in Japanese for the collar’s resemblance to the traditional straw raincoat (*mino*; fig. 63). Strut and block assemblies are sometimes used in vertical and/or horizontal pairs (fig. 64, top).

The second general type of intercolumnar member is the “floriate bracket arm” (*hanahijiki*), where a standard flat bracket arm with blocks has been stylized through floral carving (fig. 64, bottom). The third type is the “split strut” (*warizuka*), found either with straight or with slightly curved legs (fig. 65). The design, resembling the diagonal braces (*sasu*) supporting the roof ridge (see fig. 30), may have been the forerunner of the last main type of intercolumnar

member, the “frog-leg” strut (*kaerumata*), though the origins of the latter are not precisely known (figs. 66–69). First appearing in about the twelfth century, the frog-leg strut became progressively more decorative, incorporating intricate carvings of flora and fauna. In the Edo period in particular the strut often nearly disappeared beneath coiling dragons or other sumptuous ornamentation. There are two basic types of frog-leg struts, the “open” (*hon kaerumata* or *sukashi kaerumata*), where the space between the legs is either empty or filled to varying degrees with carving (figs. 66–68), and the “closed” (*ita kaerumata*), a solid piece bearing only the characteristic frog-leg outline (fig. 69).