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# A Bents Perspective

'Bent' is an early English construction term referring to the 'cruck' method of building, where a crooked or bent tree would be riven (split) into two lengths and bound (bent) together at the ridge, held apart with a collar tie and raised into position to form an A shape bent cruck frame. A number of these bent cruck frames would serve as sectional supports for the connecting beams and purlins. Refer to Figure i-1.



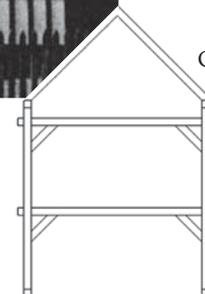
Figure i-1  
Bent Cruck Frame

This bent cruck method of building was used primarily for barns and rural housing and obviously limited in material availability. The irregular shape of the hewn logs would have necessitated a centerline reference, for there were no flat surfaces. The method of layout would have been 'scribe' (due to the irregular, bowed surface), requiring the positioning one timber atop the other with their centerlines plumb and level. A compass-like tool called a scriber was used to transfer the points of joinery from one irregular timber surface to the other, all aligned to a centerline, very similar to log construction.

After the fall of the Roman Empire, Europe underwent tremendous growth in urbanization spurred by the emergence of new countries, states and kings. Heinrich I, during his reign as Germany's first monarch from AD 912-936, made the decision to bring his peasant commerce within the fortified walls of his castles as protection from the marauding Huns, creating the first medieval cities. Space in these new cities was very limited, requiring a building system that was fast and efficient and would lend itself to additions and renovations. The rural methods of log 'blockwork' and post and beam 'frame and rubble' was just not portable enough. The answer was 'braced' timber framework, the inclusion of diagonal kneebraacing gave the structural rigidity to be easily assembled between existing buildings. The infill walls could proceed after the roof was placed. Refer to Figure i-2.



Figure i-2  
English Half-Timber  
Bent Style



German Geschossbau  
Bent Style

Two basic medieval timber braced framing styles emerged, known by many names, and represented by the Germanic 'geschossbau' and 'stockwerksbau' frame types. Refer to project Post & Beam perspective. The geschossbau frame is a timber 'bent', a sectional (transverse) support for the connecting beams. Apart from the post height limitation and eventual favor of the stockwerksbau platform framing method, the bent was an effective cross-sectional support, which gave rise to the truss.

Following the Crusades during the 14th C, the Church had money and desire to create lofty roofed houses of God. Master carpenters and masons learned the mathematics and geometry to build the truss. Great 'hammer-beam' trusses would crown stone walls giving wide spans with an unobstructed view to the celestial cathedral ceiling above. The magnificent hammer-beam trusses of Westminster Hall span over 68 feet (20.7 m), extend over 240 feet (73.2 m) long and carry a roof dead weight of over 800 tons. Refer to Figure i-3. Commissioned by King Richard II in AD 1393-99, the master carpenter was Hugh Herland. Various types of truss configurations, not so grandiose, that did not require the monolithic strength of stone walls would soon be incorporated into braced frame bents. These structural bents become the cross-sectional supports for the purlins and beams connecting them into a structure. Refer to Figure i-4 a,b,c.

Figure i-3  
Westminster Hall  
Hammer Beam Trusses



Figure i-4a,b,c  
Bent Truss Styles

