BENDING TIMBER.

All bearing timber or timbers to be subjected to strains should before being used or placed in position, be felled at least two years, and be at least six months out of the water. Builders and lumbermen too often use timber soaked with water or inherent with fresh sap, and the result is great shrinkage or splitting under strain.

When framing timbers in large bearing constructions, such as trusses, bridges, and so forth, the timbers should be carefully examined so as to obtain the best permanent results, and have the timber placed in its most natural position. For example, if a stick be bent or curved and the upper part or side be under the strain of compression (as it will be, if placed cambered side up) the shrunken fibres on the round side will also very properly be in compression and the hollow side or compressed fibres in tension.

When the height of a post does not exceed seven or eight times its diameter or thickness, it crushes without bending; therefore, to obtain the utmost strength with the greatest stiffness a post or wooden column should not be higher than ten times the diameter (if round) or thickness (if square.)

Above ten times the diameter the strength decreases in the following proportions:—

For a post	12ft.	high	the decrease is	5/6
" "	24ft.	"	"	½
" "	36ft.	"	"	⅓
" "	48ft.	"	"	⅙
" "	60ft.	"	"	1/24
" "	72ft.	"	"	1/24

From the above table will be seen the necessity of strengthening posts or bearing uprights by braces or cross timbers, thus guarding against buckling or springing sideways, the strength of timbers braced being three times as great as that unbraced.

Regarding the bending of large timbers for structural framing or bridges, the writer would state that steaming being too long a process for rapidity or economy, its use has become obsolete and the simpler method of building up a curved beam by bending a series of thicknesses round a mould or form is now mostly employed. The author has seen curved beams or trusses built up by this laminated system, even to an elliptic shape, the thicknesses being ½ in. or ⅜ in. of yellow pine, and breaking joint, the full constructed thickness of the beam being 8 in. and its depth 14 in. The ends were kept in position by a tie rod of wrought iron 2 in. in diameter, screwed to a tension with a turn-buckle.

Wood is elastic, and when not too well seasoned, will readily bend without breaking, and as it becomes seasoned when bent, it retains its curvature without going back to its natural shape. This fact is much appreciated and employed by ship and boat builders in bending knee ribs or other curved structural parts for the frames of hulls, and might be followed with success in much of the circular outside finish in our modern frame cottages. In this connection I might state that there are really only two successful methods of bending for outside finish, and these are either cut the stuff out of the solid wood or build it up and bend in thicknesses.—Owen B. Maginnis, in Carpenter and Builder.

RELATIVE STRENGTH OF METAL AND TIMBER.

In a comparison made by Prof. R. H. Thurston of the relative strength of metal and timber, cast iron, he states, which weighs 444 pounds to the cubic foot, will sustain in a one-inch square bar a weight of 16,500 pounds; bronze, weight 525 pounds, tenacity, 36,000; wrought iron, weight 450, tenacity 50,000; hard "struck" steel, weight 490 tenacity 78,000; aluminium, weight 168, tenacity 26,000 In comparing equal weights of wood and metal the latter does not always prove the stouter, the instance being cited of a bar of pine just as heavy as a bar of steel an inch square and holding up 125,000 pounds, the best ash 175,000, and some hemlock 200,000 pounds. The best steel castings made for the United States navy are rated at a tenacity of 65,000 to 75,000 pounds to the square inch. By solidifying such castings under a great pressure, Whitworth got a tensile strength of 80,000 to 150,000 pounds. Fine steel wires and ribbons from ingots give a tenacity of 300,000 pounds to the square inch of cross section. Ordinary aluminium is only one-third as heavy as steel; a bar of it, with a square section of three inches, will hold up 78,000 pounds.