

centre load is 6 by 10 by 90 divided by 12 equals 720 lb. From these examples it is seen to be always most economical to set a horizontal beam on its edge, or place it so that the greatest dimensions shall correspond to its depth.

5. To find the weight that an inclined beam (as a rafter) will safely bear at the centre distance between supports:—

Rule.—Find the centre weight by the fourth rule—that a beam of length equal to the horizontal span or spread of the inclined beam will safely sustain—divide this result by the horizontal span of the inclined beam.

Example.—What will a pine rafter 20 ft. long, with 12 ft. rise and horizontal span of 16 ft., of 2 in. by 4 in., sustain safely at centre when there is supposed to be no support at its centre? If horizontal and 16 ft. long, the safe centre weight equals 2 by 16 by 90, divided by 16, or 180 lb.; dividing this result by 16, and multiply by 20, the safe centre weight is 220 lb. This would correspond to a uniformly distributed load of 440 lb. If the rafter be supposed to carry two square feet for each foot in length, the load would be 104 lb. to each square foot.

Note.—A rafter of these dimensions would need a support at the centre; in that case its horizontal span would be 8 ft. instead of 16 ft. The result would be a safe centre load of 440 lb., or a safe distributed load of 880 lb.; but this is distributed over a rafter 10 ft. long instead of 20 ft., so that on the same supposition as before the safe load becomes 41.6 lb. per square foot; a safe load for any roof.

Remark.—This rule, although sufficiently exact for ordinary purposes, and safe for ordinary roofs when the factor of safety, five, is used, must be replaced by more exact and complicated rules when very exact results are required. This is safe for all farm buildings.

6. When the dimensions of a horizontal beam that will safely carry a given load are wanted, the following rules must be used:—

The product of the breadth into the square of the depth equals the load at the centre divided by ninety for pine, or by the numbers given under the fourth rule for any other material. By assuming the depth the breadth can be found.

Example.—What sized pine beam, 16 ft. long, will safely support 1,000 lb. at its centre?  $1,000 \div 90 = 77.1$ , equals the breadth multiplied by the square of the depth. If we assume the depth to be 3 in., its square is 9 and the breadth 11.1, divided by 9 = 1.3.

Hence the answer is a piece 1.3 by 3.

When the load is distributed over a number of square feet, the centre load must first be found by multiplying by the number of feet and dividing by two.

7. If the beam is inclined, divide the centre load by the length of the beam. Multiply this quotient by the horizontal space, and proceed as in the sixth.

8. The amount an upright beam will safely carry when subjected to a pulling strain, can be found by multiplying the number of square inches of its cross section by the strength of one square inch.

The following table gives the safe strength of different woods:—

Woods.	Safe strength lbs. per sq. inch.
Ash.....	3,200
Birch.....	1,200
Hickory.....	2,200
Maple.....	2,000
White oak.....	2,000
Pine.....	2,000
Walnut.....	1,600
Poplar.....	1,400

9. The amount an upright post loaded at upper end will sustain can be found approximately in the same way as the tensile load; the amount per square inch should be taken about four-fifths that given in Rule 8. This is an approximate rule that cannot be relied on in cases where very accurate results are required.

These rules give accurate results with the exception of rules 5th and 9th. The results given by rule 5th are

safe, and do not differ much from the true results. Those given by rule 9th for the size of posts are very near correct when the posts are of moderate length.

#### PERSONAL.

Mr. M. Gendron, a well-known lumberman of the Upper Ottawa, has returned to Ottawa after a successful season's operations.

A protest has been entered against the election of Mr. A. Miscampbell, the well-known lumberman and member-elect for East Simcoe.

Mr. David McLaren, the well-known lumber merchant of Montreal, has been elected on the board of directors of the Consumers' Gas Co. of that city.

It is with regret we observe the announcement of the death at Liverpool, England, of Mr. Robert Blackburn, of the Hawkesbury Lumber Co., of Ottawa, at the age of 66 years.

Mr. Frederick Lingham, of Belleville, Ont., has just returned from a trip to Johannesburg, Africa. Mr. Lingham is interested in lumbering and mining matters, and this fall intends to make a large shipment of lumber to Africa by way of British Columbia.

## Lumberman

: : : : : We have Special Values in  
Japan Teas

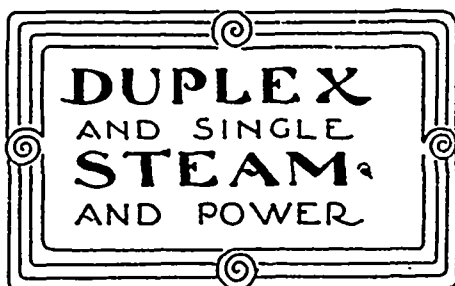
a line of Nagasaki just suitable for  
Camps and prices **RIGHT**. Drop  
us a post card for sample. : : : : :

**EBY, BLAIN & CO.**

**WHOLESALE GROCERS - TORONTO, ONT.**

# Pumps

& HYDRAULIC  
MACHINERY



NORTHEY, LD.  
TORONTO