x16 inch automatic engine, revolving 190 times r minute, with a boiler pressure of 90 pounds s indicator diagrams are not furnished, it will t be possible to tell just how much power this gine is developing, and the next best thing is o determine how much power it can develop un- r fair conditions.

The area of a 16-inch circle is 78 square inches, d the piston speed is 507 feet per minute. The an effective pressure is taken at one-half the ler pressure, making it 45 pounds. When we ltiply these three together and divide the pro- ct by 33,000, we find it can develop 54-horse wer. Large engines of this type will develop horse power on 30 pounds of water per hour, t for one of this size it will be necessary to llow 35 pounds, calling for 1,890 pounds per ur.

shells is 54 inches and they are 14 feet long, with 46 tubes 3 1-2 inches in diameter This makes 98 square feet of heating surface in the shell, and 550 in the tubes, or 648 for each boiler, and as there are two of them they both contain 1,296 square feet of heating surface.

Now, if 1,296 square feet of heating surface is to supply 176 horse power it is allowing only 7 1-2 square feet for each horse power, which is evidently much less than it ought to be, as at least 15 should be allowed. Is it any wonder that they have hard work to keep up steam in the winter time when the sawdust is frosty and may have ice and snow mixed with it? It is usually claimed that there is not work enough on the engines in these mills to call for their full capacity. This may be true, but my experience has been [illegible] in cold weather, wh n the

Columbia River Lumber Company, Golden, B.C.—Hanna's Camp. Slide for driving logs almost completed, 700 feet long and drop of 125 feet. Photo taken on May 10th. That night the reserve dam in the mountains burst and swept entire work away.

here is also a slide-valve engine in this plant ha is 11 by 14 inches, revolving 225 times per nute The area of an 11-inch circle is 95 square hes; the piston speed is 525 feet per minute, nd the mean effective pressure is taken at 45 unds, which makes 68-horse power. We must low 50 pounds of water per horse power for is engine, making 3,400 pounds per hour, or ,290 pounds for both engines.

Let us note whether we have boiler capacity nough to supply this easily or not. One-horse ower at the boiler consists in evaporating 30 ounds of water in one hour under conditions hat are about the same as found in this plant, o that to run these engines the boilers must upply 176-horse power.

We will next note whether they are in condi- ion to do this or not. The diameter of the shafting turns hard in its bearings, and exposed pipes and engines cause much condensation of steam, the full power is called for during a portion of the time at least, so far as the boilers are concerned, and usually they are not large enough to furnish it easily. If only one-half the engine capacity is called for in the above-mentioned case, each horse power must be developed by 15 square feet of heating surface, which is about right where coal or dry wood is used, but is not enough for green sawdust It should be increased to 20 at least, in this case.

Failure to make steam enough in these mills is usually due to two causes, one of which is that the power estimated as enough to run the machines is less than really is called for in practice. The other reason may be explained as follows: The power of a boiler is computed by its ability to evaporate 30 pounds of water in one hour for each horse power, therefore if a man buys a 60-horse power boiler and puts in a 50 horse power engine, of a type that requires 50 pounds of water per horse power per hour, it is no wonder that he can not keep up steam easily, for while his boiler is calculated to evaporate 1,800 pounds of water per hour, the engine must have 2,500 pounds, if it has a full load.

There is another point that I wish to call attention to in this connection, as follows Each of these boilers has 46 tubes each 3 1-2 inches in diameter, so that the combined area of their openings is 382 square inches The area of stack should be about 20 per cent. greater than this in order to secure best results. This brings the whole up to 458 square inches, so that the stack should be 2 feet in diameter and none of the connections between it and the tubes should be less than this. For two boilers it should be 34 inches in diameter, and whether for one or more boilers it should be 80 feet high above the grates. Stacks that are smaller and shorter than this are used every day in the year, but the best results are not obtained unless they are at least nearly as large and as high as the above calculation calls for

A plant that gave very good results when burning wood, green sawdust, etc., as proportioned as follows The engine was 11x30 inches and revolved 72 times per minute With a mean effective pressure of 40 pounds (one half the boiler pressure) it could develop 42 horse power. The boiler contained 900 square feet of heating surface Calculated on the above basis the engine called for 50 horse power at the boiler, which was an allowance of 18 square feet of heating surface for each boiler horse power, or 21 square feet for each horse power that the engine could develop. As the work of sawing is unsteady it did not develop this continually, but for portions of the day it came fully up to it. As I was perfectly familiar with this plant before the mill was burned, I consider it a good practical example of what can be done, as much green chestnut sawdust was burned for fuel.

Taking all of these things into consideration, the following rule for determining the number of square feet of heating surface that will be required in a tubular boiler that is to be fired with sawdust, will answer provided the engine is in good order. When the valves and piston leak steam there is no way to determine the amount required, except to give it a trial.

Rule. Multiply the area of the piston in square inches by its travel in feet per minute, and by one half the boiler pressure Divide by 33,000 and the quotient will be the horse power of the engine. For an automatic engine, multiply the horse power by 18 For a throttling engine, multiply by .25 This will be enough to supply steam when cutting off at about one-quarter stroke in the automatic engine, and its equivalent in the throttling.

The mills and booming privileges of Miller & Woodman, at Pleasant Point, N.B., have been sold to A Cushing & Company, of St John, at a price said to be in the vicinity of $20,000

Sir Henry Joly, Lieutenant-Governor of British Columbia, who has always taken a deep interest in the subject of forestry, has undertaken to test the growing in British Columbia of some of the trees of Eastern Canada, and in November last planted some seeds of black walnut, butternut, white ash, green ash, red oak and maple. A large percentage, it is said, have started growth. The Lieutenant-Governor will make comparisons of the growth of such trees in Quebec with their development in British Columbia. After the trees have attained a satisfactory size for transplanting, it is his intention to distribute them among those who may be interested in such matters.