

Slide 1

Forest Mensuration = Measurement

Stumpage = The value of a tree or a group of trees as they stand, uncut in the forest.

Measuring Logs (Scaling):

- Logs are cut into even lengths from 8' to 16' + 4" for trim.
- Measure Diameter. Use yardstick or Biltmore Stick (Log Scale Stick side) to measure small end inside of bark. Round under 1/2" down and over 1/2" up. Round exactly 1/2" alternating down then up. For oval logs^ average between widest and narrowest.
- Measure lengths. Round to smaller even length(9-1/2' will be 8').
- Convert to board feet Use a log scale, type of which may depend on where one lives.

Scribner Log Rule- oldest, based only on small end, doesn't account for taper, low estimates.

Doyle Log Rule - underestimates small logs, overestimates large logs.

International 1/4" Log Rule - allows for taper, most accurate.

- Convert diameters and lengths to board feet using rule from printed chart or rule from side of Biltmore Stick.
- Some species may be grouped together under separate categories.
- Don't combine species. Keep species separate on tally

Slide 2

MEASURING TREES:

Measure Diameter. Taken at 4-1/2' BDH (diameter at breast height). Use calipers - if not round take average of several measurements. Use diameter tape - graduated into 3.14" marks, 3.14** in circumference = 1" in diameter.

Use Biltmore Stick - "tree scale side**", gives accurate estimate based on geometry, rest stick on tree with eye 25" from stick, instructions on stick.

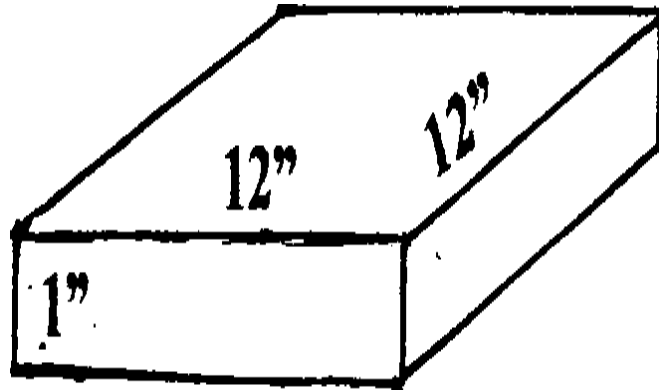
On slopes, measure from uphill side of tree. Trees over 20" in diameter should be checked with diameter tape.

Measure Height Use Merritt Hypsometer (on one edge of Biltmore Stick). Stand one chain (66') from tree. Bottom of stick to line up 18" from ground at stump level. Hold stick 25" from eye. Calibrated in 16' logs that can be cut from tree.

Convert to board feet. Use International 1/4" Rule. Read from Biltmore Stick "tree scale side" of stick.

Don't combine. Keep species separate on tally.

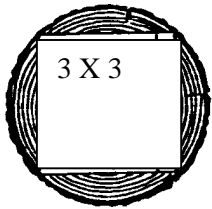
BOARD FEET: Board feet estimates from logs or standing timber can be equated to the volume of lumber that can be sawed from those logs or standing timber. "Typical board foot"



$$12'' \times 12'' \times 1'' = 144 \text{ cu. inches}$$

$$144 \text{ cu. inches} = 1 \text{ board foot}$$

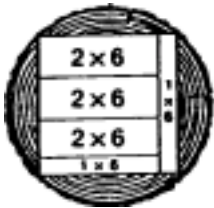
Examples: (given: lengths to be 8')



LOG DIAMETER 5 INCHES
6 BOARD FEET

$$3'' \times 3'' \times 8' = 3'' \times 3'' \times 96'' = 864 \text{ cu. in.}$$

$$864 \text{ cu. in. divided by } 144 \text{ cu. in./bd. ft.} = 6 \text{ bd. ft.}$$



LOG DIAMETER 10 INCHES
32 BOARD FEET

$$7'' \times 7'' \times 8' = 7'' \times 7'' \times 96'' = 4704 \text{ cu. in.}$$

$$4704 \text{ cu.in. divided by } 144 \text{ cu. in./bd.ft.} = 32.66 \text{ or } 32 \text{ bd.ft.}$$

one board sawed to 2" thick x 12" wide x 8' long

$$2'' \times 12'' \times 96'' = 2304 \text{ cu. in.}$$

$$2304 \text{ cu.in. divided by } 144 \text{ cu.in./bd.ft.} = 16 \text{ bd.ft.}$$

MBF = 1000 board feet

Qualitative Assessments:

- Grading: the assigning of a quality value simultaneously with a quantitative value in board feet. Monetary value of a high quality board can be several times greater than a low quality board.
- Veneer: Larger diameter, high quality logs of more desirable species can be sold as veneer logs for as much as three times the value of saw logs, and the mill would not have to saw those logs. At a special facility, hardwood veneer logs will be cut into very thin slices, which will be glued to a low grade board.

CORDS:

- A cord is a volumetric measurement that is typically:
4' wide 14' high x 8' long.
- A cord will equal 128 cubic feet ($4' \times 4' \times 8' = 128 \text{ cu. ft.}$)
- When measuring racked firewood, this may include two rows of pieces cut to 24" long or three rows cut to 16" long.

Example: How many cords are there in a rack of firewood 8'x8'x16'?

$$8' \times 8' \times 16' = 1024 \text{ cu. ft. } 1024 \text{ cu. ft. divided by } 128 \text{ cu. ft./cord} = 8$$

Other Measurement Applications:

<u>Product:</u>	<u>Measurement:</u>
charcoal, turpentine, alcohol	cords, tons
veneer	board feet
pulpwood (under 12" DBH)	cords are not used as much today, tons are used for most operations
firewood	cords