



Forestry Training

**Why Do Foresters Talk the
Way They Do?**

Purpose

To introduce you to forestry terms you will hear in these presentations

- Forester
- Stand
- Stocking
 - (Overstocked, understocked)
- Tree and Stand Measurements
- Basal Area
- Silviculture



What is a Forester?

- Trained, qualified professional who cares for trees and forests
- Training includes:
 - University course work
 - Practical field experience



Foresters & Loggers are not the same

Foresters

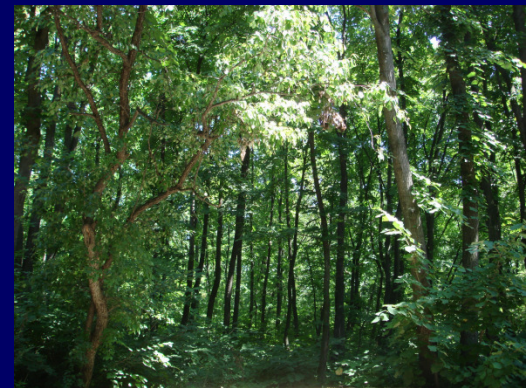
- Architects
- Help design the type of forest you want
- Develop a design that includes a variety of options

Loggers

- Builders
- Cutting, felling & transport of trees
- Skilled in the use of tools, equipment and methods for cutting & removing trees

Stands

Trees → Stands → Forest



Are these stands?

Stand of White Pine?

**Stand of Mixed
Hardwoods?**



What is a Stand???

- A spatially continuous group of trees and associated vegetation having similar structures and growing under similar soil and climatic conditions.
- *A forest is a collection of stands.*
- **We usually manage stands, not forests**

Stocking

- Stocking is an important way of describing a stand of trees.
- A stand can be well-stocked, overstocked, or understocked.
- Stocking is based on the number and size of trees in a stand.

Overstocked Stand

- Trees are spaced so closely that they compete for resources.
- Growth and health of trees is reduced.



Understocked Stand

Trees are spaced so widely that the site is not fully utilized.

Total growth per acre is reduced.



Well Stocked Stand

Trees are spaced widely enough to avoid competition but closely enough to utilize the entire site.

Growth per acre is maximum.

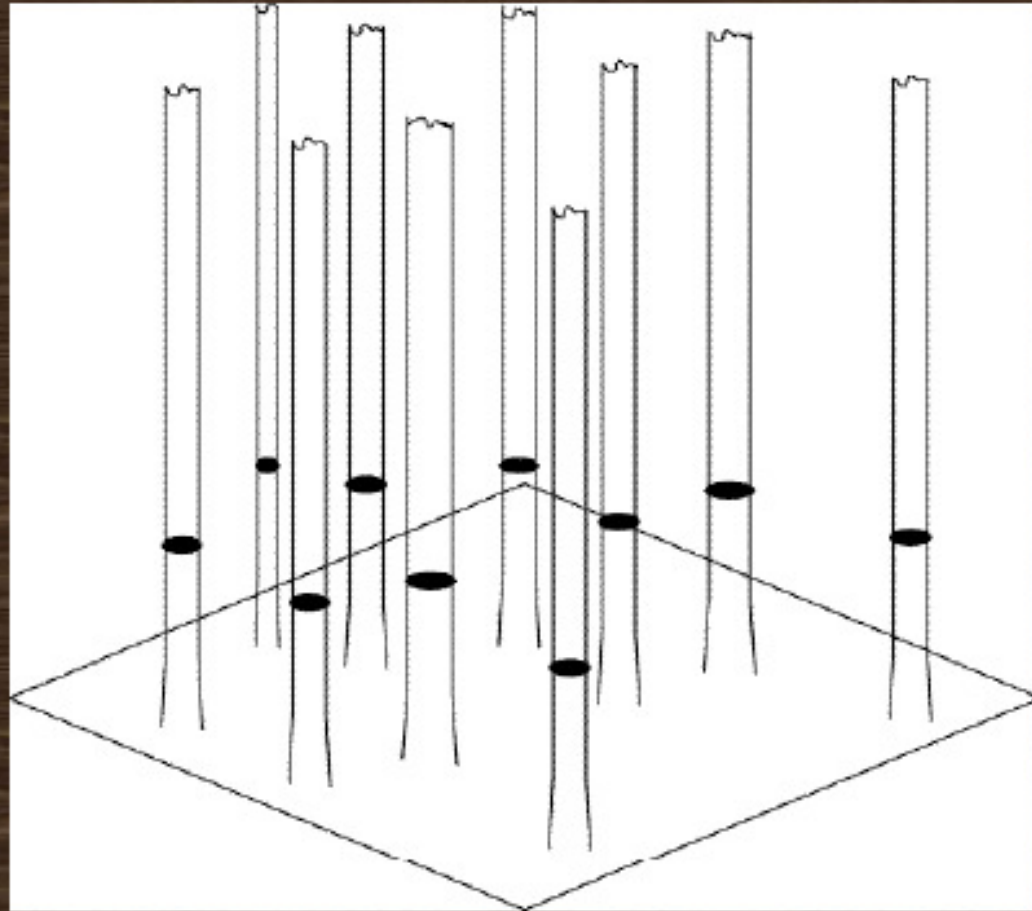
Trees are healthy.



How to measure stocking?

- Diameter at Breast Height (DBH)
 - Average tree diameter at 4.5 feet above the ground
- DBH can be converted to Basal Area (BA)
 - Cross sectional area of a tree (or group of trees)

Basal Area



Basal Area (BA)

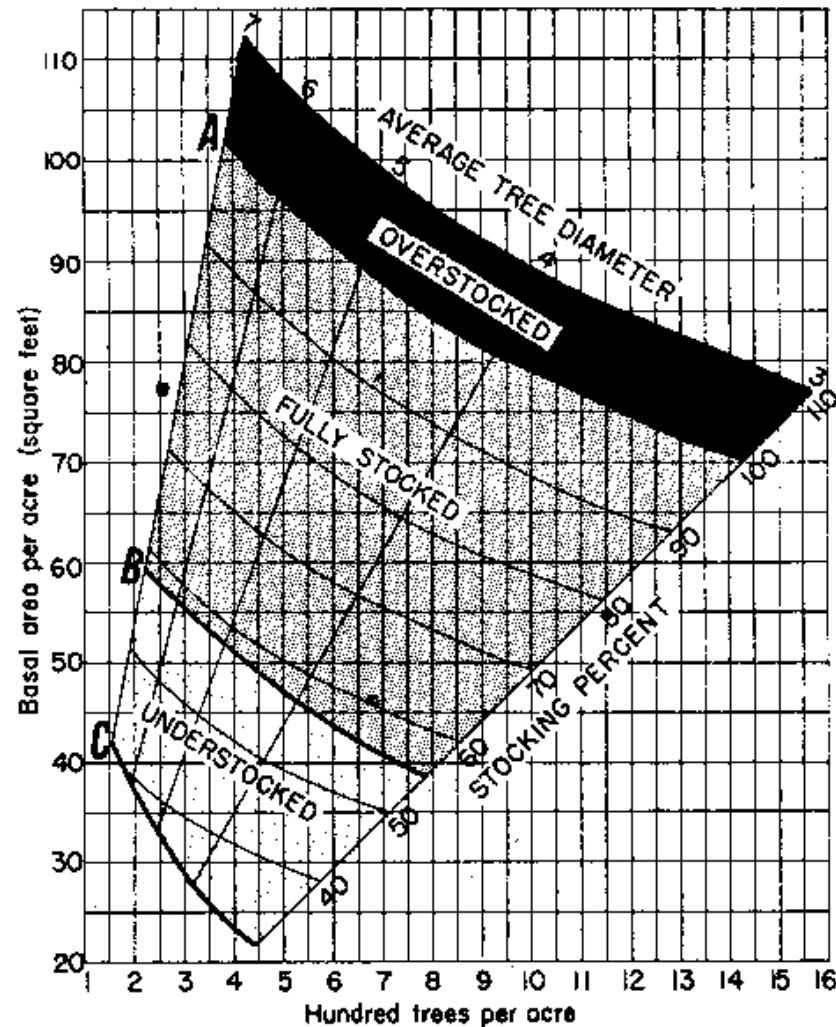
- Basal Area usually described per acre (e.g. $BA = 90 \text{ sq. ft/acre}$)

Stocking Chart

Based on:

- Basal area (BA) per acre
- Number trees per acre

trees can fully utilize the site. Curve C shows the lower limit of stocking necessary to reach the B level in 10 years on average sites. (Average tree diameter is the diameter of the tree of average basal area.)

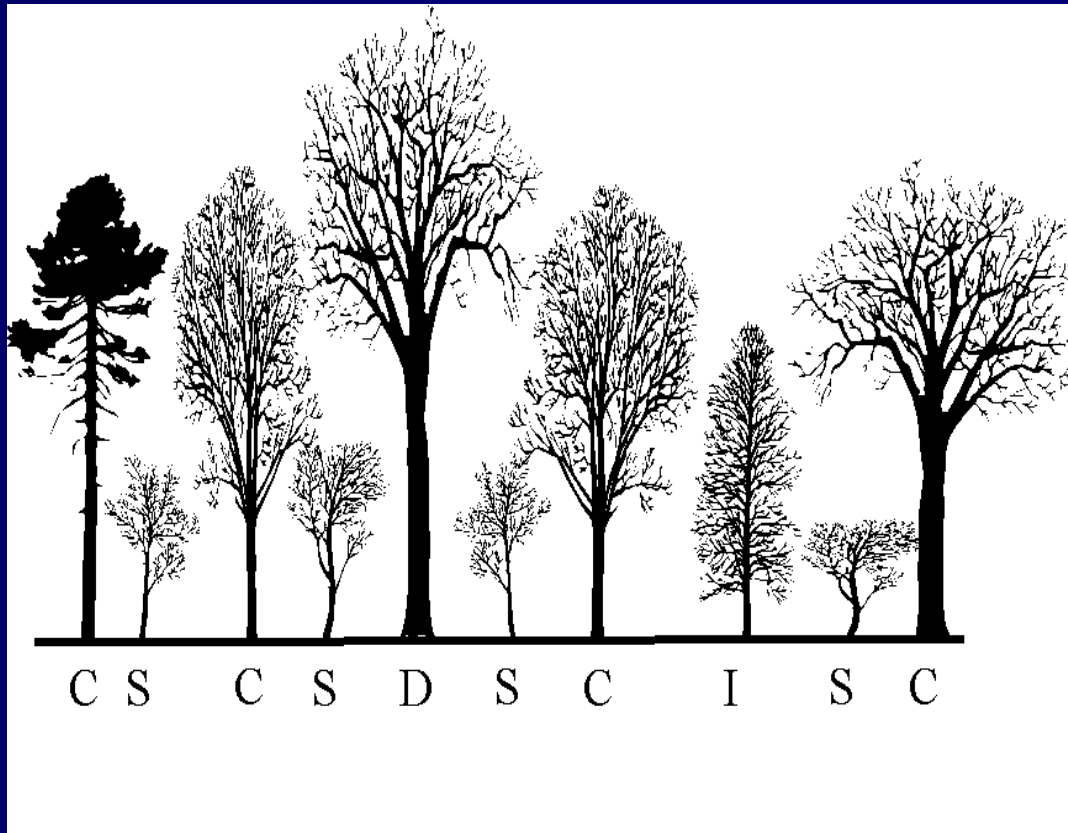


Tree & Stand Measurements



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Crown classes – canopy position



- Upper canopy
 - D (dominant)
 - C (codominant)
- Lower canopy
 - I (intermediate)
 - S (suppressed)

Purpose

To introduce you to basic forestry tools and techniques for measurement of

:

- Tree Diameter
- Tree Height
- Stand Volume



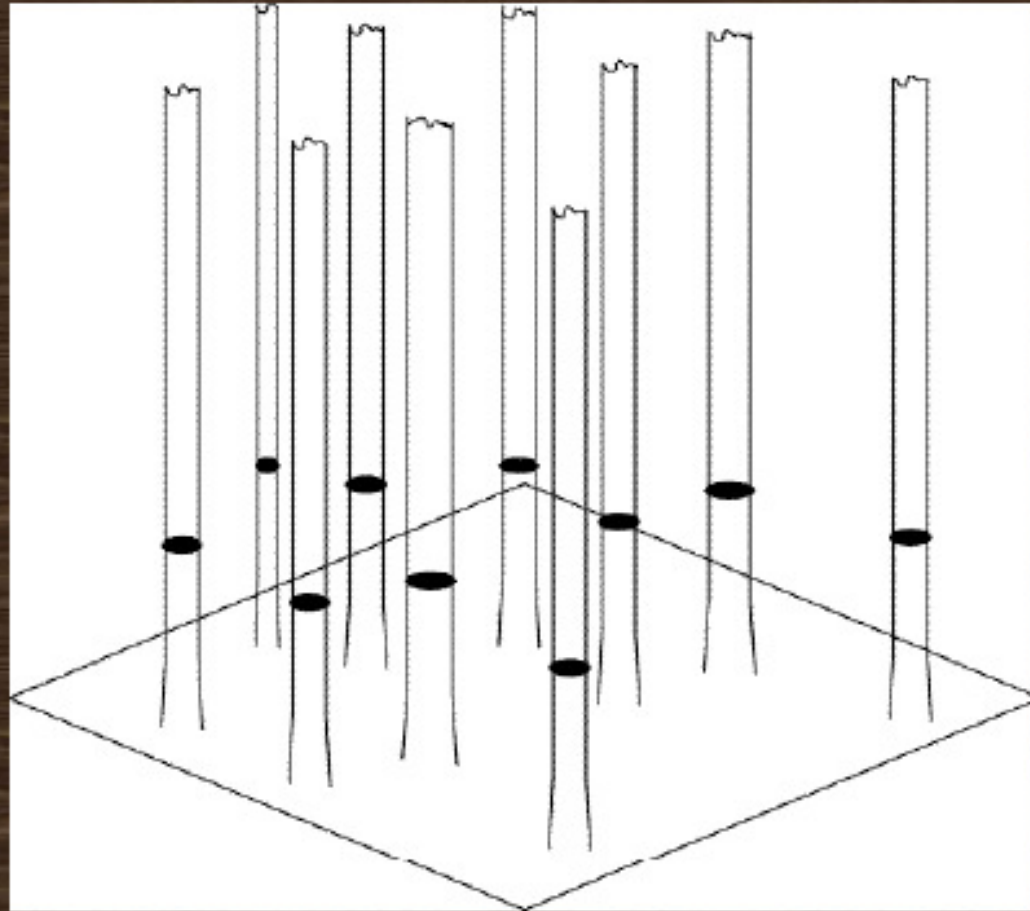
Tree Diameter

- The standard measurement unit for tree diameter is *D.B.H.*
- D.B.H = “the average stem diameter, outside the bark, at a point 4.5 feet above the surface of the ground”

Value of Diameter Measurements

- Diameter is required for determination of tree volumes
- DBH is frequently converted to Basal Area (BA)
 - Basal Area is defined as the “cross sectional area, in square feet, of a tree of known diameter at breast height”
 - Basal Area is an index of (tree) stocking

Basal Area



Diameter Measurement Instruments

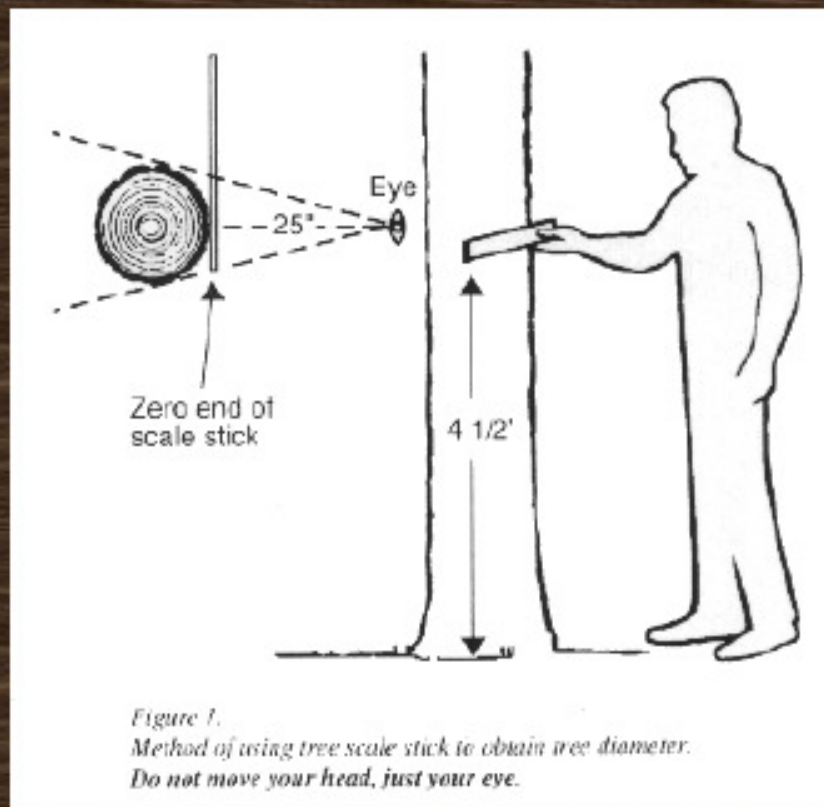
- Tools that measure tree diameter are called *dendrometers*
- Generally three (3) types
 - Biltmore Stick
 - Caliper
 - Diameter tape

Biltmore Stick

- Named after the first Forestry School)
- Straight wooden stick
- Graduated for direct DBH readings
- Generally calibrated to be held 25-inches from the eye
- Least accurate
- Good for estimates
- Requires practice & experience

Tools to use to gather data

- **Biltmore stick** - a tool calibrated to measure the diameter of a tree at breast height.



Caliper

- Wood or Aluminum
- Quick, simple
- Good for measuring trees up to 18-inches in diameter
- Requires that the measurer take two (2) diameter measurements on each tree - one 90 degrees from the other



Diameter Tape

- Most consistent device
- Quick, precise
- Good for trees over 18-inches DBH
- Must make sure that the tape is level & taut
- Reads to the nearest 1/10-inch
- 1-inch of diameter on the tape = 3.1416-inches
- Elliptical trees can read high



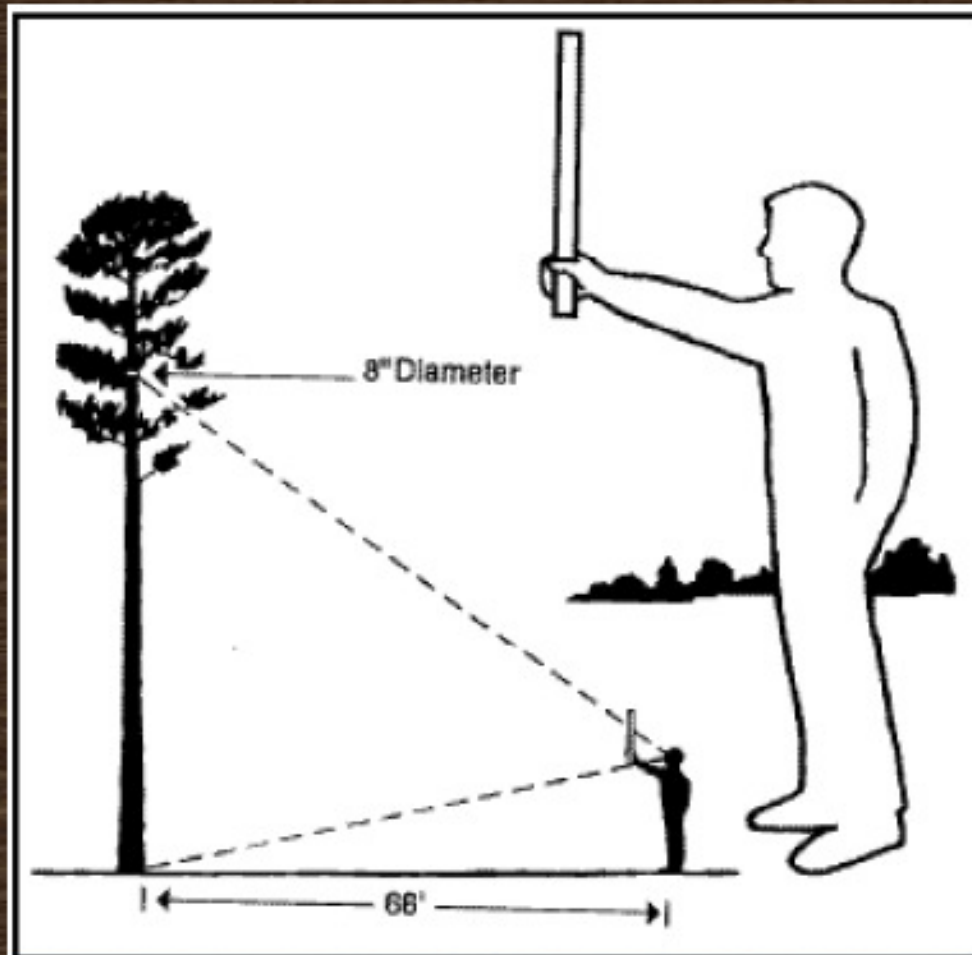
Height Measurements

- Instruments which measure Tree height are called *hypsometers*
- Tree height is required for volume determination & site index
- Many different tools to measure tree height but only a few have gained widespread acceptance by practicing foresters

Merritt Hypsometer

- Tree Height measured from the Biltmore Stick
- Stand 66-feet from the base of the tree
- Sight zero or bottom end of stick with base of tree
- Make a second sighting to merchantable height
- Read the number of 16-foot logs from the stick
- Requires experience

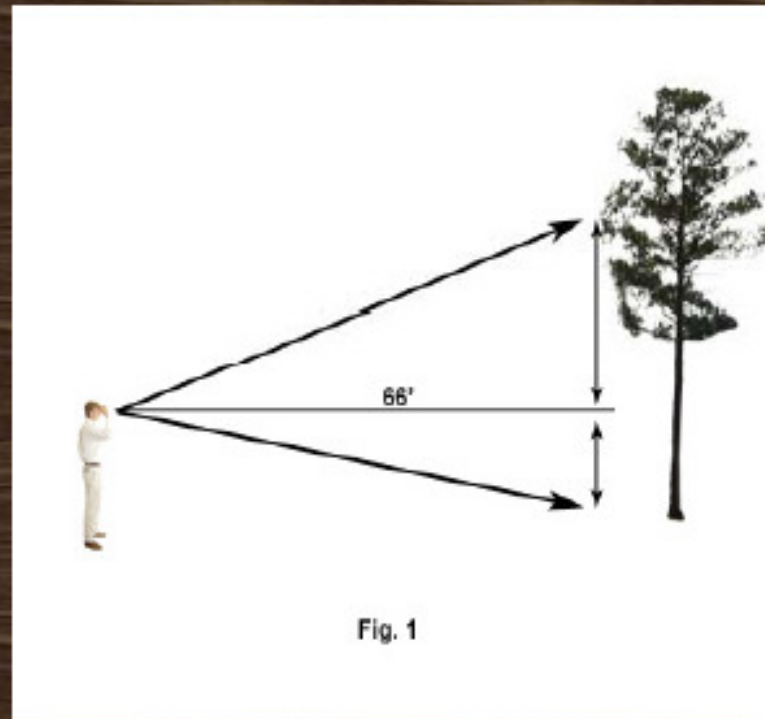
- Biltmore Stick used to determine tree or product height.

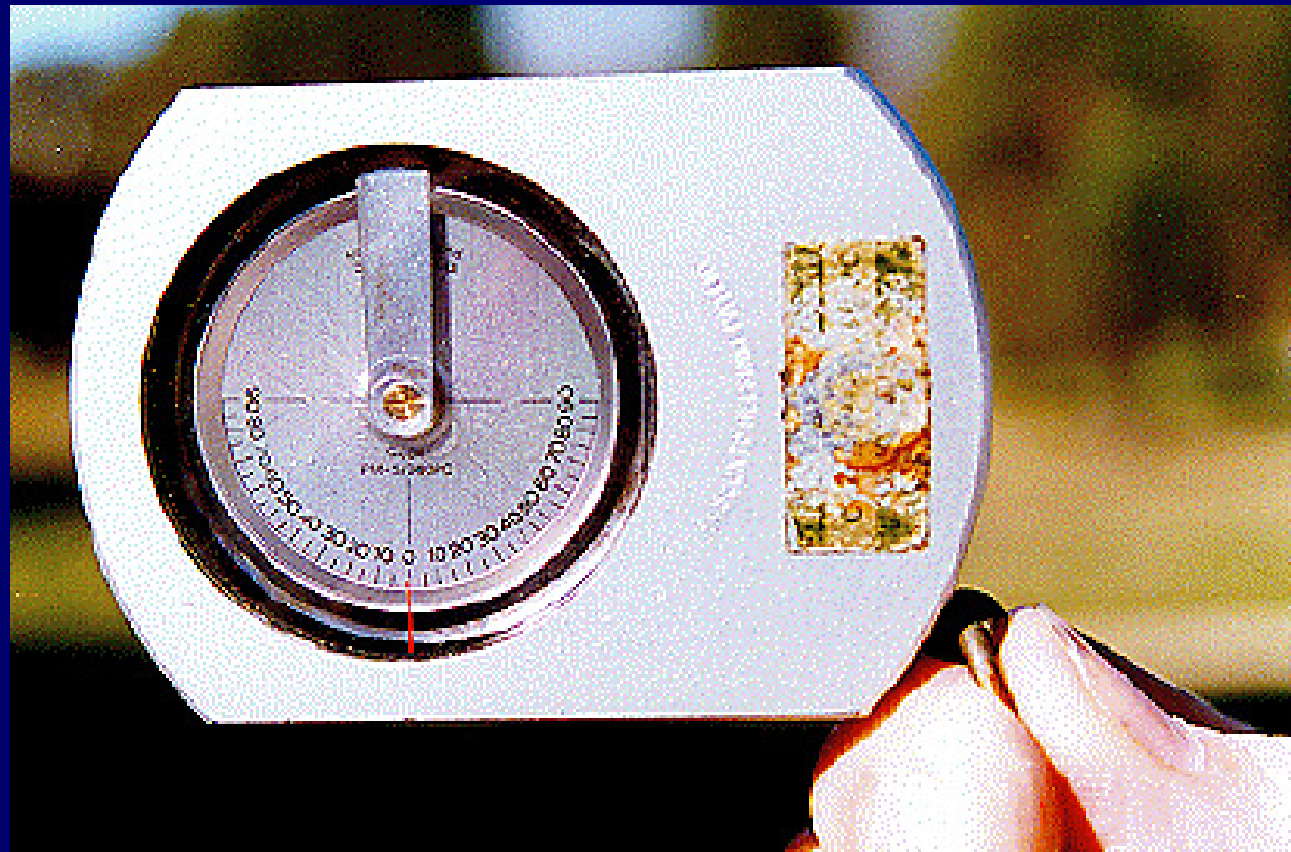


Clinometers or Altimeters

- Measure tree height in two scales
 - % scale (100 ft.)
 - topographic scale (66 ft.)
- operates on basic trigonometric principle that relate tangents of angles to the top and base of the tree which are multiplied by the horizontal distance from the tree to derive the height
- Result in readings directly in feet or meters
- Accuracy to within 2-5% of tree height

- Clinometer - an instrument used to determine the height of a tree.





Silviculture = Applied Forest Ecology

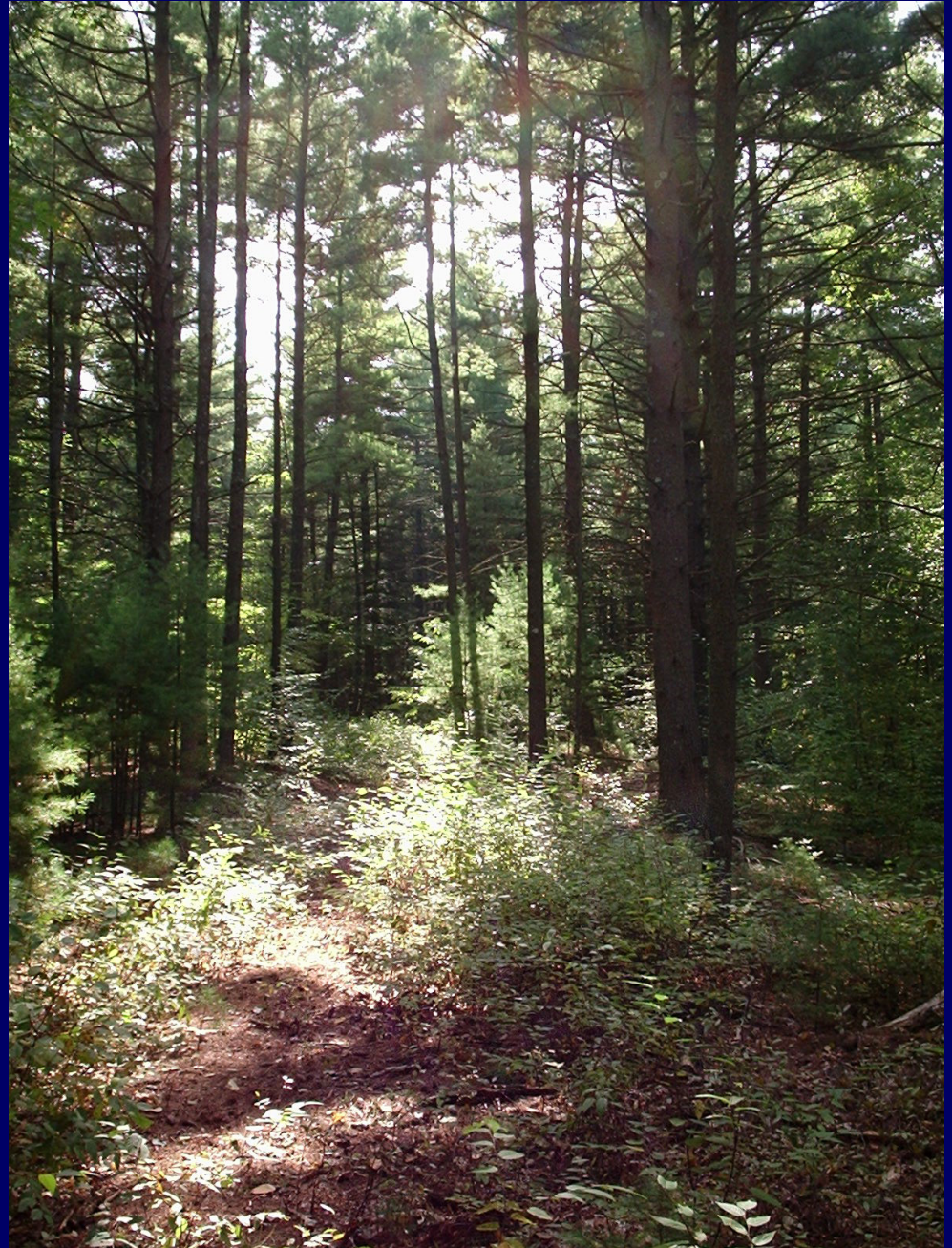
- The (art and) science of controlling the **Establishment, Composition, Growth, and Quality** of forest stands to achieve the objectives of ownership.
- A means to an end
- Tool to “control” forest vegetation
- Done in the context of sustainability



Single-tree selection



Single-tree selection



Patch Cut



Shelterwood



Clearcut



Clearcut for Wildlife Habitat

