‘State of the Art’ Timber Cruising

a.k.a. “Vertical Log Scaling”
Why Cruise?

1. To measure volume prior to harvest.
2. To apply dollar value to standing timber
   - Timber Sales
   - Sale of Land and Timber
   - Collateral for loans
Quote: “The only thing worse than a timber cruise is two cruises on the same area” - Unknown
What Do Cruisers Measure?
Tree Form Equations

Figure 1
The Shape of Trees

Trees are basically the same shape the world around, regardless of ownership, region, or management style.

The sampling design and intensity is the same in fixed log length systems or this variable log length system.

The difference is in how the trees are measured and graded.
Figure 2
The Basic Tree Measurements

<table>
<thead>
<tr>
<th>TOP DIAMETER FACTOR</th>
<th>A (1.0&quot;)</th>
<th>B (2.0&quot;)</th>
<th>C (3.0&quot;)</th>
<th>D (4.0&quot;)</th>
<th>E (5.0&quot;)</th>
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<tbody>
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The cruiser measures or estimates:
*D4'H
*Form Factor; diameter at Form Point / D4'H
*Bole Height stump to a Top Diameter Factor.

All lengths are measured from the stump.

FORM POINT and TOP DIAMETER FACTOR can vary depending on the size and shape of the trees.

All diameters are measured outside bark.

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C.E. Behr
1923
Variable Log Lengths

Figure 3
The Variable Log Length System

Logs are made to reflect probable falling and bucking in preferred lengths and to the best sorts and grades.

CONVEX HYPERBOLA

88% 25"

STUMP

D4'H  FP  FF  TDF  BL  SGlog1  SGlog2  SGlog3
25  16  88  4  97  34  38  24

97' BOLE LENGTH

34' log

38' log

24' log

.4  8.8"
Log Grades & Sorts
Hyperbola Equations
Log Volumes

18” X 34’ = 450 board feet
13” X 38’ = 230 board feet
8” X 24’ = 40 board feet
Tree Measurements
Is it “In or Out”
Bole Heights & Diameters

How come there’s so many limbs in the way?
Timber Cruisers Must Know:

- Basic Measurement Techniques
- Mensuration
- Logging Methods
- Log Scaling
- Products and Markets
- Appraisal Techniques
- Communications Skills
Modern Measuring Tools
Volume Calculations are Driven by Table Values
Defect Deductions

• Best:
  – Feet of Length
  – Inches of Diameter
  – Percent by log

• Worst:
  – Percent by Species for the entire stand
Breakage

• Estimated in the field
  – Cull segments are left in the woods
  – Breakage loses applied like a Log Scaler
Cruising Parameters

- Bark Thickness Ratios
- Minimum Scaling Diameter
- Minimum Log Length
- Preferred Log Lengths
Bark Thickness Ratios

• Wood diameter/bark diameter
• Varies by species, age, site, and region
• Critical to accurate cruise data
  – All cruise measurements are outside bark
  – 4% difference can equal 8% volume error
  – Genetically grown trees have different BTR
Sampling – Plot Design
Training Cruisers

- Visit sort yards
- Talk to scalers
- Bucking Cards
- Efficient use of Equipment
- Roll out scales