technical notes

V-Gauge

by I. E. Bella¹

A fast, accurate and handy diameter-measuring device for small trees (diameters of 4 inches or less) is described. It can be constructed quickly from a piece of plywood 7 x 12 x 1/4 inches.

Studying total productivity of young aspen stands in Manitoba and Saskatchewan required a great number of accurate diameter measurements of stems and branches of small trees. For this purpose, the use of diameter tapes and calipers proved to be slow and cumbersome. Therefore, a fast and accurate diameter-measuring device was needed. This note briefly describes an instrument constructed for measuring tree diameters of 4 inches or less.

The instrument (V-gauge, Fig. 1 and 2) is simply a V-shaped section calibrated on the inner edge of each arm to read tree diameters at the point of contact. For the purpose at hand, calibration was in inches, but it could have been in other units. (The two surfaces would allow for two different units.) Calibration may be for left- or right-hand use. The precision of the gauge may be increased by decreasing the angle of the V and thus enlarging the scale as well as the size of the instrument for measuring the same diameter. The procedure for constructing the V-gauge is as follows:

- (1) Draw an appropriate angle, considering the diameters to be measured and the accuracy required (on Fig. 1 it is 30 degrees).
- (2) Draw a bisecting line.
- (3) Draw a line parallel to one arm of the angle at a distance equal to the maximum radius to be measured (on Fig. 1, R = 2 inches).

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- (4) From the point of intersection of the parallel line with the bisecting line draw perpendicular lines to each arm of the angle (on Fig. 1, lines AB and AB').
- (5) Subdivide the resulting arm sections² (OB and OB') into appropriate units (on Fig. 1, OB is equivalent to a 4-inch diameter and the smallest equivalent units are 1/10 inch).

Any strong but light-weight material is suitable for a V-gauge — e.g. plywood, perspex, glass-reinforced plastic, or certain light metals such as aluminum. Plywood should be sealed with good-quality varnish to protect the scale and preserve the wood. A loop strap attached at the vertex enables the user to wear the instrument on his wrist.

One person using a V-gauge can measure and record tree diameters at about the same rate as two persons — one measuring, one recording — with a diameter tape. As the V-gauge has no moving parts, it cannot get out of adjustment and thus cause instrument errors.

²OB may be calculated by using

$$\text{simple trigonometry: } \tan(\alpha/2) = \frac{AB}{OB}$$

$$\therefore OB = \frac{AB}{\tan(\alpha/2)}$$

Figure 1. V-gauge calibration.

Figure 2. The V-gauge in use.

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