Favorite Papers and Proven Truths after 35 years – J. D. Arney, Ph.D.
Western Mensurationists' Meeting, June 21-22, 1999
Penticton, British Columbia

Thinking in non-conventional space:

"The salient points in the new technique are: progressively diminishing diameters replace heights as the independent variable, the sum of upward progressive totals of height replace weighted squares of diameters, and volume of each sampled standing tree is determined without bias from the standing tree itself rather than from a possibly biased regression developed from felled trees from an alien population." Grosenbaugh (1948)

Gosenbaugh, L.R. 1948. Forest parameters and their statistical estimation. Proceedings of the Auburn Conference on Statistics Applied to Research in the Social Sciences, Plant Sciences, and Animal Sciences. September 7-9, 1948. Statistical Laboratory, Alabama Polytechnic Institute, Auburn, Alabama.

Grosenbaugh, L.R. 1954. New Tree-Measurement Concepts: Height Accumulation, Giant Tree, Taper and Shape. USDA Forest Service. Southern Forest Experiment Station. Occasional Paper 134. 32pp.

"It is shown that precisely two points are necessary and sufficient to determine any stand growth curve. Accordingly, the diversity in growth curves of forests throughout the world is reduced to a few types that accurately describe growth of any coniferous or hardwood high forest stand."

"Unlike equations for physical laws, functions used to describe tree and stand growth do not reflect the essence of the growth. Usually we use a formula if its shape resembles the growth curve's shape, but this resemblance seldom means identity. Until we discover a genuine growth function, it would probably be safer to rely on tables. The two-point principal can be used in any form – formula, table or graph. It is particularly valuable because it allows us to avoid use of questionable formulas and provides a basis for construction of growth types through generalization of yield tables. The types may be easily stored in a computer memory and used for calculations just as well as formulas." Zeide (1978)

Zeide, Boris. 1978. Standardization of Growth Curves. Journal of Forestry 76(5) 289-292.

Mensurational Concepts to build upon (these are non-trivial):

Calibrate models only on growth intervals which exceed six meters of height growth!

Stand density is variable, not constant as applied in most growth models!

"Stand structure is the loose term used to denote stand distribution in space and in size. Although mean tree diameter, volume or age coupled with tree density in space describe the important central tendencies of stand structure, they fail to recognize differences in dispersion. It is obvious that volume behavior of tightly clustered groups of trees of all sizes will be different from the behavior of evenly spaced trees of uniform size, even though the sites, mean densities per acre, and mean sizes of tree are identical."
Grosenbaugh (1948)

Clumpiness of stand structure has been shown to alter final yields by 10-40 percent!

Even-aged models and rules-of-thumb to not apply to all-aged forests!

Grouping by species tolerance is a means of strengthening small datasets!

Small harvest settings (2 hectares – 5 acres) have significant (20-50%) shading impacts on intolerant species!

Locally calibrate tree taper models, site curves, growth models, small-tree survival!

A computer can interpolate a table as fast as solve an equation, use Boris Zeide's advice!

If you really want to know how to design and use forest inventory, ask Kim Iles!