A NEW METHOD IN FORMULATING A VOLUME TABLE.

(F. E. Hutchinson.)

The Taper Curve method of formulating volume tables is now widely known among foresters. While the table evolved is the same as that derived by the older method of arithmetic averaging of volumes, that is, the "Standard" or two-dimension table, and is consequently open to the same objection that form is averaged on the other two variables, yet the saving in labour both in number of trees needed for a reliable average, and in subsequent computation by graphic methods is so great that the method has come into very general use, and may almost be considered now as the "standard method" of compiling a two-dimension table.

In classifying trees prior to averaging the most contentious point involves the decision as to the height classes to be used, total or merchantable. For a set of taper curves presumably of permanent value, obviously total height is the ideal. Yet a table based on total height is a cumbrous thing to use for merchantable volume, and if handled by one not understanding its basis can give rise to great errors in use.

The State Forest Service rimu volume tables were made by the taper curve method in three versions, one each for Central North Island, Westland, and Southland. These tables give merchantable volume by 2 inch D.B.H. groups and 2ft. merchantable height units. In their compilation all merchantable heights in any D.B.H. class were averaged for taper. This was equivalent to assuming that in any D.B.H. class all trees would have the same total height, and that a varying merchantable length was the result of accidental factors operating on the bole of a tree of an unchanging total height. Within the D.B.H. class the average taper curve was compiled as the average form of the lower portion of the bole of a tree of unstated but undifferentiated total height. The result was tantamount to assuming that in Central North Island, for instance, every 24″ tree has the same total height and average form. This assumption is obviously open to serious question, but no study has been made of the extent of the error incurred. It has resulted, however, in a two dimension table reading in merchantable height easily applied by unskilled men in a type of forest where merchantable length is rarely governed by a minimum diameter, but rather by an arbitrary crown distri-

bution, and where poor visibility makes the obtaining of total height almost impossible.

During the past year, Mr. C. S. Barker elaborated a volume table for black beech (**N. solandri**) near Oxford, Canterbury, for the State Forest Service, and was good enough to seek a certain amount of collaboration from the writer.

The field data showed a considerable range of total heights in any given D.B.H. class, as might be expected. Merchantable height in this species is purely arbitrary, and no fixed relation to total height or to height to a given top diameter exists. Visibility is good, however, and the obtaining of total heights in the field is quite possible.

The method adopted was this. The trees were divided into ten-foot classes on total height, and the tapers averaged in the usual way. Then from the harmonised curves merchantable volumes were read off for merchantable lengths by 2ft. units. This, tested on the field data from which it was compiled, gave satisfactory results. The form of the trees is averaged on the two variables of D.B.H. and total height, rather than on D.B.H. alone, as the rimu tables, 'yet reads direct the merchantable volume of any arbitrary length of the lower bole.

The table requires two measurements of height in the field, however. Total height must be known, to place the tree in its right height class, and merchantable length must also be known to secure the volume of bole actually usable in any given case. Three entries are therefore required—D.B.H., total height, and merchantable length, as compared to the usual table where but one height measurement is required. The cruiser must clearly understand this before commencing his tally of the trees. Once this is grasped, however, the work is no more complicated than for tallying in the ordinary way. The sheet is ruled for D.B.H. down the side, divided across the top into fairly broad spaces for 10ft. total height classes. As each tree is encountered its actual merchantable height is entered in small figures opposite the correct D.B.H. and under the appropriate total height.

Examination of the field data showed that no reliable averaging of merchantable lengths could be made in any total height class. In evenaged stands a fairly reliable average of total height on D.B.H. could presumably be made, but it is not considered that much could be gained by attempting to get total heights in this way rather than by direct classification of every tree as encountered