LETTERS TO THE EDITOR

DUBLIN,
1st November, 1954.

DEAR SIR,

Kindly allow me space in your journal to voice a theory which, in my opinion, is the key to the estimation of lop and top in standing timber.

Strangely enough, the idea was first conceived in 1949 on hearing that a lorry-load of round larch stakes prepared to size and specification, had been rejected by a would-be purchaser. The sole complaint was that the wood in the stakes was too young.

Consideration of the matter showed that stakes of the required sizes could be got in the following ways:

(*a*) As butt lengths from a young stand, e.g., thinnings of a thriving seventeen-year-old Japanese larch stand.
(*b*) As top lengths from a middle-aged stand.
(*c*) As butt lengths from an old lanky densely-crowded neglected stand.

It was at once clear that there is no appreciable difference in the age of the wood in the stakes from (*a*) or (*b*), and that case (*c*) would rarely obtain in normally managed woods.

The incident did, however, give rise to a train of thought which eventually led to the present theory.

It was realized that while many books have been written, and are still being written, on forest mensuration—it is not necessary to mention the old familiar Hoppus—little or nothing has ever been written about lop and top of standing timber. It is very understandable, of course, when one considers that firewood in the past was relatively unimportant compared with commercial timber. For this reason primarily occular estimates were considered adequate. Again, the problem brimmed with complexities which, in the case of hardwoods, were not worth the time or trouble of investigation, and in the case of conifers with their low firewood value, a completely futile business.

To-day, however, in the case of hardwoods, closer utilization along with the advances in the field of wood technology, give the opinion that a mensurational technique other than the " hit or miss " method at present used, is justified. It is certainly justified if it is simple in its application and can be made to coincide with the field work involved in normal mensurational work.

Such a technique is visualized here, but before plunging into its theory the writer wishes to emphasize that no claims can be made for it pending successful experimental work. In fact it may be considered a daring innovation doing violence to the tradition of the profession, but if a successful technique is finally evolved as a result of this theory, it is felt that timber valuers and private woodland owners will have a very useful tool at their disposal.

THE THEORY

Every forester realizes that the growth of individual stems in a stand of timber is dependent on density, other variables being constant, e.g., soil fertility, exposure, etc. In other words the larger the crown the larger the tree, the greater the diameter at timber height and breast height and, of course, the greater the volume. The height variable has been ignored on the assumption that volume reflects the combined influence of height and diameter. Considering also that timber height is fairly constant for a given stand, the writer suspects that there is a mathematical relationship between top diameter and crown wood volume.

This theory is further emphasized by the fact that nature normally supports her structures on an adequate foundation. Has anybody ever seen a tree branch greater in diameter than the parent stem, or even equal to it ? This fact again gives reason to believe that there is a nice balance or ratio between branch diameter and stem diameter at the branching point.

SPECIES VARIATION

This suspected relationship will vary from species to species owing to their different branching characteristics. In fact, the whole theory is based on the belief that the branching characteristics of any species are retained as the crown spreads in growth, irrespective of age. In other words, density, which, of course, can be measured as top diameter, is considered the determining factor alone. If this is true a long spindly old tree in a dense stand could have a crown similar to that of a younger tree, provided the diameters at timber height are equal. A practical example may illustrate this point. Every forester knows that he can get a Christmas tree from the top of a spruce pole similar to one removed at pre-thicket stage.

FIELD WORK

The experimental work involves the compilation of data in the field and their subsequent analysis.

The date required are:

(*a*) Species.
(*b*) Top diameter.
(*c*) Quantity of lop and top wood.

It would, perhaps, be advisable to get as much data as possible, e.g., timber height, breast height, quarter girth, and stem volume also, in case they are required. Needless to remark, these data can best be got while felling is in progress. The quantity of crown wood will need to be measured accurately. A portable water-tank with an overflow pipe, known as a zylometer, would be more accurate than weighing the timber, possibly. Any improvised tank should suffice for getting the crown volume by displacement of water, provided the displaced water is collected and weighed. It is then a simple

matter to calculate the wood volume. Weighing carried out immediately after felling whem moisture content is at a maximum, might be sufficiently accurate for a preliminary study.

ANALYSIS

This is the final and most important step. The volume or tonnage data collected in the field are plotted by species against the top diameter for each tree measured, using square paper or graph paper. It might be necessary to plot against basal area or other data, depending on the graph pattern.

If there is a relationship it may be very evident, or it may not. There might be no relationship. A linear relationship would be very satisfactory, but this would be too good to be true, indicating that a direct proportion existed.

If any relationship exists it will in all probability be a curvilinear or parabolic one, but until statistical checks are carried out and found satisfactory the equation of the relationship cannot be determined.

Assuming success the next stage is to compile tables directly from the graph or calculate them from the equation. These tables are the answer to the problem.

I believe that this theory should apply equally to trees of firewood quality, the diameter measurement being taken immediately below the first branch whorl.

Mise le meas,

WILLIAM SHINE.