THE UNRELIABILITY OF TREE GROWTH IN SITE ASSESSMENT

By Malachy Sharkey.

One of the most exacting essentials in reafforestation is the assessment of sites and soils as a necessary preliminary to selection of species. The choice of species has an effect which extends far beyond the early stages of the new crop and whether it is correct or not may often not be clear until the stand is well advanced, by which time mistakes cannot be rectified without drastic treatment and heavy expenditure.

The safest basis for choice of species is the purely ecological one, which normally consists of two steps, namely, an inductive process or an assessment of the principal locality factors, and secondly, a deductive process or selection of a species whose requirements throughout life are likely to be supplied by the site in question. In practice the nature, quality and depth of soil are ascertained by digging test holes or by profile analysis. For further indications of the timber producing potentialities of a site the nature of the surface vegetation and any pre-existing tree growth are taken into account, since the reaction of the living vegetation present on the site is usually indicative of two very important factors, namely, soil fertility and soil moisture conditions.

It is generally accepted that the most reliable and conclusive indicator in site assessment is the quality or success of an existing stand of timber on the site or on a similar site in the locality. A species which gave good results would naturally be repeated, while an existing species which proved a failure would be avoided. But here a note of warning must be introduced. Many are the pitfalls which await the unwary forester. He must tread " cautiously lest he rushes in to judge rashly." *Existing low grade tree growth should not always be taken at its face value—without first considering the history of the accusatory stand.* In this short article I intend to dilate somewhat on this all important aspect of site assessment, namely, the unreliability of existing poor quality timber stands as site indicators without due reference to the history of the stands. As an illustration I will cite two examples from my limited experience as they presented themselves here at Broadford Forest.

Compartment 13, Violet Hill property, has a moderately exposed location with a south-westerly aspect. Most of the area carried a light scrub covering of Birch, Hazel, Mountain Ash and Furze, with occasional scattered conifer standards, apparently the remnants of a former clear-cut wood. The soil generally is of a mild, moderately fresh, friable nature, with a sandstone foundation, and

sufficiently deep to permit of normal root development. The surface vegetation is typical of its Birch-Rowan association and for the most part consists of Bracken, Briar and fine grasses, with scattered areas of fern (Dryopteris filix-mas), and Scabious (Scabiosa succisa L.), with a bottom layer of Bedstraw (Galium saxatile L.) and mosses (Hylocomium squarrosum L. and Polytrichum commune L.).

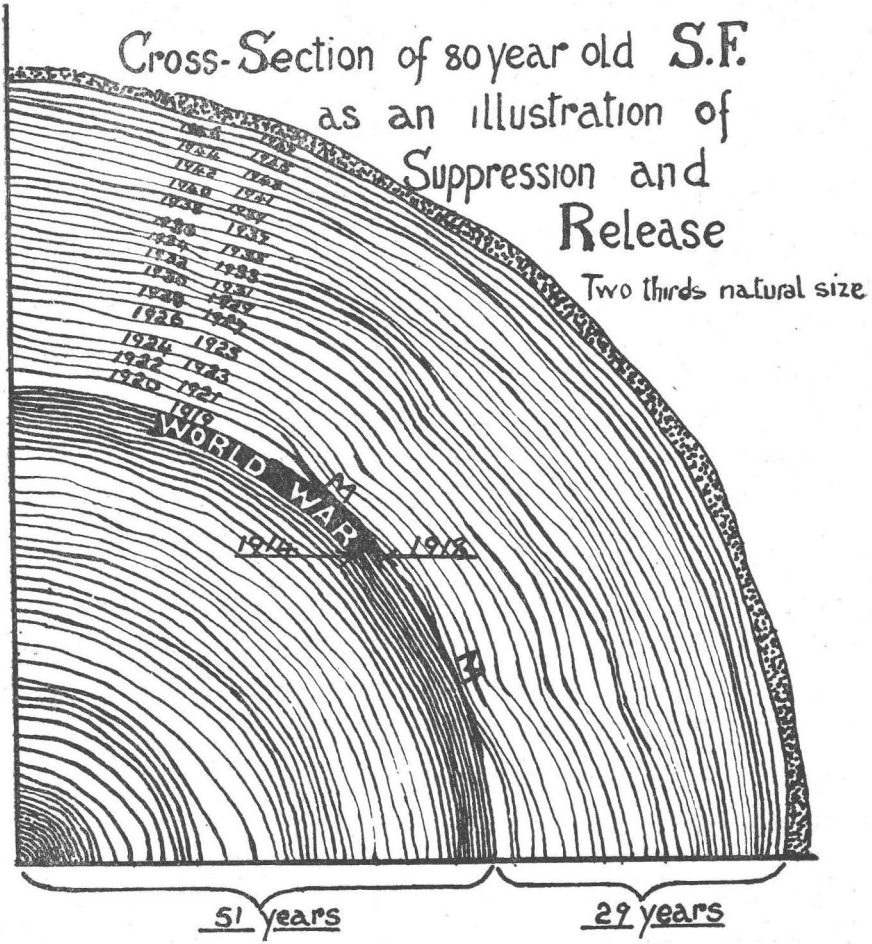
This was clearly a good European larch site as indicated by all locality factors—except one—the presence of a small plot of poor quality larch to the north of the compartment on a site of average soil qualities. These unhealthy E.L. showed various signs of premature stagnation—retarded annual growth, dense covering of lichens on trunks and main branches, and a thick spongy bark. A ring count of a felled specimen showed their age to be approximately 35 years, while their average height was about 30 feet. Their presence on this apparently ideal larch site strongly suggested that at some stage of their existence or perhaps all through their life-growth some inhibitory factor or factors interfered with their normal growth. Fortunately, the one-time estate steward who supervised the laying out of all the younger plantations lived nearby. His testimony vindicated my presumptions. The area under review once carried " the finest larch in Ireland." When this was felled most of the compartment was again planted with E.L. pure. Precautions, however, were not taken against the ubiquitous arch-enemy, the rabbit, who soon made short work of their luscious shoots, resulting in the complete failure of this E.L. crop. Some years later a plot of E.L. culls from another planting area were carelessly planted and protected against vermin only by a temporary fence. Without subsequent attention these few score trees were left to survive amidst encroaching undergrowth until to-day they present themselves—a discredit to their environment.

In example No. 2 the accompanying drawing of a quadrant of a Silver fir cross-section will serve as " Exhibit A." This cross-section was taken from an inferior stunted Silver fir, which, from a ring count, seems to be over 80 years old. It was one of about a dozen similar growing in moderately heavy fertile soil, amidst a stand of oak in compartment 8, Violet Hill property. Some of the oak was recently cleared in the operating of a fuel scheme and the cleared area—on which a moderately dense covering of selected oak standards was retained—was prepared for planting.

And so we come to the selection of species. Judging by the soil and the surface vegetation and bearing in mind that a shade-bearing species was necessary, Silver fir appeared the most suitable species for the new crop. Here again the quality of the old crop, which in this case was the incriminating S.F., growing on the area pointed reproachfully against this species. The forked stunted growth of these Silver fir on such an apparently suitable site appeared inexplicable.

In the course of clearing the area one of the Silver fir was felled—and so, the retarded growth was explained. On the cross-section of the S.F. stump is was noticed that about midway between centre and bark a very dense band of annual rings was visible (see illustration). This cycle of very poor annual growth was followed by a period of very active growth as indicated by the comparatively broad rings immediately adjoining (externally).

What was the cause of this sudden change of growth, or when did it occur ? By counting the number of rings between the dense band and the outer ring it was ascertained that 29 years elapsed since the tree revived its growth activity: 29 years subtracted from



1947 (year in which tree was felled) gave 1918—the last year of the first world. The solution was complete. Obviously, in the exigencies of that stringent period some trees must have been removed from this area, which was conveniently adjacent to a public road. The estate steward later verified that my deductions were correct.

The actual facts were that in 1918 all the better quality S.F. and some of the oak were removed from this area. The only S.F. left standing were semi-suppressed specimens and other inferior types. Even these were damaged in the extraction of the good quality stems, as the old bark wounds (MM), which are visible on the cross-section, indicate. Having obtained liberty and light these suppressed weaklings immediately looked upwards and belatedly recommenced growth until in 1947 they stood—figuratively and almost literally—a question mark.

Thus, in the above two instances a reference to the history of the existing misleading timber crops explained their presence and revealed the causes of their low quality growth. If within the confines of a small forest two such examples of the unreliability of existing low grade tree growth as a conclusive indicator in the assessment of sites so impressively presented themselves, doubtless the very chequered history of Irish woods with their repeated " culling " in successive emergencies—national and international—must provide many pitfalls and false leads to Irish foresters. This must be guarded against, as not only is the timber crop an expression of site qualities, but it is a reflection of site history and management.