

AN ODD STUDY OF TREE STUMPS

Grafted Roots Form Underground Pipe Lines to Keep Alive the Defoliated Trunk.

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The overgrowth on stumps of Douglas and Grand Fir is a very noticeable feature in the woods of the vicinity of Victoria, British Columbia, and first attracted my attention many years ago.

Believing that foliage was necessary to maintain life in a tree and always finding these stumps more or less in the neighborhood of other standing foliage trees of the same species, I concluded that a union of roots between the stumps and tree was the cause.

When, however, a few years ago, I began to assemble photographic studies of characteristics of our native trees for the Natural History Society of British Columbia, one of the first things I sought to learn through correspondence with authorities on the subject was the ascertained, scientific explanation of the matter. Many conjectures and opinions were expressed, but not a single account of actual investigations was given.

Among foresters, lumbermen, farmers, etc., to whom I first spoke and who had observed these stumps, the prevailing opinion seemed to be that the growth of new wood was caused by reserve material in stump, and the idea of its being due to root-union was doubted.

Many botanists to whom I wrote and sent photographs, held that the callus formation was due to reserve material in the stump, while others again expressed the opinion that such vigorous growth was impossible without foliage or root connection with a tree possessing foliage.

A EUROPEAN VIEW.

The first person from whom I obtained authentic information was Professor Somerville, of Cambridge University, to whom Mr. James R. Anderson, of Victoria, had sent some of the photographs of these stumps.

In a letter to Mr. Anderson, April 23rd, 1919, he says (referring to these stumps):

"This is the condition of things we often find in the larch in Europe, which, of course, is a deciduous tree, as contrasted with the evergreen character of the Douglas fir. So far as I have observed, the larch is the only conifer indigenous to Europe, which fre-

quently shows this condition of things, and it is usually attributed to the inarching of roots of adjoining trees, the stump of one that has been felled, procuring a good deal of nourishment from the roots of one or more adjoining trees that have been left growing.

"I do not know that this subject has been exhaustively investigated, but it would be interesting to make an examination of a large number of larch trees which have stood well removed from other individuals of the same species and which have been felled some years before. In such cases, one would not expect callusing of the stools for, if the theory is well founded, it is only where other trees of the same species are left to grow in the immediate neighborhood of one or more that has been felled, that one would expect to find this phenomenon.

"That the roots of trees in a wood grow together to a large extent is an undoubted fact, and the photographs that you have submitted show this very conclusively. Of course, one can have a certain amount of growth taking place in a stem which has been severed from the stump, provided the stem is laid in a cool, moist place, in which event the cambium becomes active in the spring, and ten per cent or more of an annual wood-ring can be formed in the ensuing season. I have found this notably in the larch, but I doubt not it occurs in other species."

MR. PEMBERTON'S FINDINGS.

Whilst, as already related, I sought information through correspondence with authorities, I also took every opportunity of investigating the characteristic of overgrowth of stumps as well as that of the frequency and cause of root-union.

I examined a multitude of overgrown Douglas and Grand fir stumps in the vicinity of Victoria, not only those in which root systems were already exposed to view, but by uncovering many others with root systems deeply buried in the soil.