



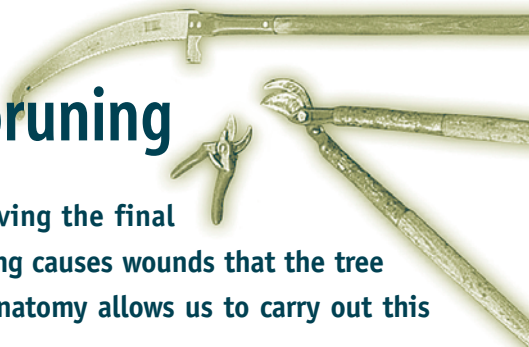
# Branching out

from the Canadian Forest Service ■ Laurentian Forestry Centre

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## Anatomy of a successful pruning

Pruning is a very useful silvicultural treatment both for improving the final quality of a stand and for controlling certain pests. However, pruning causes wounds that the tree must close as quickly as possible. Knowing a few facts about tree anatomy allows us to carry out this operation efficiently while preserving the tree's health.



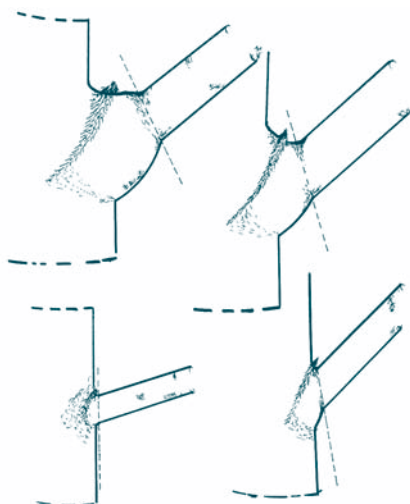
At the junction of the branch and the trunk there is a thicker part, called the branch collar, which is composed mainly of stem tissues that envelop the branch. The collar is easily visible in deciduous trees, but harder to see in conifers because of the pronounced angle between the branches and the trunk.



*Good cut.*  
Photo: SCF



*Bad cuts.*  
Photo: SCF



*Proper cutting angles and positions.*  
Image: A.L. Shigo

Pruning should be done just outside the branch collar, using an appropriate and well-sharpened tool. In many conifers, since the branch collars are not well developed, pruning may be done near the trunk while taking care not to damage the bark.

Another school of thought recommends cutting directly through the

centre of the branch collar. Although the wounds may close more quickly than with traditional pruning, wood discoloration and decay usually develop more frequently with this method. In fact, cutting into the branch collar removes protective tissues that normally prevent micro-organisms from invading the tree.

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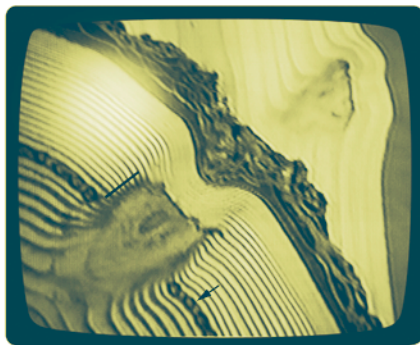
Pruning also accelerates the transition from juvenile wood to mature wood, a remarkable advantage, particularly in conifers. Juvenile wood generally forms during the first 20 years of growth. It has a number of characteristics that affect wood mechanical properties and reduce its quality. For example, it contains shorter fibres and is generally less dense than adult wood. The formation of juvenile wood appears to be promoted by hormones and nutri-

## Defence mechanisms<sup>1</sup>

Bark is the tree's first line of defence. It protects the tree's internal tissues from stress factors such as the presence of a multitude of airborne pathogenic fungi spores. When the bark is damaged, the tree reacts through various mechanisms such as:

- more intense wall lignification;
- significant accumulation of resin in conifers;
- increased growth near the wounds to quickly cover the injury;
- compartmentalization.

Compartmentalization involves various protective tissues which completely surround the wood that has been exposed, for example, to fungi that cause decay, thereby protecting the adjacent healthy wood.



Tree pruned at 19 years (arrow) and closure of the wound after about 10 years. The branch stub (black line) corresponds to the bark thickness at pruning. Background: see picture on the right. Photo: British Columbia Forest Service



Tree with thin bark pruned at 8 years and closure of the wound starting the first year (arrow). Photo: British Columbia Forest Service

ents coming from the branches and tree tops. One or two prunings performed when the tree is young



Plantation of pruned white pines. Photo: SCF

therefore promote the development of adult wood. Furthermore, the bark of young conifers is thin, and pruning usually creates wounds that close quickly in those trees. Pruning performed on older individuals with thicker bark causes wounds that close much more slowly.

It is therefore recommended to prune young trees, using the right tools, just outside the collar located at the base of the branches. The protection area located inside the col-

lar should prevent micro-organisms from penetrating the parts of the tree that bore these branches. Proper pruning promotes the formation of healthy, knot-free wood, results in more cylindrical stems, and reduces the proportion of juvenile wood in conifers.

## FOR ADDITIONAL INFORMATION, PLEASE CONTACT:

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1 D. Rioux, 2004. The natural defences of trees against injury and disease. Branching out, No. 16, Canadian Forest Service – Laurentian Forestry Centre.