

# Tree Biology & Proper Pruning

A woman with blonde hair, wearing a purple long-sleeve shirt, red pants, and green gloves, is holding a young tree sapling. She is looking up at the tree. The background shows a residential street with houses and parked cars.

One of the greatest pleasures in life is knowing a little bit about the way things work.

-Dr. Alex Shigo

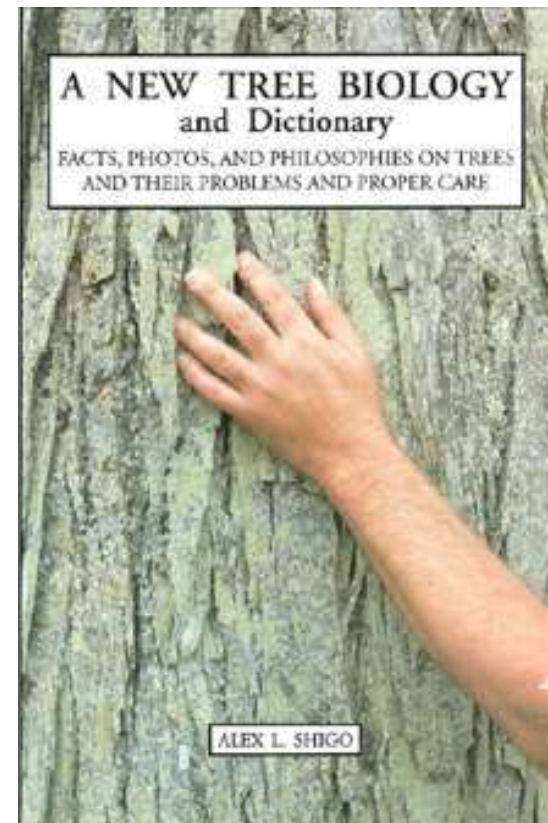
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# Tree Biology

A quick look at the basics of tree growth and urban tree considerations.

John Buttrell, ISA Certified  
Arborist & Tree Risk Assessor  
Arborscape Tree Care





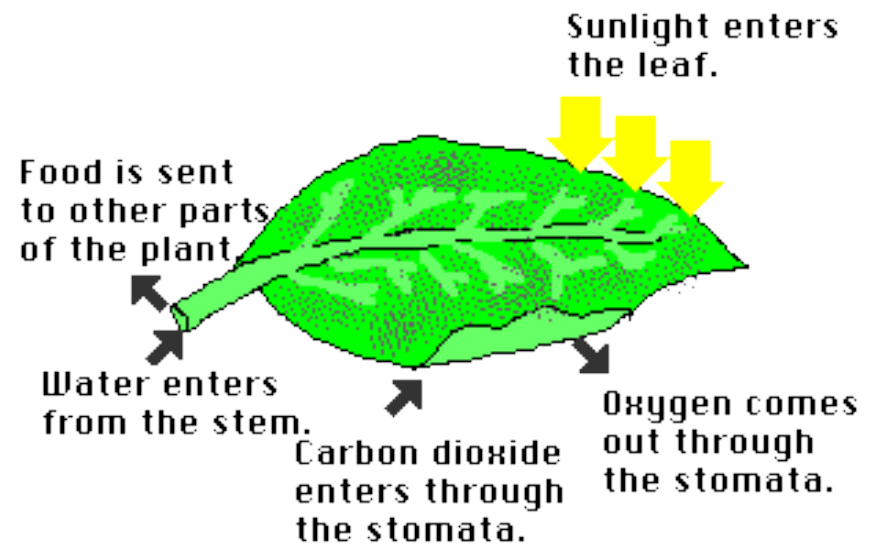
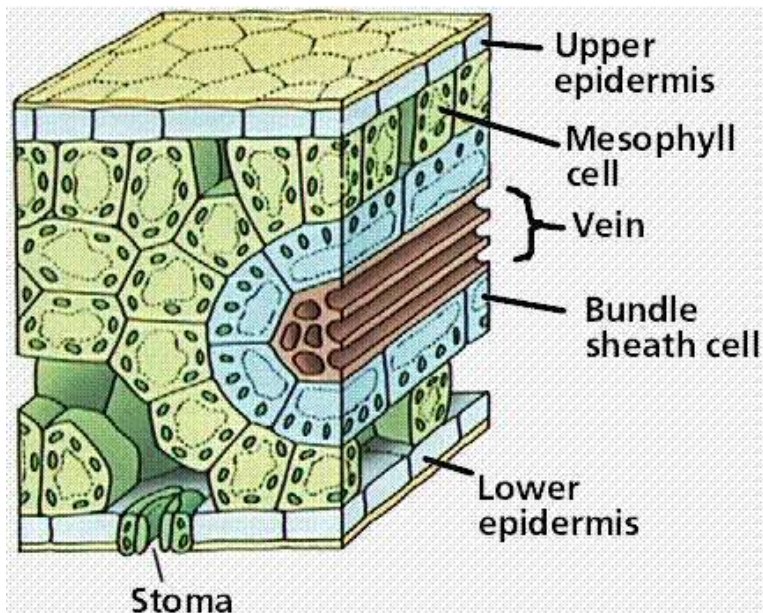
# How do they do it?



**Trees are the biggest organisms on earth. They create their own food from light and water, defend themselves, reproduce, and communicate. All without being able to change location.**

# Energy & Growth

Trees use the sugars they create through photosynthesis to grow, seal wounds, and add strength.





# Trunk: Support, Storage, and Transport

- Moderates temperature
- Provides defense
- Reduce water loss
- Made of old (non-functioning) phloem and cork tissue
- Lenticels are small openings in the bark that allow gas exchange

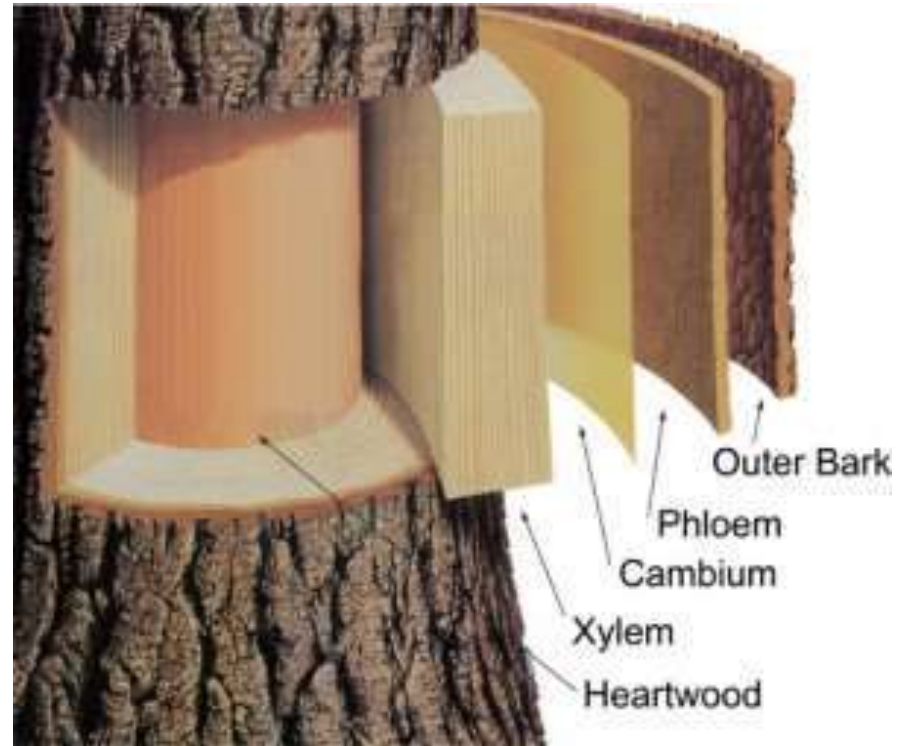
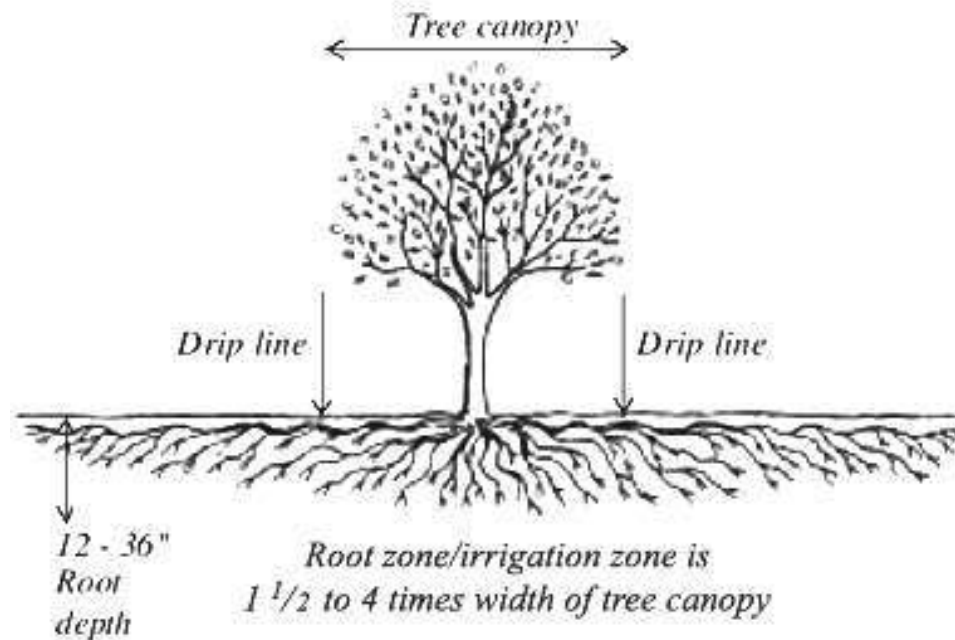


Image: TX A&M Extension

# Healthy Roots = Healthy Tree

- Roots have 2 main jobs: anchor the tree and take up water and nutrients
- Most roots are in top 18 inches of soil
- Roots must be able to breathe or they will die
- Roots can grow 4 times the distance to the dripline



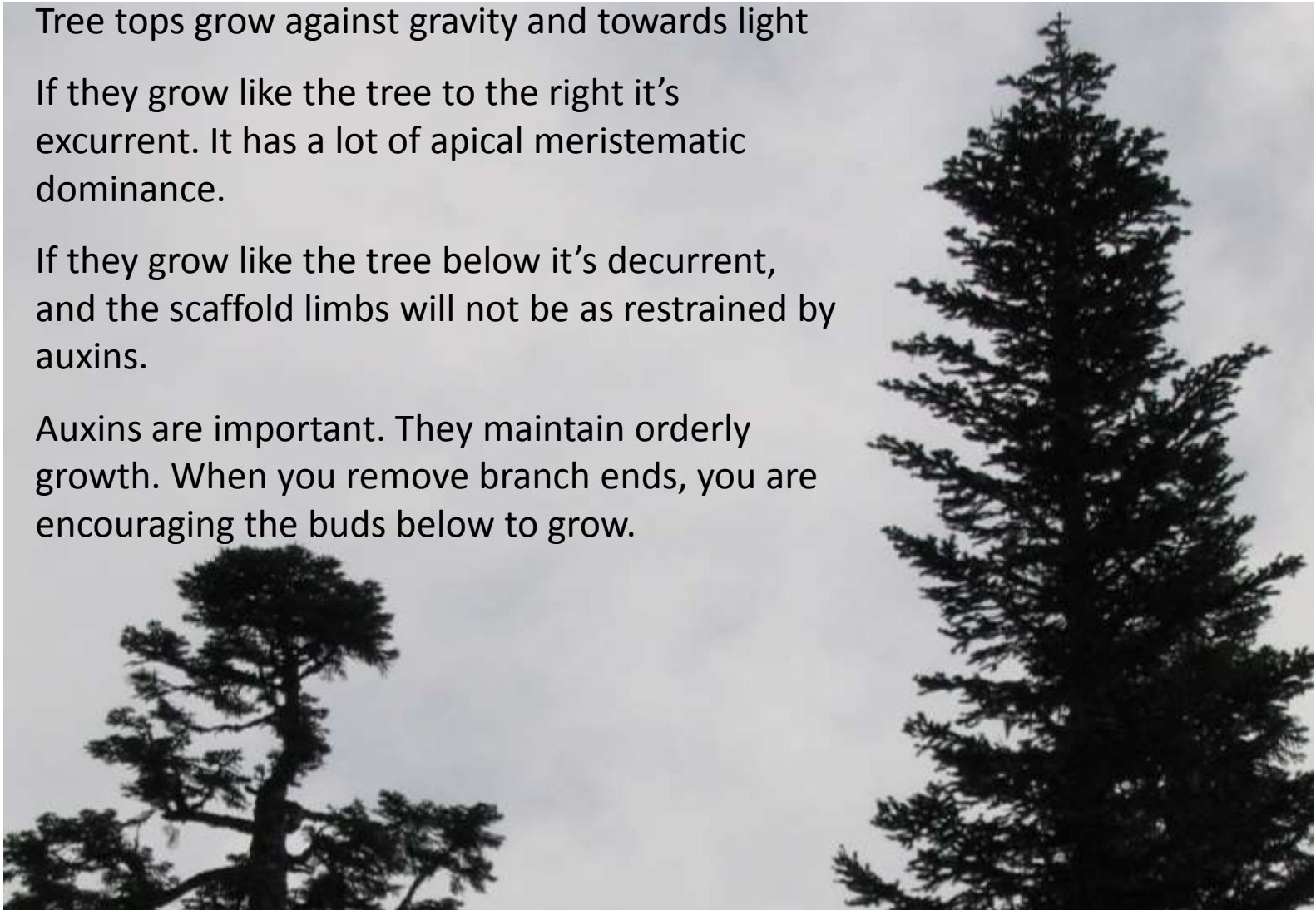
# Tree Growth

Tree tops grow against gravity and towards light

If they grow like the tree to the right it's excurrent. It has a lot of apical meristematic dominance.

If they grow like the tree below it's decurrent, and the scaffold limbs will not be as restrained by auxins.

Auxins are important. They maintain orderly growth. When you remove branch ends, you are encouraging the buds below to grow.



# Trees and Wounding

Trees have NO WOUND HEALING PROCESS - healing in a sense of REPLACING or REPAIRING injured tissues.

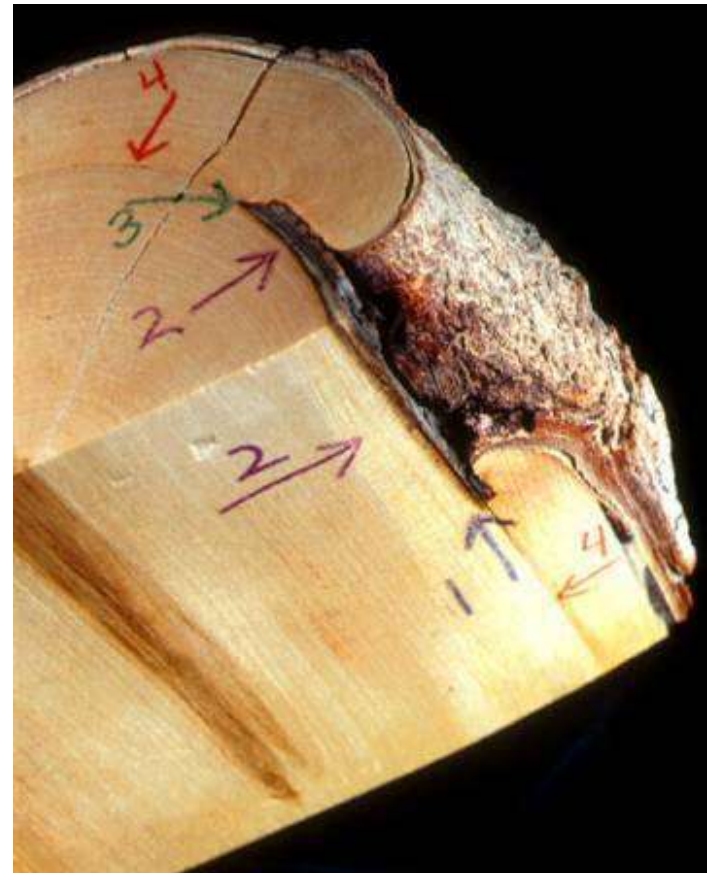
HEAL means to restore to a previous healthy state. It is impossible to **HEAL** injured and infected xylem.

Trees **SEAL** off damaged tissue rather than HEAL it.



# C.O.D.I.T.

- Concept of wall formation in wood as defense from decay organisms
- Trees use physical and chemical defenses against the onslaught of decay pathogens



# C.O.D.I.T

- Decay is progressive
- Extent of decay is influenced by
  - Tree species
  - Tree vigor
  - Severity, placement, and number of wounds



# Tree Hazards and Safety

This is why we need to understand basic tree biology



Photo from Columbian Newspaper article dated 5-14-13



# Keys to Tree Success

Familiarize yourself with your trees and look at them often

Four characteristics of tree vigor

- new leaves or buds
- leaf size
- twig growth
- absence of crown dieback





# Keys to Tree Success

- Right tree/location/care
- Timely training
- Mulch appropriately
- Adequate space for growth
- Water and nutrients
- Careful attention to where pruning cuts made



A woman wearing a blue cap, safety glasses, a purple jacket, and a high-visibility yellow vest is pruning a tree. She is using a hand saw and is focused on her work. The background shows a residential area with houses and greenery.

And now on to pruning...

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# Tree Care - Pruning

**Pruning = intentionally injuring a tree to achieve a management objective**

- Pruning should not be random; objective should be defined beforehand
- Pruning should only be performed when necessary and with clear purpose
- Pruning should maintain the natural structure of the tree
- Pruning should involve the minimum number of cuts to achieve the desired objective

# Tree Care - Pruning

## When to prune landscape trees

- Easier to see branch architecture in winter
- Winter pruning = invigorating
- Summer pruning = dwarfing
- Flowering trees: prune after bloom to maximize flowers
- Mitigate hazards, correct storm damage, and remove broken branches immediately
- Pruning cycle depends on species, age, and objectives



# Tree Care - Pruning

## Reasons to prune

- Maintain tree health and vigor
- Correct structural defects and promote strong branch unions
- Improve aesthetics
- Reduce hazard potential
- Correct storm damage or improper pruning
- Control size and form; provide clearance
- Influence fruit and/or flower production

# Tree Care - Pruning

## Industry standards for pruning

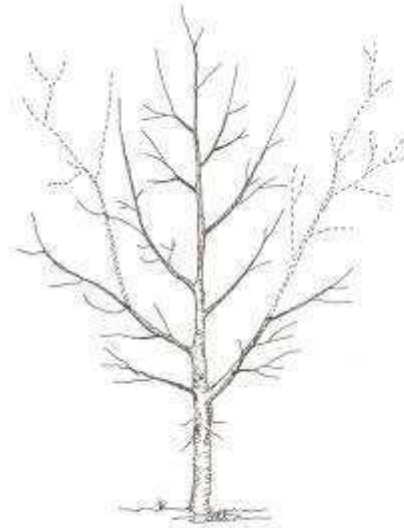


# Tree Care - Pruning

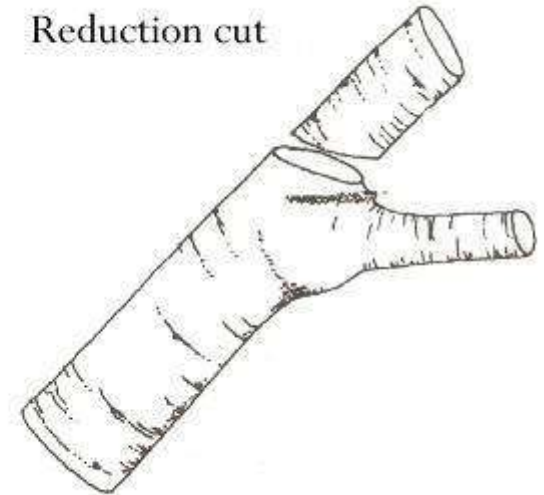
## Where to make the proper cut



Removal cut



Reduction cut

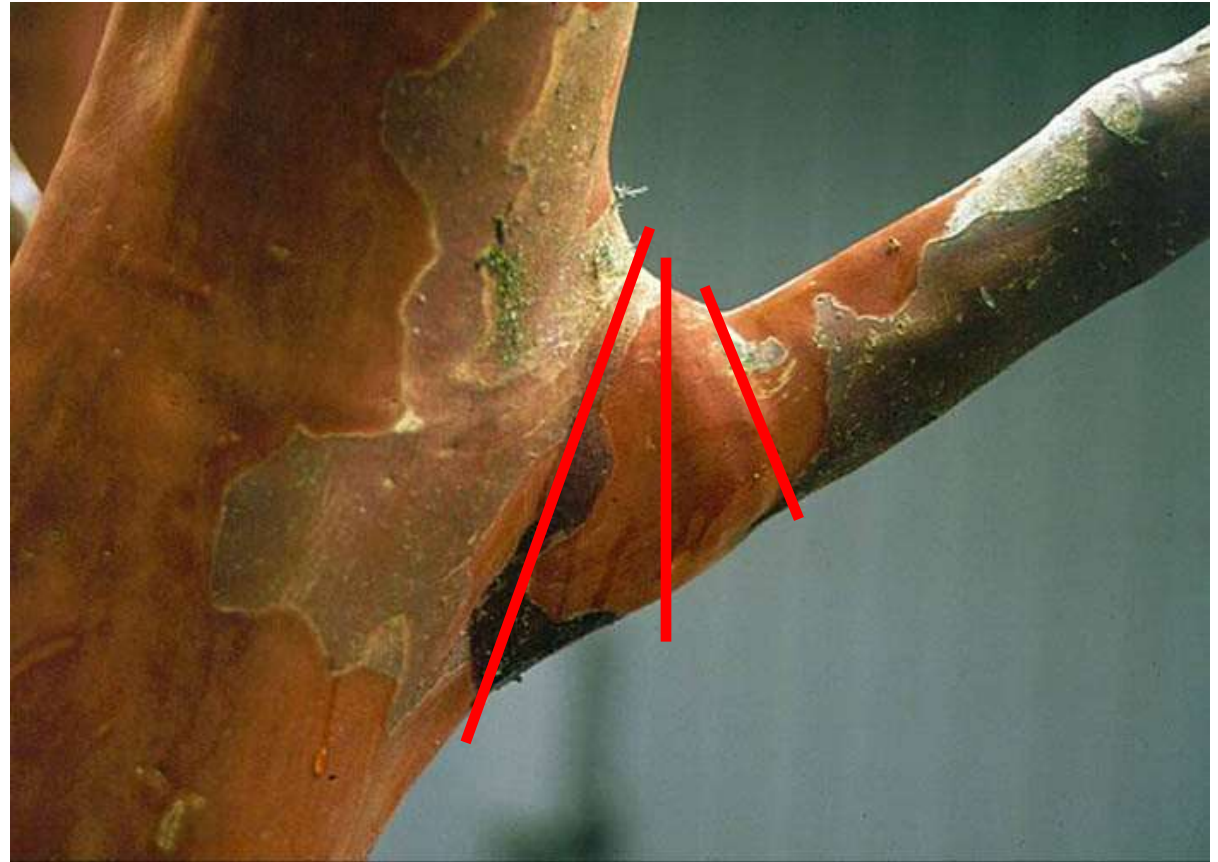


# Tree Care - Pruning

**Removal cut**

**Locate the  
branch collar**

**Where is the  
proper cut  
made?**

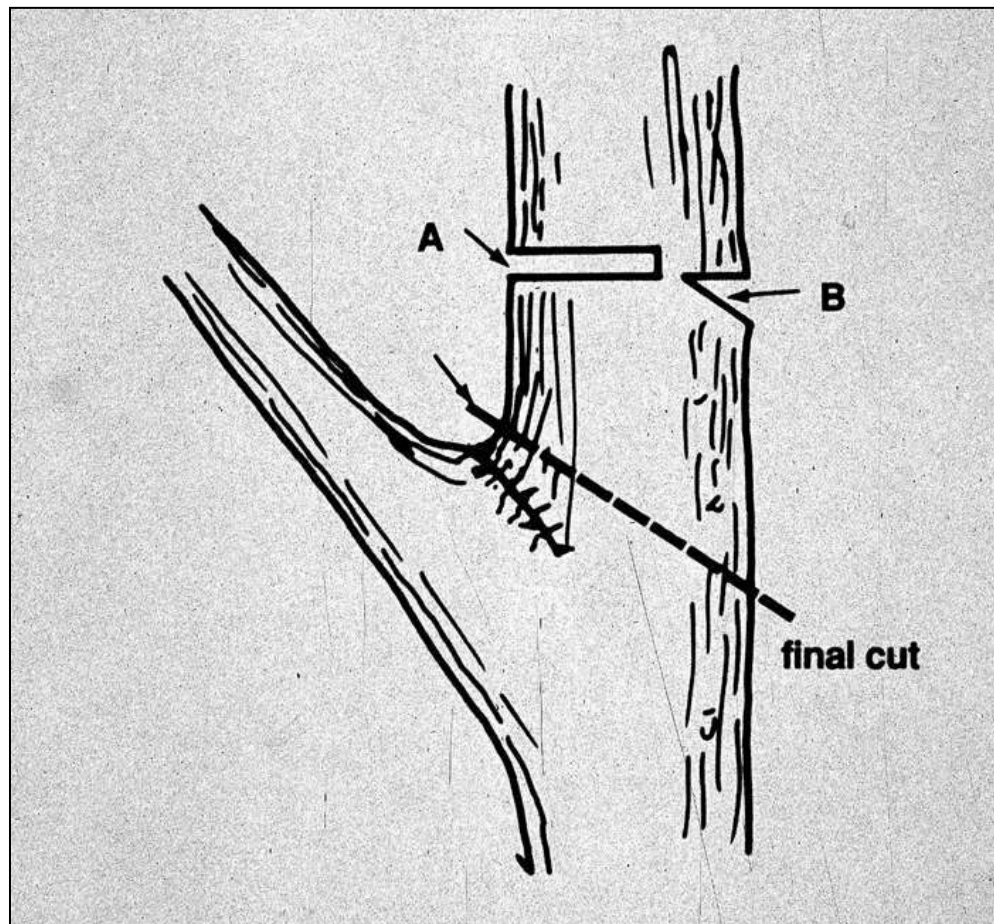




# Tree Care - Pruning

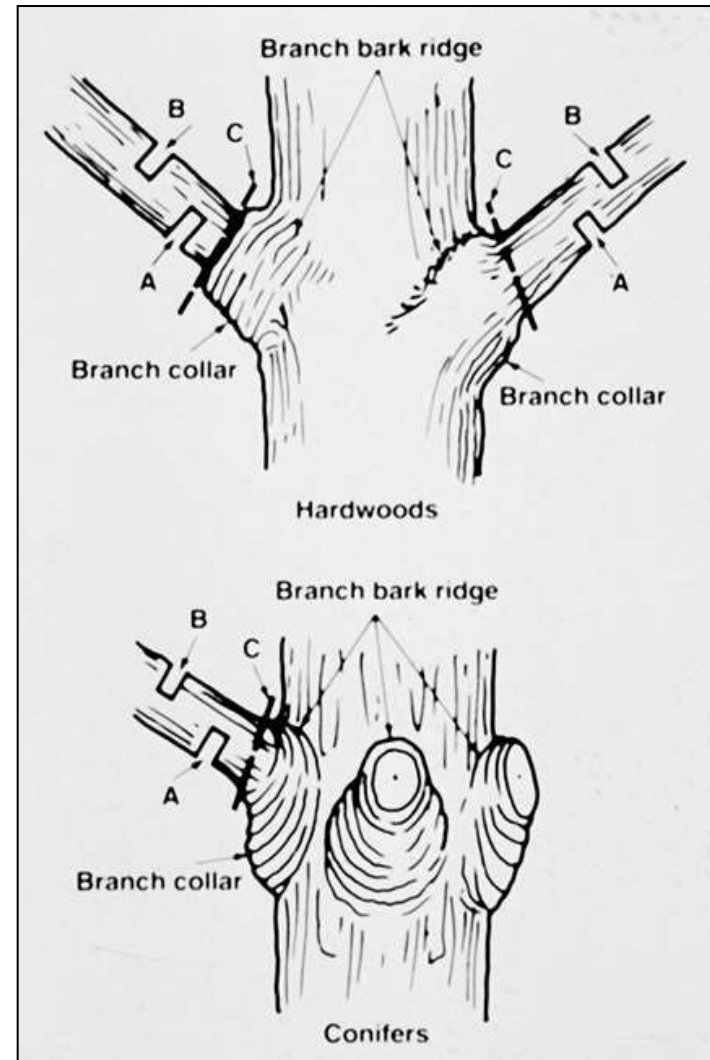
## Reduction cut

Cut back to a lateral branch that is at least  $\frac{1}{3}$  the diameter of branch to be removed



# Tree Care - Pruning

Use the 3-cut method on larger branches to avoid tearing the bark



# Tree Care - Pruning

Small wounds can seal via CODIT



Large wounds can result in decay and cracks



# Tree Care – Root Pruning

- Repair damaged hardscape
- Reduce potential hazards
- Correct girdling roots



When trees are root pruned, there is always risk of tree failure. Trees with defects or poor general health are not good candidates for root pruning.



# Tree Care – How NOT to Prune



## Stub cuts

- Wound too far from branch bark ridge
- Difficult for woundwood to seal
- Can create a decay column into trunk

# Tree Care – How NOT to Prune

## Flush cuts

- Removes branch bark ridge
- Creates larger wound
- Does not properly seal with woundwood
- Leads to internal decay



# Tree Care – How NOT to Prune

**Bad cut = flush cut**

Wound wood does not develop evenly.



# Tree Care – How NOT to Prune



## Topping

### It Doesn't Work

- The tree does not stay small and it is certainly not safer
- Shortens lifespan of a tree
- Removes too many food making leaves – photosynthesis
- Looks ridiculous



# Tree Care – How NOT to Prune

## No Topping

- It Doesn't Work
- It's Expensive
- It Starves a Tree
- It Creates Dangerous Trees



# Tree Care – How NOT to Prune

Painting with wound dressing is NOT recommended

- Research shows it is ineffective
- Seals in moisture & may cause decay
- Prevents tree from properly sealing wound

# Tree Care – Tools of the Trade

## Hand Pruners



Branches up to 1/2"

## Pruning Saw



Designed for green (live) wood

# Tree Care – Tools of the Trade



Pole Pruner



Pole Saw



# Tree Care – Tools of the Trade

## Chainsaw



Branches > 3" diameter

ALWAYS wear proper safety equipment and hire a professional when the job is too big

# Questions?

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- [www.cityofvancouver.us/urbanforestry](http://www.cityofvancouver.us/urbanforestry)