Basics of Pruning

The Why's, When's, and How's of Tree Work

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Tree Biology Overview

- Removing live crown can cause stress to trees
  - Can cause a biological response to produce more leaves
- Epicormic, adventitious, and dormant sprout arise on the trunk or branches

Tree Biology Overview

- Growth regulating hormones at the apical growth sites inhibit lateral growth
  - Accounts for orderly branch development and spacing

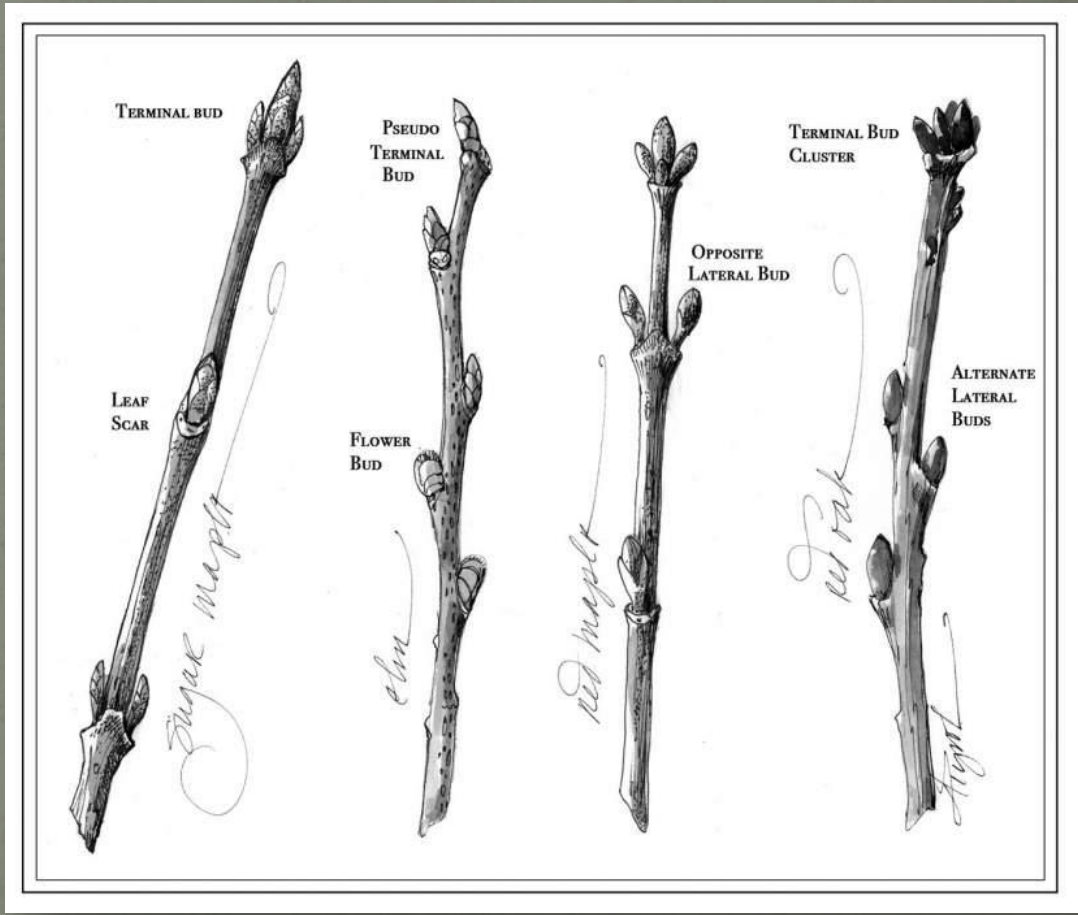
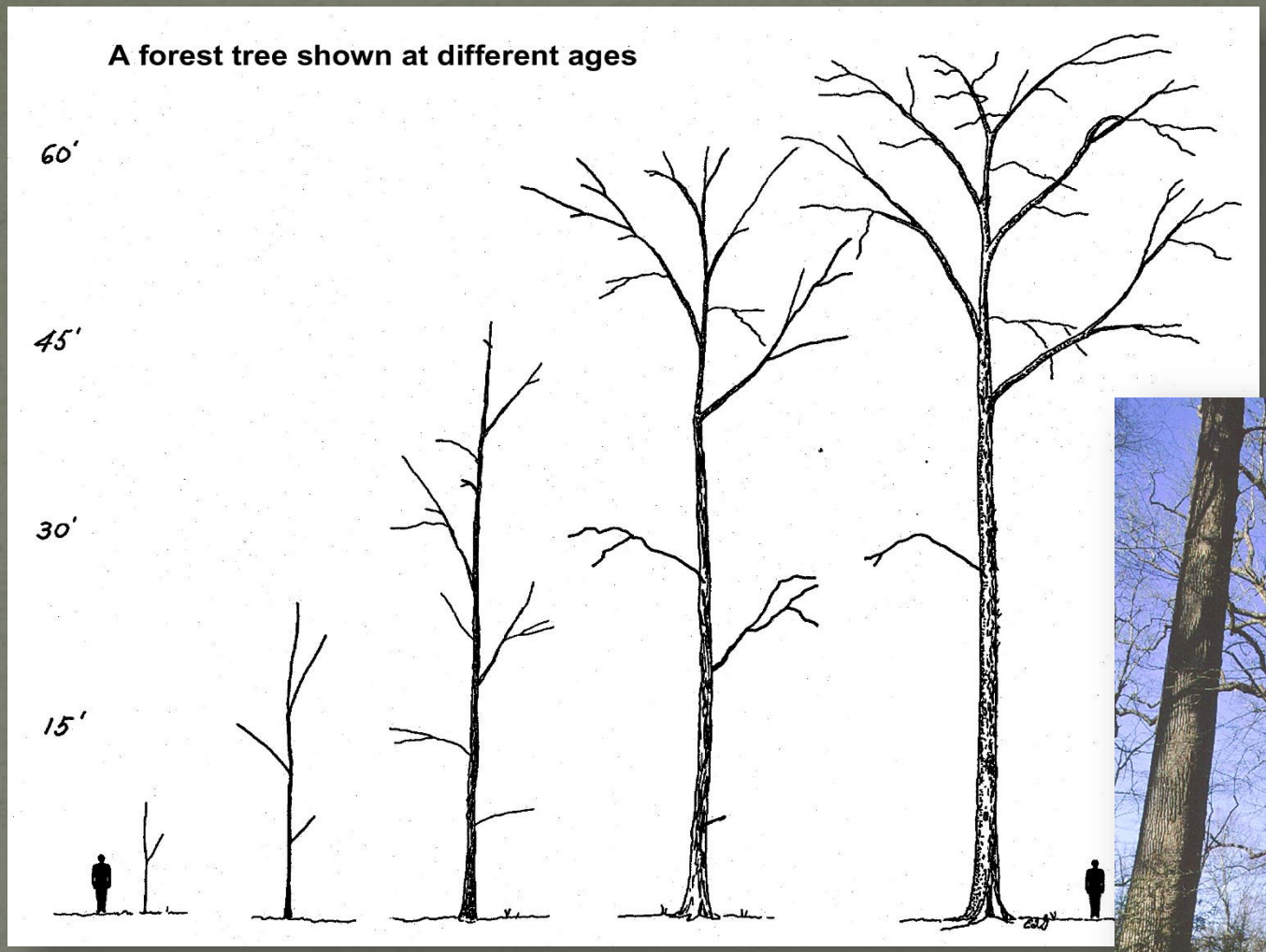


Illustration by Adelaide Tyrol

Tree Biology

Excurrent Form

Decurrent Form



Trees in the forest grow with one trunk, and codominant stems toward the top of the tree

Open grown trees

- Canopy develops low on the trunk and spreads wide

- Tree is often wider than tall
- Driven by access to sunlight

Nice looking tree?

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Close-up of base of tree

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Same tree five years later

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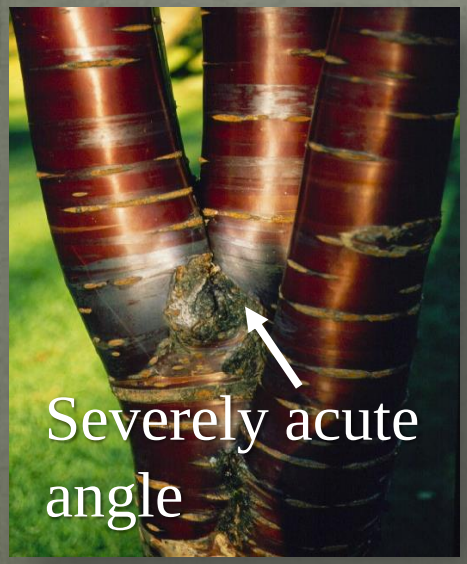
Co-Dominant leaders

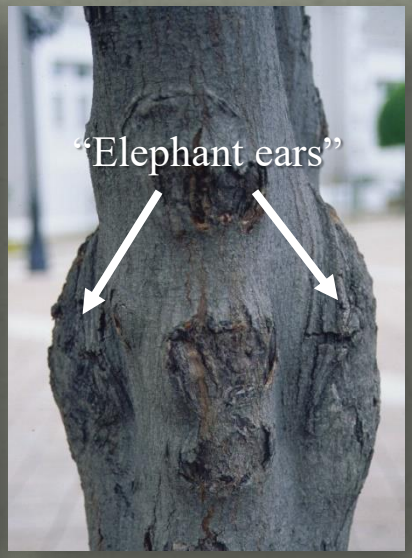
Co-Dominant leaders with Included Bark

Tree Biology

Codominant Stems

- Can often be eliminated by pruning when a tree is young
- Stems nearly same size



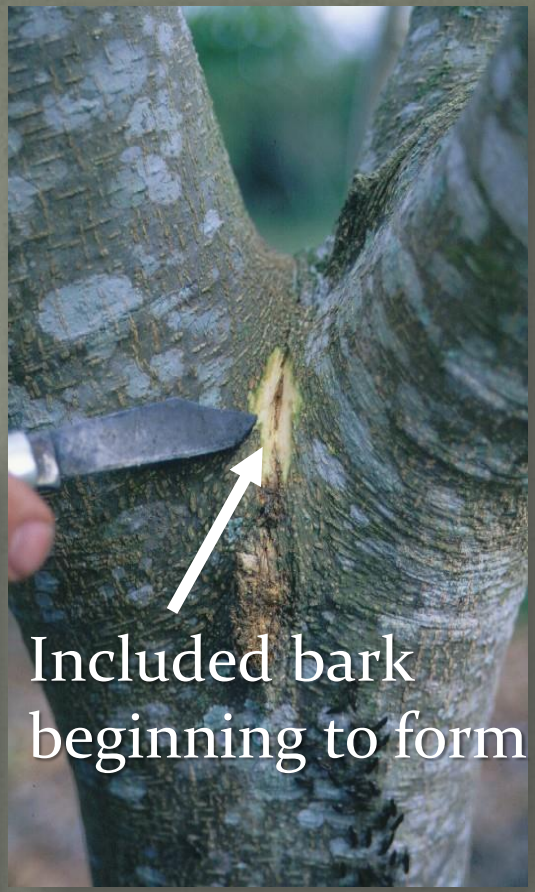


Tree Biology

Included Bark

Tree Biology

Included Bark


Included bark
beginning to form

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Structurally sound tree

- Scaffold branches spaced vertically.
  - Rule of thumb: about 5% of tree's ultimate height.
- Scaffold branches spaced radially
  - None directly above another.
- Some branch unions have a prominent branch bark ridge
- Another indicator of a strong branch union is a swollen area at the base of the branch called the collar.

Tree Biology

Scaffolding Branches

- Well spaced branches
- Eliminate branches with touching branch collars

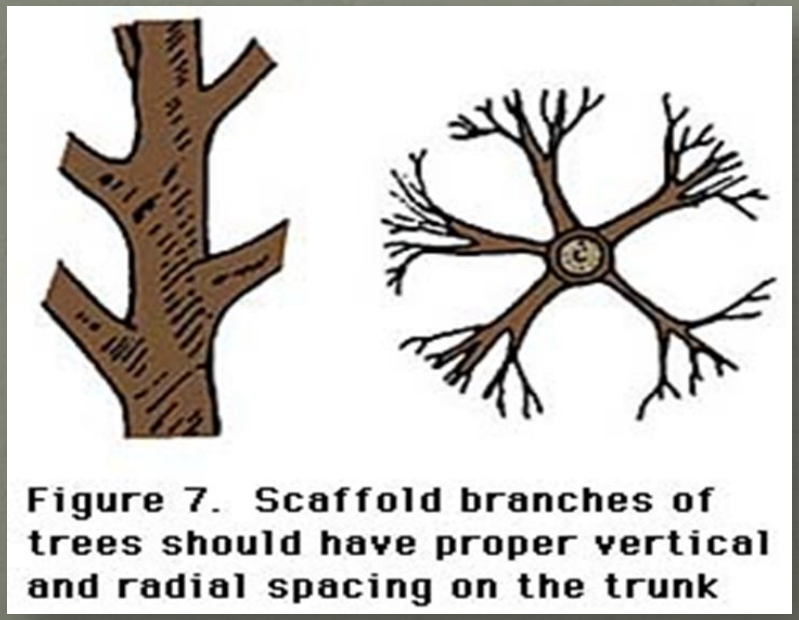

Figure 7. Scaffold branches of trees should have proper vertical and radial spacing on the trunk

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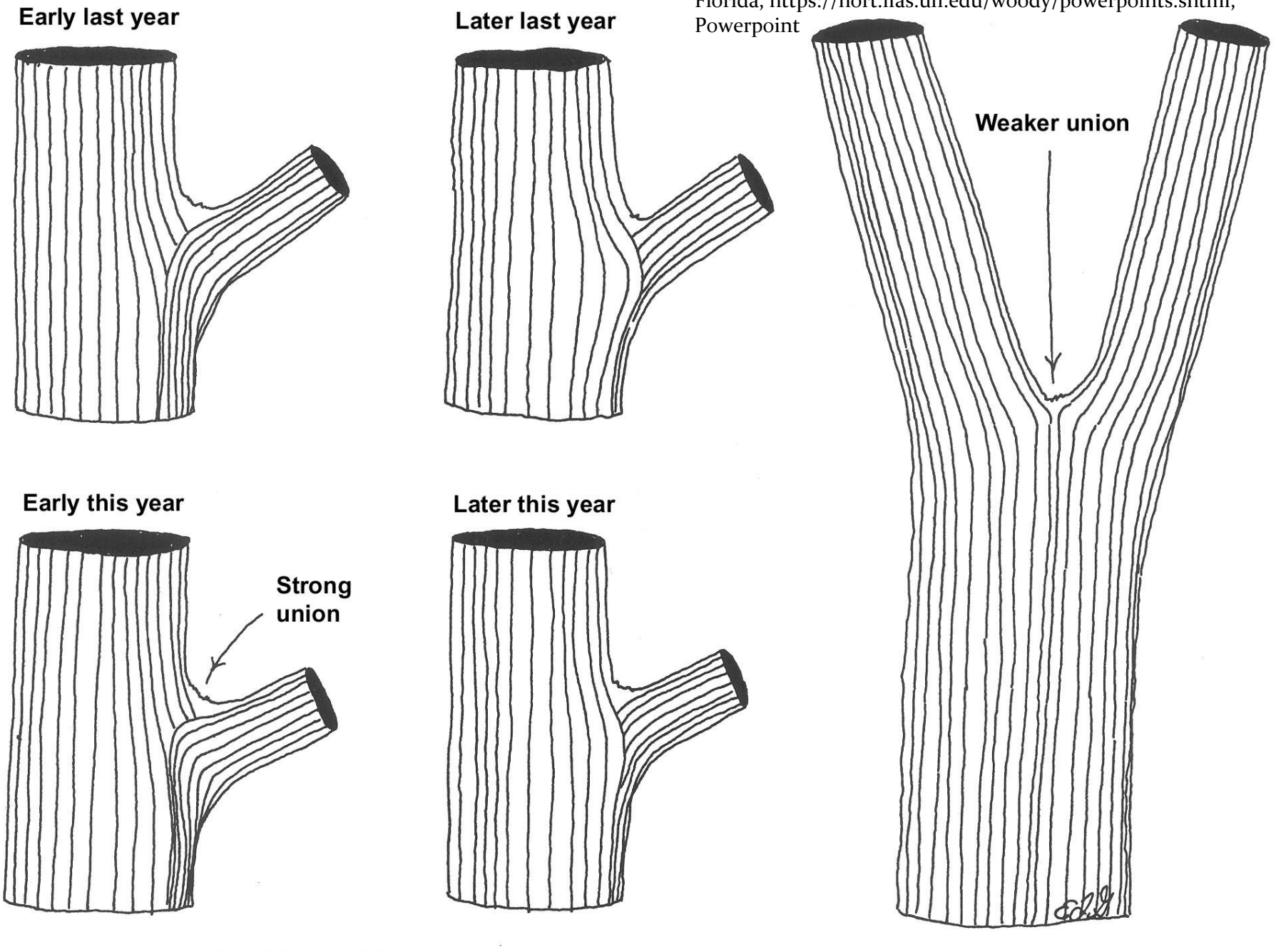

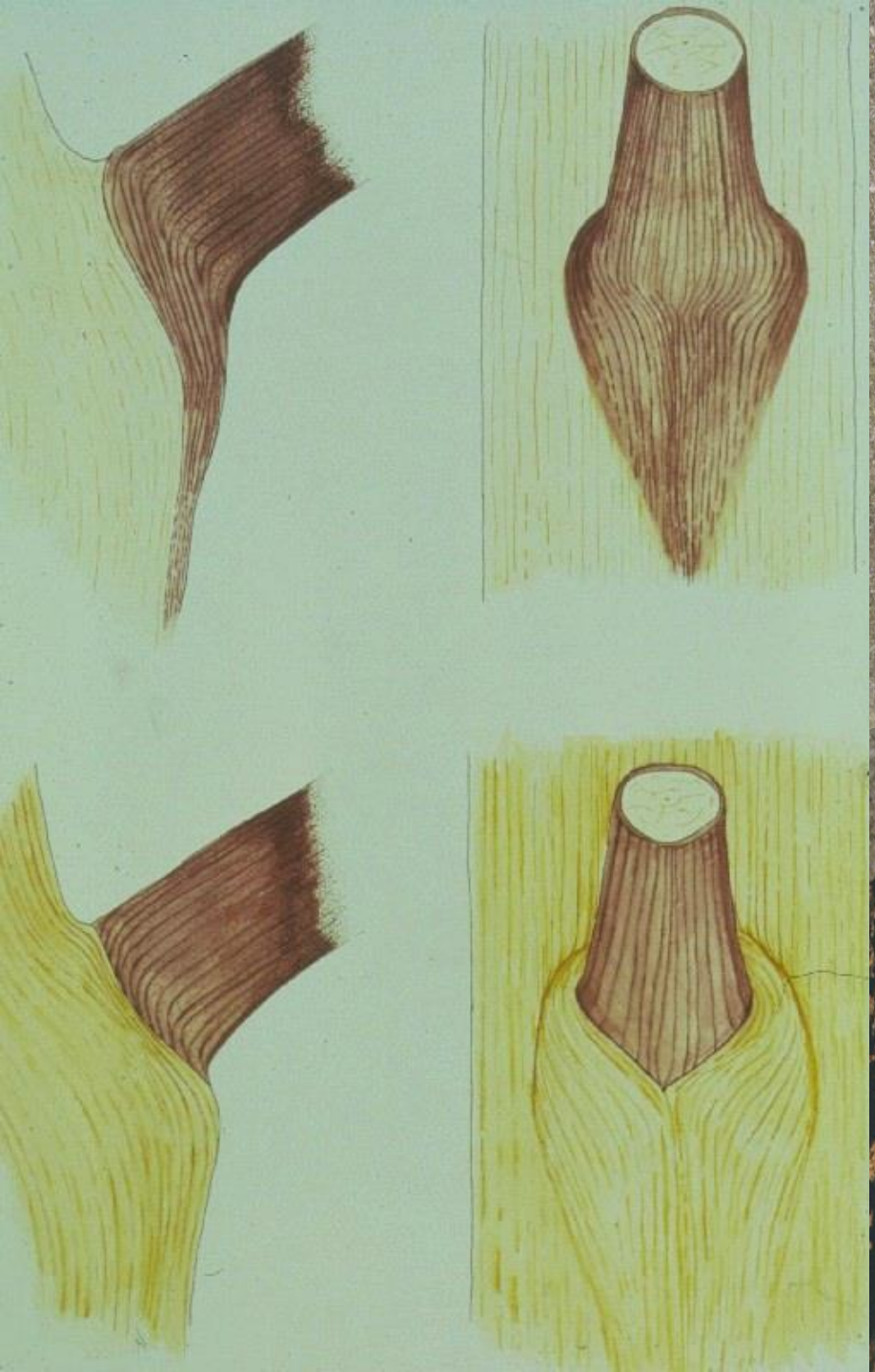

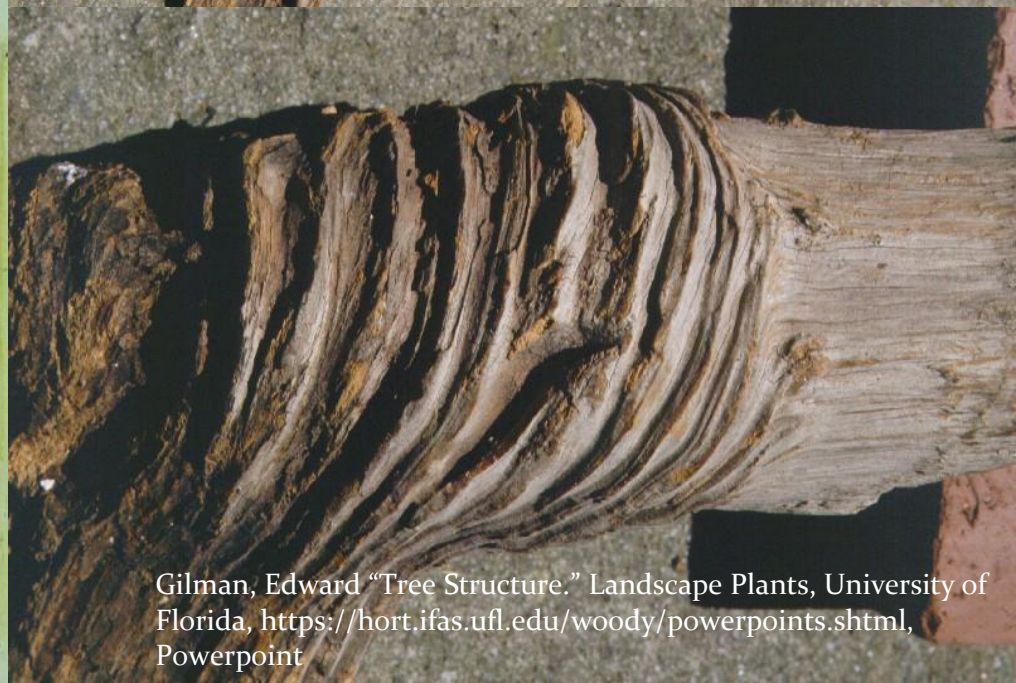

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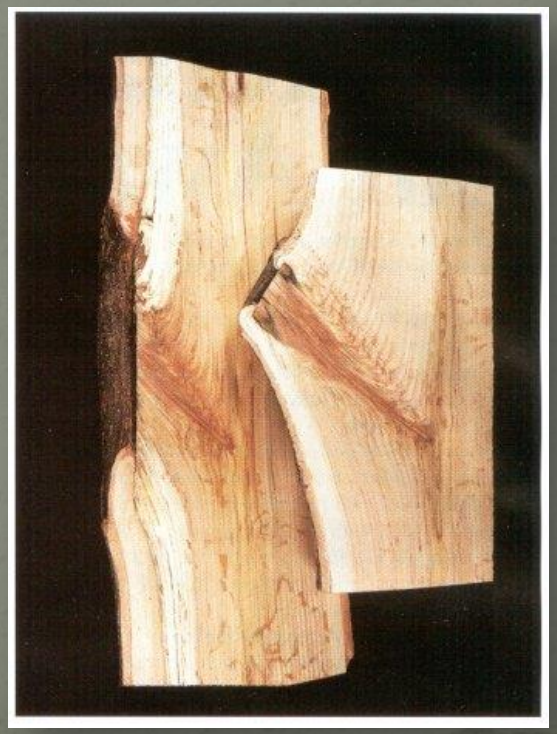
Branch Bark Ridge

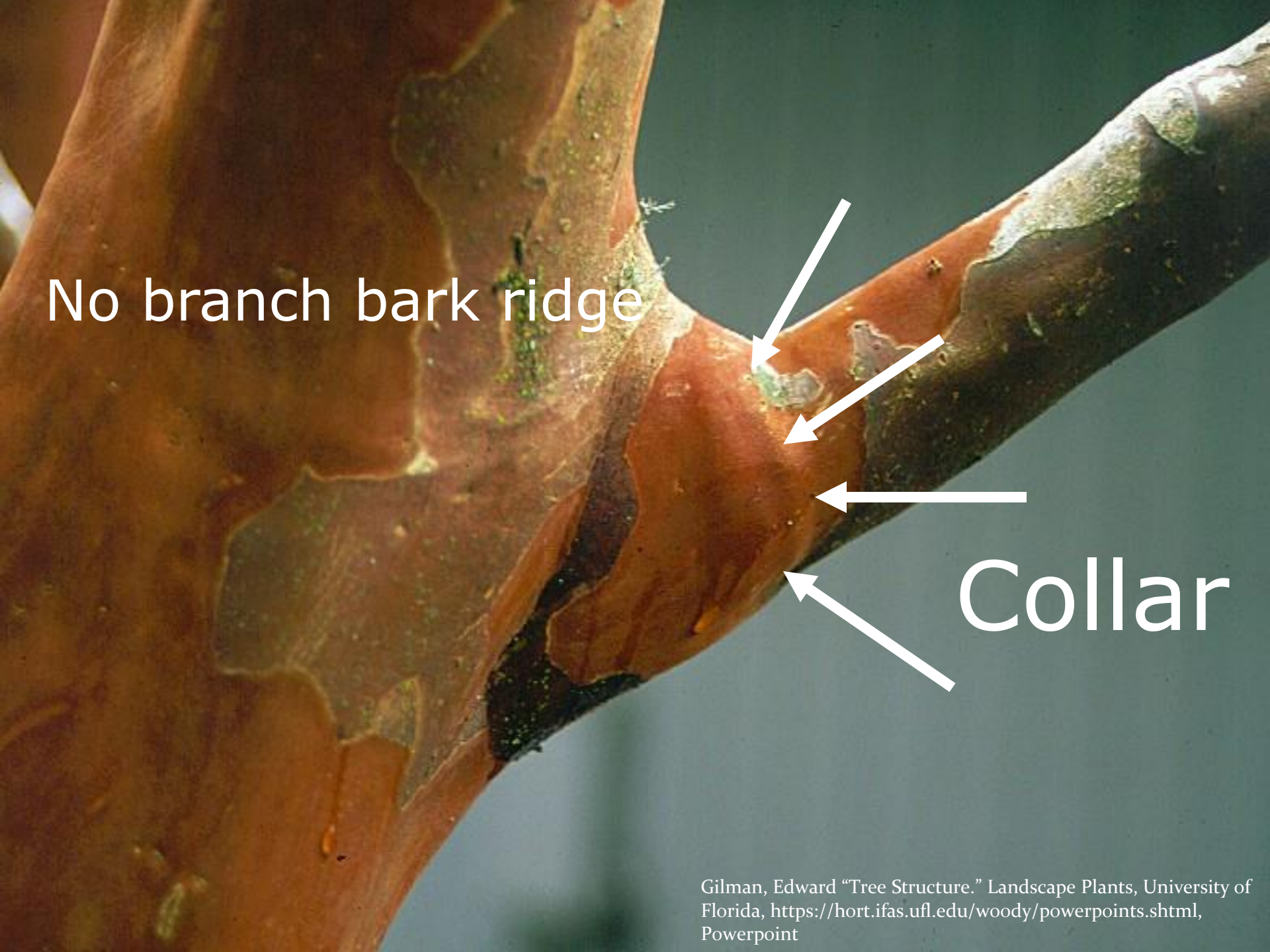
- Raised ridge of bark at the junction of the trunk (or parent stem) and a lateral branch
- It is formed on the upper side of the branch union.
  - Result of new branch wood and new trunk wood pushing up into the union.

Tree Biology

Branch Collar

- Enlarged area at the junction of a branch and the trunk
- Formed by layers of overlapping vascular tissue





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Pine union

- Collar is visible as a swelling at the base of the branch
- Branch bark ridge (arrows) is visible as a dark, rough bark region on the top and sides of the union

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Wood orientation at union

- Peel the bark from the union
- Note how trunk wood grows out onto the base of the branch (dotted line is edge of trunk wood)

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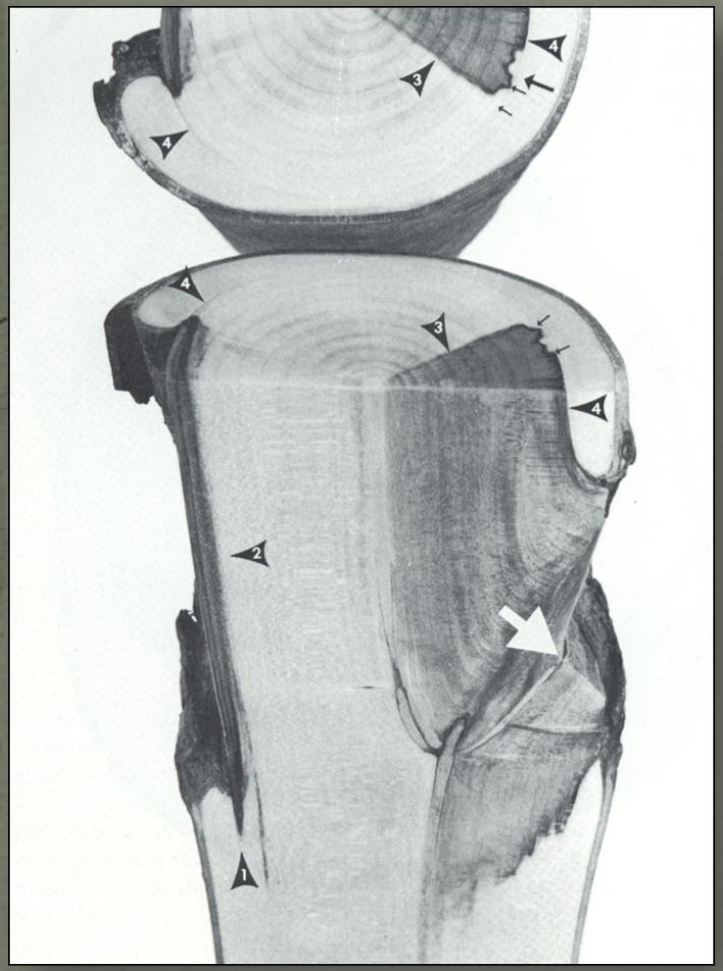
CODIT and Injury response



- Pruning is intentional wounding
  - Wounding can lead to infection and decay
  - A tree has several defenses to deal with injury, and subsequent decay, but within a limit

Branch Protection Zone

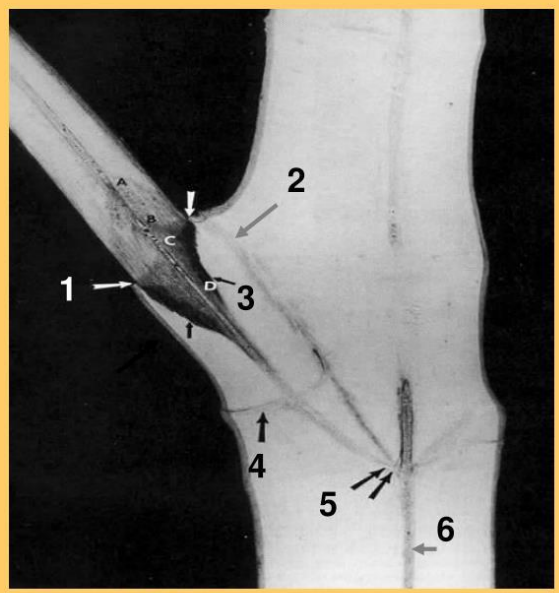


Photo credit: Dr. Alex Shigo

1. Branch Collar
2. Branch bark ridge
3. Branch protection zone
4. Dormant bud
5. Pith protection zone
6. Pith

Why do we Prune?

Pruning Objectives

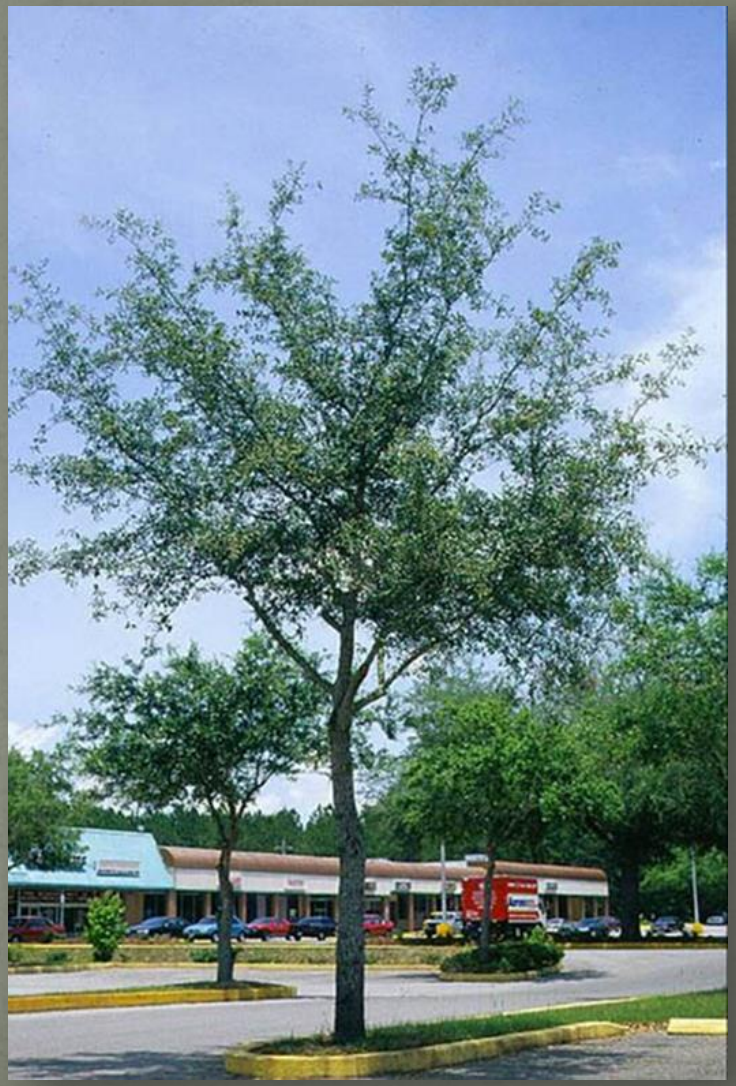
- Reduce Risk of Failure
  - Creates a more structurally sound tree
    - Remove or mitigate codominant stems, included bark, unbalanced canopy
  - Reduce risk of damage to people or property
  - Reduce conditions that could lead to catastrophic branch or tree loss

- Can/should be done at any stage of a trees life

- Considerations and adjustments to practice need to be made based on tree age

Pruning Objectives

- Promote strong structure and safety
  - Develop or maintain a dominant leader
  - Identify lowest branch in the permanent canopy
  - Prevent branches below the permanent canopy from growing too large
  - Keep all branches less than ½ the trunk diameter
  - Space main branches along dominant trunk
  - Suppress growth on branches with included bark
  - Pruning can prevent expensive damage to people and or property.
    - If hazardous structural issues in trees can be recognized prior to a storm, pruning can help to mitigate their damaging effects



Your goal

Single trunk

Poor management

Multiple trunks

Better management

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Pruning Objectives

- Clearance
  - Direct away from building or structures
  - Roadway/sidewalk clearance
  - Utility lines

Pruning Objectives

- Reduce Shade and Wind Resistance
  - A lawn, ground covers, or shrubs can receive more sunlight when live foliage is removed from the crown of large overstory trees.
  - The tree's resistance to wind also can be reduced with pruning.

Pruning Objectives

- Improve Aesthetics
  - Often involves shaping or balancing the crown of trees or shrubs.
  - Pruning to improve aesthetics typically includes the removal or reduction of undesirable branches

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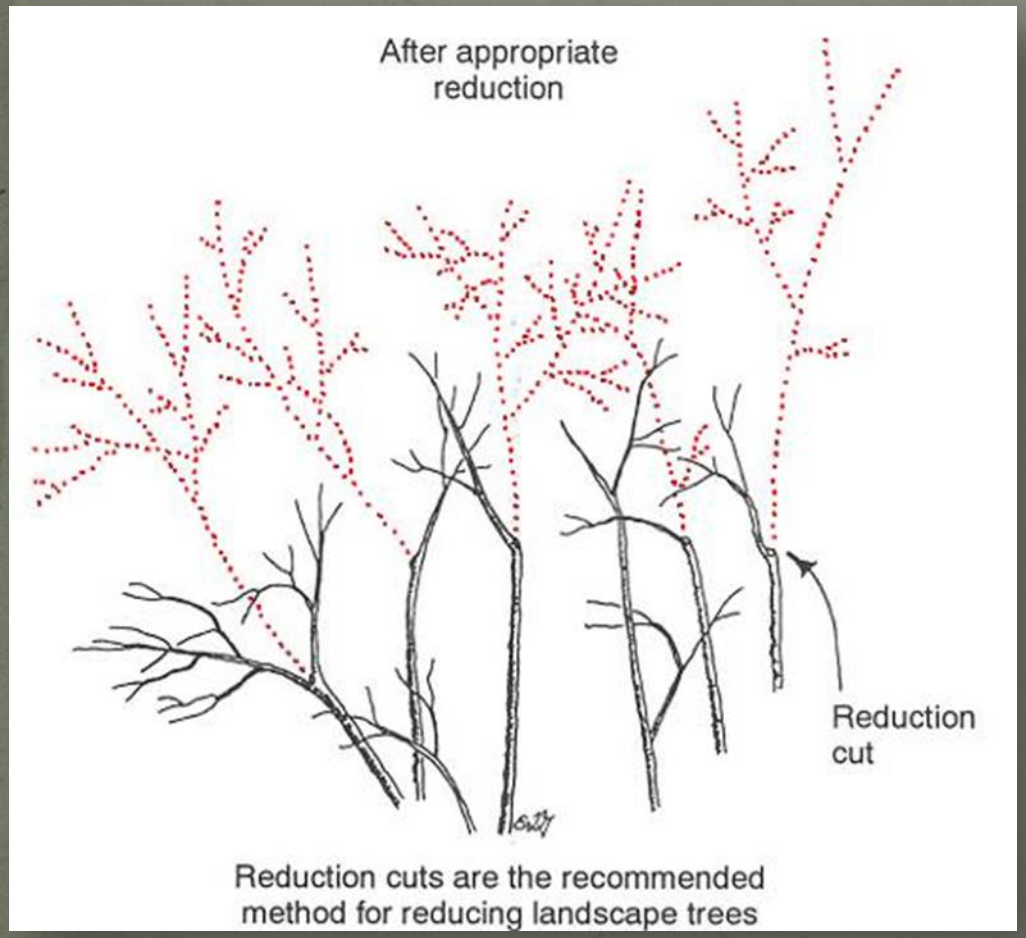
Pruning Objectives

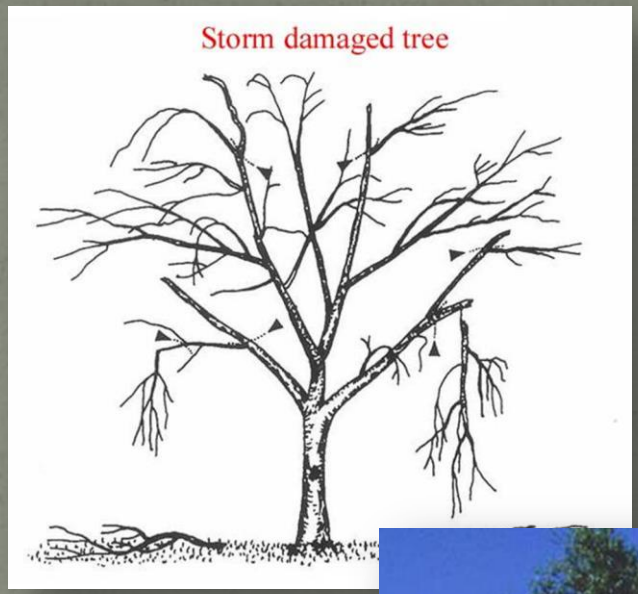
- Size management
  - Pruning meant to mitigate a tree's growth that has exceed the desired aesthetics or safety considerations

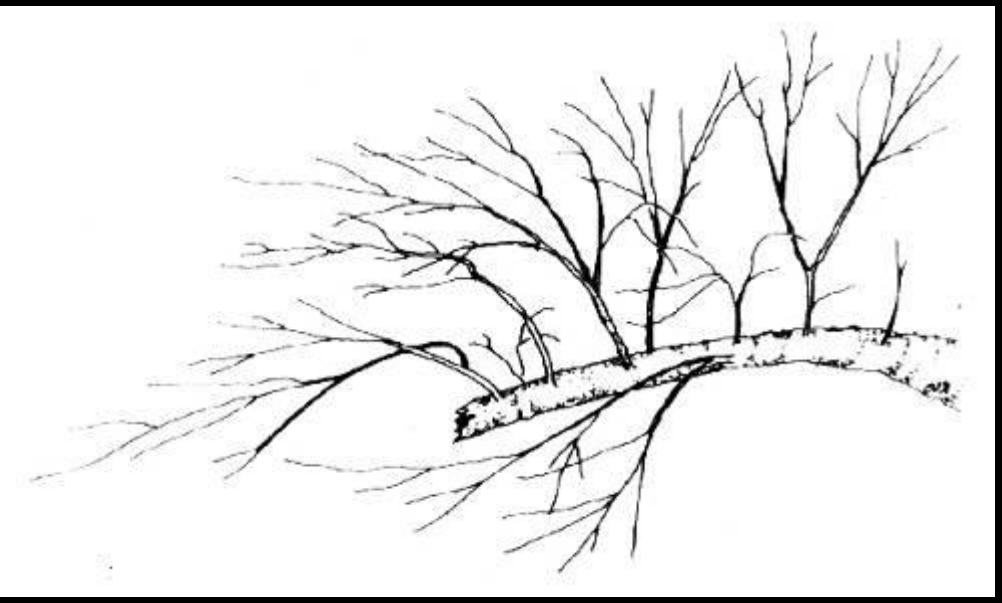


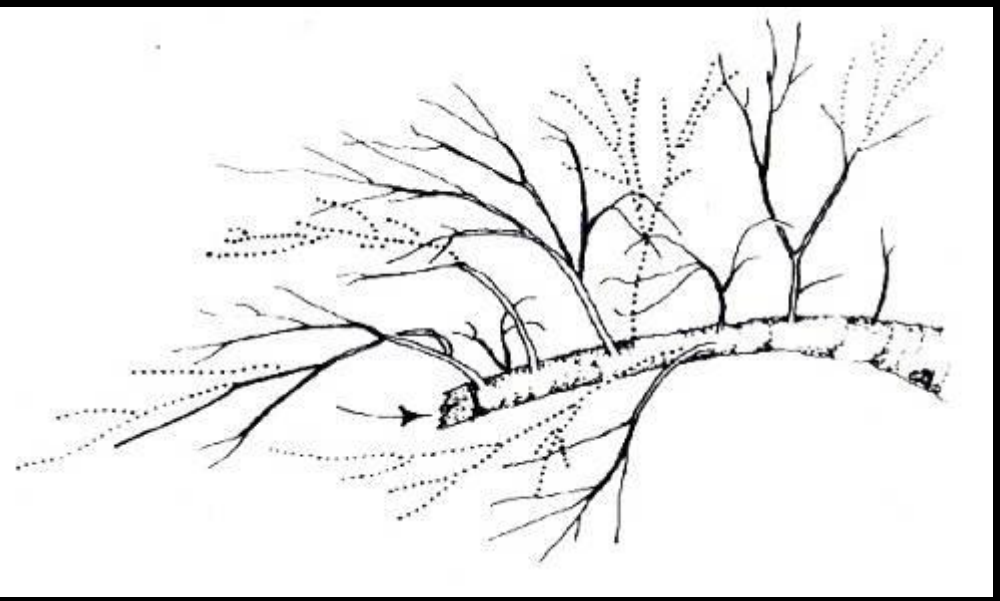
Reduction cuts are the recommended method for reducing landscape trees

Pruning Objectives

- Restoration
  - Improve a tree or shrub's structure, form, or appearance after it has been topped, severely headed, vandalized, lion-tailed, broken in a storm, or otherwise damaged







Reduce some

- Shorten 1/3 of the sprouts. They will continue to store energy, but will eventually be removed.

Remove some

- Remove 1/3 of the sprouts to allow space for the most vigorous ones to grow.

Leave some

- These will develop into the new branches.

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Pruning Objectives

- Influence Flower and Fruit Production
  - Less Flowers/Fruit = Shearing done when flower buds are present
  - More Flowers/Fruit = Pruning to create a strong structure with adequate sunlight exposure

Pruning Objectives

- Improve Views (vista pruning)
  - The selective removal of branches to provide vertical clearance
  - Best done over a period of years, not all at once

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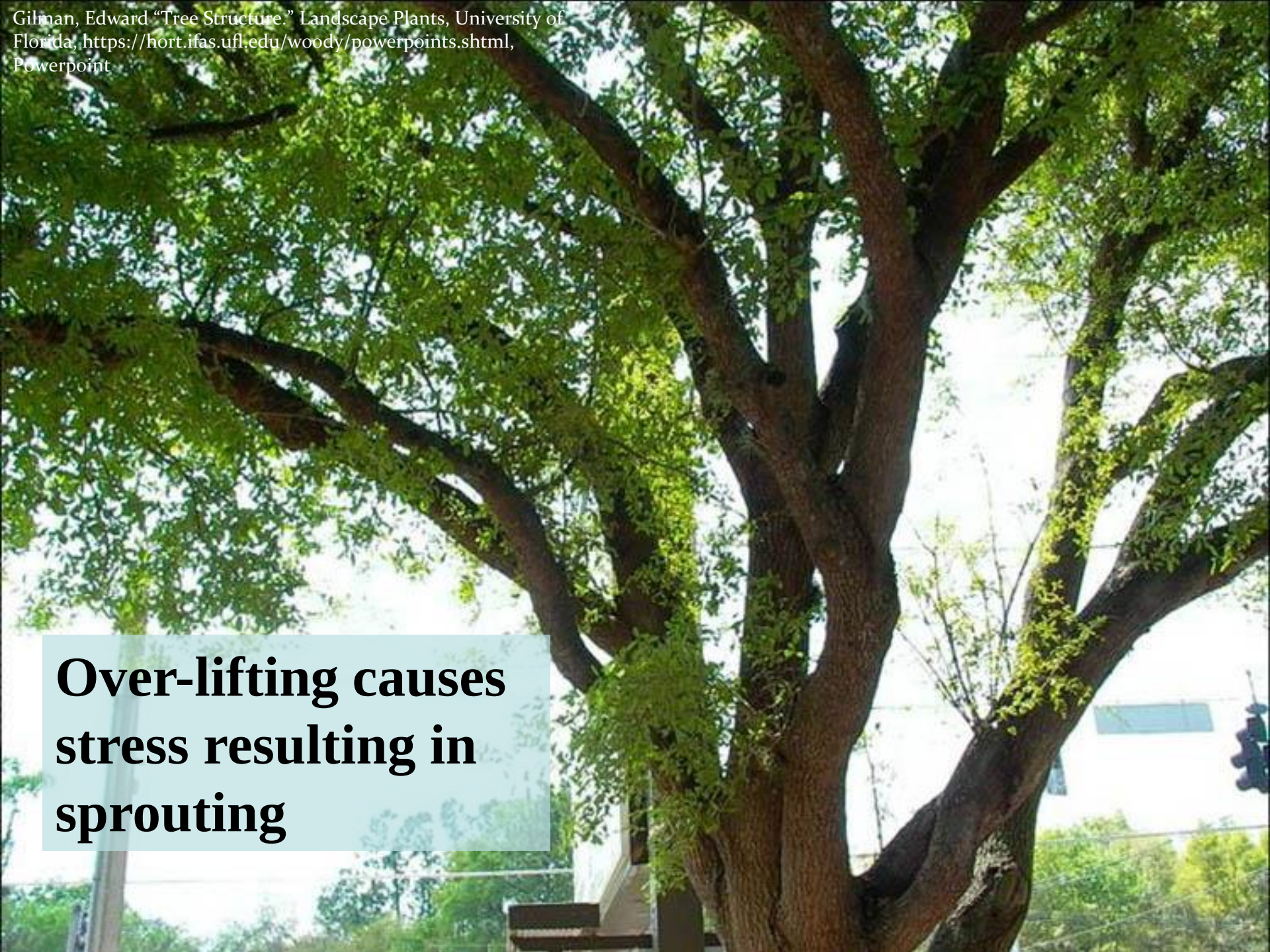
Large pruning cuts

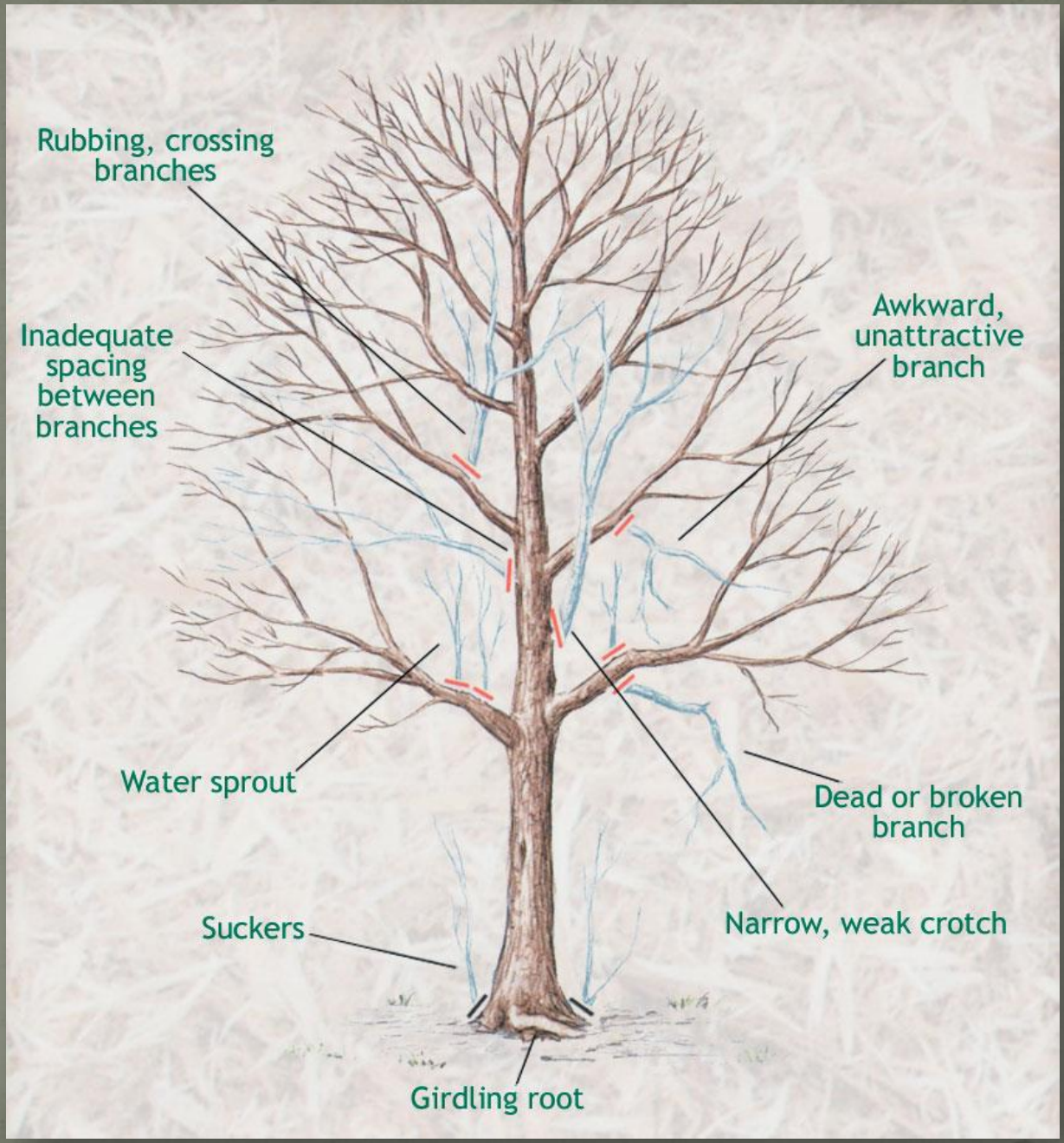

Gilman, Edward "Tree Structure." Landscape Plants, University of Florida, https://hort.ifas.ufl.edu/woody/powerpoints.shtml, Powerpoint
Over-lifting causes stress resulting in sprouting

What to Prune

- Do not remove more than 25% of branches per season
- Remove broken, crossing or rubbing branches.
- Dead, dying, diseased limbs
- Competing leaders/Co-dominant stems
- Narrow branch unions with included bark
- Low branches?

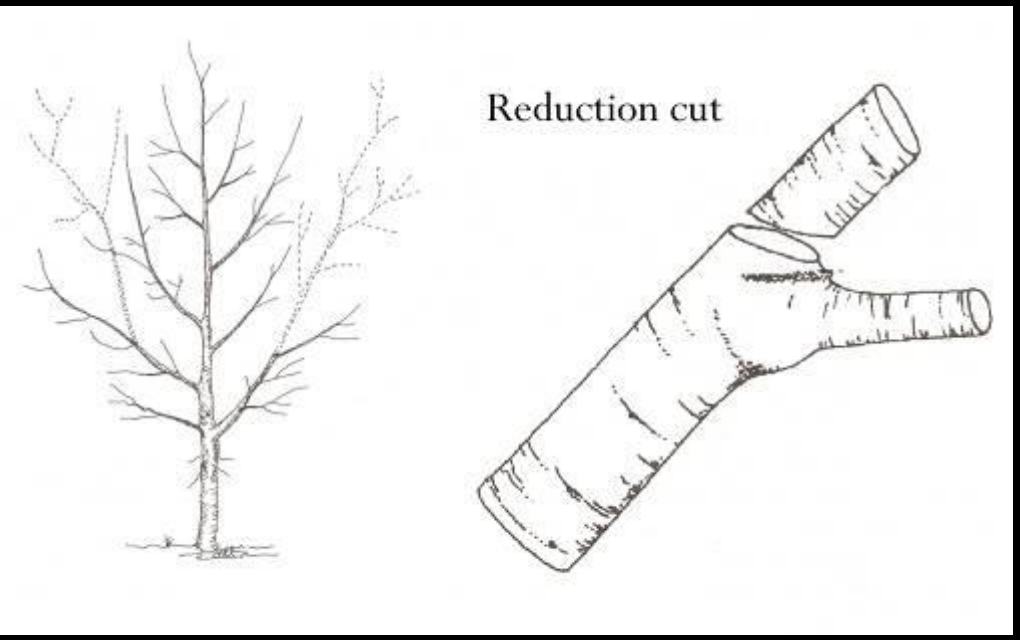
  Maybe
- Sprouts/Suckers?

  Maybe

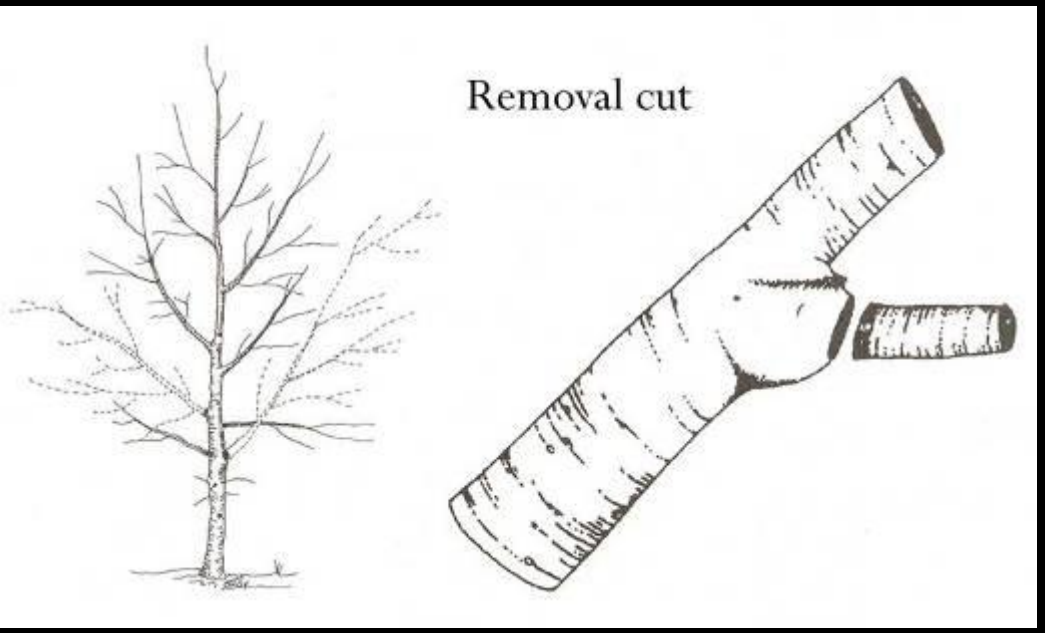

Rubbing, crossing branches
Inadequate spacing between branches
Awkward, unattractive branch
Water sprout
Dead or broken branch
Suckers
Narrow, weak crotch
Girdling root

How do we Prune?

Types of pruning cuts:



Reduction cut shortens the length of a stem by pruning back to a smaller limb.



Removal cut prunes a branch back to the trunk or parent branch.

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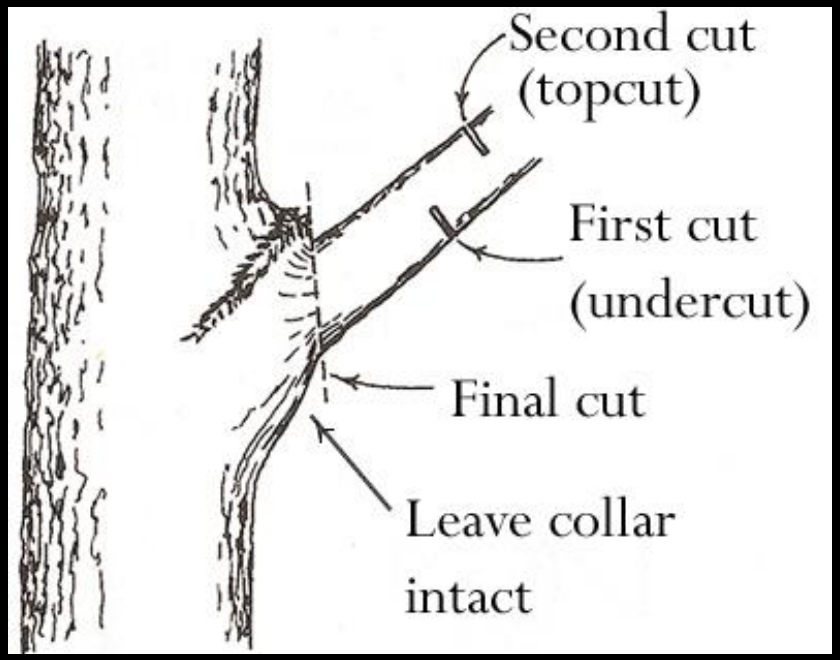
Make good pruning cuts



Step 1

Make an undercut about 12 inches from the trunk.

Step 2

Make a top cut farther out on the limb.

Step 3

Remove the stub with final cut, being careful not to cut flush against the trunk.
Leave the collar intact.

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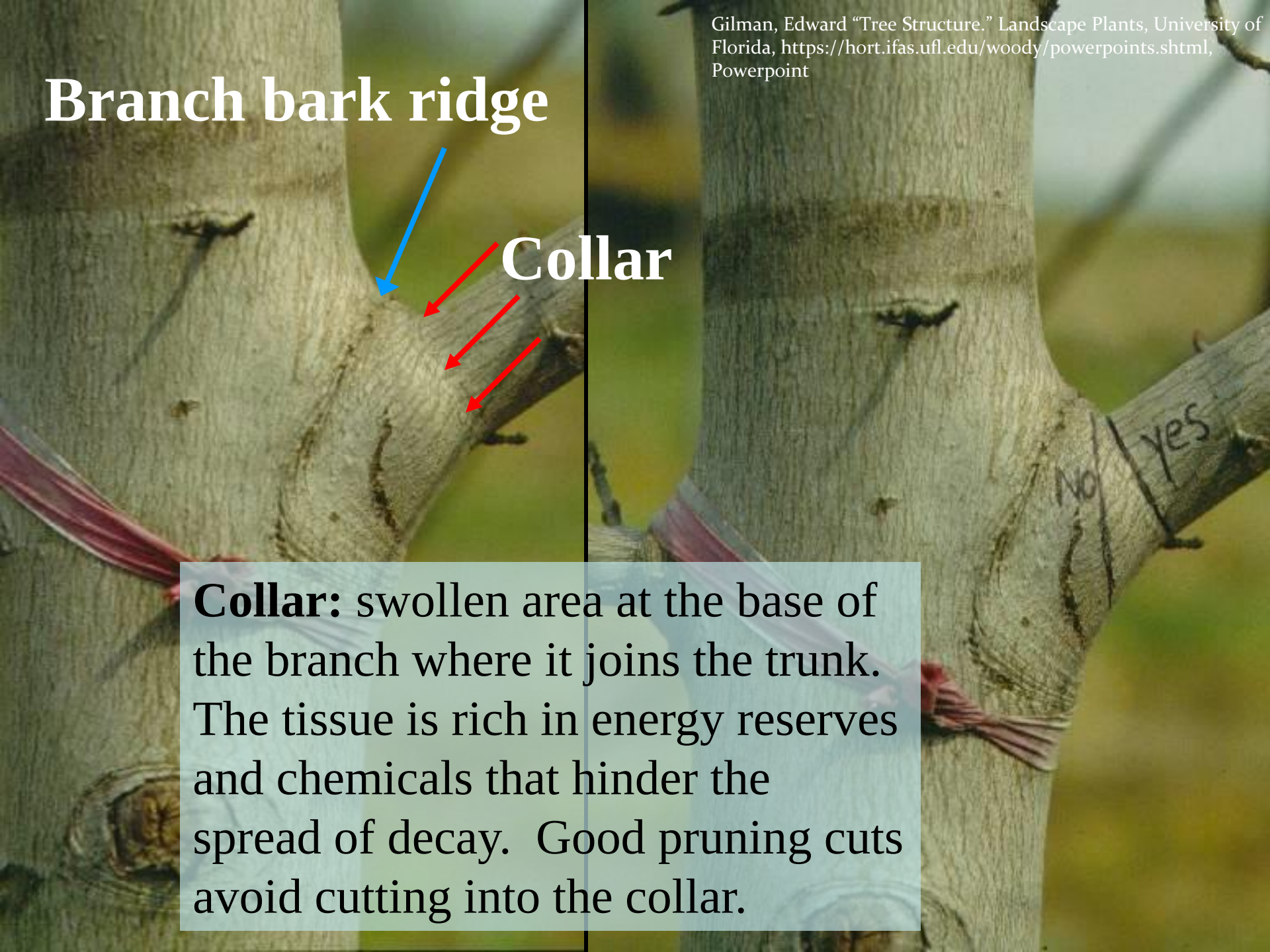

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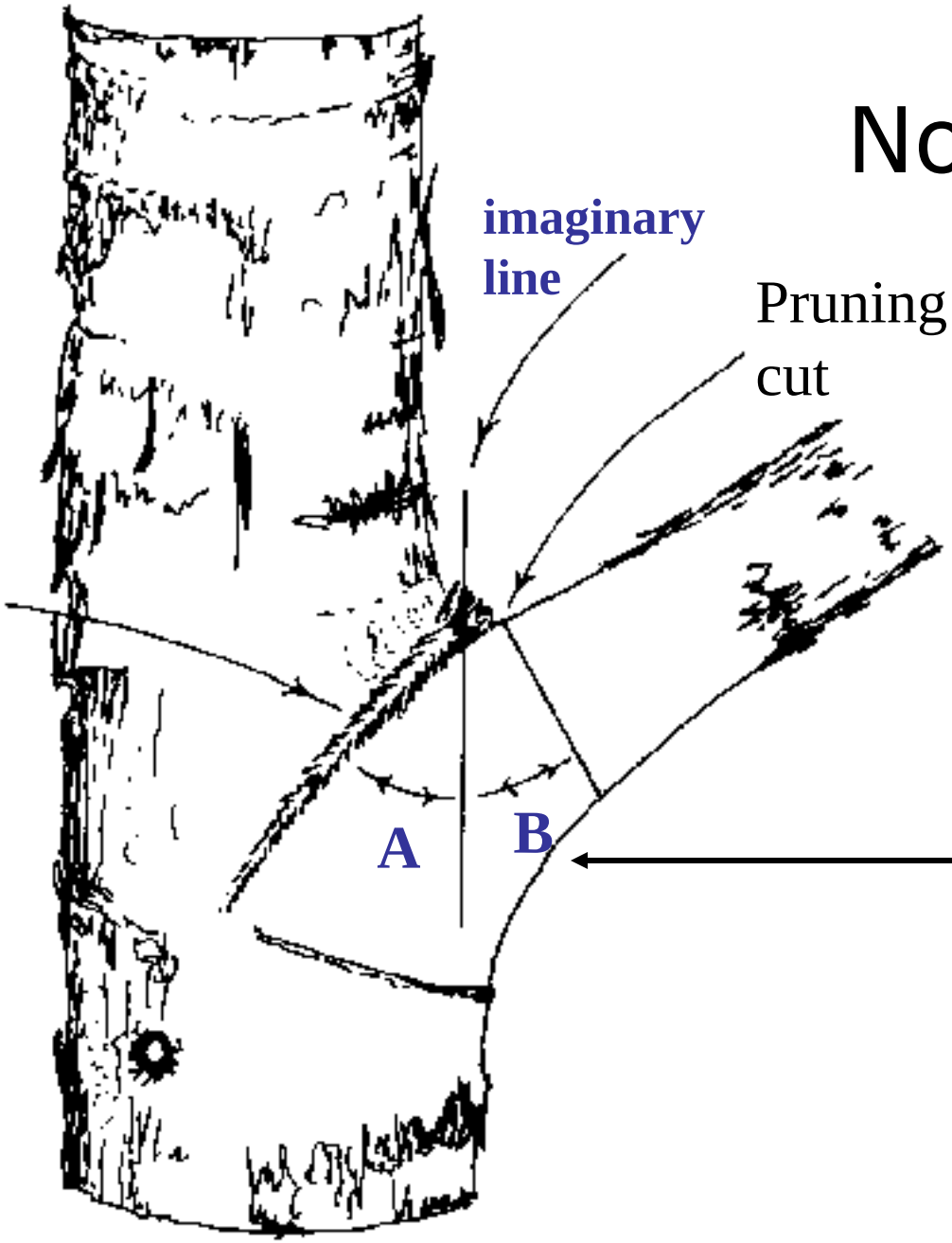
Collar: swollen area at the base of the branch where it joins the trunk. The tissue is rich in energy reserves and chemicals that hinder the spread of decay. Good pruning cuts avoid cutting into the collar.



No collar visible

Angle 'A' should equal angle 'B'

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Bad cut- called a flush cut

Woundwood does not develop evenly

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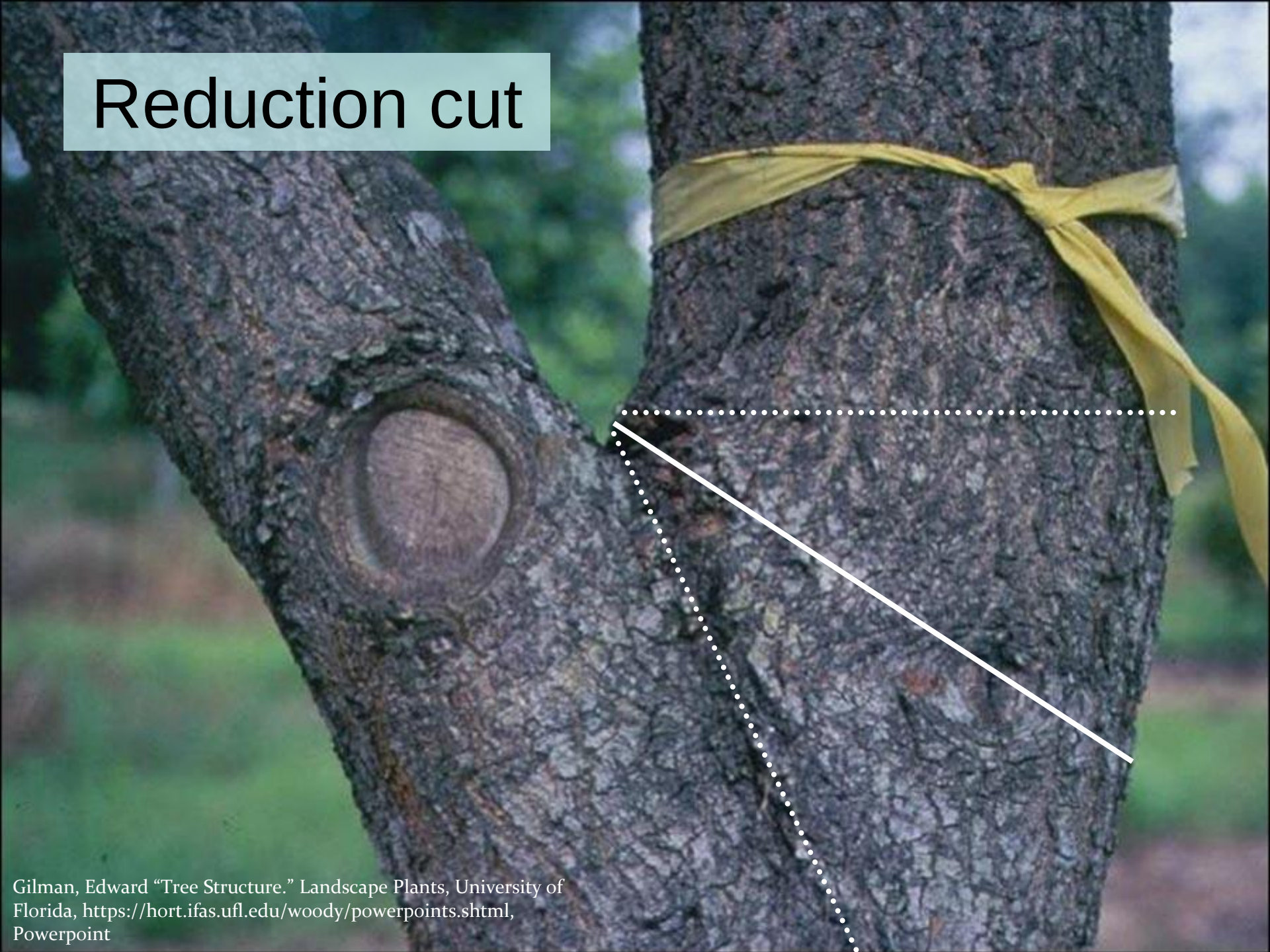
Reduction cut



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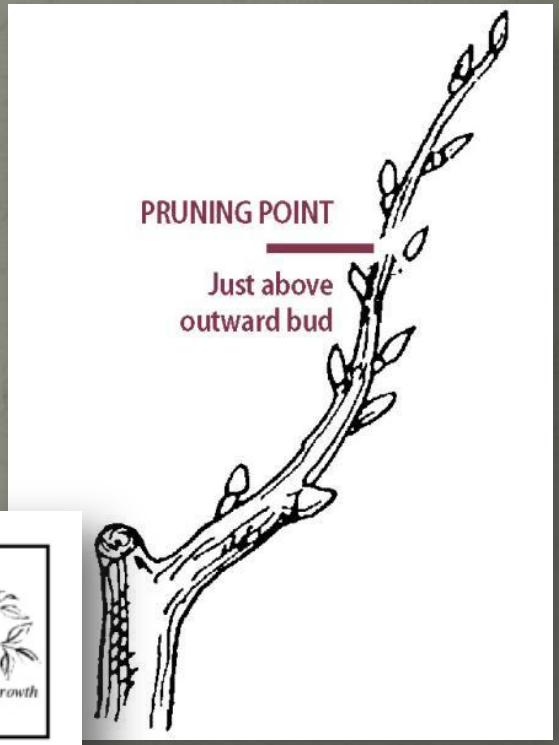
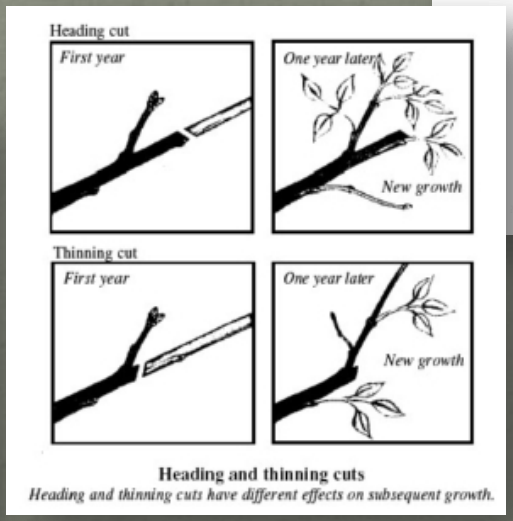
Pruning Methods

- Heading cuts- cut made at a bud or node
- Shearing cuts- partial removal of new growth



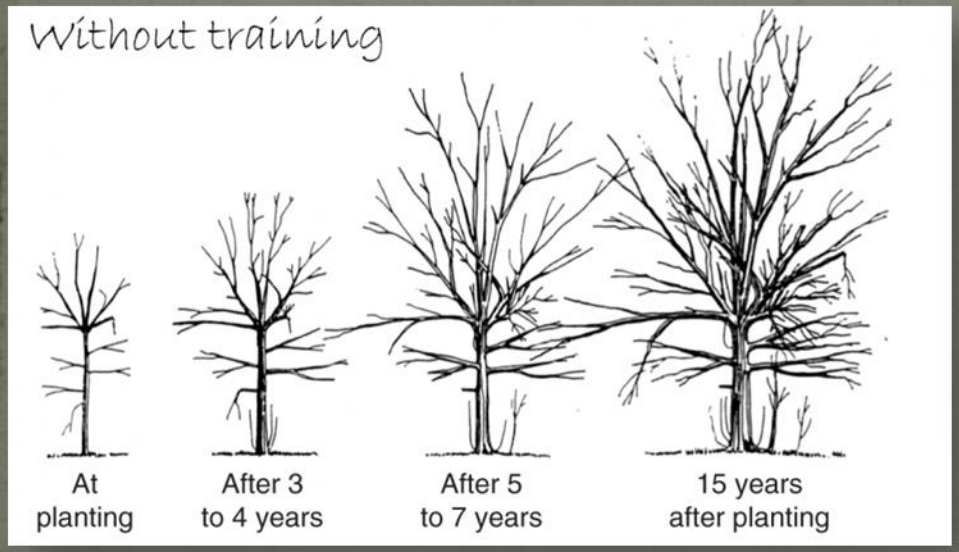


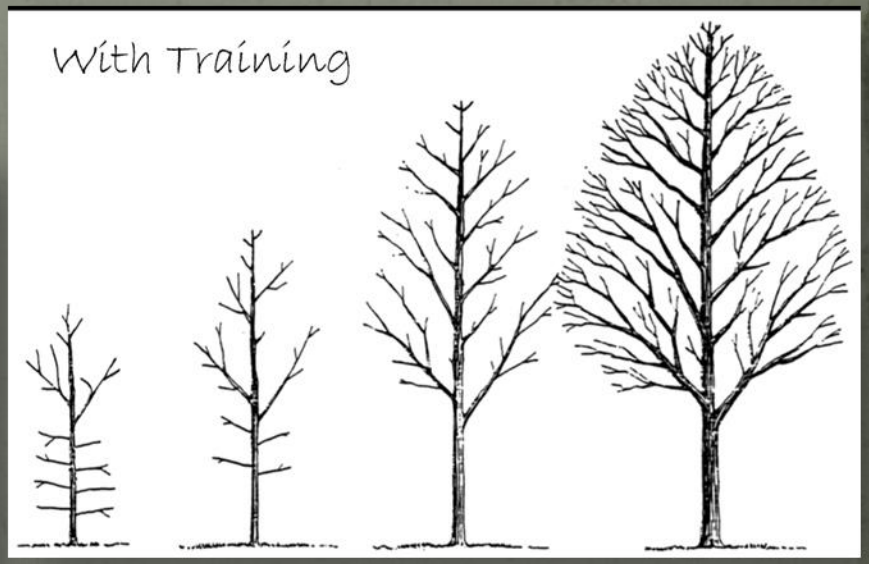
Heading and thinning cuts

Heading and thinning cuts have different effects on subsequent growth.

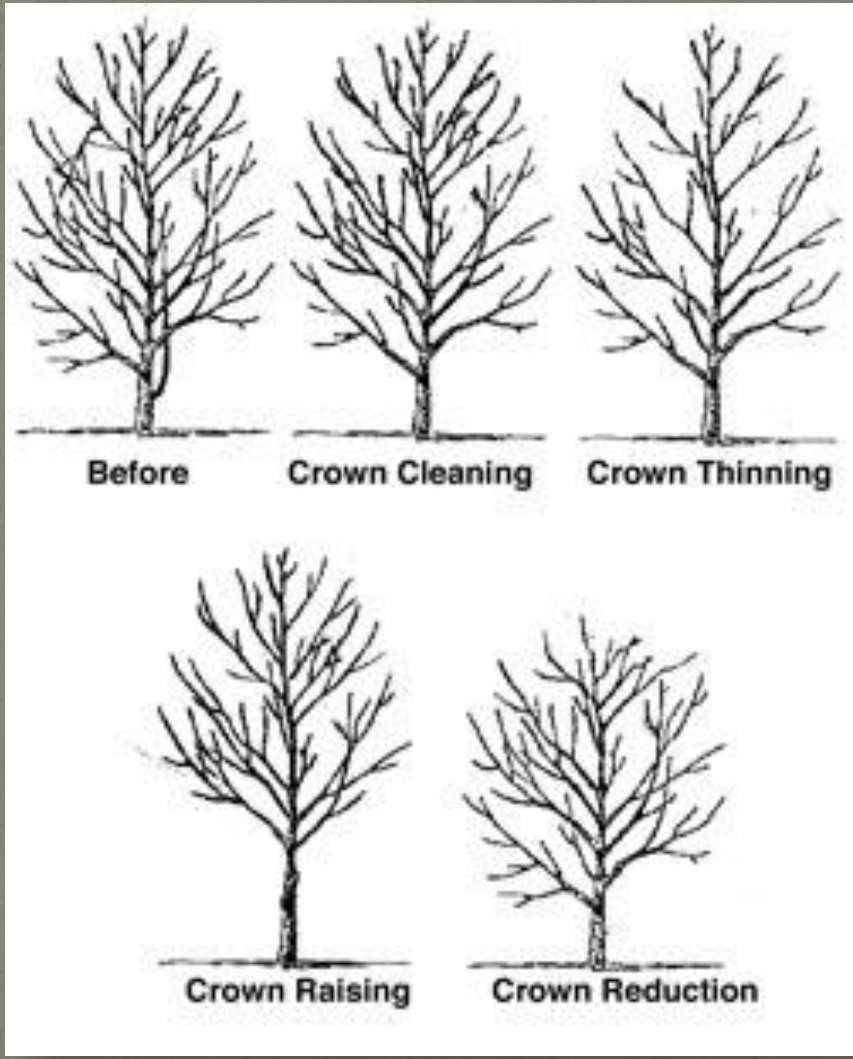
Pruning Applications

- Structural Pruning
  Easier and more effective when done to a young tree





Pruning Applications



Pruning Applications

Crown Cleaning

- Removal of dead, diseased, poorly attached and broken branches
- Remove rubbing and crossing branches
- Subordinate or remove multiple or competing leaders
- Regular crown cleaning can eliminate small problems before they get out of hand

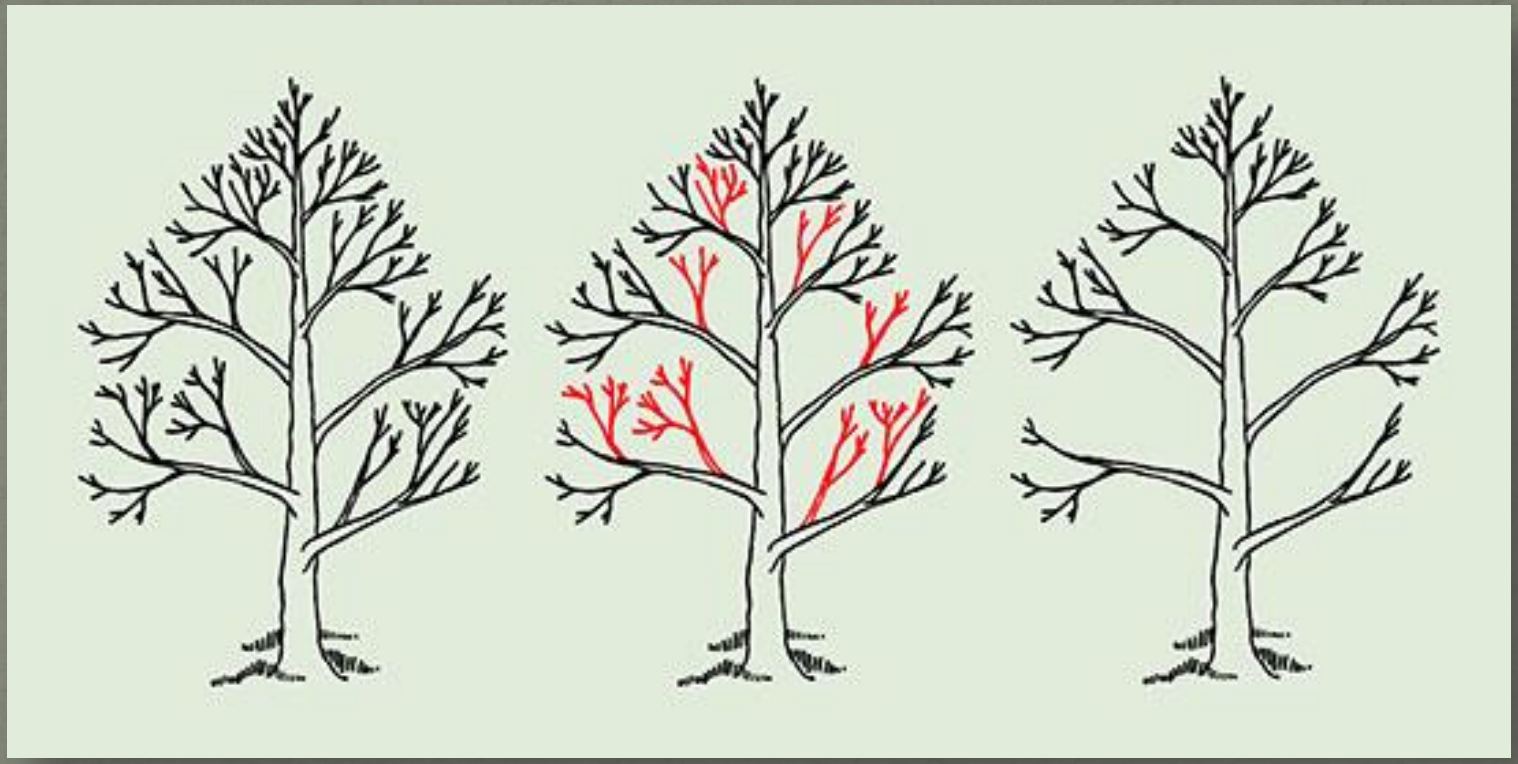
Pruning Applications

Crown Thinning

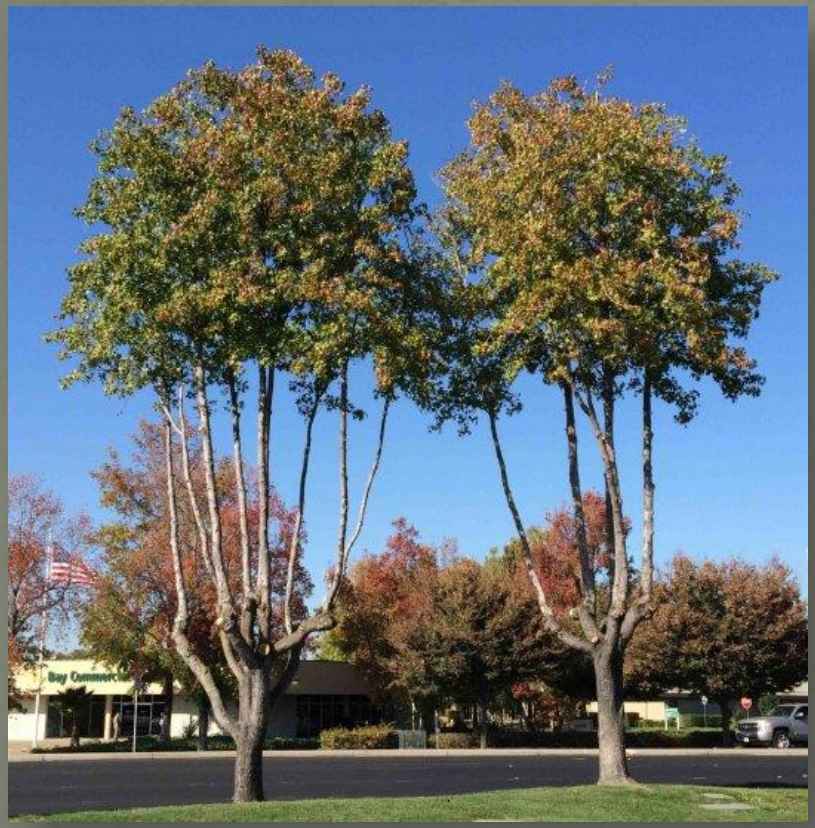
- Removal of small amounts of material throughout the canopy
- Increased light penetration and air movement
- Reduce disease, mildews, fungus, etc..
- Thinning should be evenly done thoughout the branch or crown
- Reduce risk of broken limbs on fruit trees
- Watersprout response is a sign of overthinning

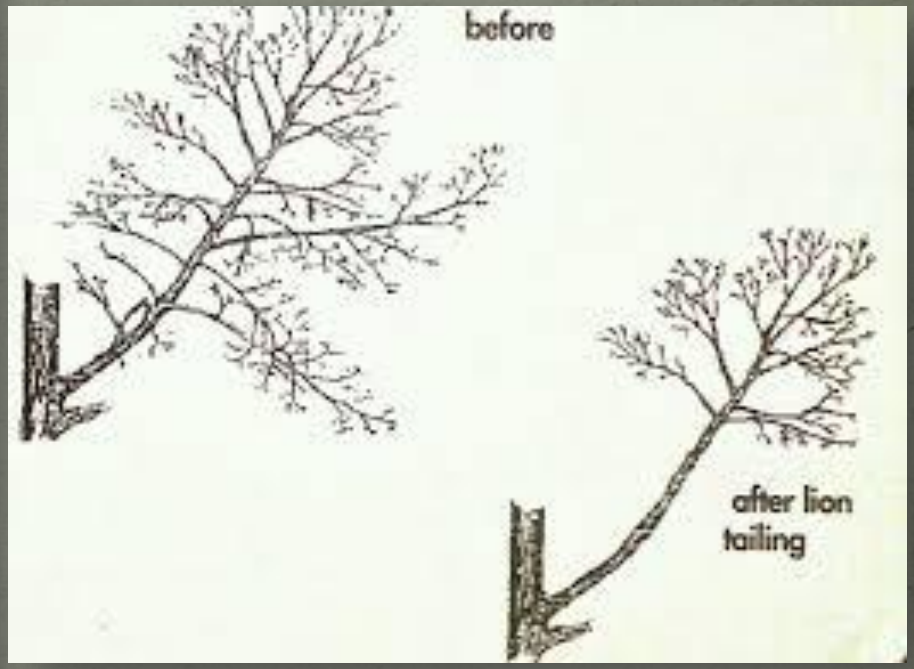
Pruning Applications

Thinning Cut



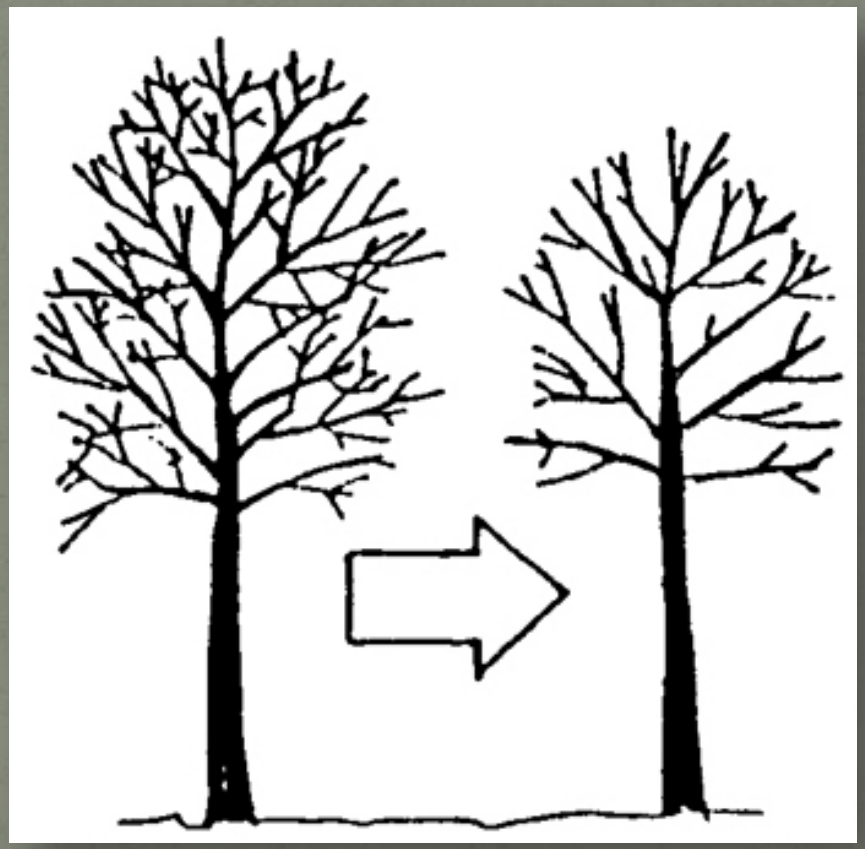
Avoid Lion's Tailing!





Pruning Applications

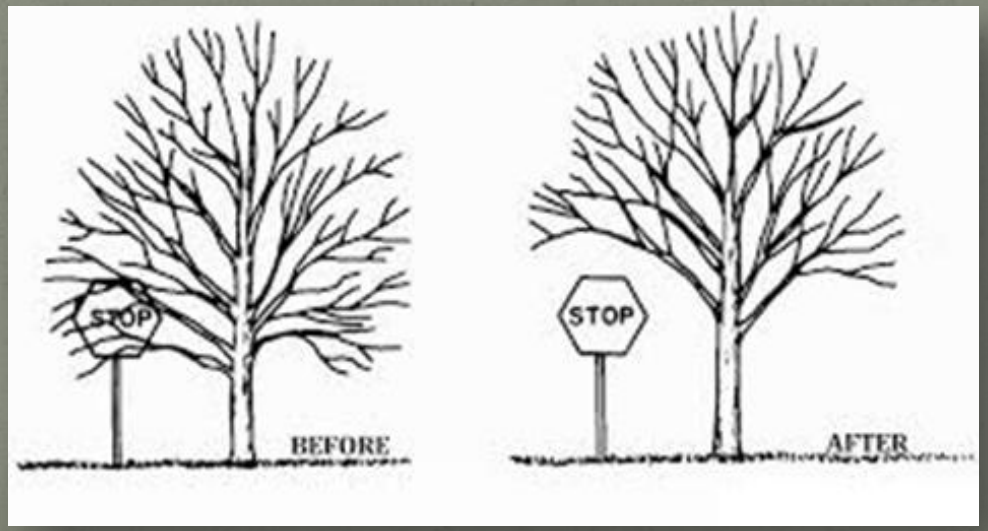
Crown Reduction



Pruning Applications

Crown Raising

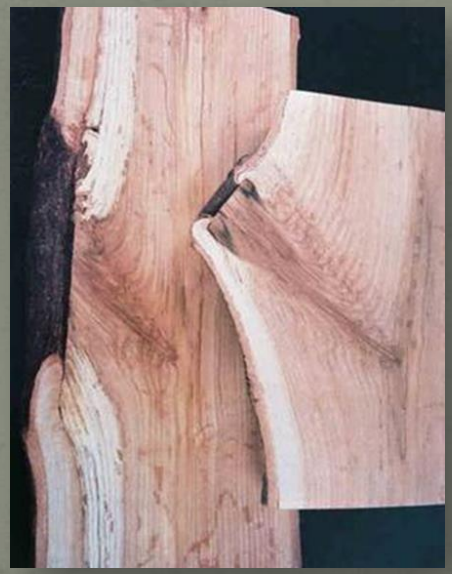
- Removal of lower limbs for clearance and visibility
- Excessive removal will negatively affect truck taper
- It is better to prune these limbs when the tree is young and branch diameter is small



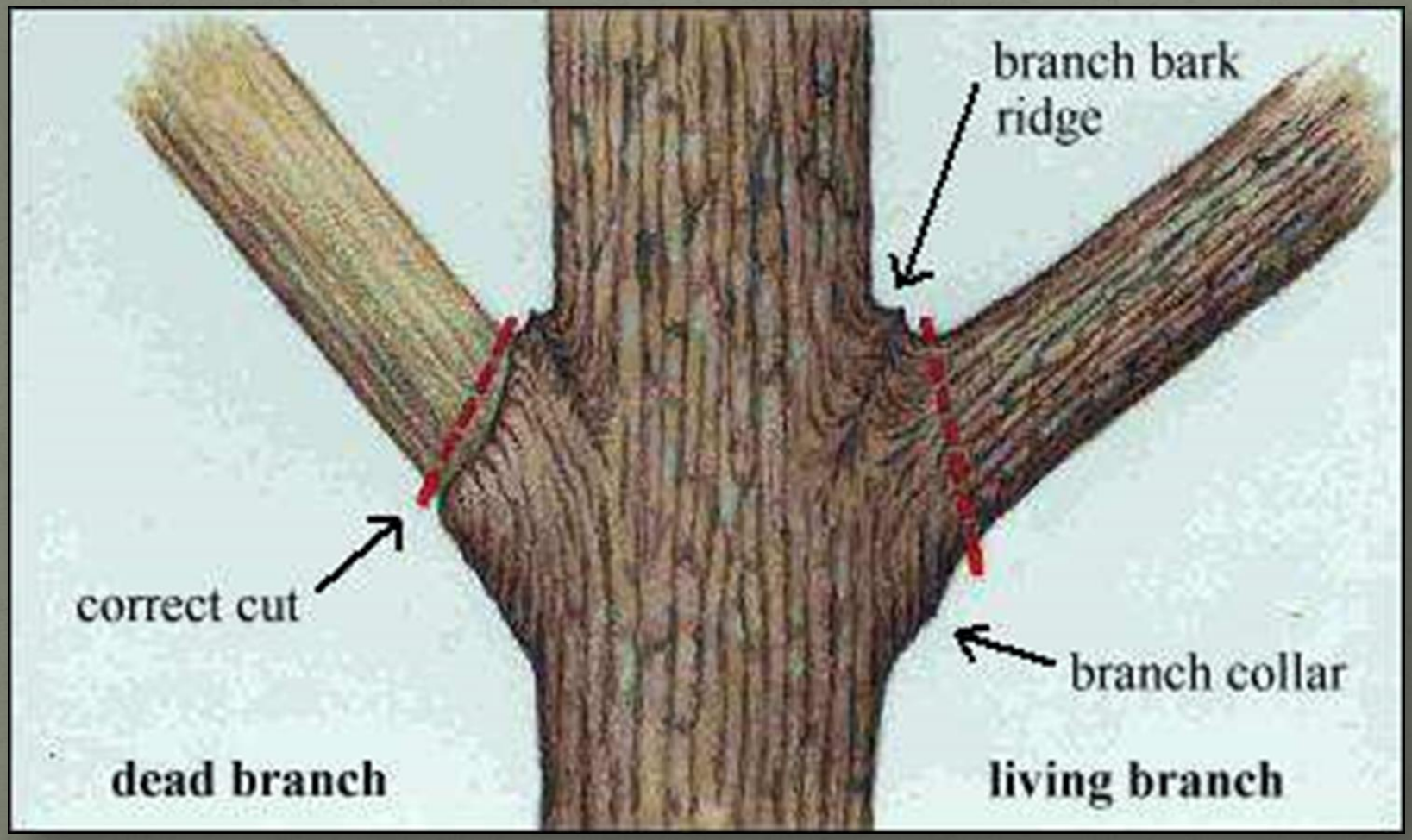
Pruning Applications

Crown Raising

- Flush cuts
- Too large of a diameter

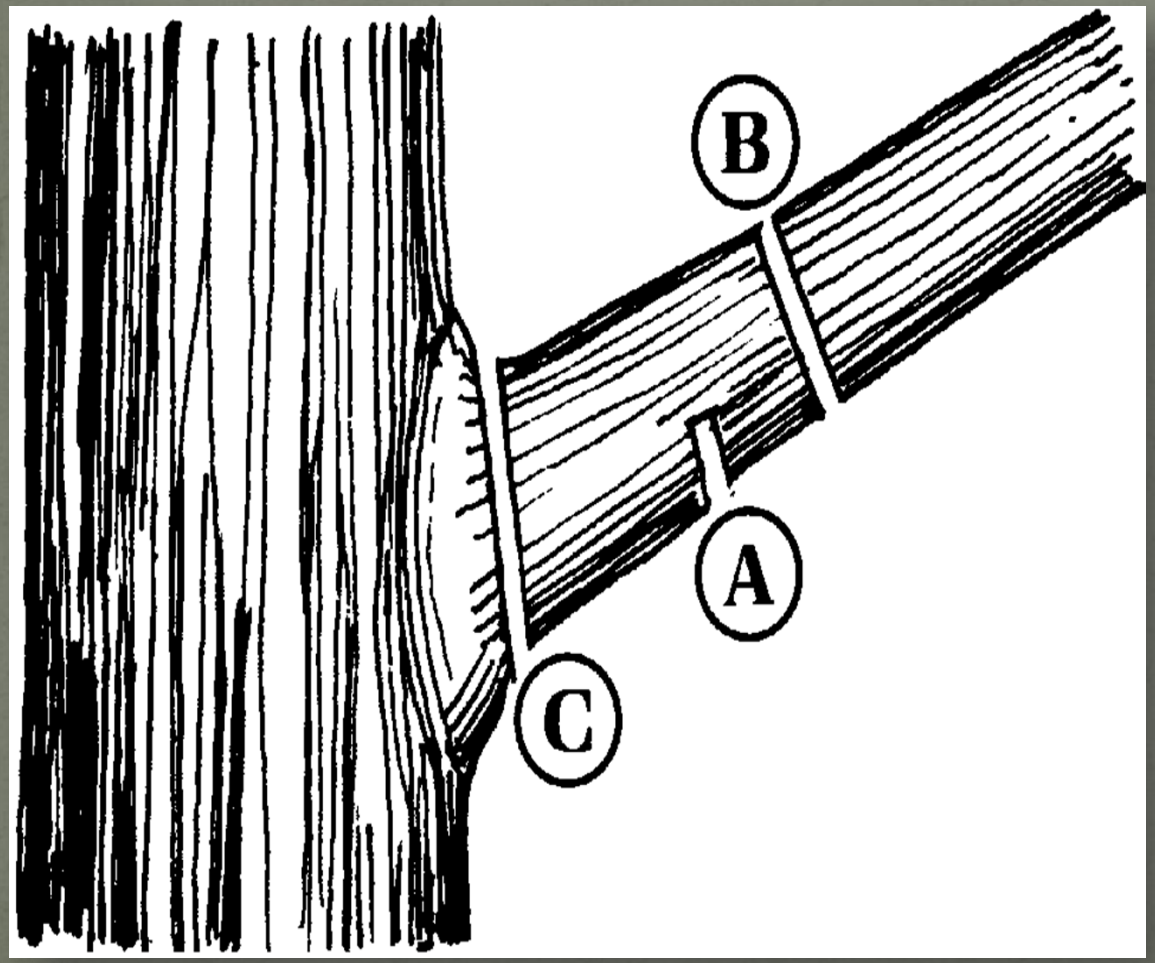


Where to make pruning cuts



Pruning at the branch collar

Pruning large diameter branches -3 cut method



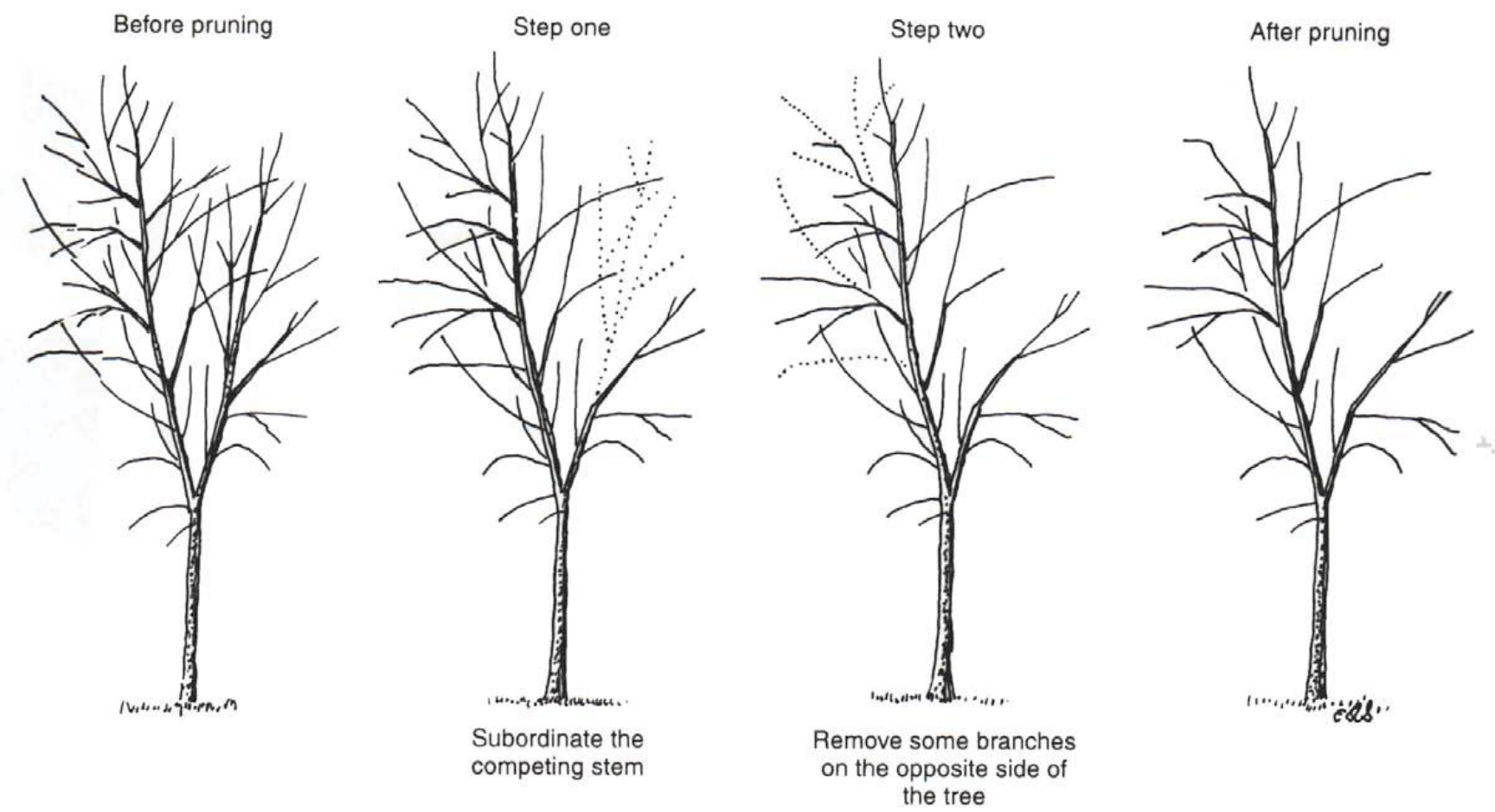
3 Cut method


3
1
2

Pruning Applications

Pruning Co-Dominant leaders

Correcting Codominant stems



Sprouts, Suckers, and Watersprouts

Timing your pruning

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  - Oaks in particular to maintain health and avoid disease

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- Dead, broken, diseased, or hazardous limbs should be pruned as soon as possible
- Pruning on oaks should be avoided during spring and summer months on account of Oak Wilt

Timing your pruning

- Flowering plants
  - Plants which bloom on current season's (new) growth should be pruned in the winter
  - Plants which bloom on last season's growth should be pruned just after bloom

Timing your pruning

- Fruiting Plants
  - Pruning during dormant season can increase structure and distribute fruiting buds throughout the plant
  - Pruning after flowering can help thin the fruit crop
  - Fruit bearing trees contain 2 types of buds: Growth (vegetative) and Fruiting buds

Utility lines

- Electric transmission, phone, cable, etc.

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- Direct vs indirect contact

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- Direct vs indirect contact
- Insulation protects the utility line, not the person!

CALL YOUR UTILITY COMPANY!

Topping, the worst pruning practice. Ever.

Topping

- Injures tree leading to decay
- Resulting shoots are weakly attached and easily break
- Wastes money
- Creates hazard

Tools for Pruning

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Caution- requires experience

Not Pruning Tools!

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Hiring a Professional

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4) Contact City staff or MDC Community Forester for second opinions

Who's going to cost more in the long run?

Questions?

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