# Fruit Tree Grafting

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**April 23, 2020**

# What Can Be Grafted?

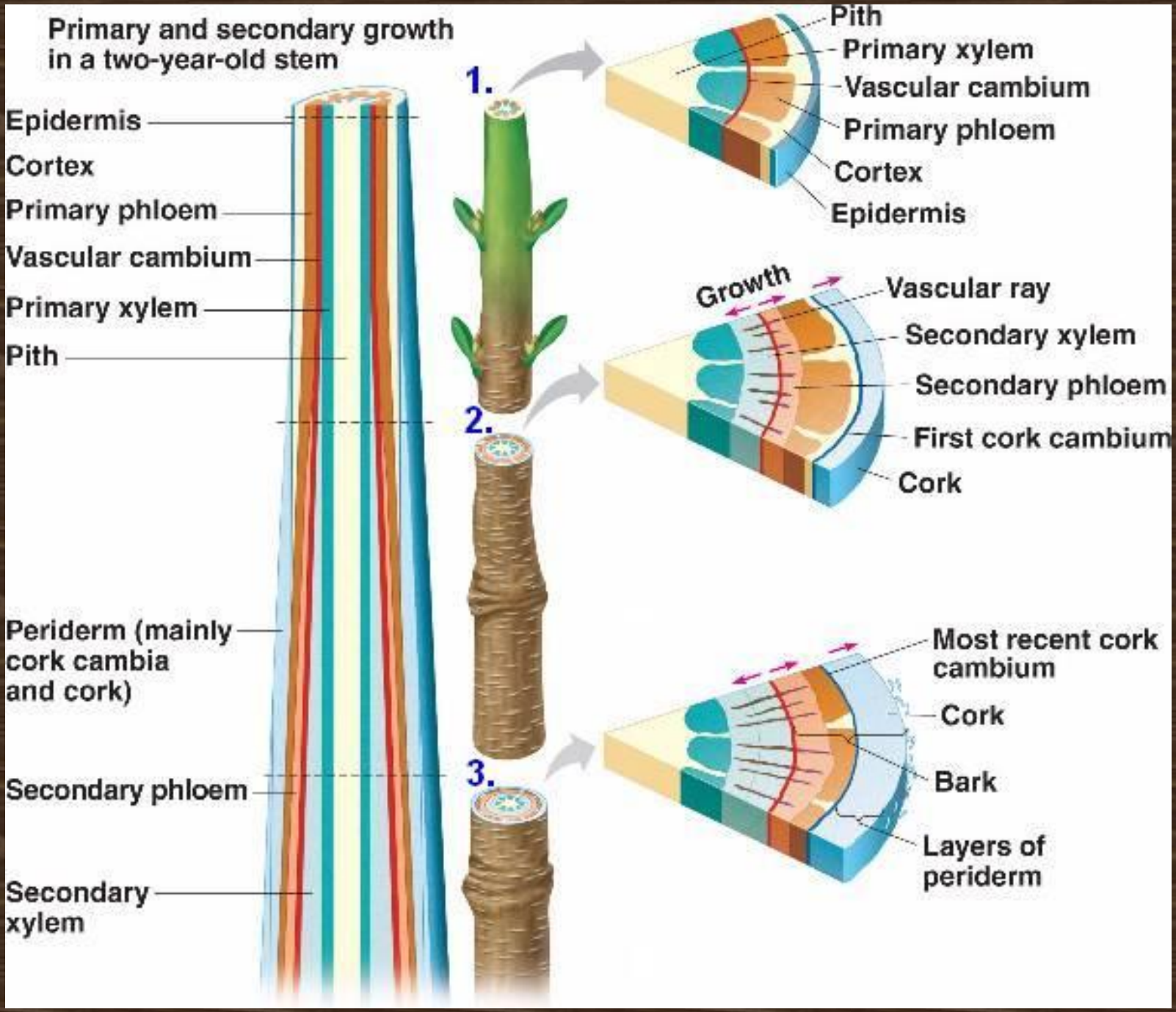
- Anything that is compatible
  - Varieties within the same species
  - Pome Fruit exceptions
    - Pears onto quince, European pears to Asian pears
    - Pear to hawthorne
    - Pear to apple, maybe with right interstem
  - Stone fruit
    - Almond to peach
    - Sweet to tart, tart to sweet

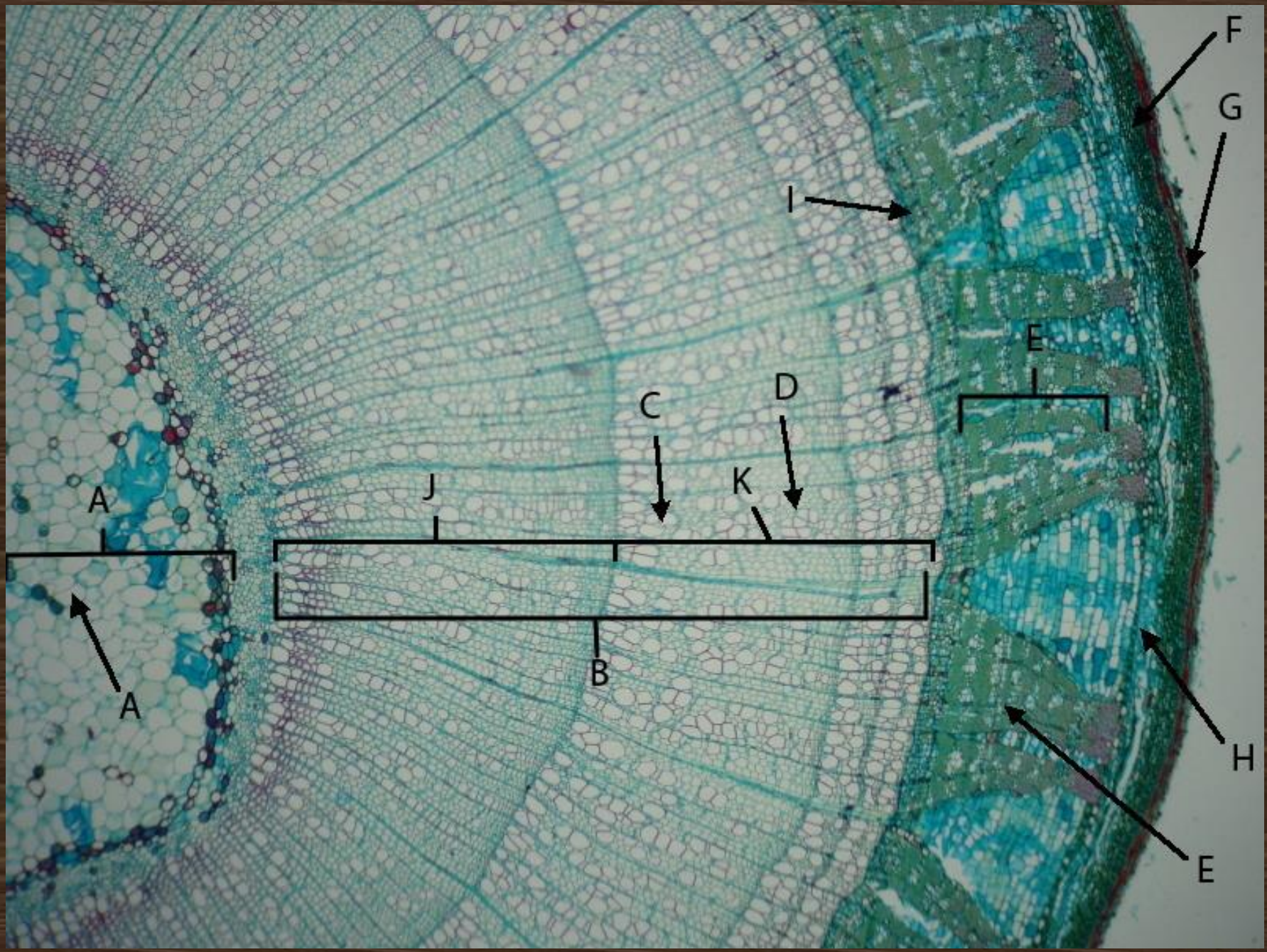
# Terminology

- Rootstock (Underwood)
- Scion
- Water sprout
- Top working
- Grafting
- Budding
- Layering

# Cell Growth and Grafting

- Connect the cambium to create vascular connection
- Callus to knit the two pieces together


Primary and secondary growth in a two-year-old stem
Epidermis
Cortex
Primary phloem
Vascular cambium
Primary xylem
Pith
Periderm (mainly cork cambia and cork)
Secondary phloem
Secondary xylem
1.
2.
3.
Pith
Primary xylem
Vascular cambium
Primary phloem
Cortex
Epidermis
Growth
Vascular ray
Secondary xylem
Secondary phloem
First cork cambium
Cork
Most recent cork cambium
Cork
Bark
Layers of periderm


F
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# When To Graft

- Grafting
  - When growth starts to resume in the spring until 1/2” green
- Budding
  - Late-July, early-August

# What To Graft

- Water sprouts (scions) onto underwood
  - Last year's growth
  - Harvest before bud break and keep dormant

# Why Graft?

- To make a new tree
- To add varieties to an existing tree

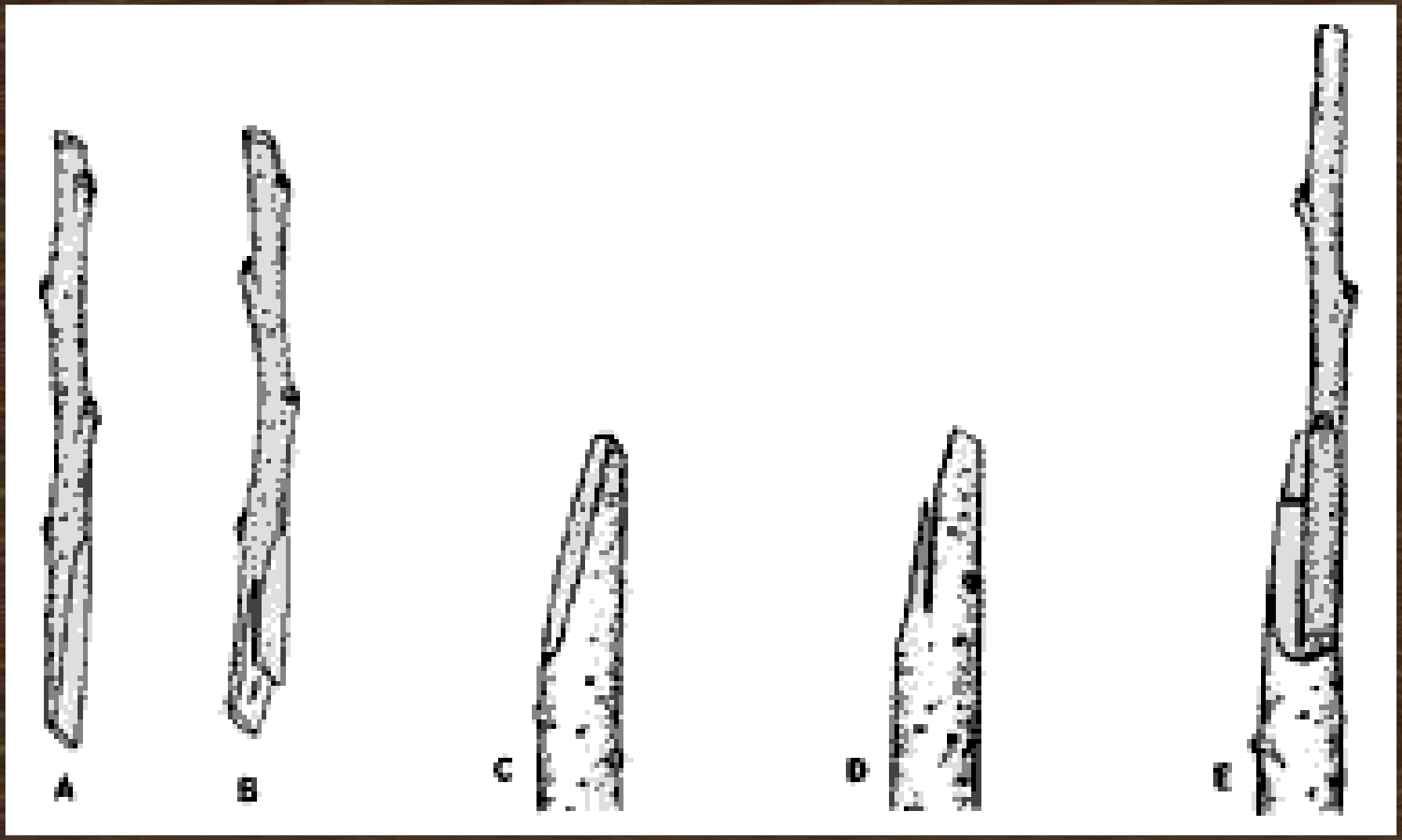
# Grafting Techniques

Whip Graft  Cleft Graft  Bark Graft  Bud Graft

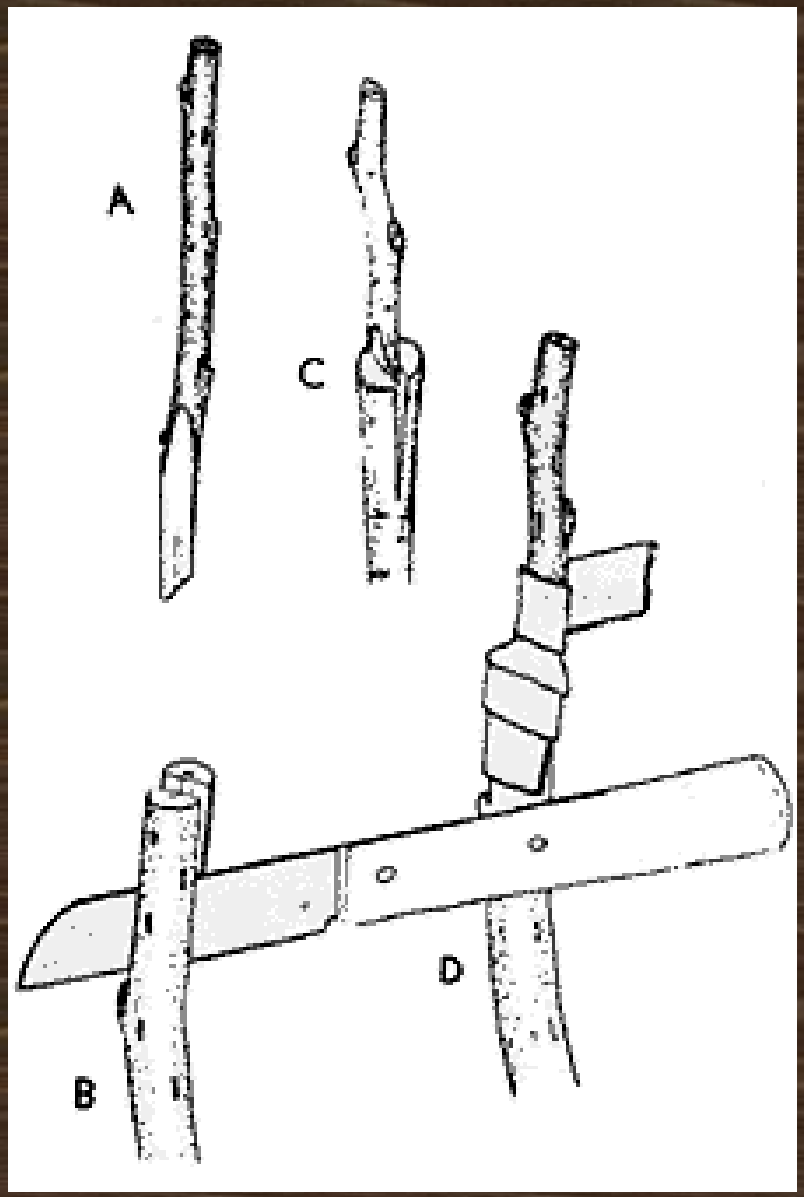
# Whip Graft

- Harvest scion wood when still dormant (Feb/Mar)
- Store scion wood in cool damp environment (refrigerator)
- Graft in very early spring when bark loosens
- Wrap graft with tape to keep moist
- Cambium contact is the key!

# Whip Graft



# Cleft Graft




# Bark Graft (Top working)

Bark Graft year 2

# T-Budding

- Grafts are made in early-August
- Harvest budwood and graft the same day
- Bud from new season’s wood

# Rootstocks

- Control vigor and size of the tree
- Disease resistance and soil tolerance different from varieties
- Control how soon the tree will flower

# Rootstocks

- Antonovka
  - Full size, seedling type
  - Will outgrow the deer
  - No fruit until year 4 or 5
- Bud 9
  - Dwarfing (50% as big as Antonovka)
  - Resistant to collar rot, very cold hardy
  - Must be supported, very precocious
- EMLA 111 (M111)
  - Semi-dwarf (80% of full size)
  - Tolerates heavy clay soils