

Chapter 35.

Plant Growth



Indeterminate growth

- Unlike animals most plants grow throughout their life

- ◆ annuals

- life cycle within 1 year
- germination → flowering → seed production



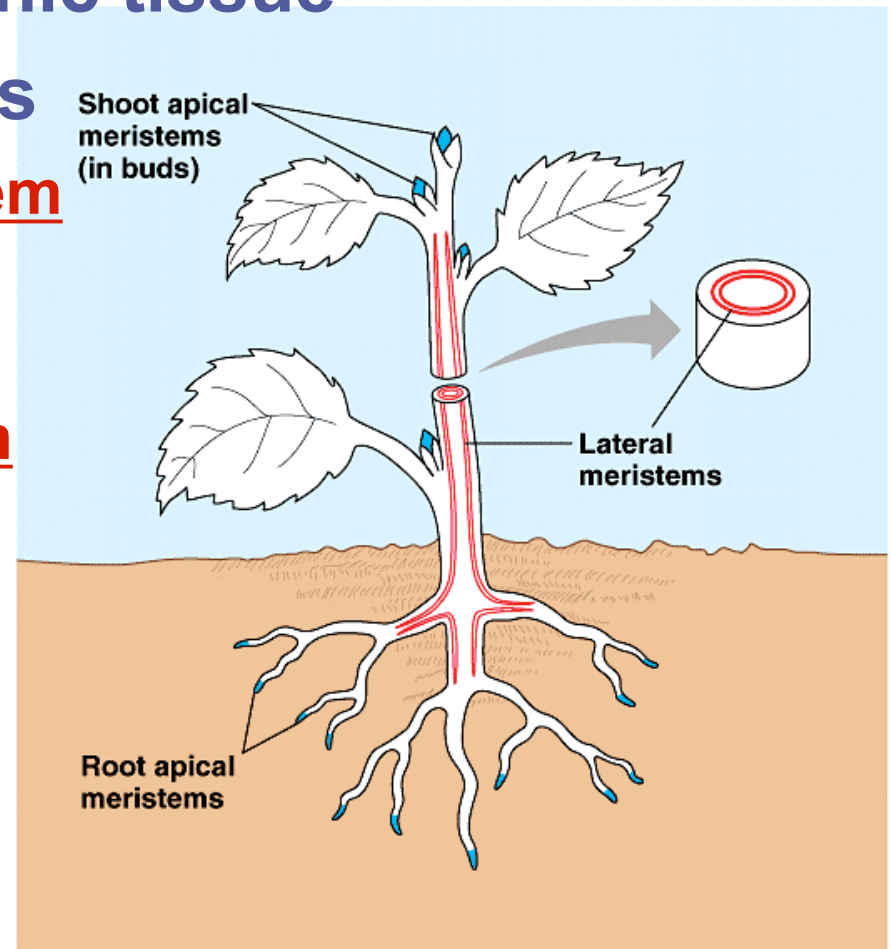
- ◆ perennials

- live many years
- does not die of old age, only disease or trauma



Meristem

- **Regions of growth**
 - ◆ perpetually embryonic tissue
 - ◆ regenerate new cells
 - **apical shoot meristem**
 - ◆ growth in length
 - ◆ primary growth
 - **apical root meristem**
 - ◆ growth in length
 - ◆ primary growth
 - **lateral meristem**
 - ◆ growth in girth
 - ◆ secondary growth



Apical meristems

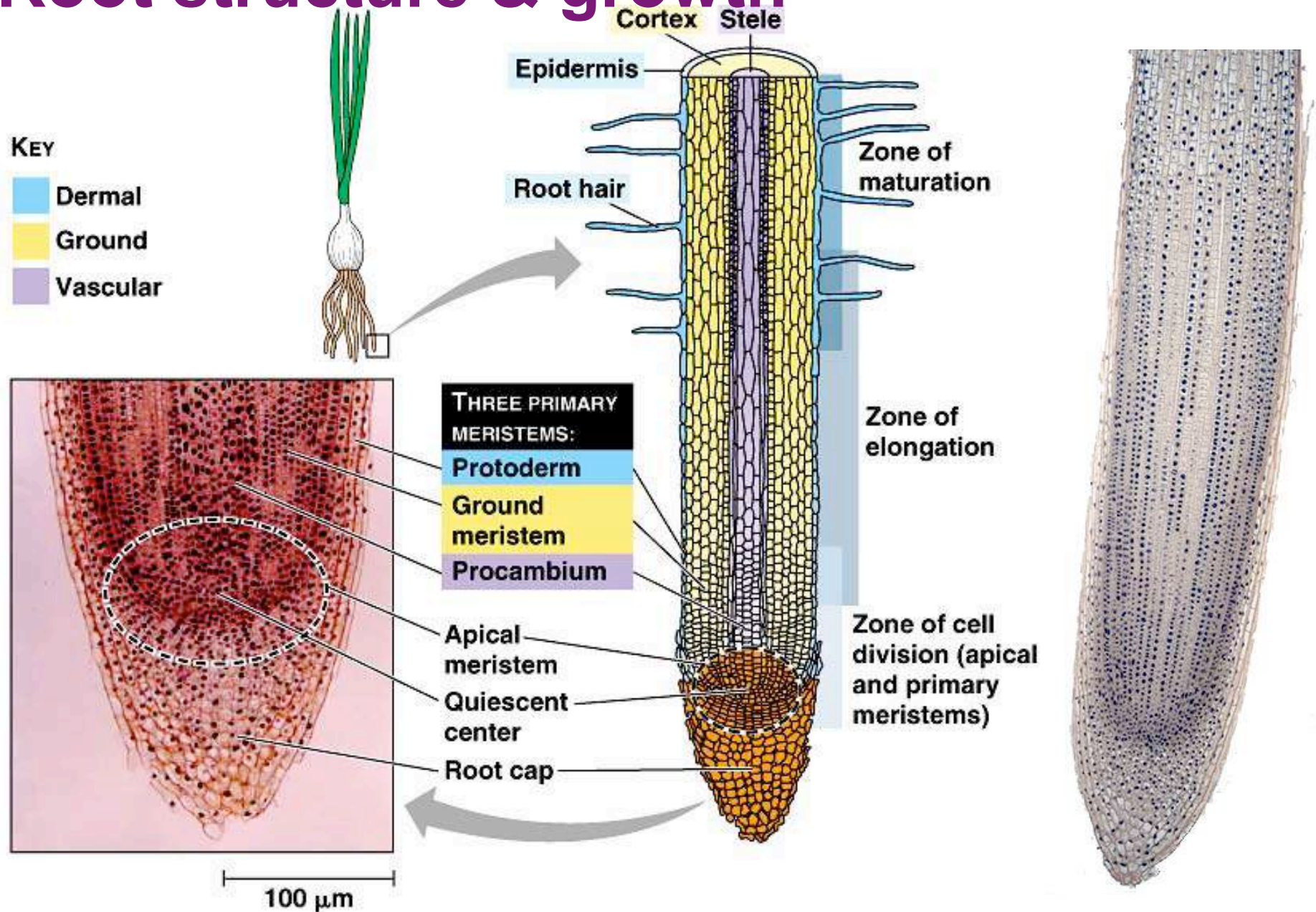


shoot



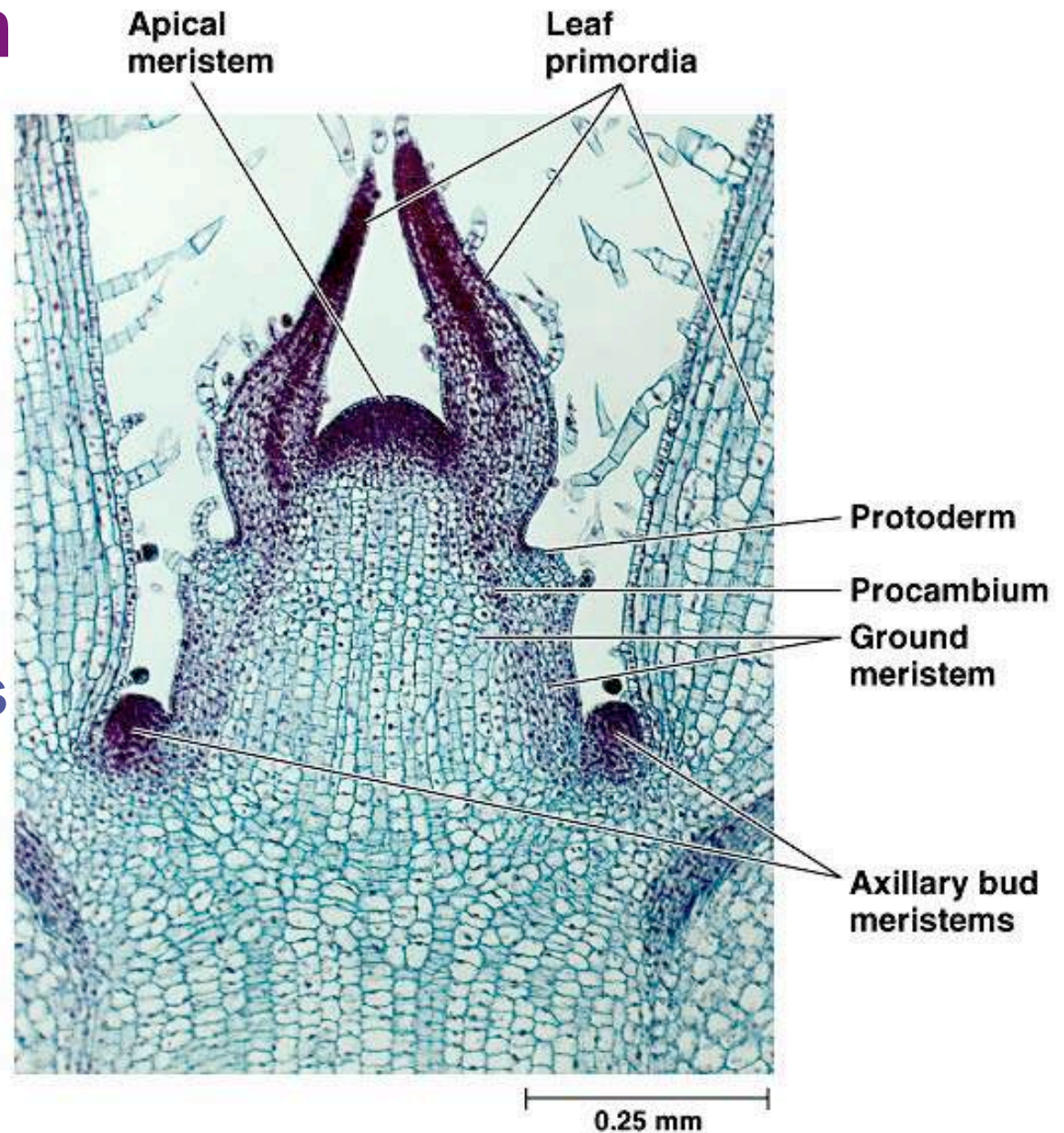
root

Root structure & growth



Shoot growth

- Apical bud & primary growth of shoot
 - ◆ region of stem growth
 - ◆ axillary buds “waiting in the wings”



Shoot growth

- Since woody plants grow from year to year, they evolved a different growth system than herbaceous plants which die back each year



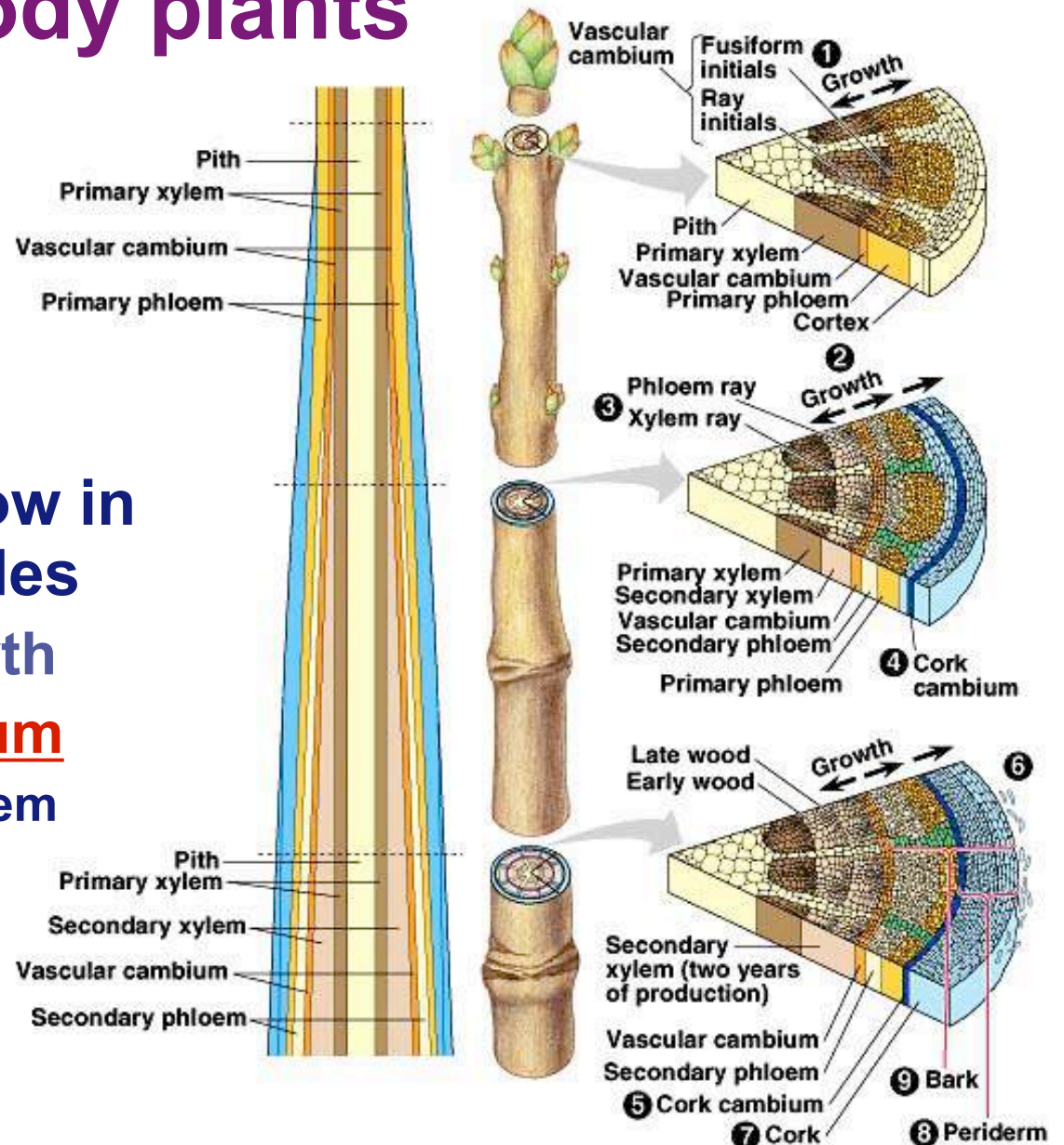
woody



herbaceous

Growth in woody plants

- Woody plants grow in height from tip
 - ◆ primary growth
 - ◆ apical meristem
- Woody plants grow in diameter from sides
 - ◆ secondary growth
 - ◆ vascular cambium
 - vascular meristem layer



Growth in woody plants

■ Primary growth

- ◆ tips of roots & shoots (apical meristem)
- ◆ restricted to youngest parts of plant

shoot

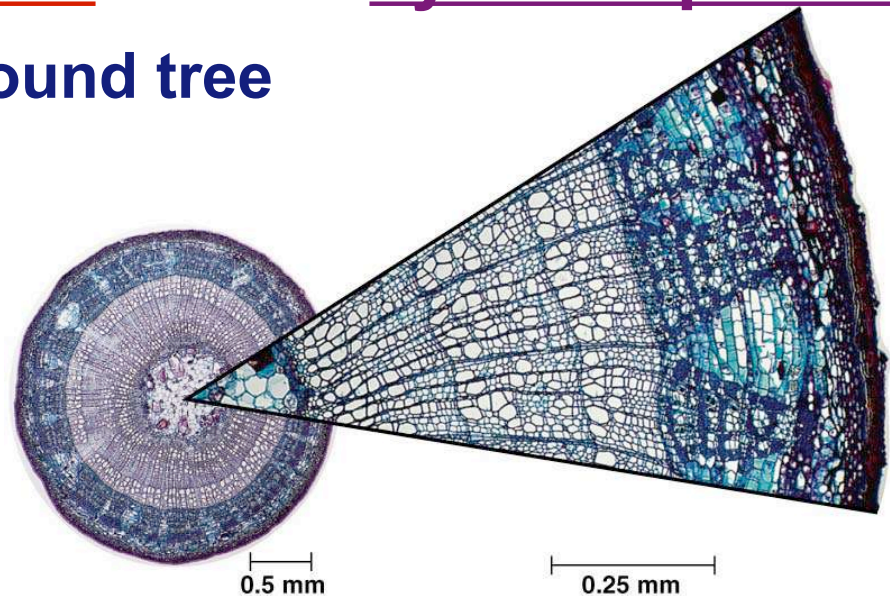


root



Growth in woody plants

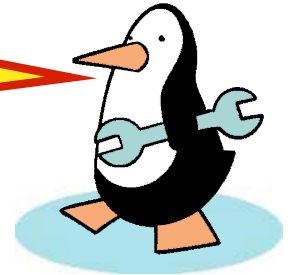
- Secondary growth
 - ◆ thickens & strengthens older part of tree
 - ◆ cork cambium makes bark
 - growing ring around tree
 - ◆ vascular cambium makes xylem & phloem
 - growing ring around tree



Woody stem

- Phloem produced to the outside
- Xylem produced to the inside

Why are early
& late growth
different?



cork
cambium

vascular
cambium

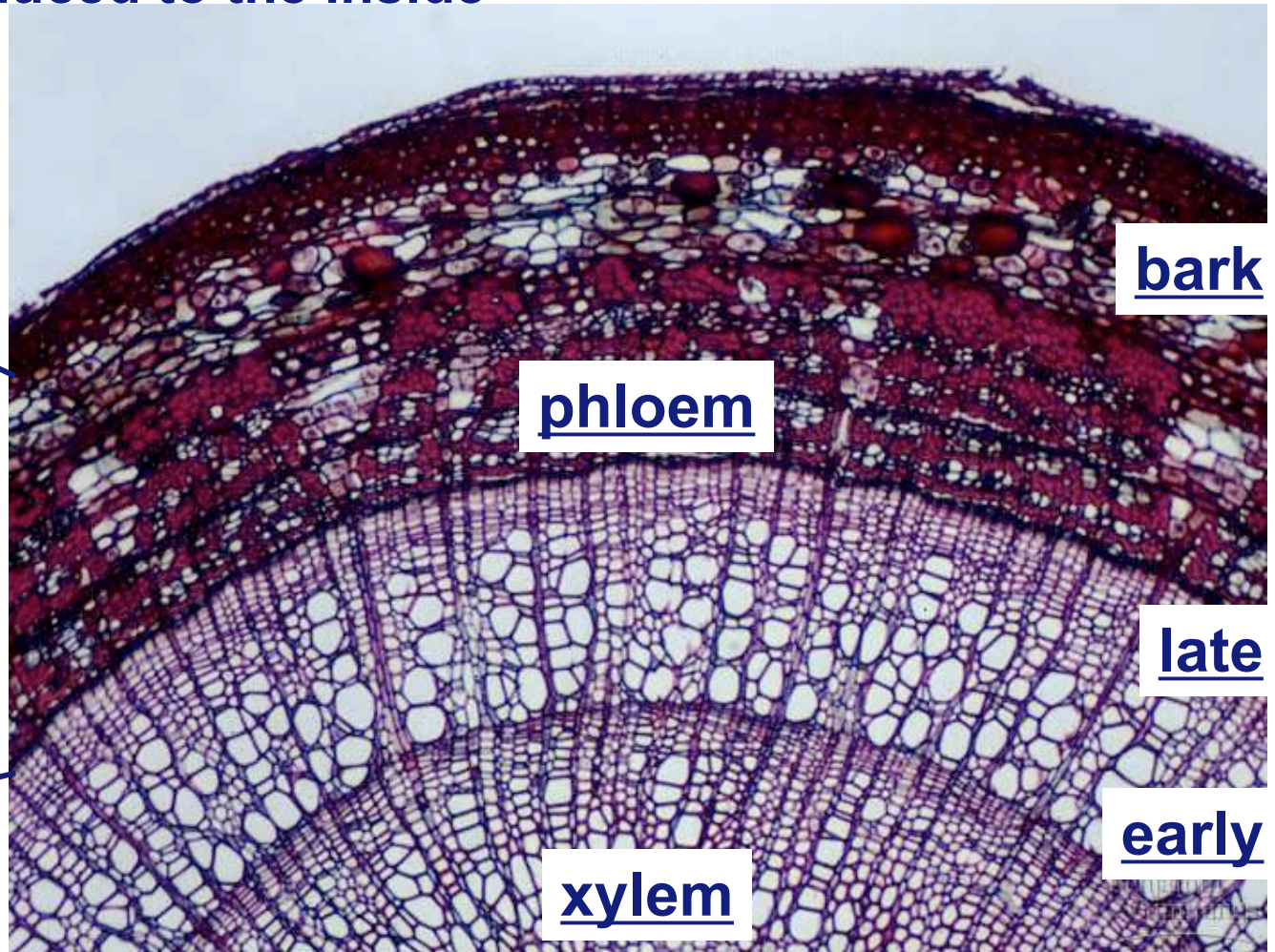
bark

phloem

late

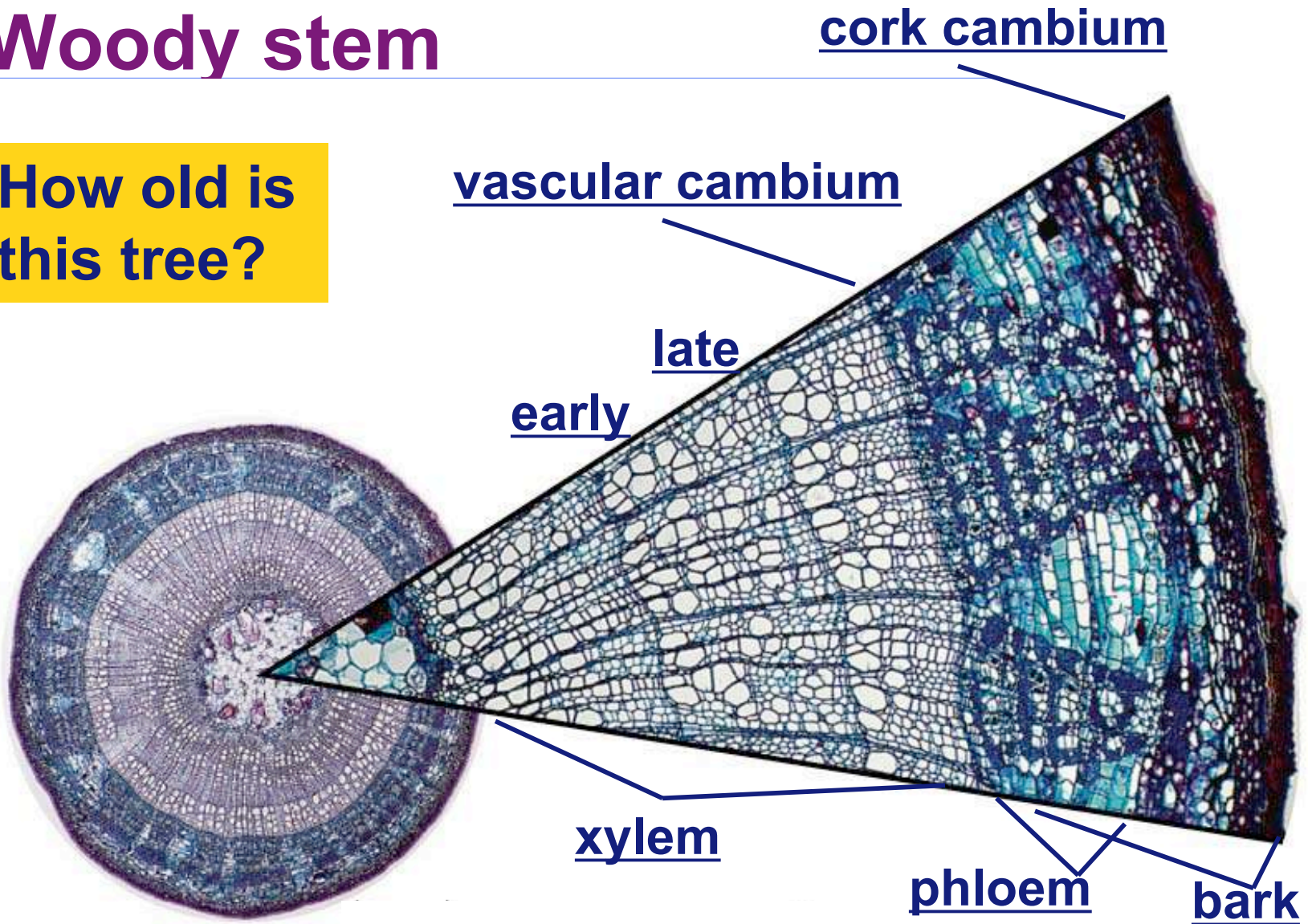
early

xylem



Woody stem

How old is this tree?



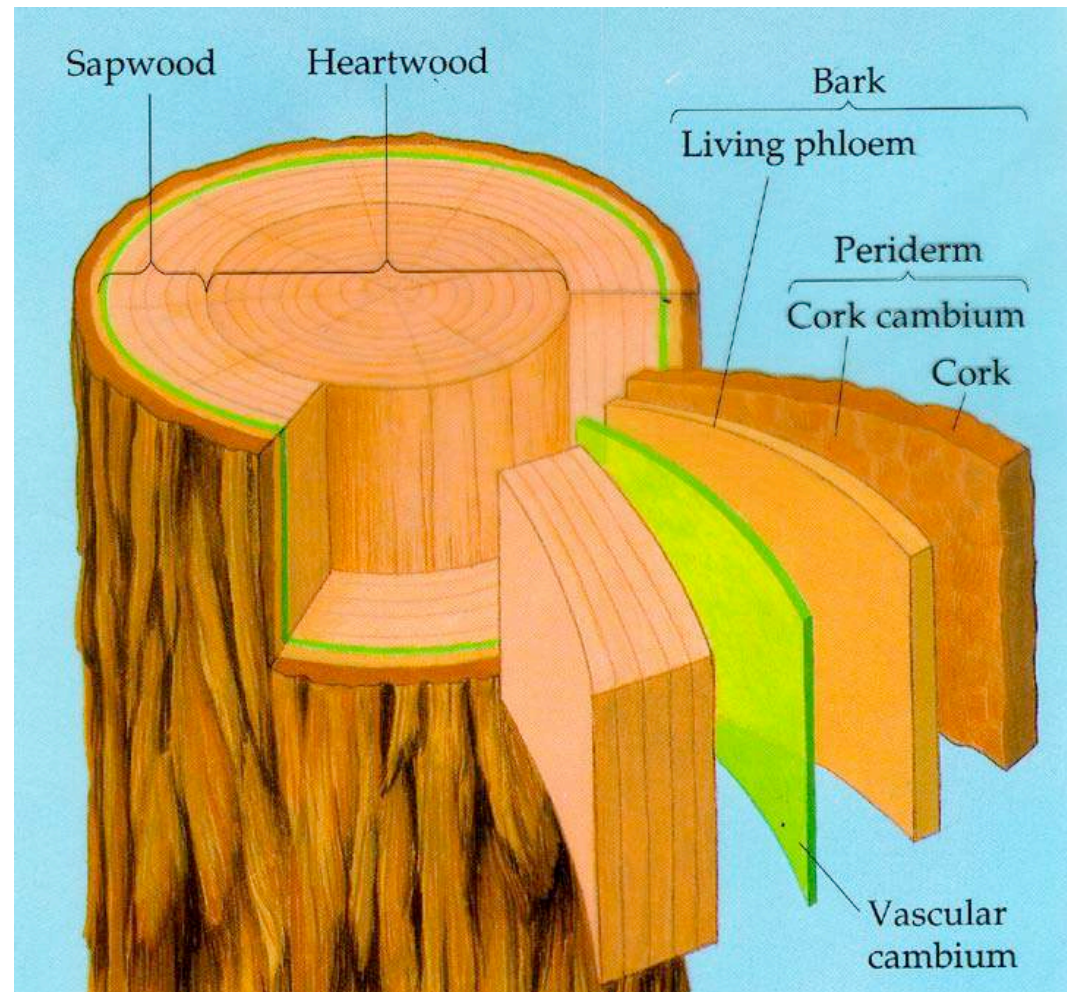
Tree trunk anatomy

Aaaargh!
Murderer!
Arborcide!



tree girdling

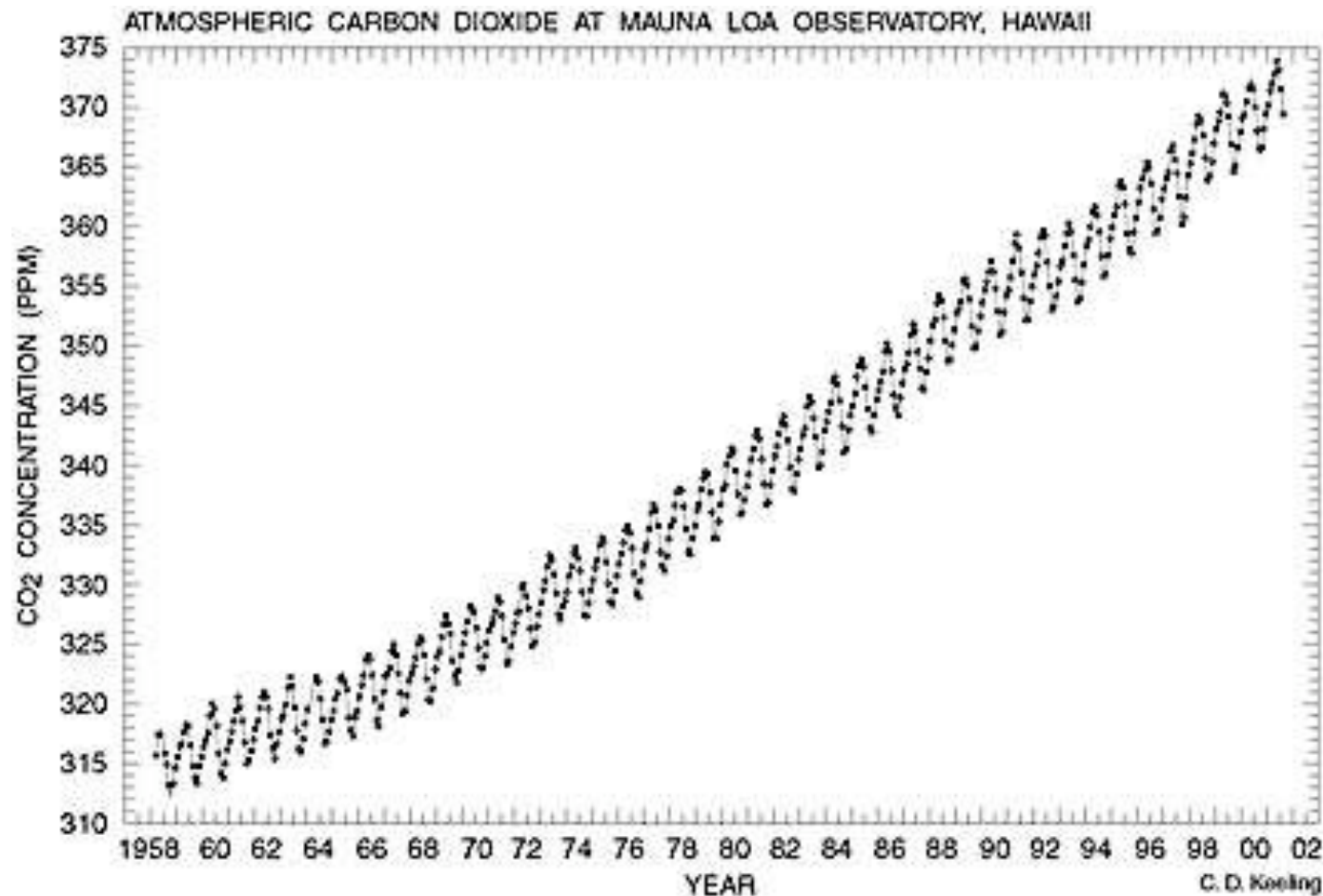
What does girdling
do to a tree?



Where will the carving be in 50 years?



Global effects of plant growth



What trends do you observe in global CO₂?



Any Questions??