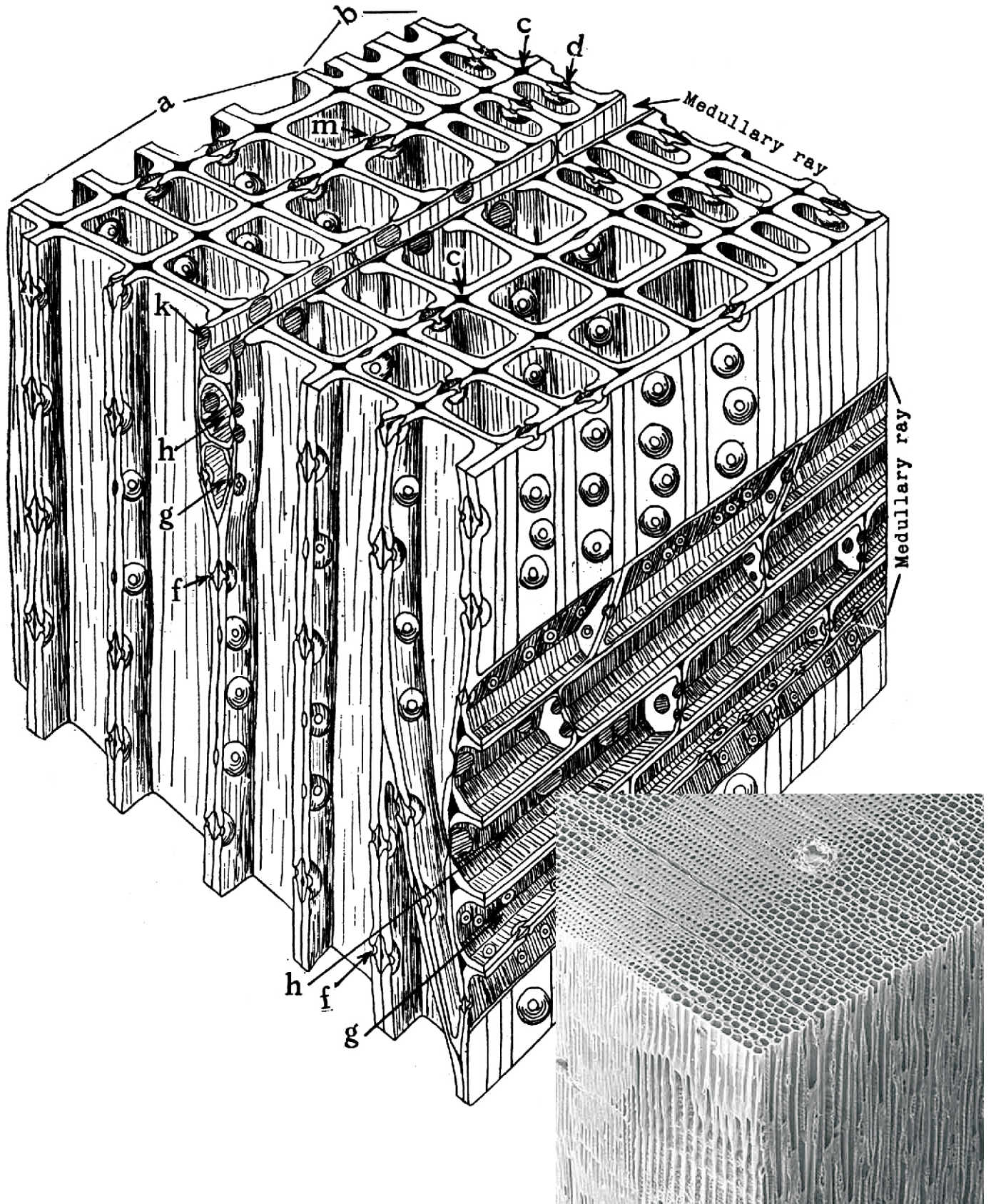
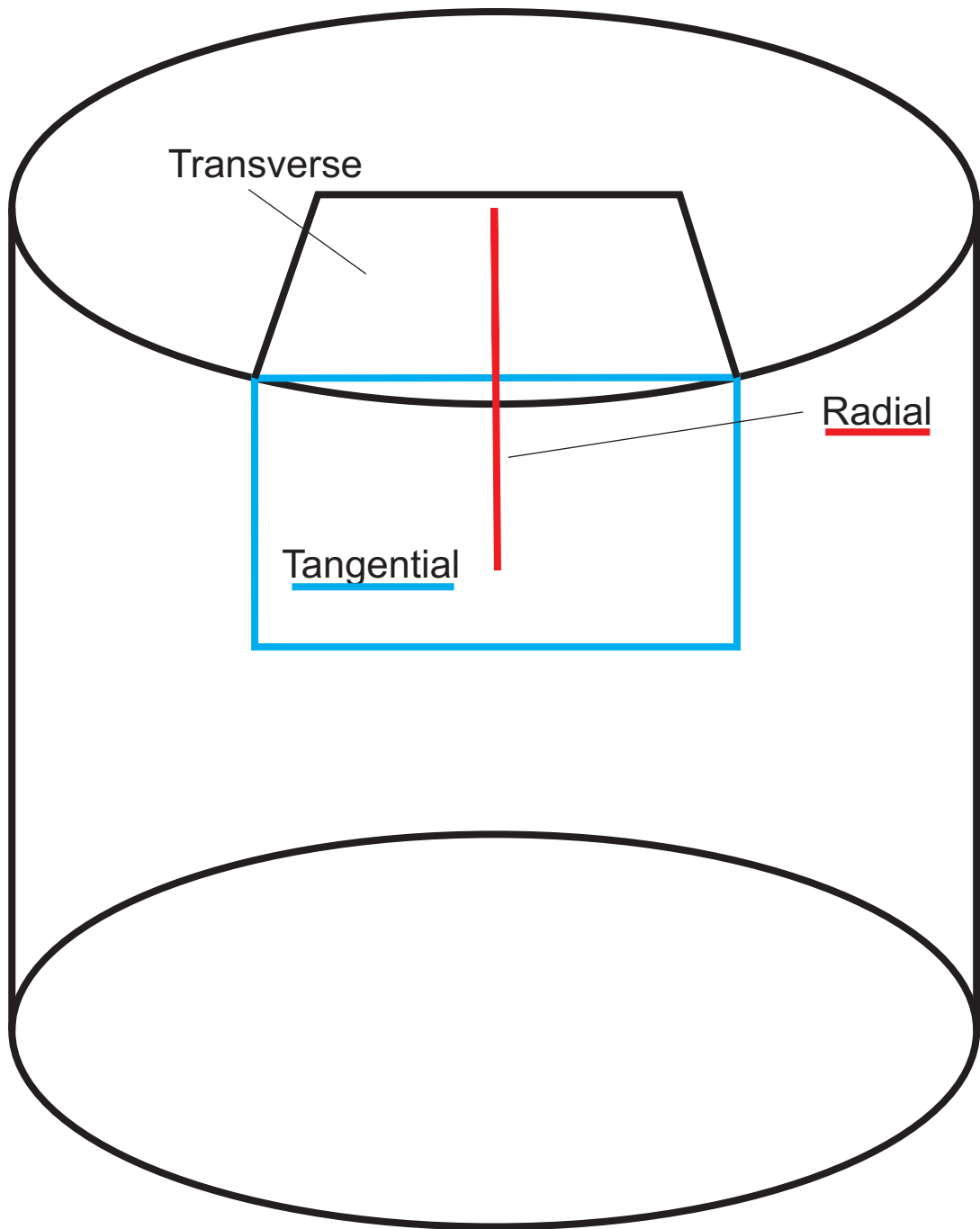


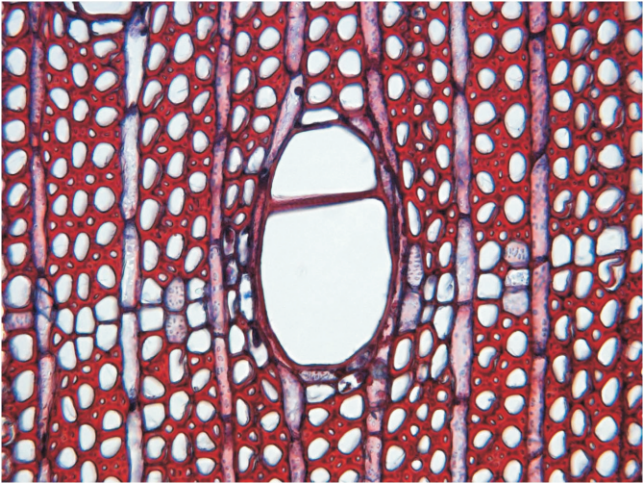
# Inside wood



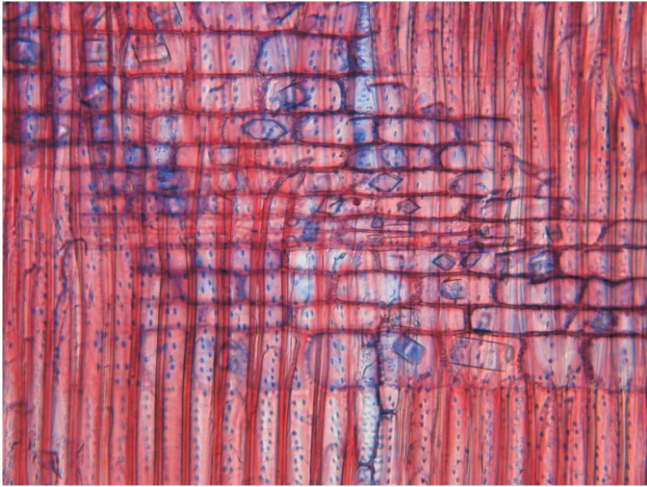
# The three views used in wood anatomy



Transverse



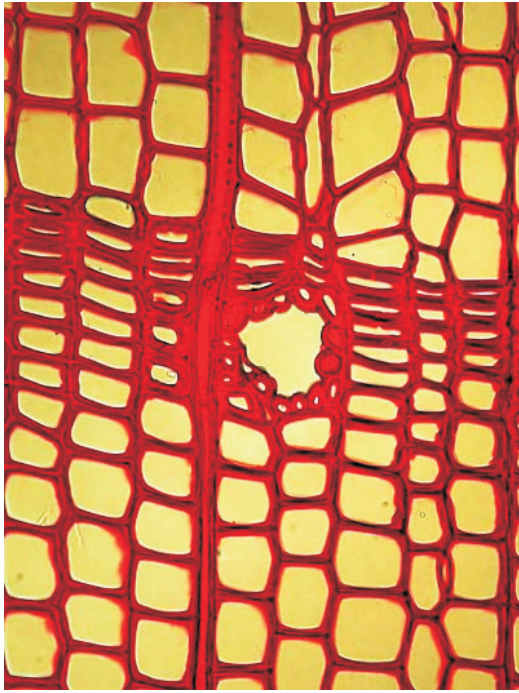
Radial



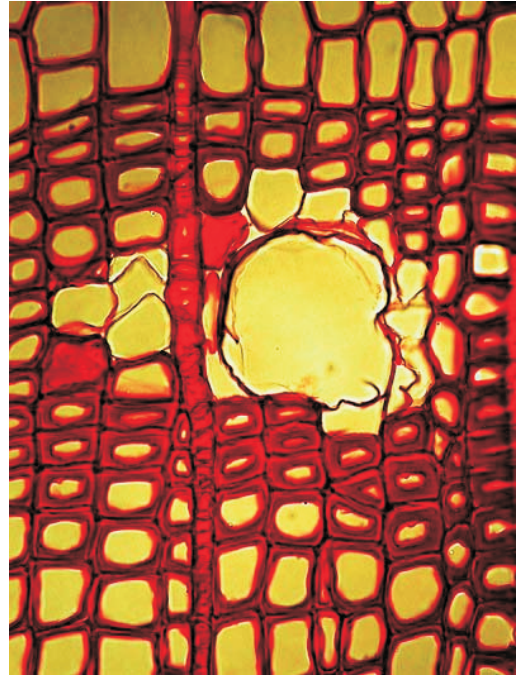
Tangential



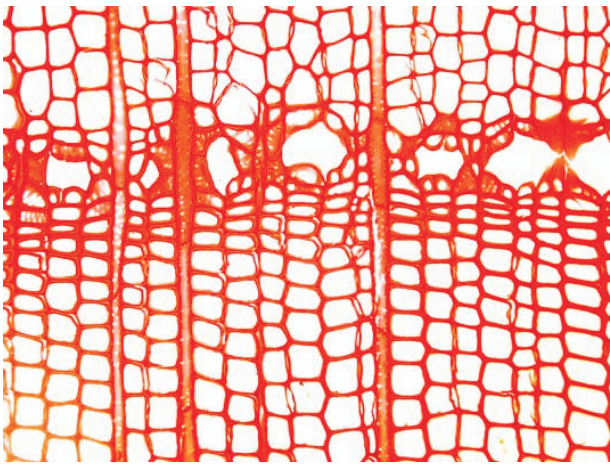
# Transverse views, conifers



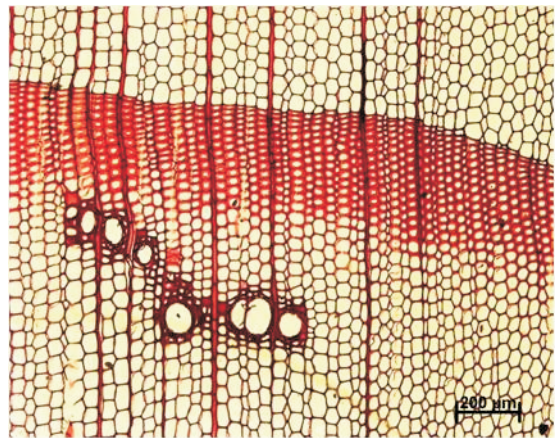
Resin canal in spruce



Resin canal in pine



Traumatic resin canals in cedar

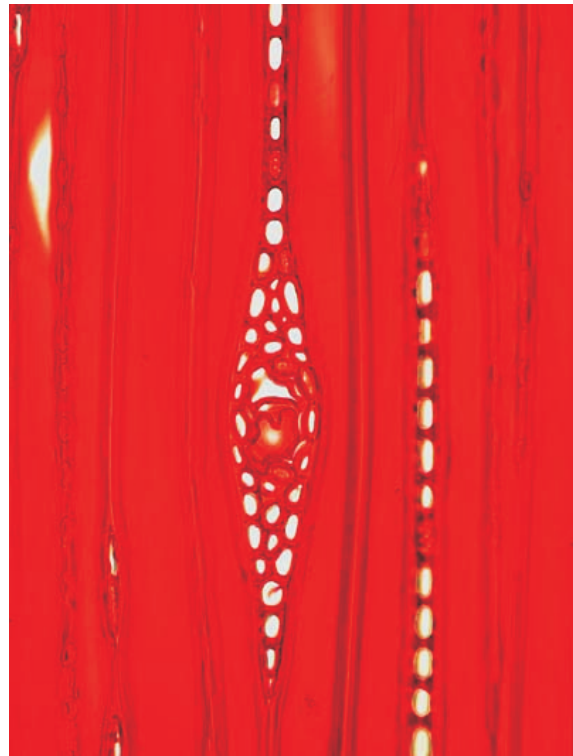


Traumatic resin canals  
in douglas fir

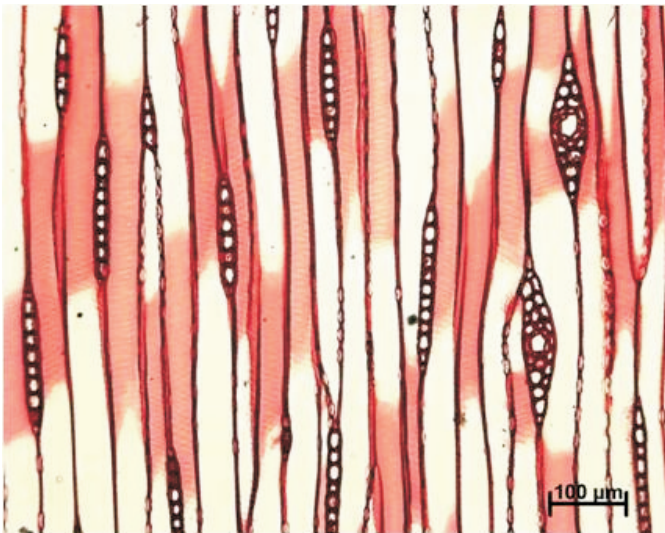
# Tangential views, conifers



pine (*Pinus*)



spruce (*Picea*)

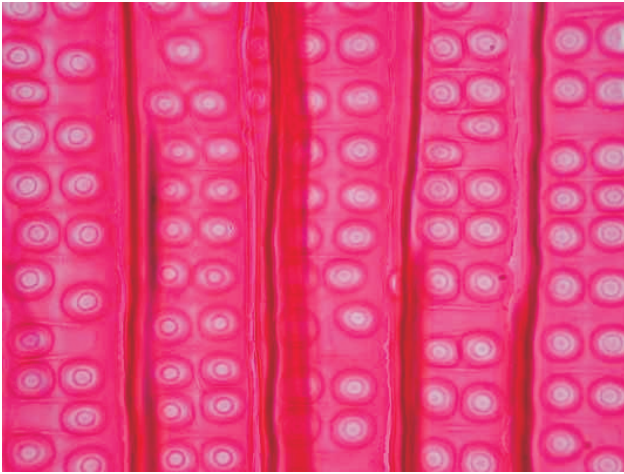


douglas fir (*Pseudotsuga*)

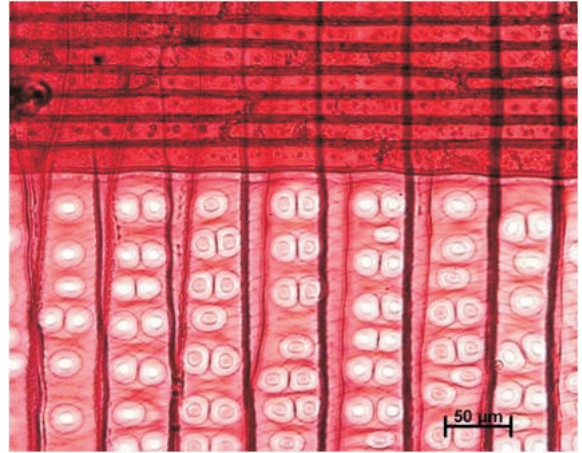


larch (*Larix*)

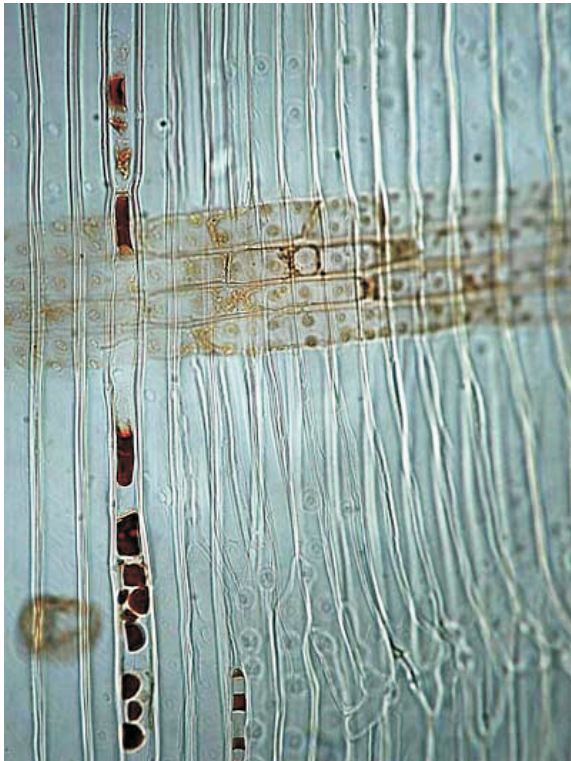
# Radial views in conifers



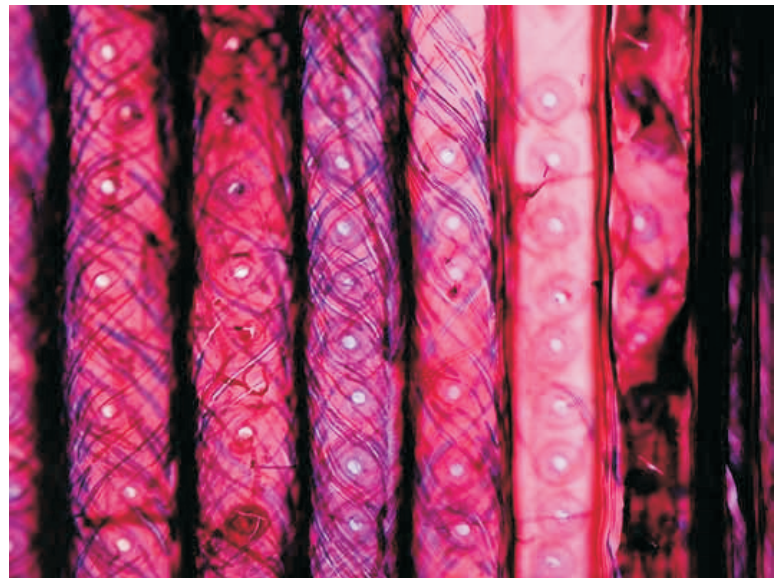
larch (*Larix*)



douglas fir (*Pseudotsuga*)

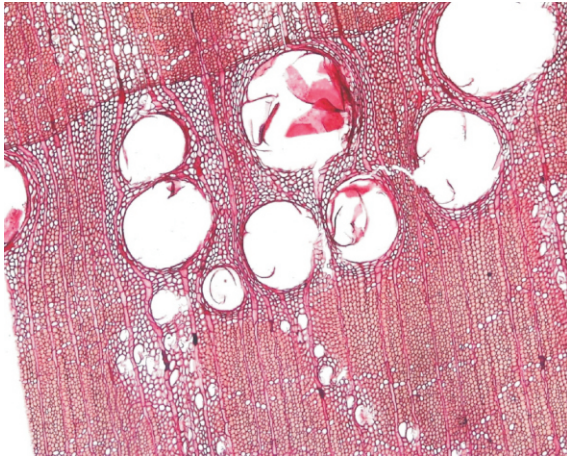


juniper (*Juniperus*)

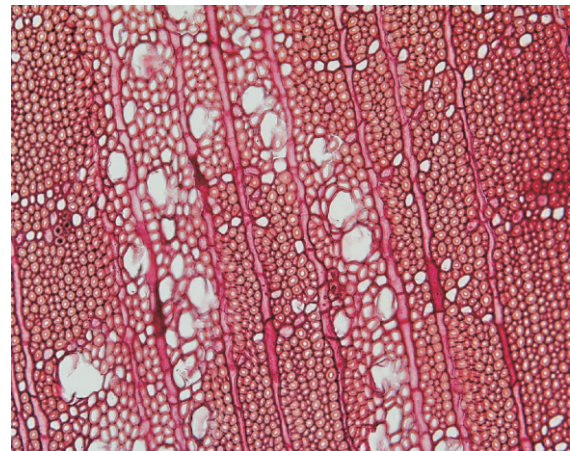


true fir (*Abies*)

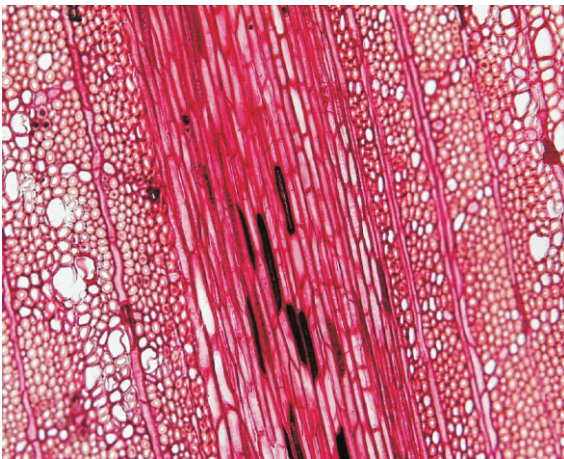
# Angiosperm anatomy in oak (*Quercus alba*)



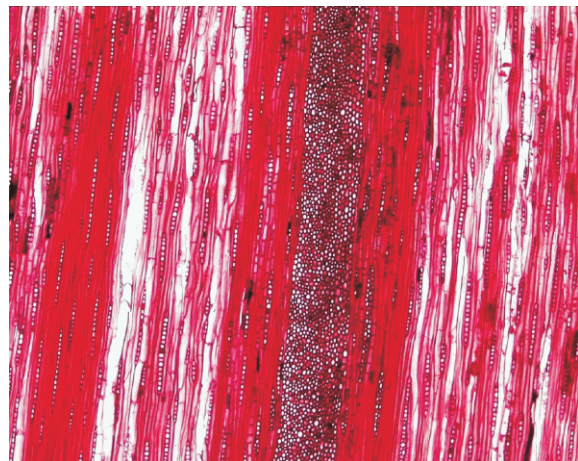
Earlywood vessels follow ring boundary.



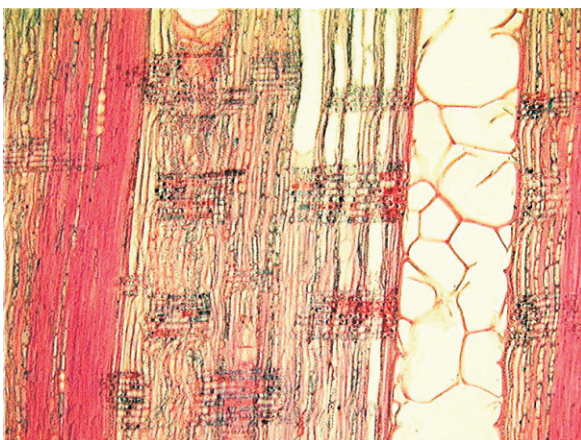
Latewood - small vessels, small rays, and fibers.



Wide ray

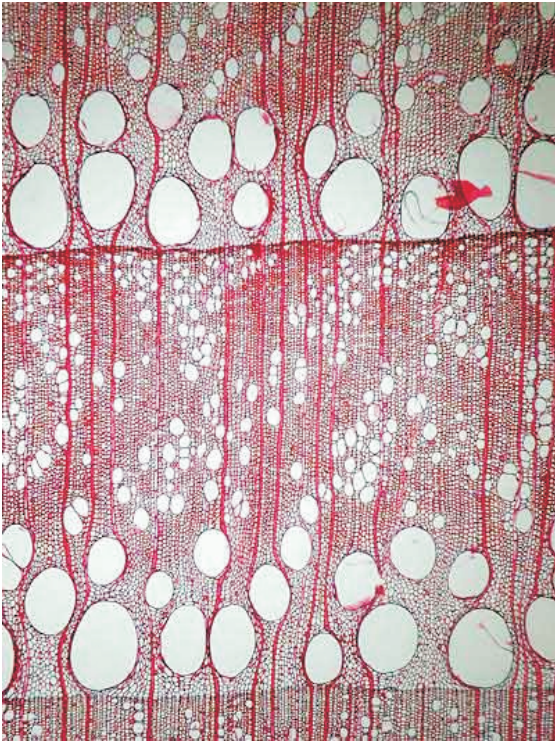


Wide ray, tangential view.

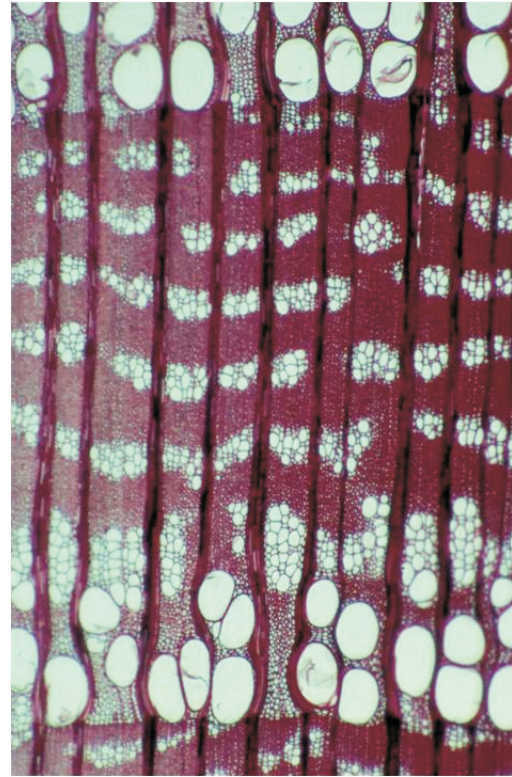


Radial view - vessel, rays, and fibers.

# Ring porous angiosperms



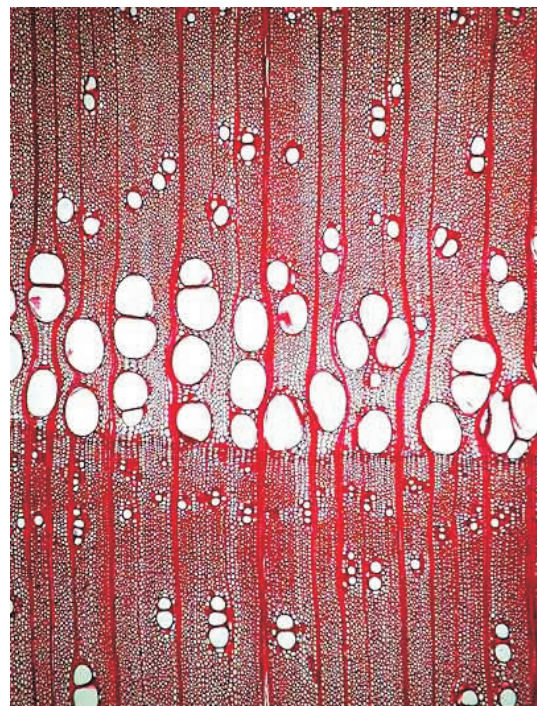
Chestnut (*Castanea*)



Elm (*Ulmus*)



Oak (*Quercus*)



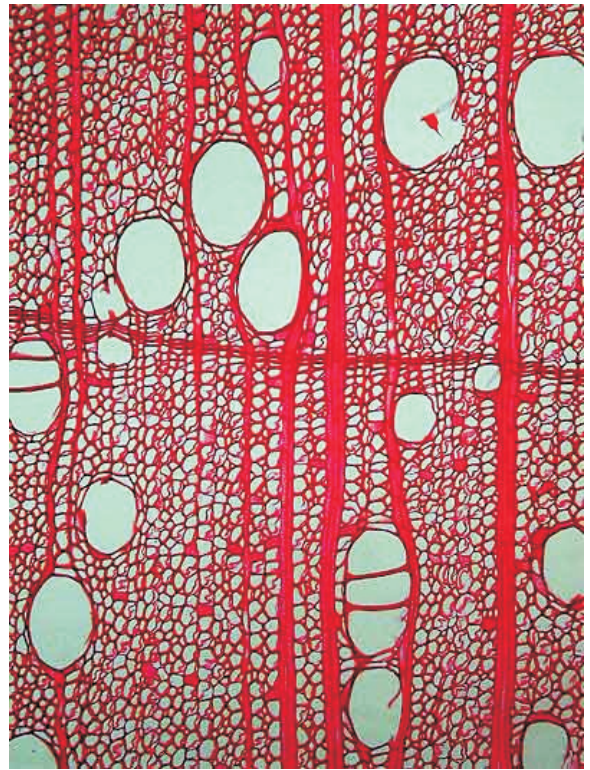
Ash (*Fraxinus*)



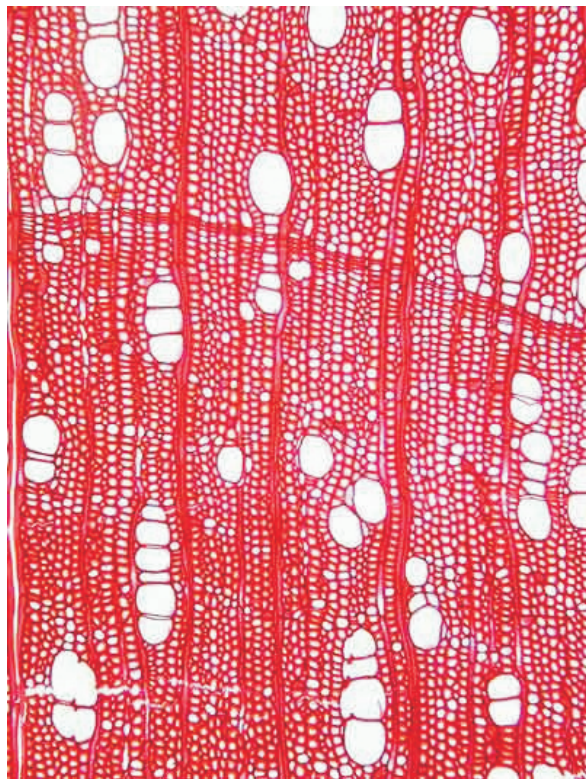
# Semi ring porous angiosperms



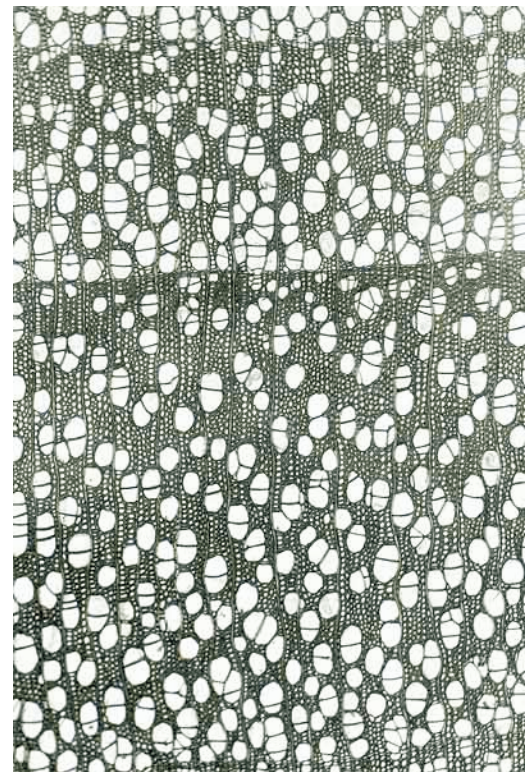
Buckthorn (*Rhamnus*)



Walnut (*Juglans*)



Hornbeam (*Carpinus*)

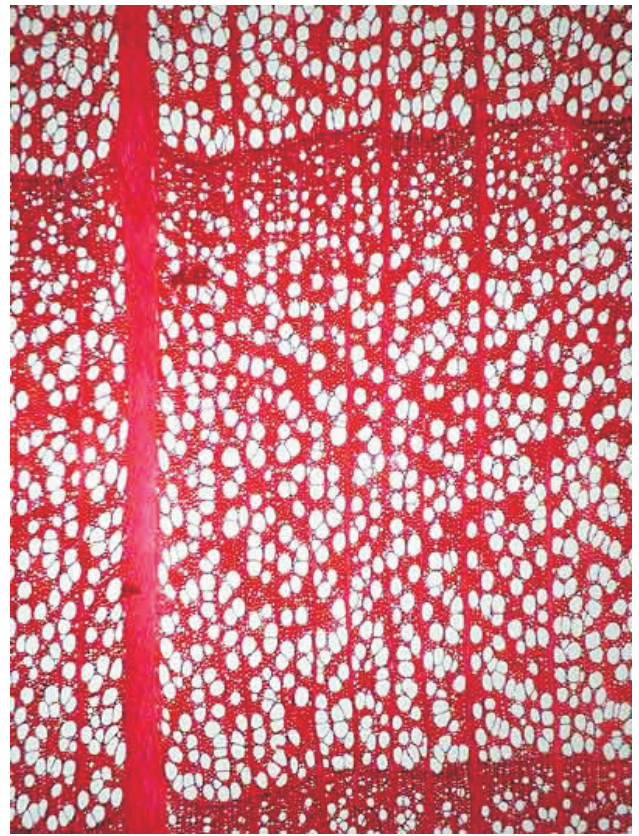


Poplar/aspens (*Populus*)

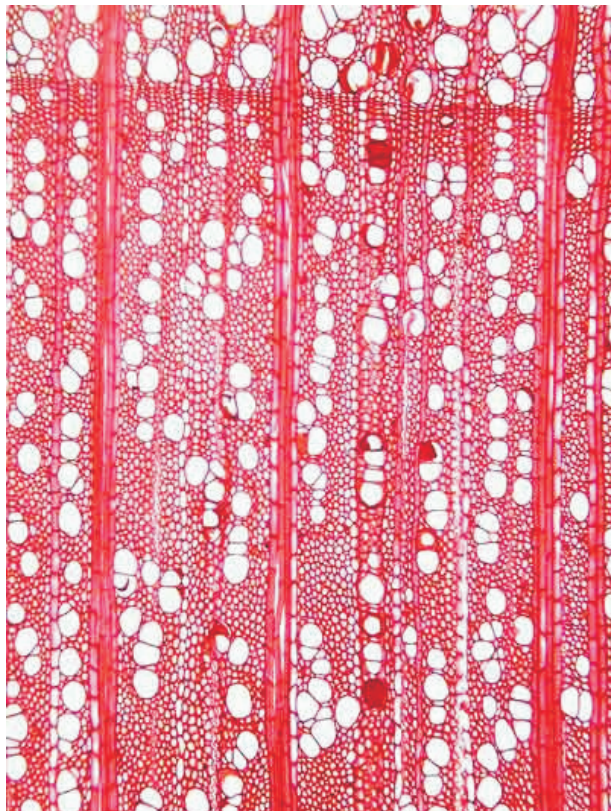
# Diffuse porous angiosperms



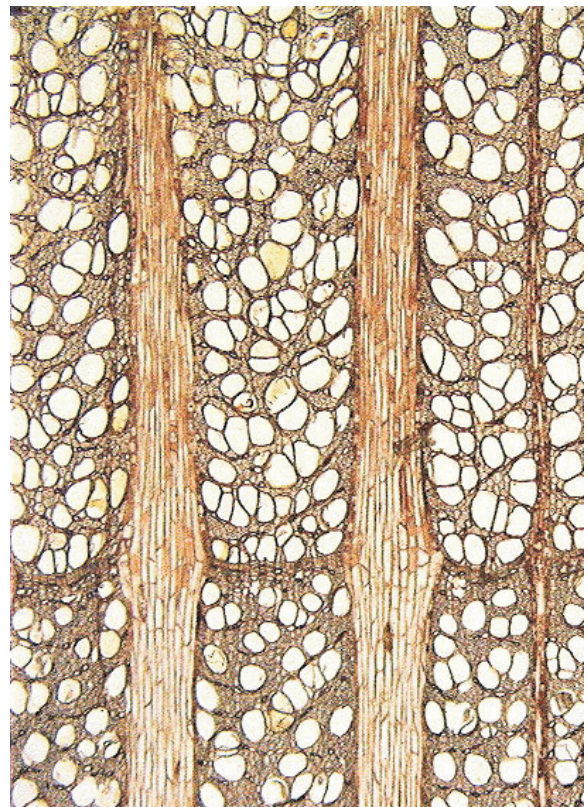
Maple (*Acer*)



Beech (*Fagus*)

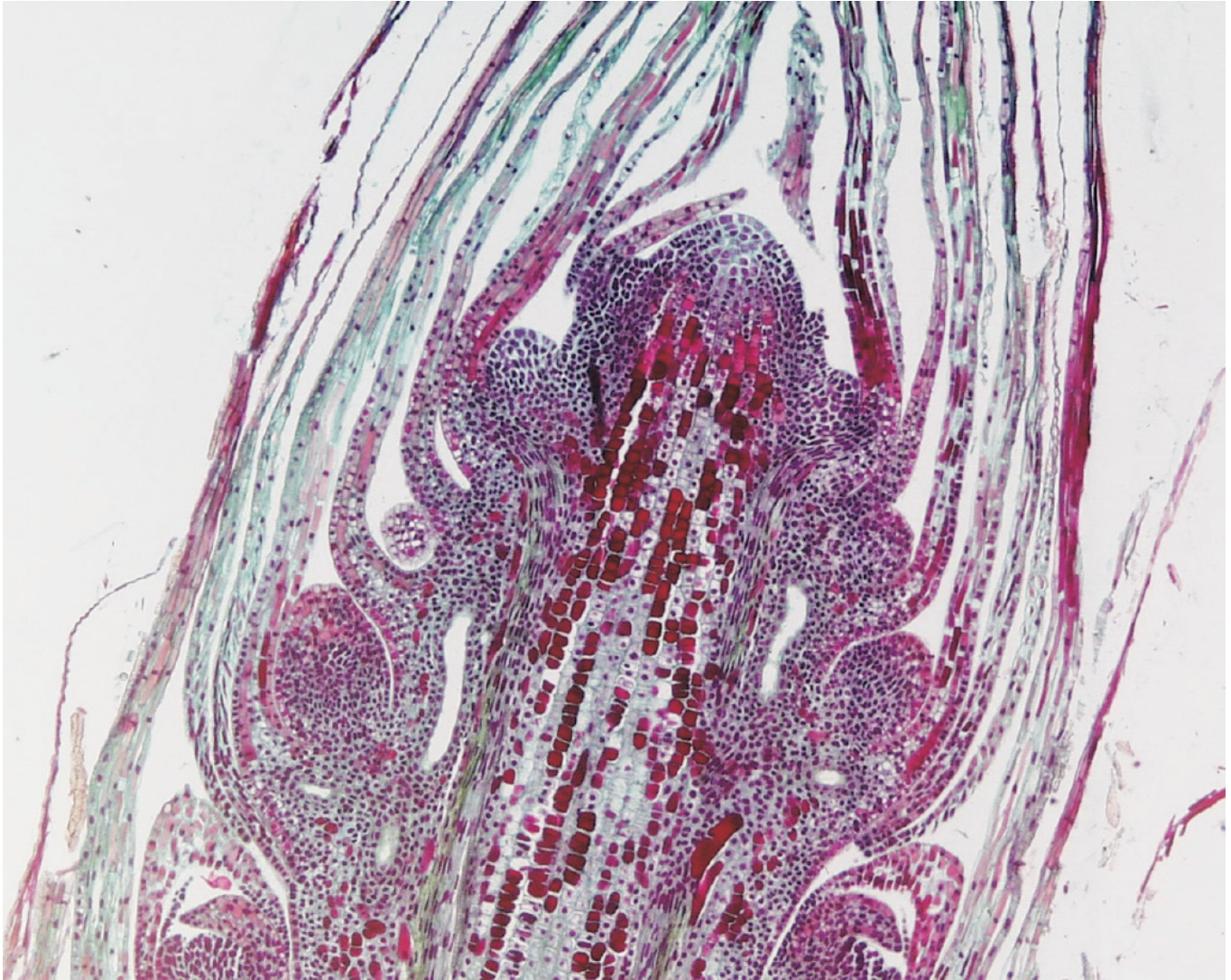


Cherry (*Prunus*)



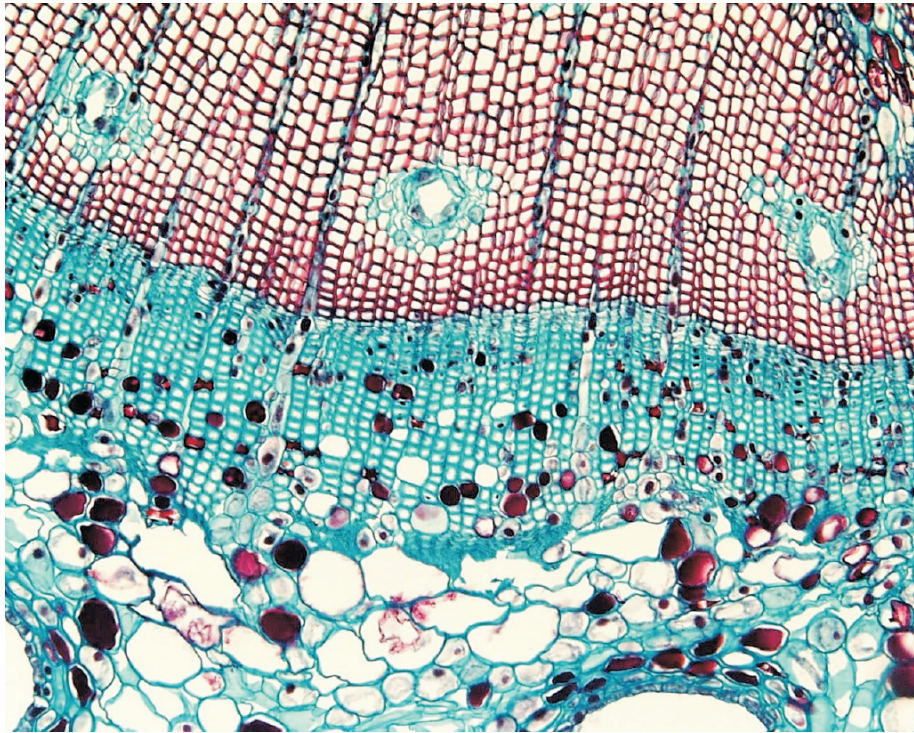
Sycamore (*Platanus*)

# Other plant tissues

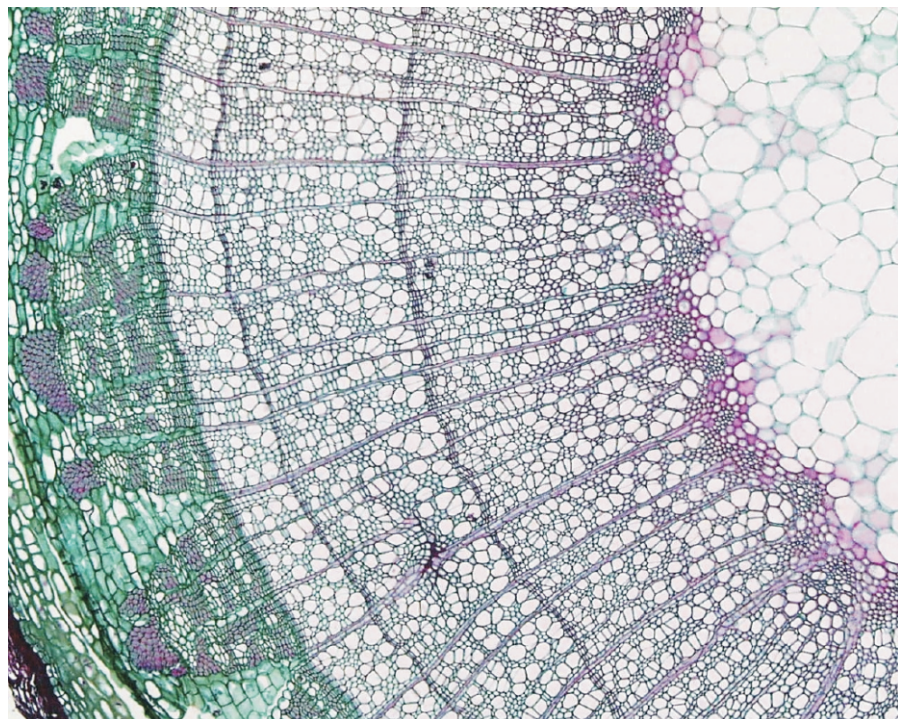


*Pinus* shoot with buds

# Phloem

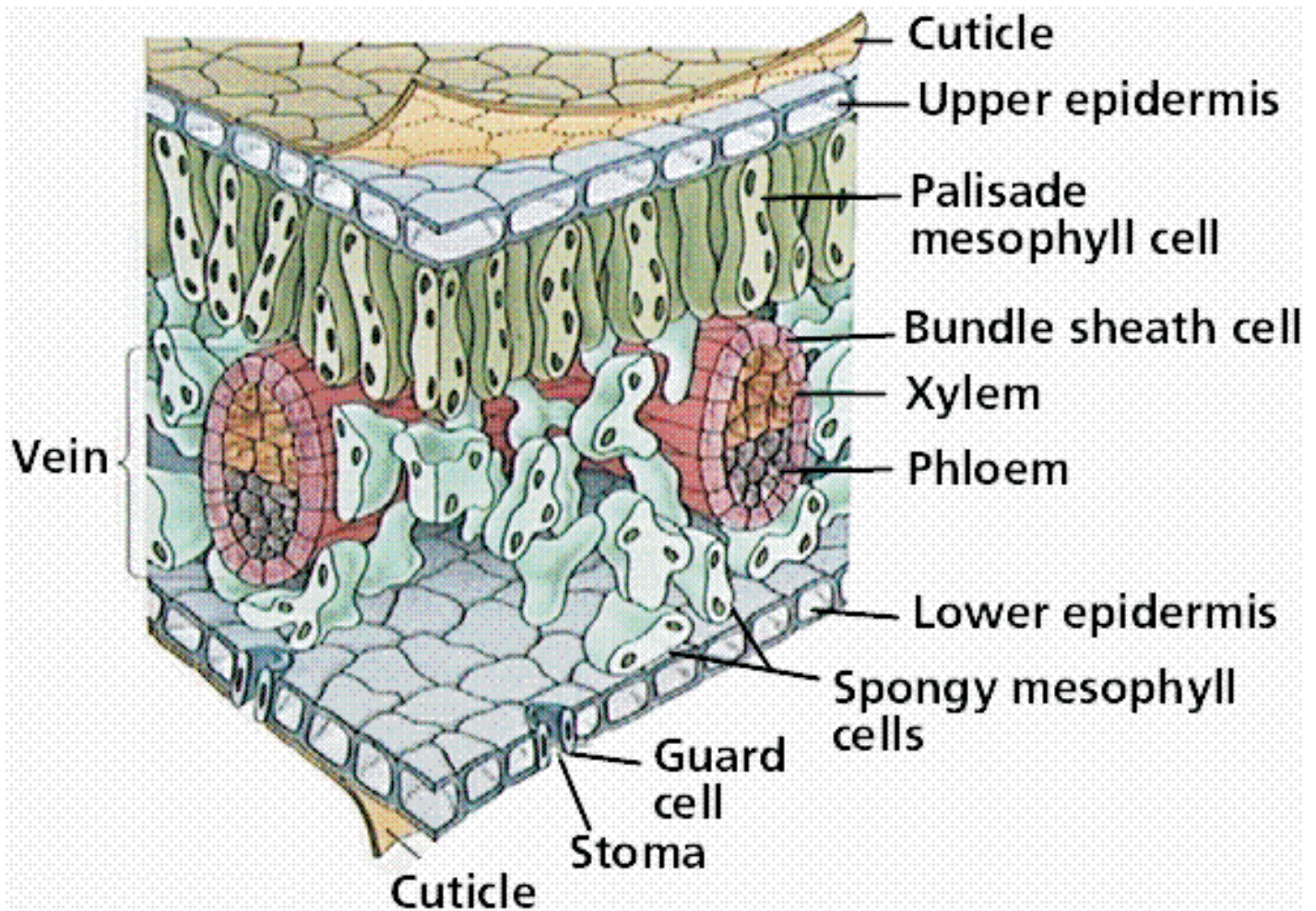


Pine (*Pinus*)

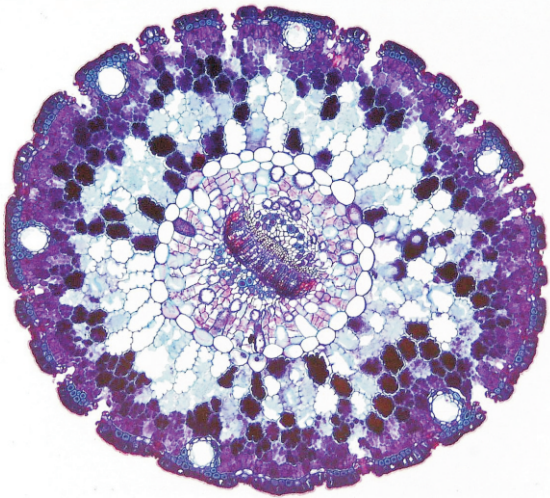


Linden (*Tilia*)

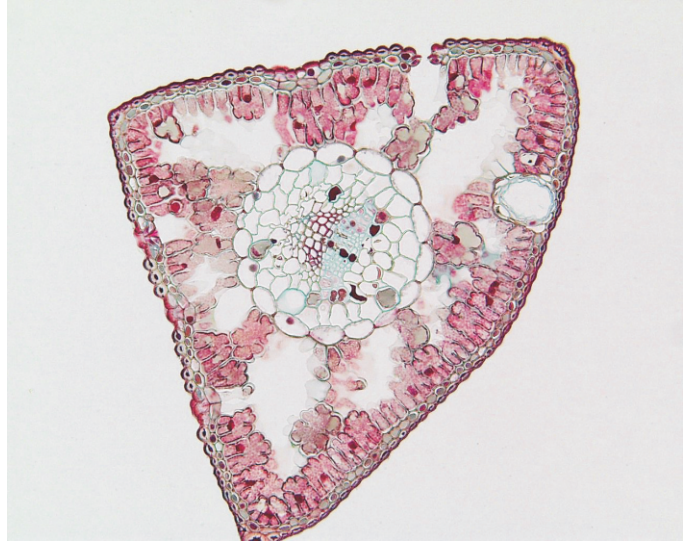
# Leaves



# Conifer leaves



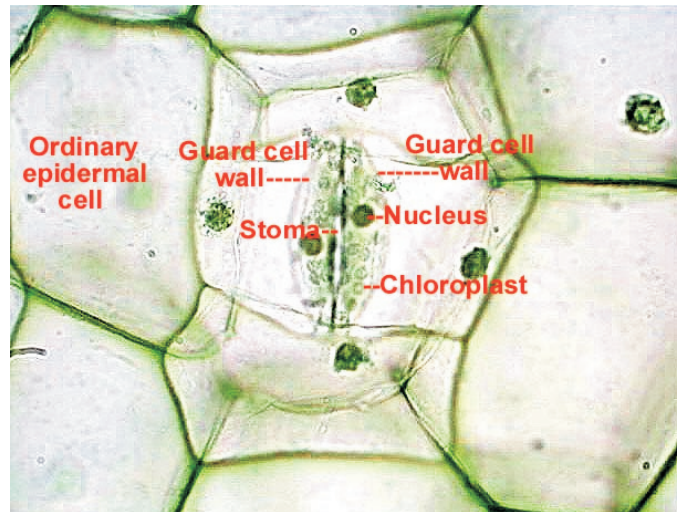
*Pinus monophylla*



*Pinus strobus*



*Pinus sp.*



Stomata detail

# Root anatomy

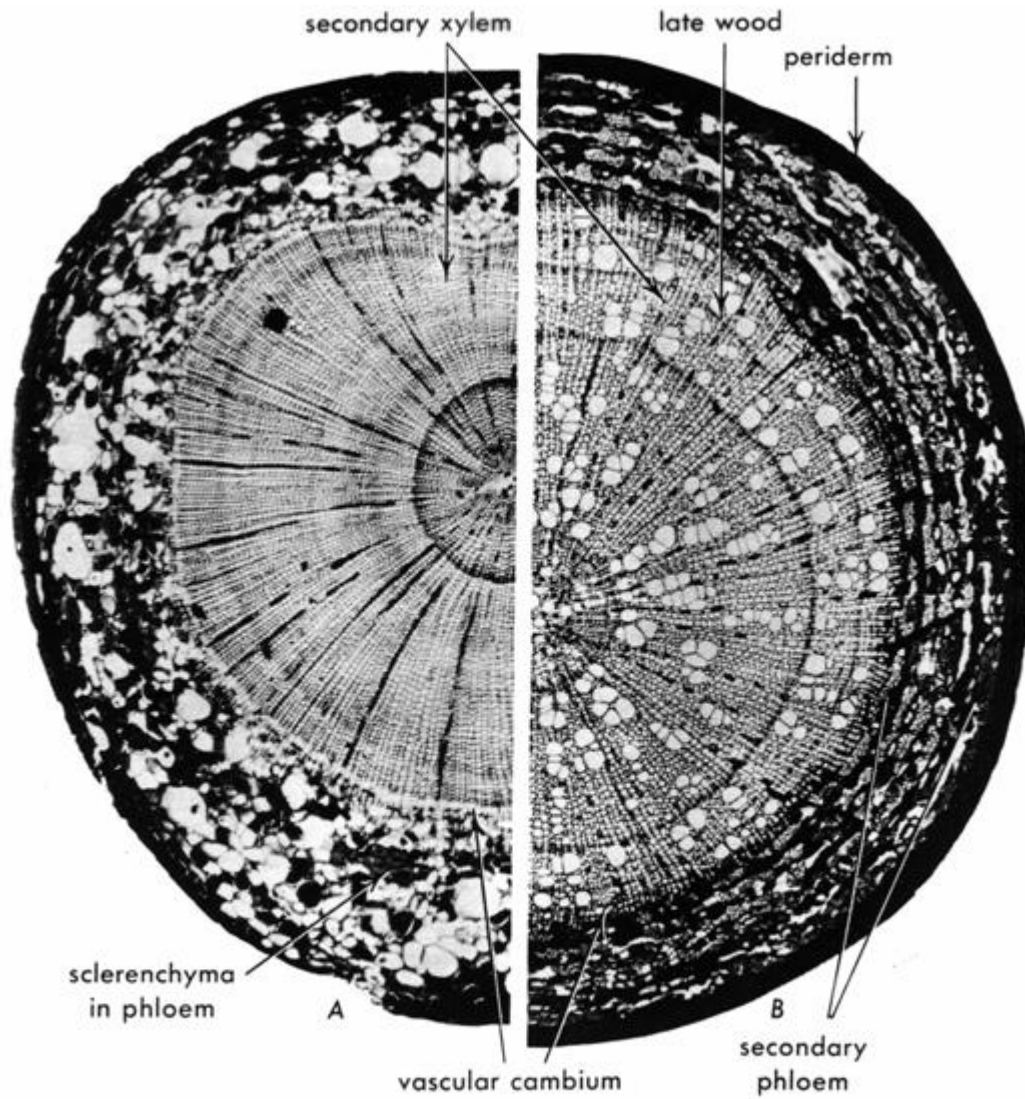
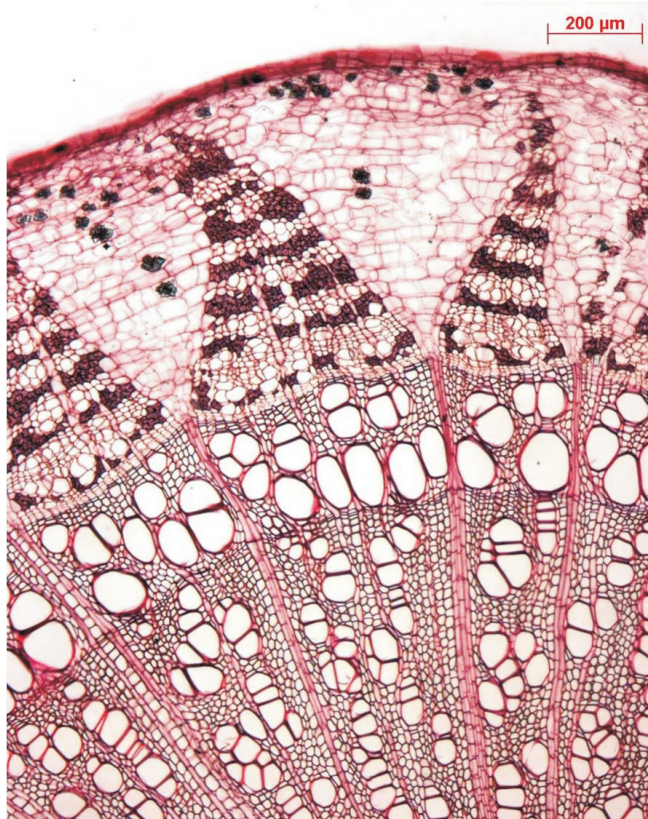
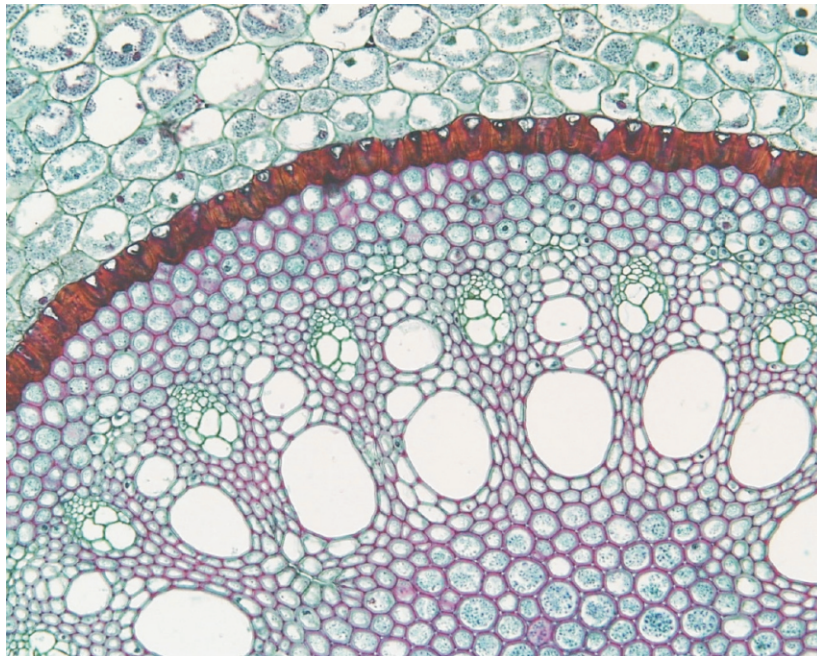


Fig. 15.4. Cross sections of roots of woody species in secondary state of growth. A, *Abies*, fir ( $\times 24$ ). B, *Tilia* ( $\times 33$ ). (After Esau, *Plant Anatomy*, John Wiley and Sons, 1953.)

# Roots



*Tilia*



Green brier (*Smilax*)