

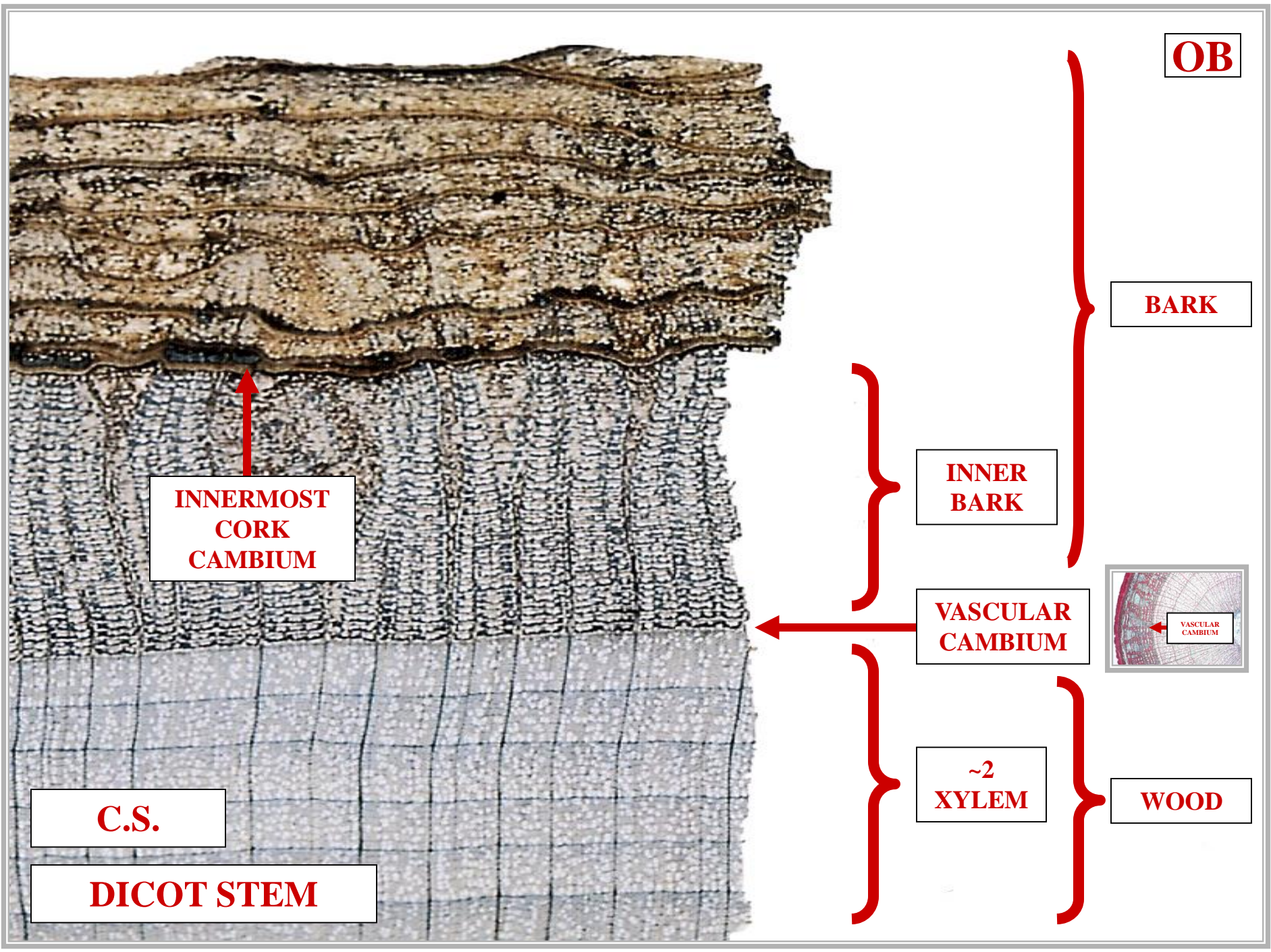
**OUTER BARK**



**IN**

**INNERMOST  
CORK CAMBIUM  
OUTWARD**

**OUTER BARK**



**OB**

**BARK**

**INNER  
BARK**

**VASCULAR  
CAMBIUM**

**~2  
XYLEM**

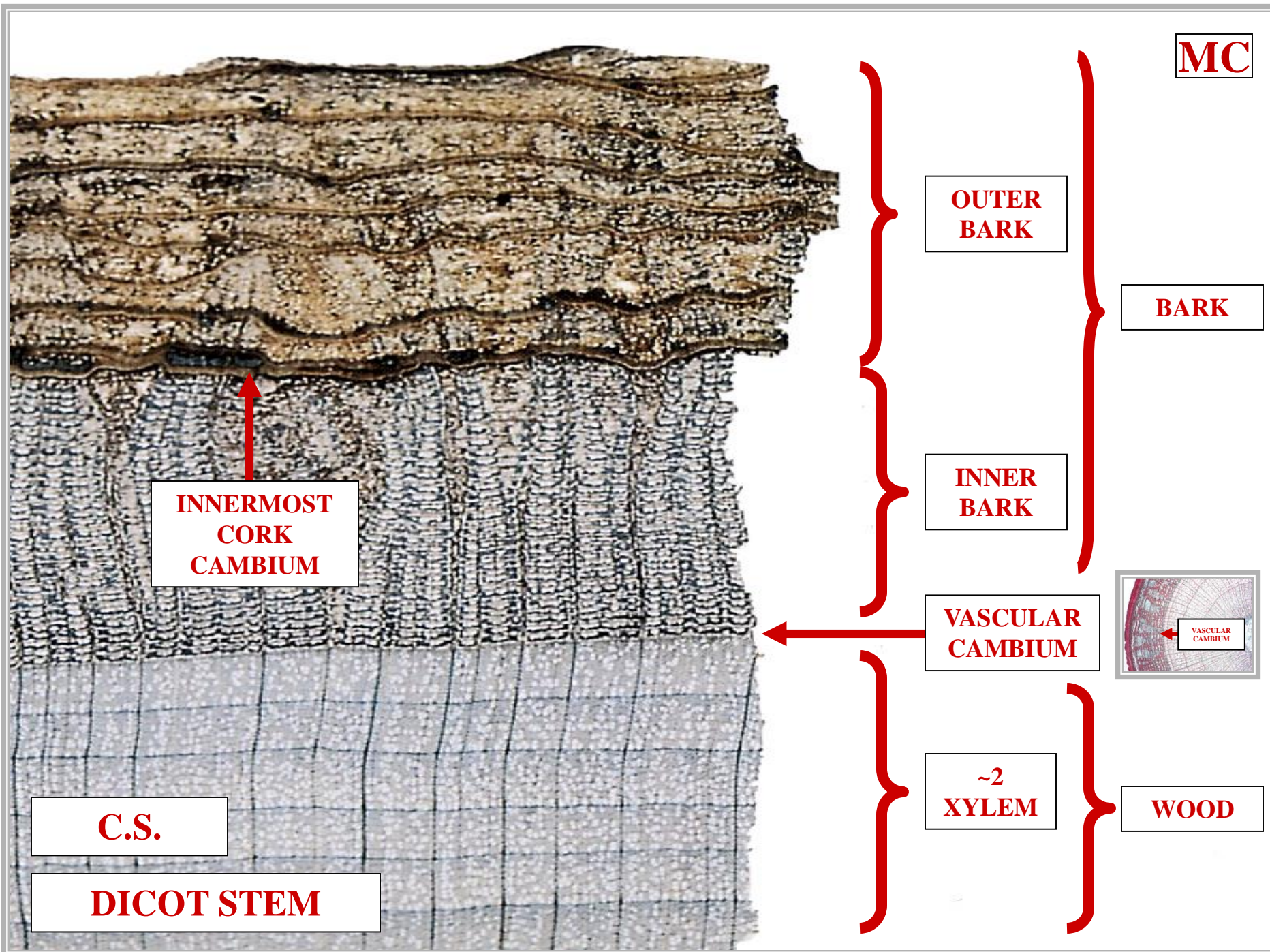
**WOOD**

**INNERMOST  
CORK  
CAMBIUM**

**VASCULAR  
CAMBIUM**

**C.S.**

**DICOT STEM**



**MC**

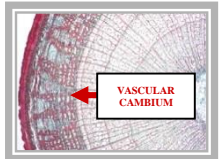
**OUTER BARK**

**BARK**

**INNER BARK**

**INNERMOST CORK CAMBIUM**

**VASCULAR CAMBIUM**

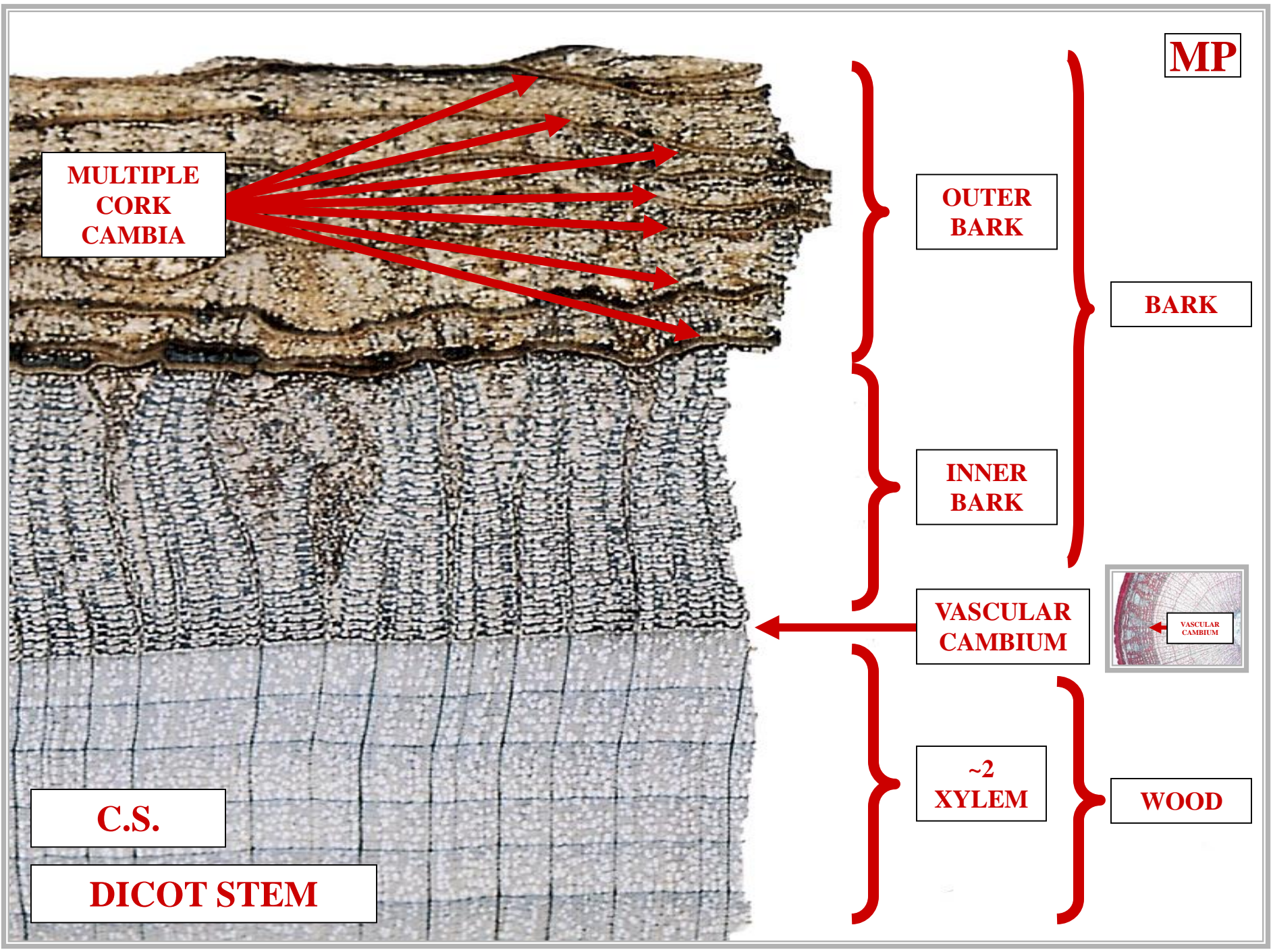


**~2 XYLEM**

**WOOD**

**C.S.**

**DICOT STEM**



**MP**

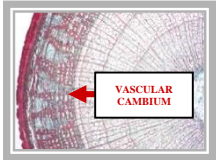
**MULTIPLE  
CORK  
CAMBIA**

**OUTER  
BARK**

**BARK**

**INNER  
BARK**

**VASCULAR  
CAMBIUM**

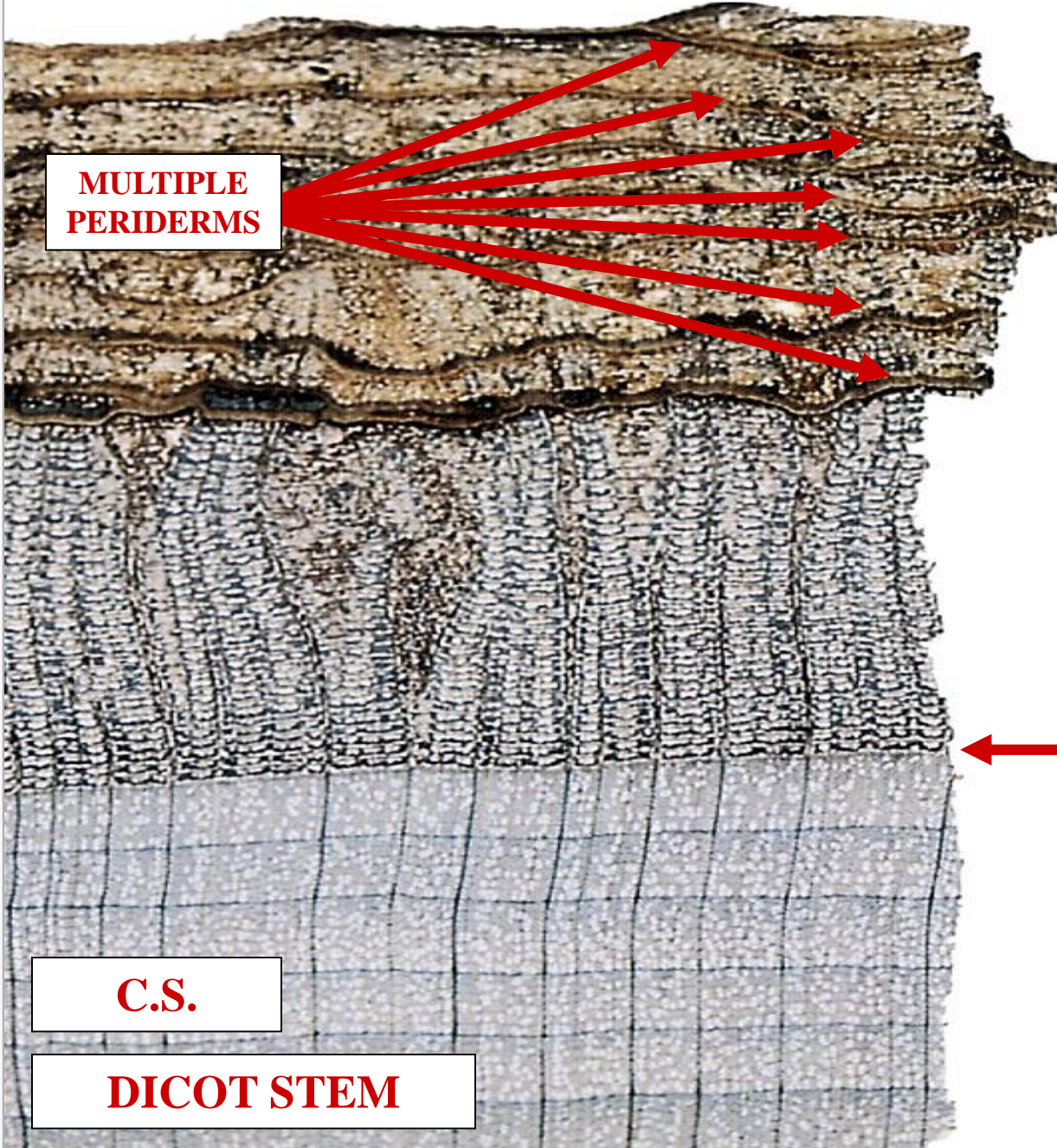


**C.S.**

**~2  
XYLEM**

**WOOD**

**DICOT STEM**



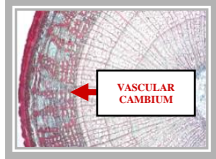
**MULTIPLE PERIDERMS**

**OUTER BARK**

**BARK**

**INNER BARK**

**VASCULAR CAMBIUM**

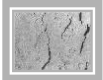


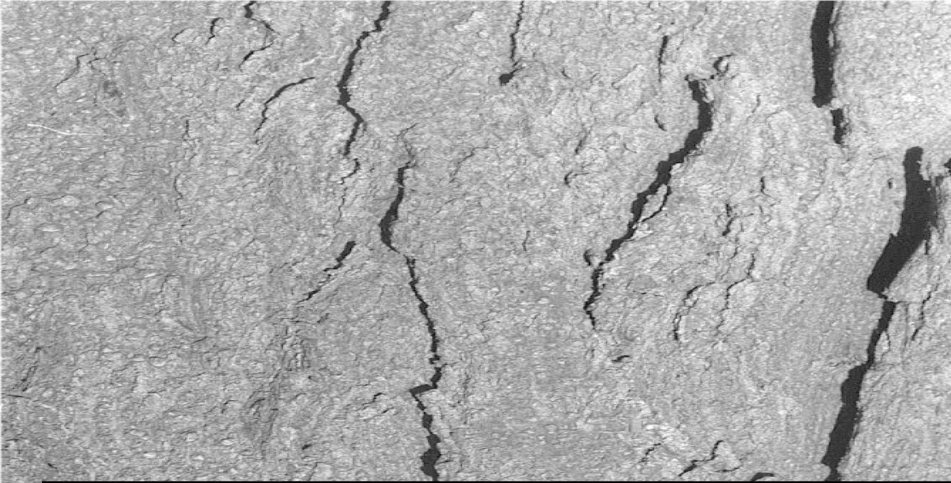
**~2 XYLEM**

**WOOD**

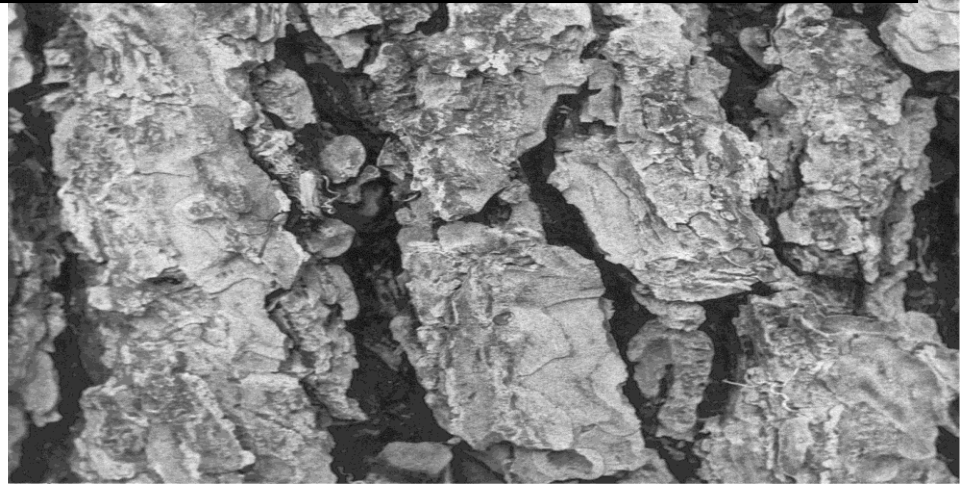
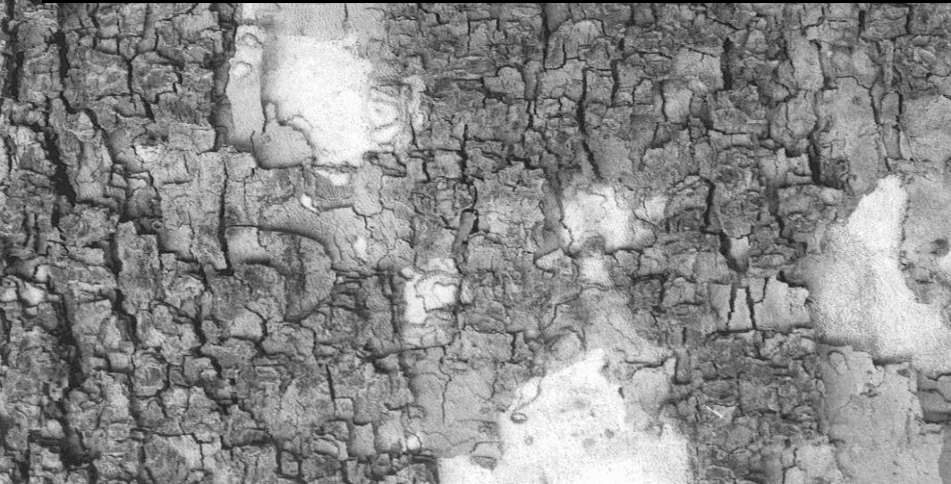
**C.S.**

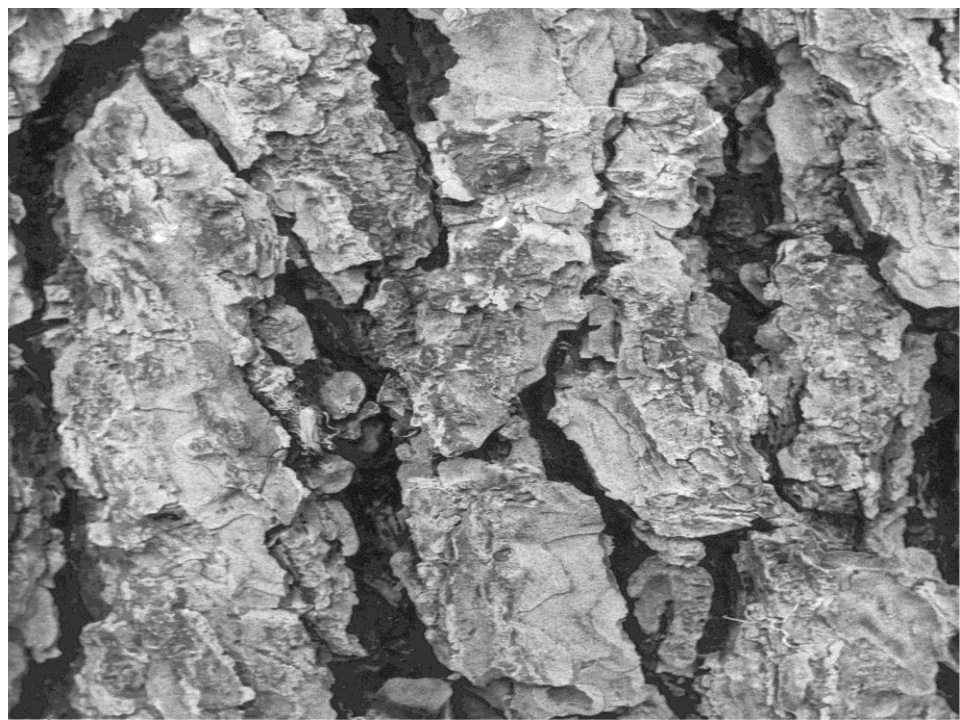
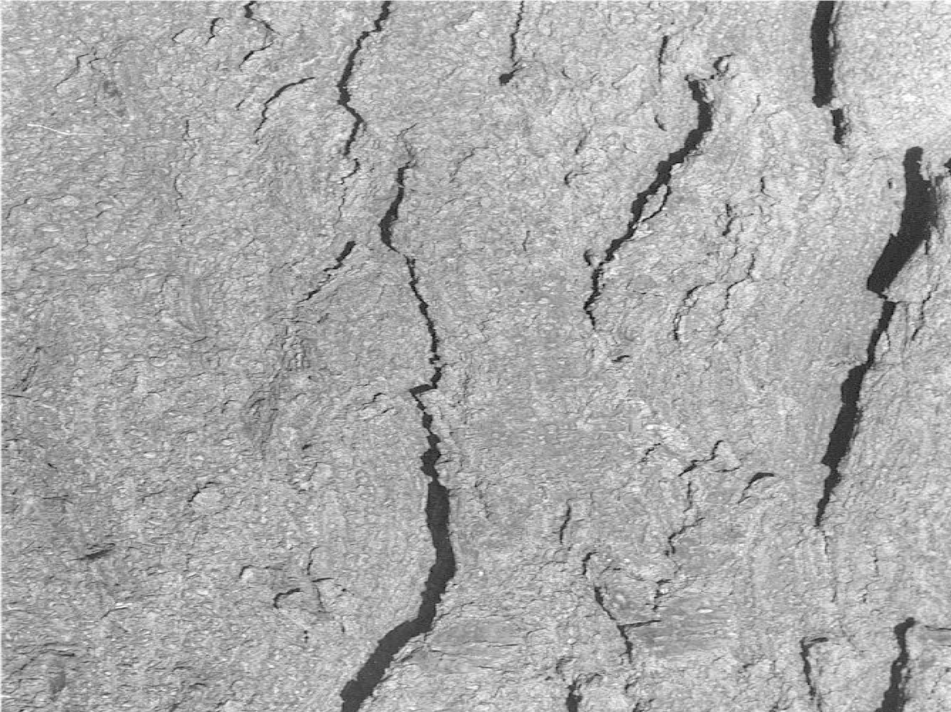
**DICOT STEM**





**IMPARTS DIFFERENT  
OUTER BARK  
MORPHOLOGY**





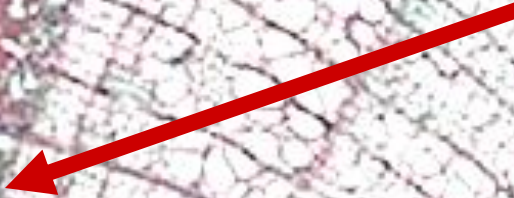


# LATERAL MERISTEMS SUMMARY



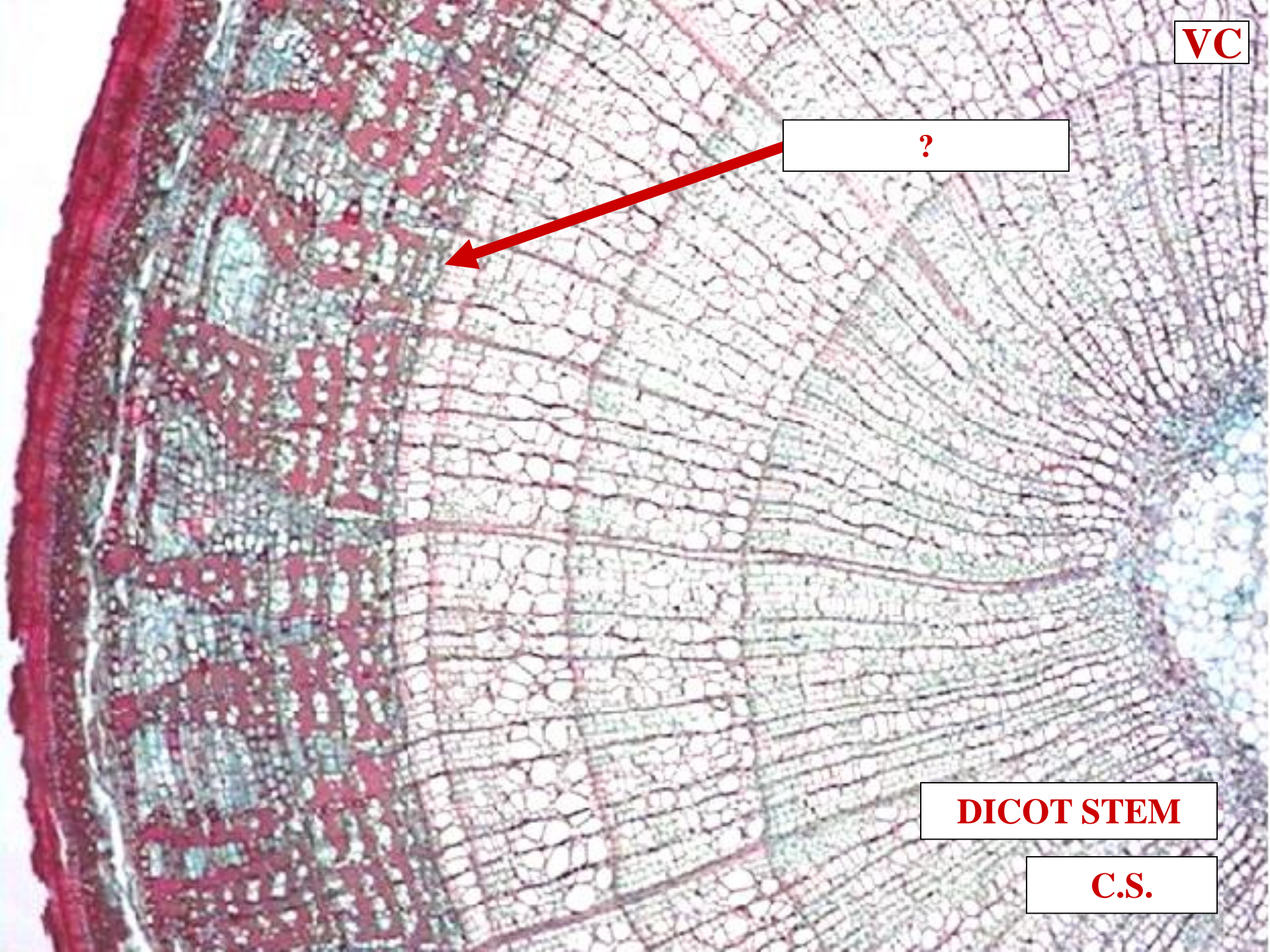
**VC**

**?**



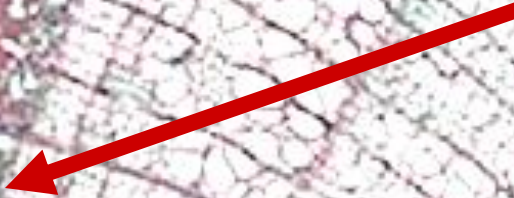
**DICOT STEM**

**C.S.**



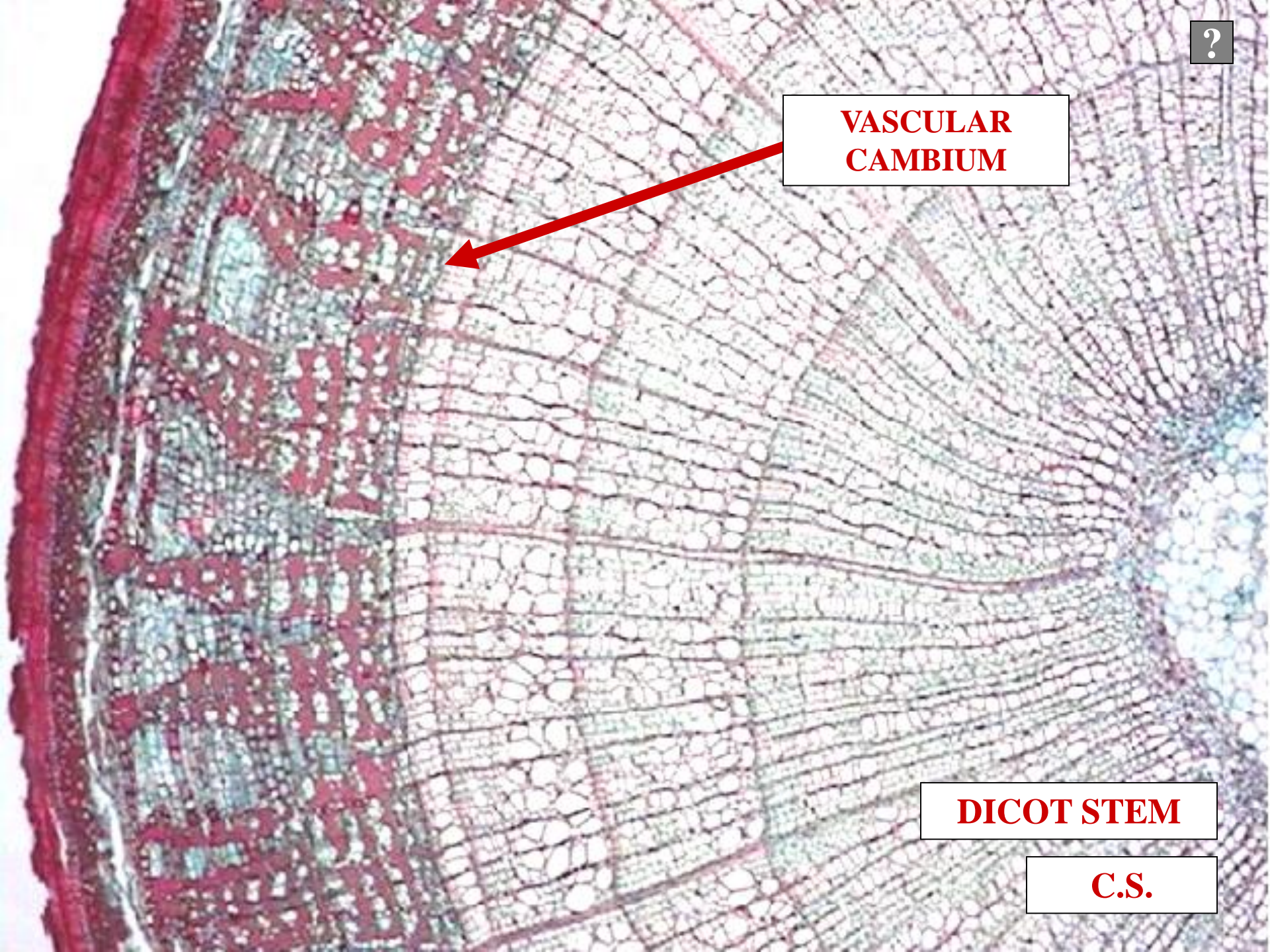
?

**VASCULAR  
CAMBIUM**



**DICOT STEM**

**C.S.**

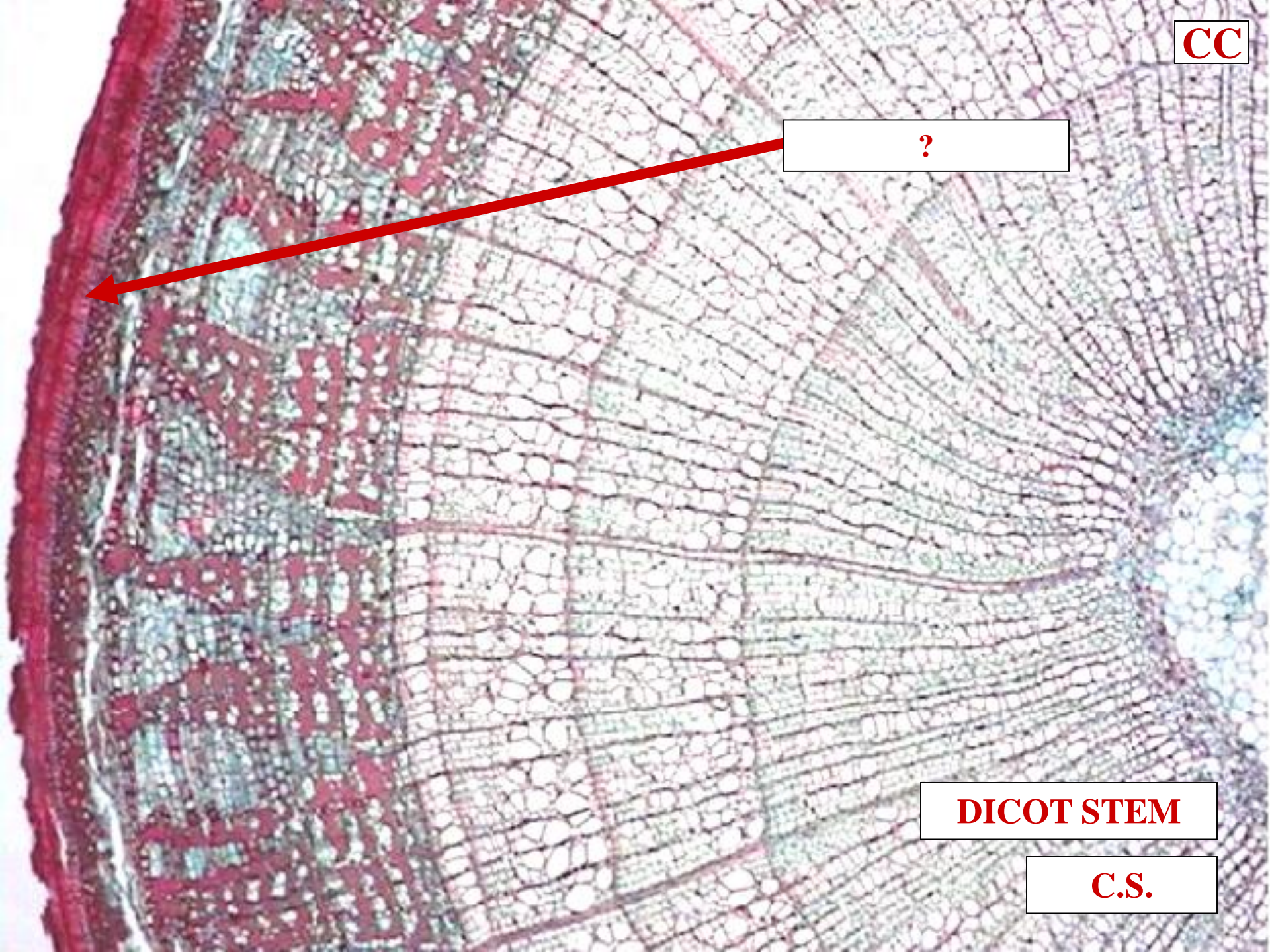


CC

?

DICOT STEM

C.S.



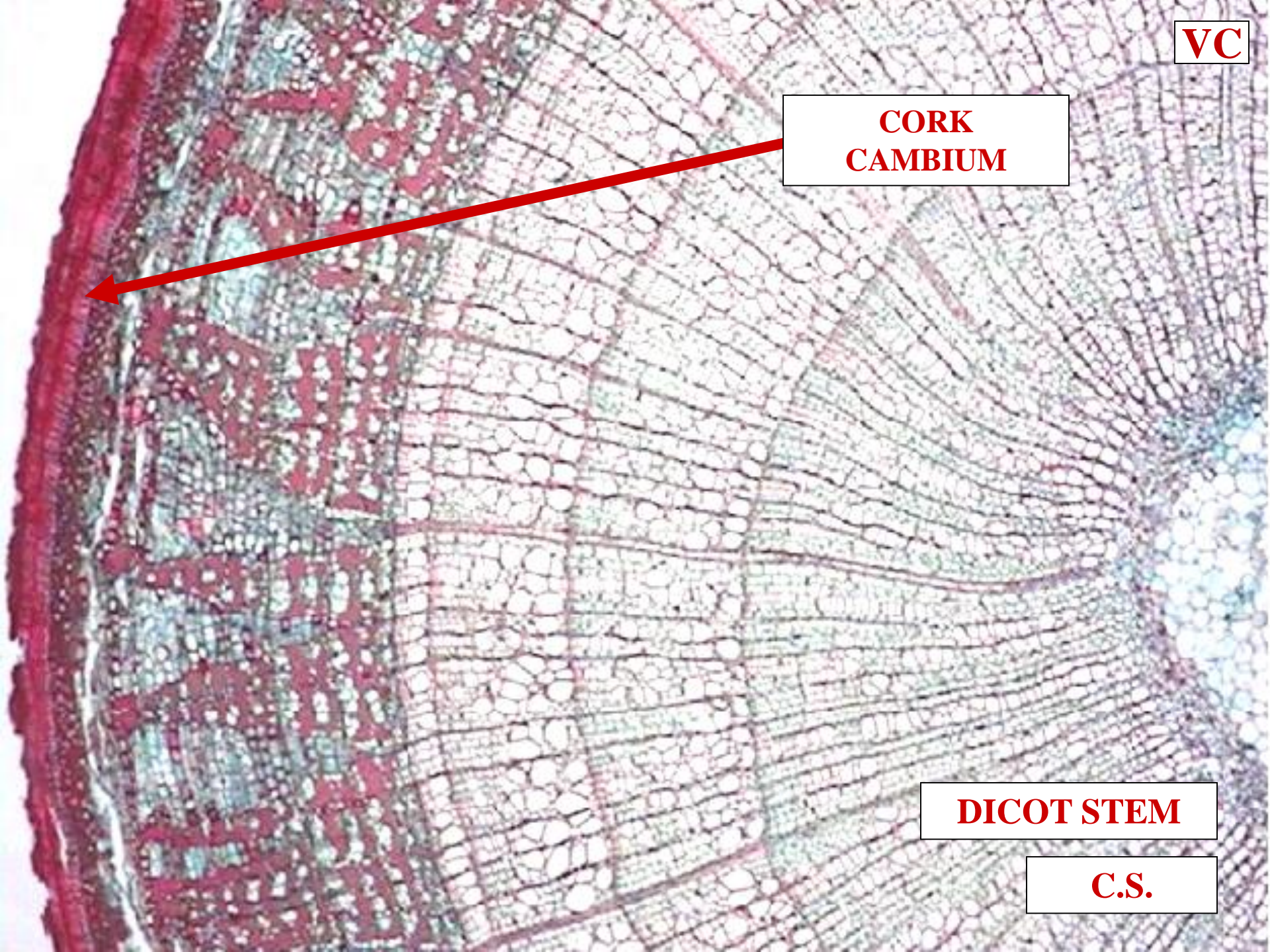
**VC**

**CORK  
CAMBIUM**



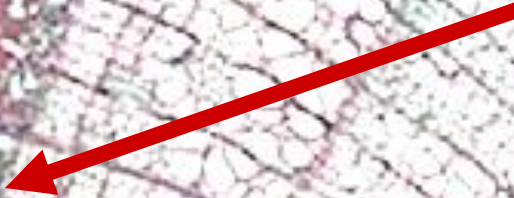
**DICOT STEM**

**C.S.**



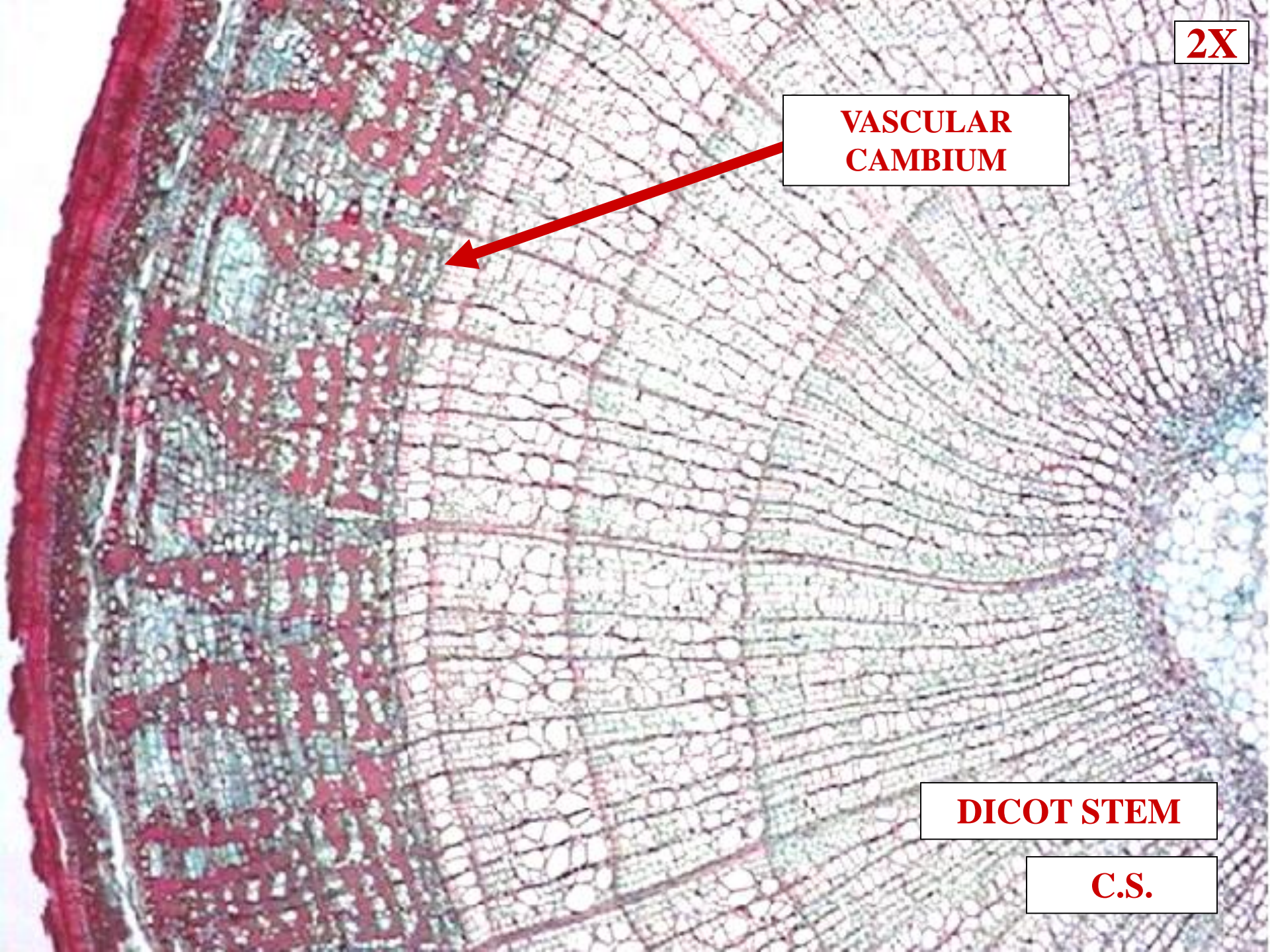
**2X**

**VASCULAR  
CAMBIUM**



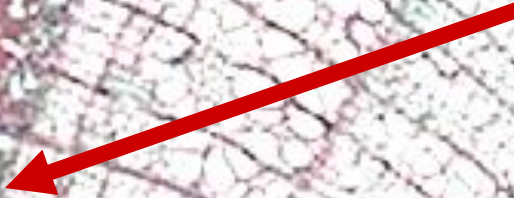
**DICOT STEM**

**C.S.**



**2P**

**VASCULAR  
CAMBIUM**

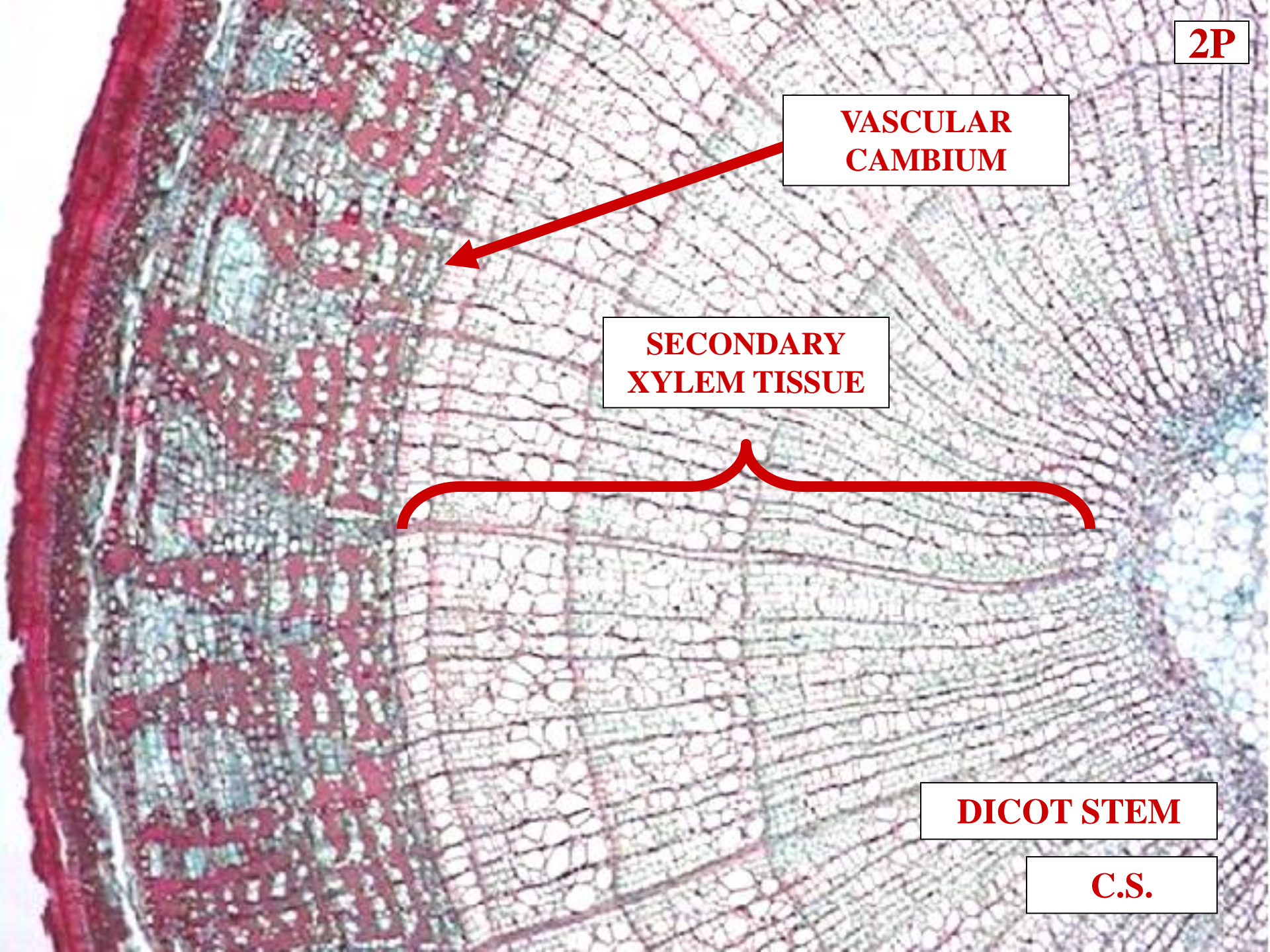


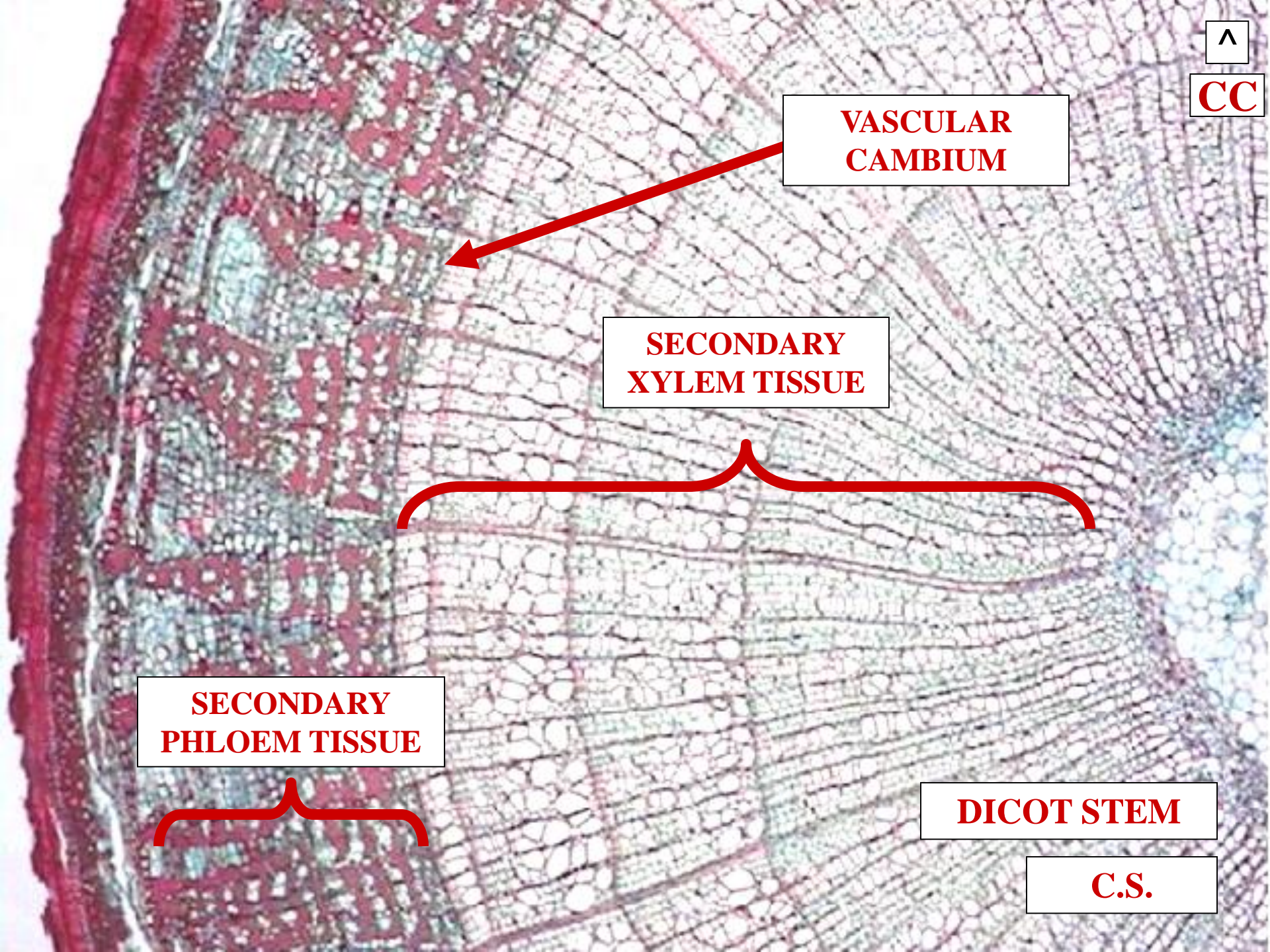
**SECONDARY  
XYLEM TISSUE**



**DICOT STEM**

**C.S.**





^

CC

**VASCULAR  
CAMBIUM**

**SECONDARY  
XYLEM TISSUE**

**SECONDARY  
PHLOEM TISSUE**

**DICOT STEM**

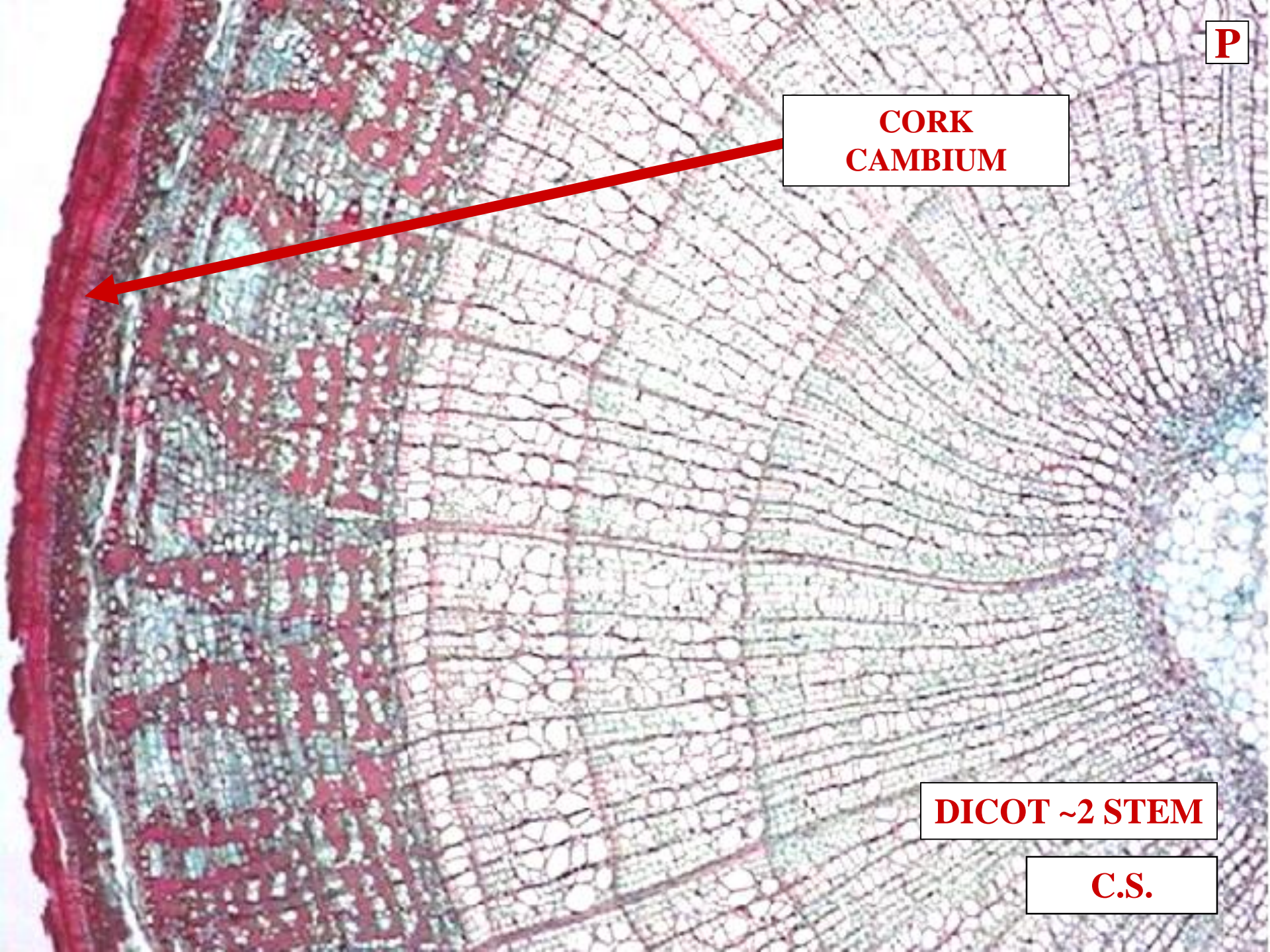
**C.S.**

**P**

**CORK  
CAMBIUM**

**DICOT ~2 STEM**

**C.S.**





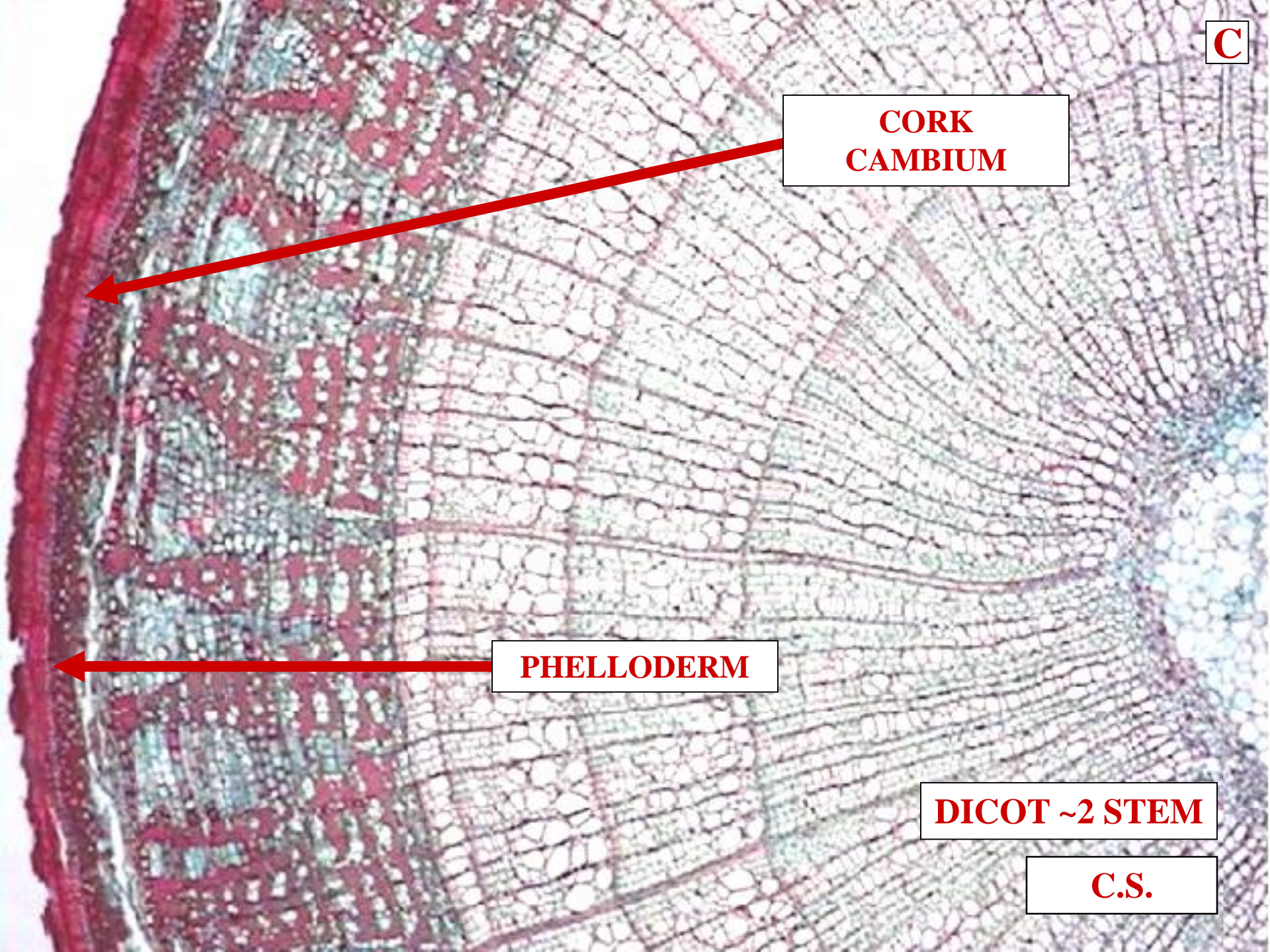
**C**

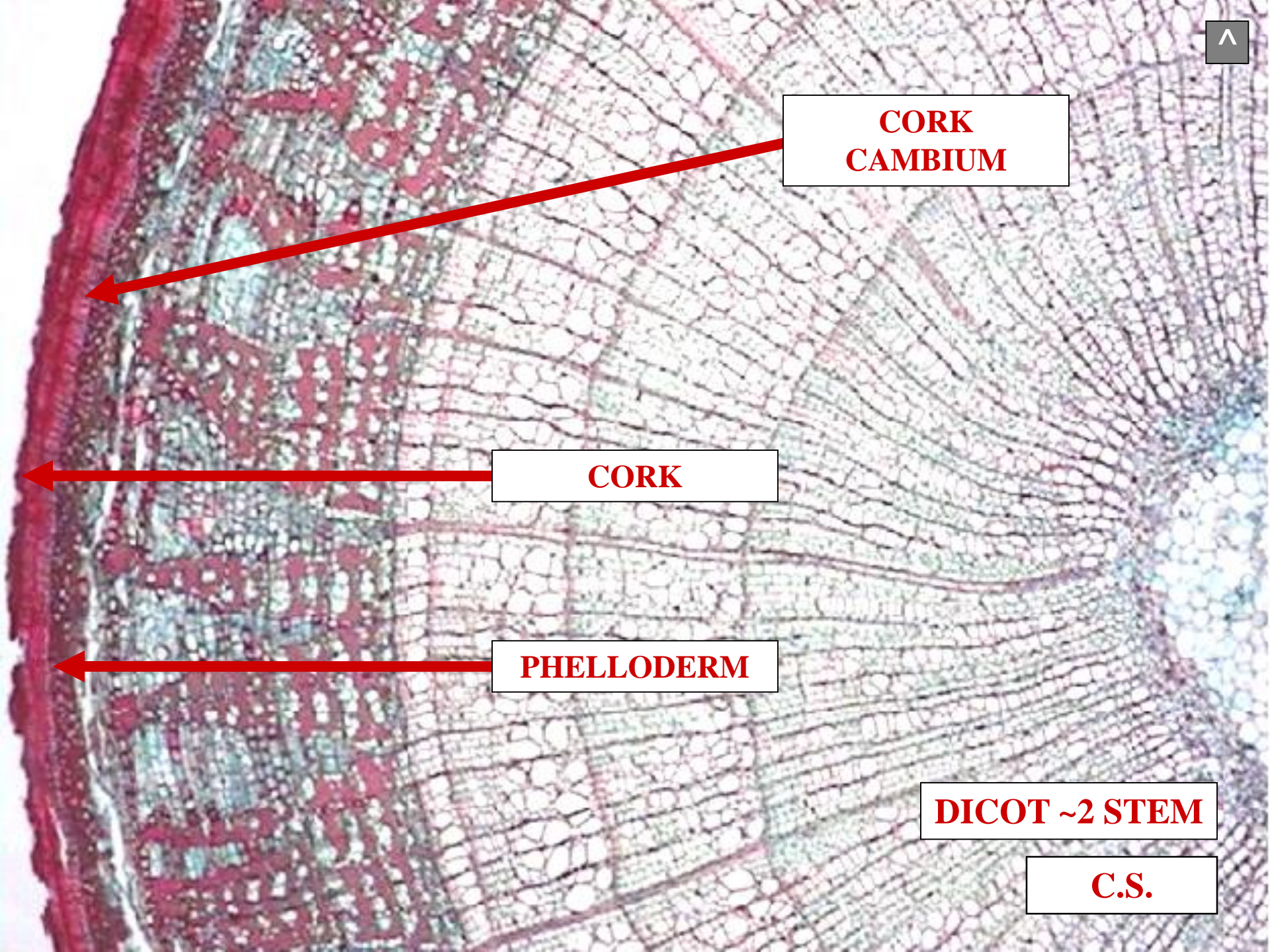
**CORK  
CAMBIUM**

**PHELLODERM**

**DICOT ~2 STEM**

**C.S.**





**CORK  
CAMBIUM**



**CORK**



**PHELLODERM**



**DICOT ~2 STEM**

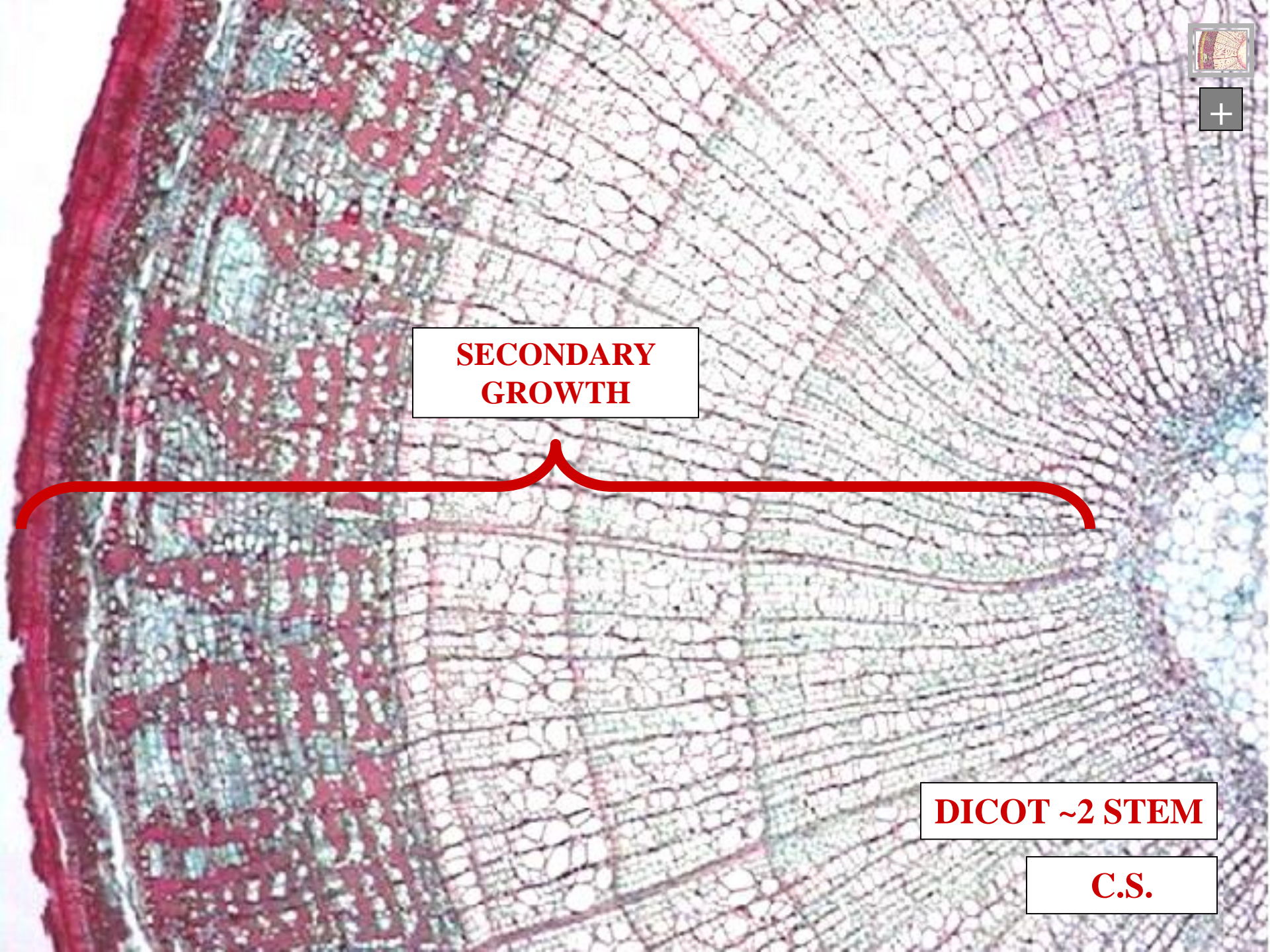
**C.S.**



# STEM & ROOT SECONDARY GROWTH SUMMARY



# **DICOT STEM SECONDARY GROWTH SUMMARY**

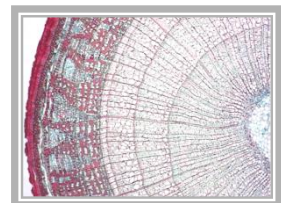
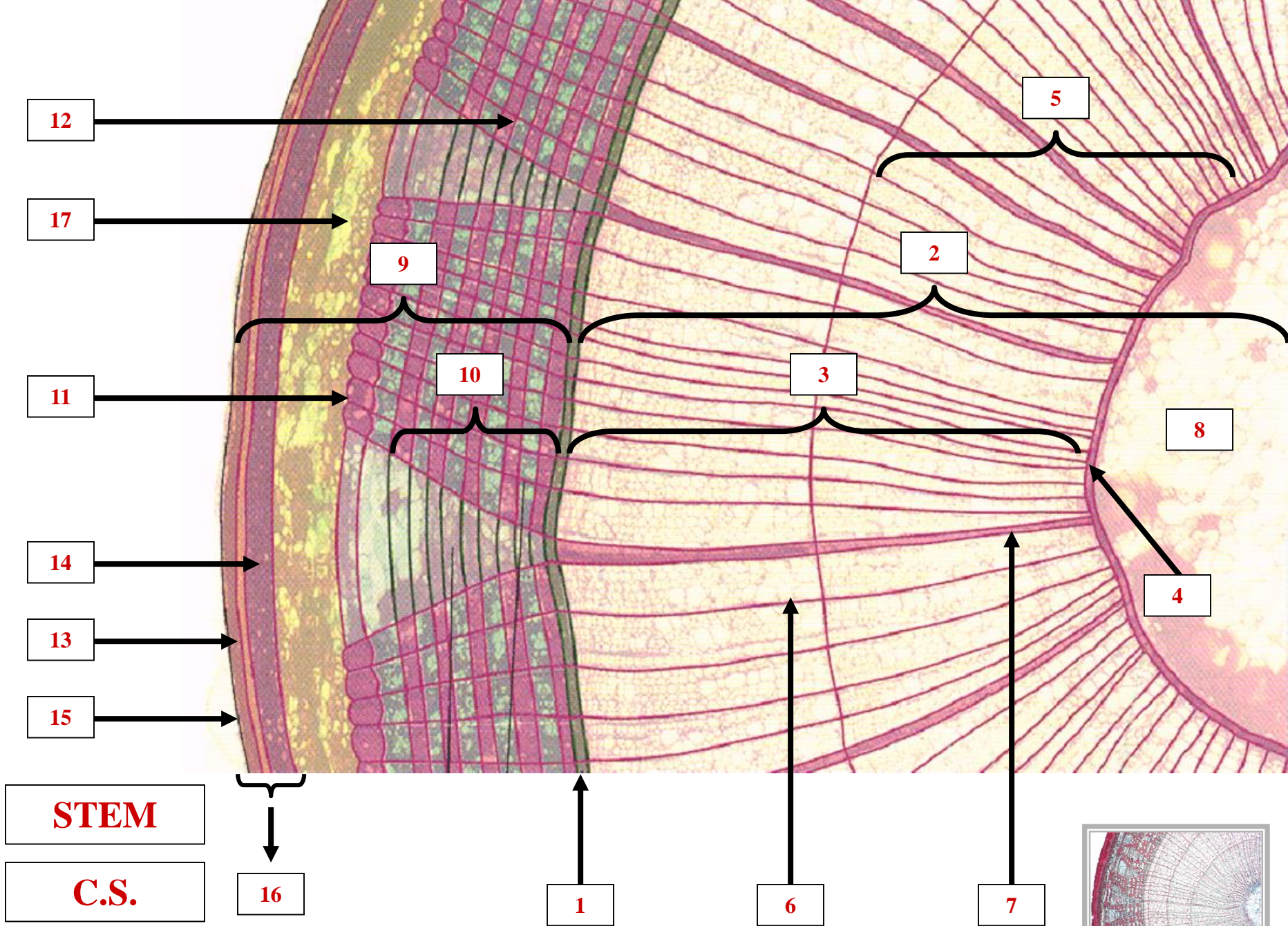


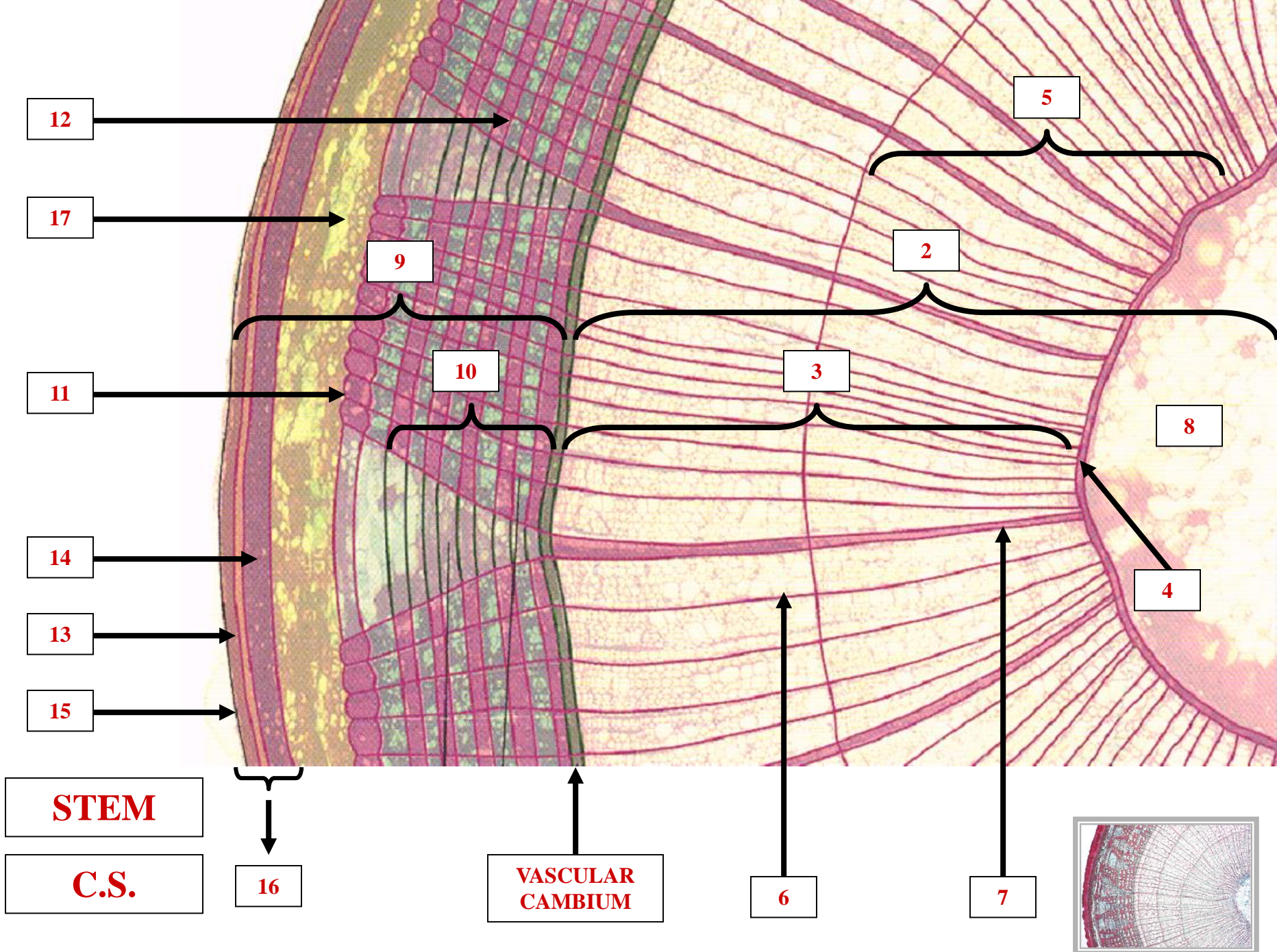
**SECONDARY  
GROWTH**

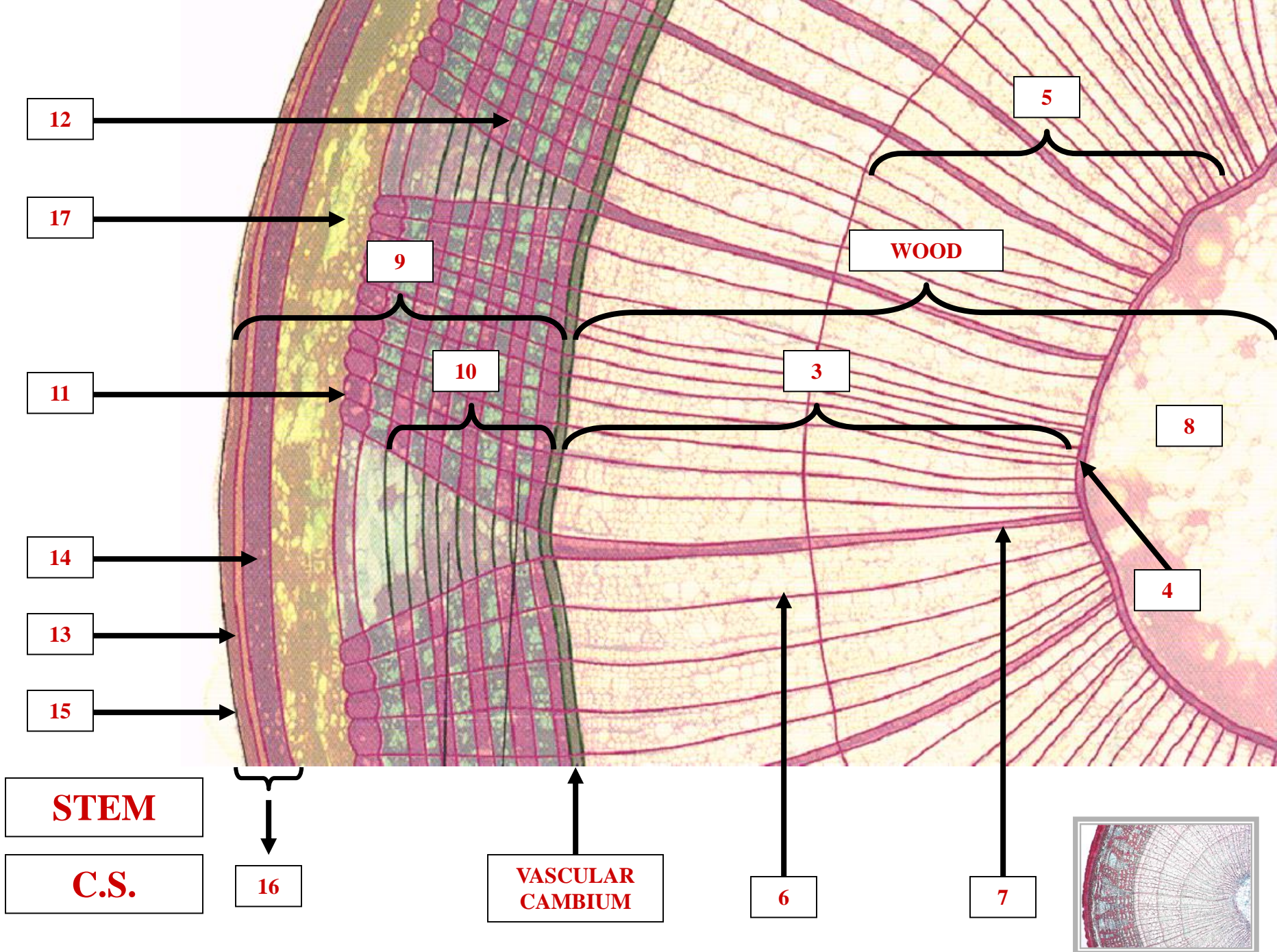
**DICOT ~2 STEM**

**C.S.**

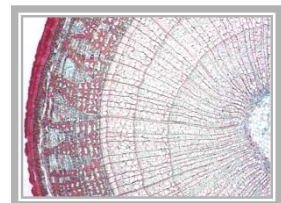
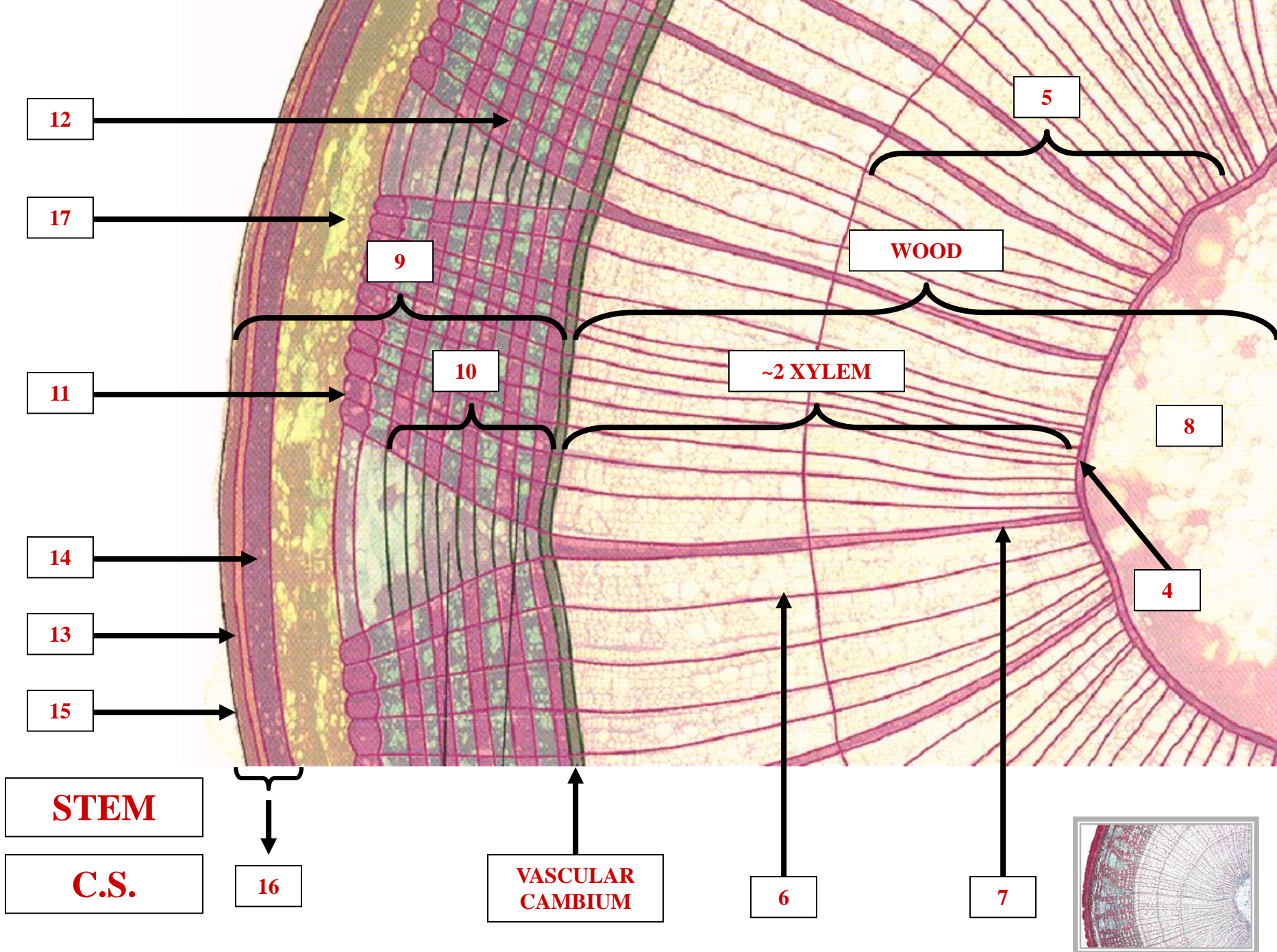


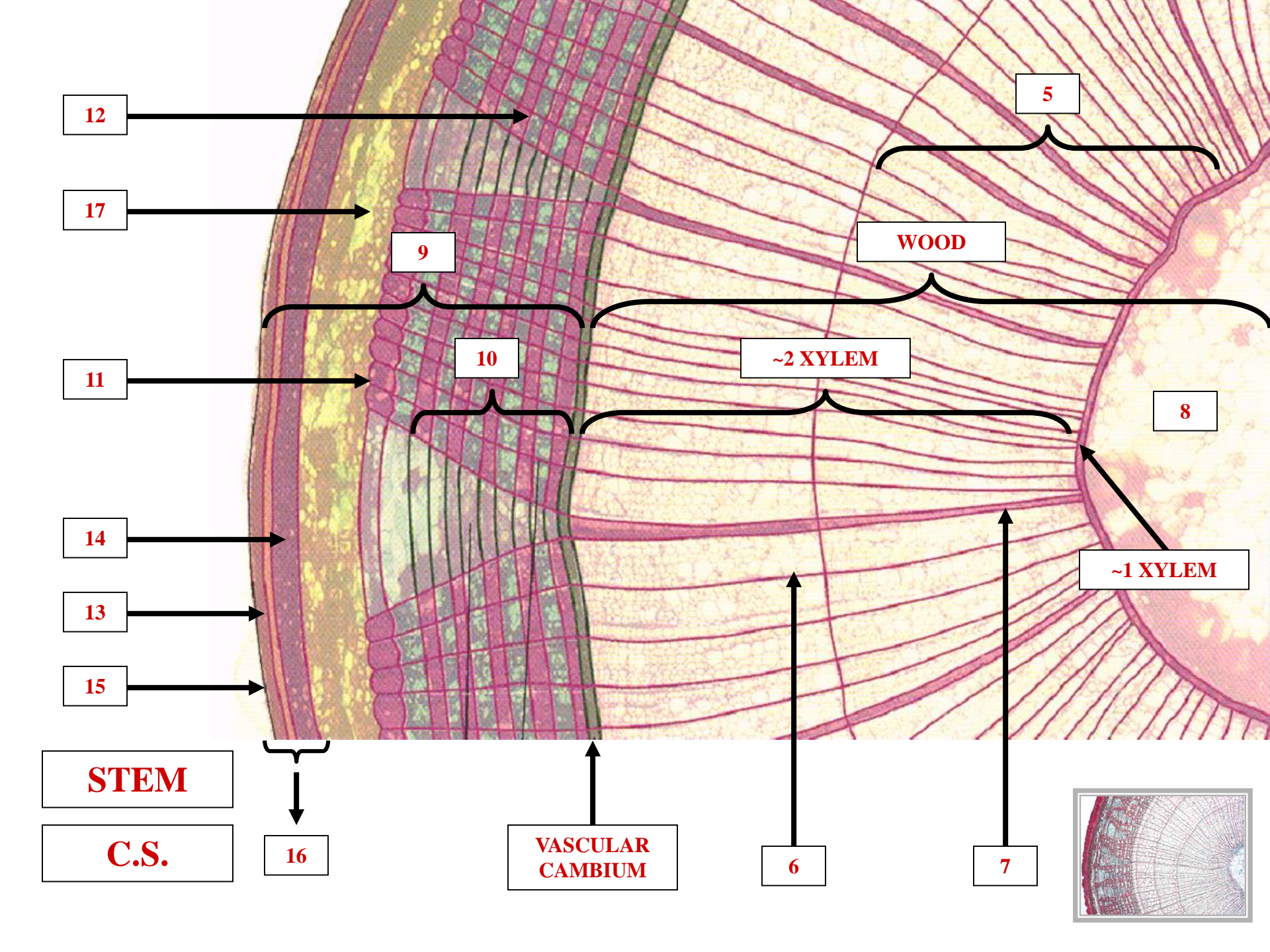


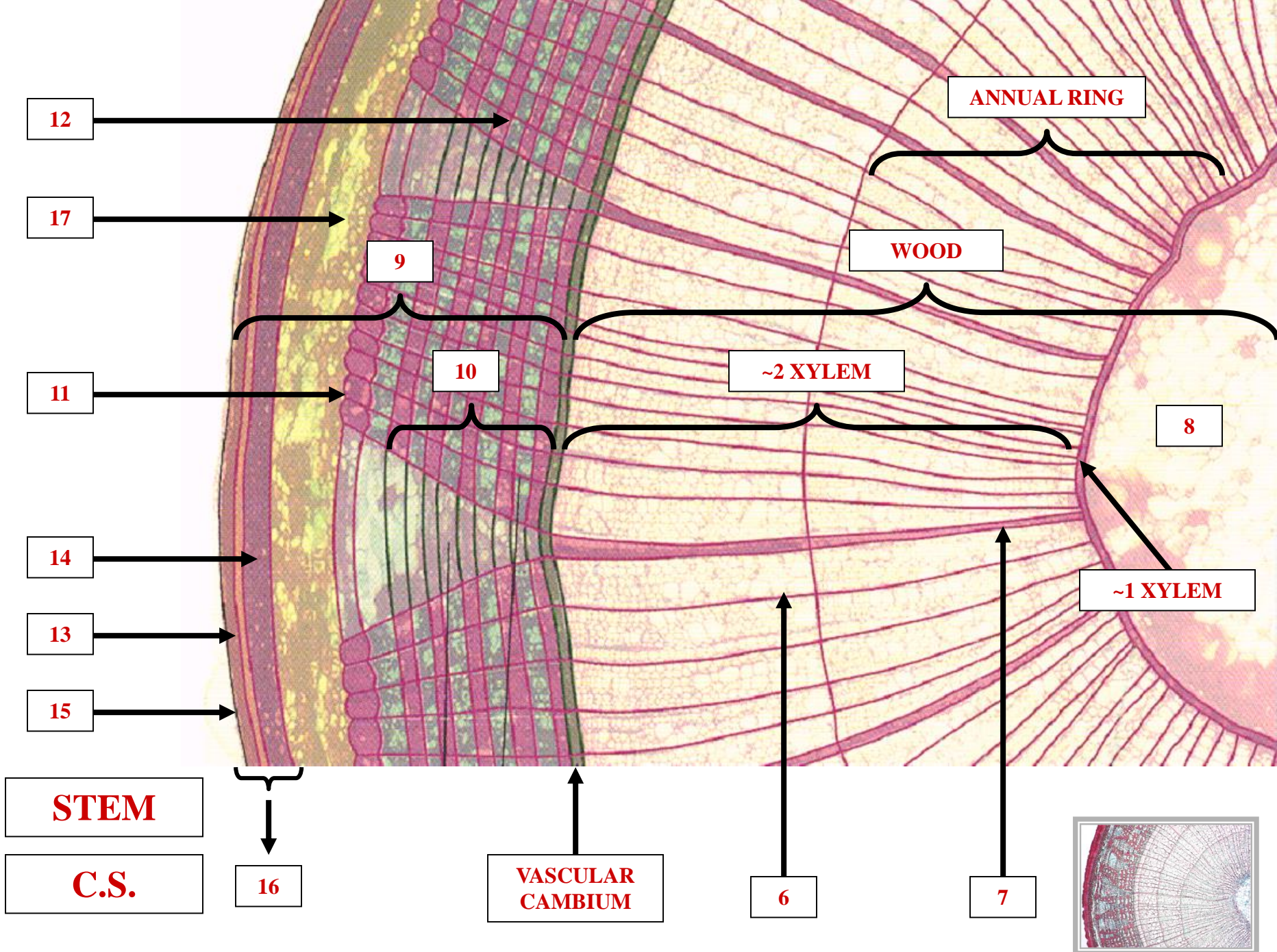


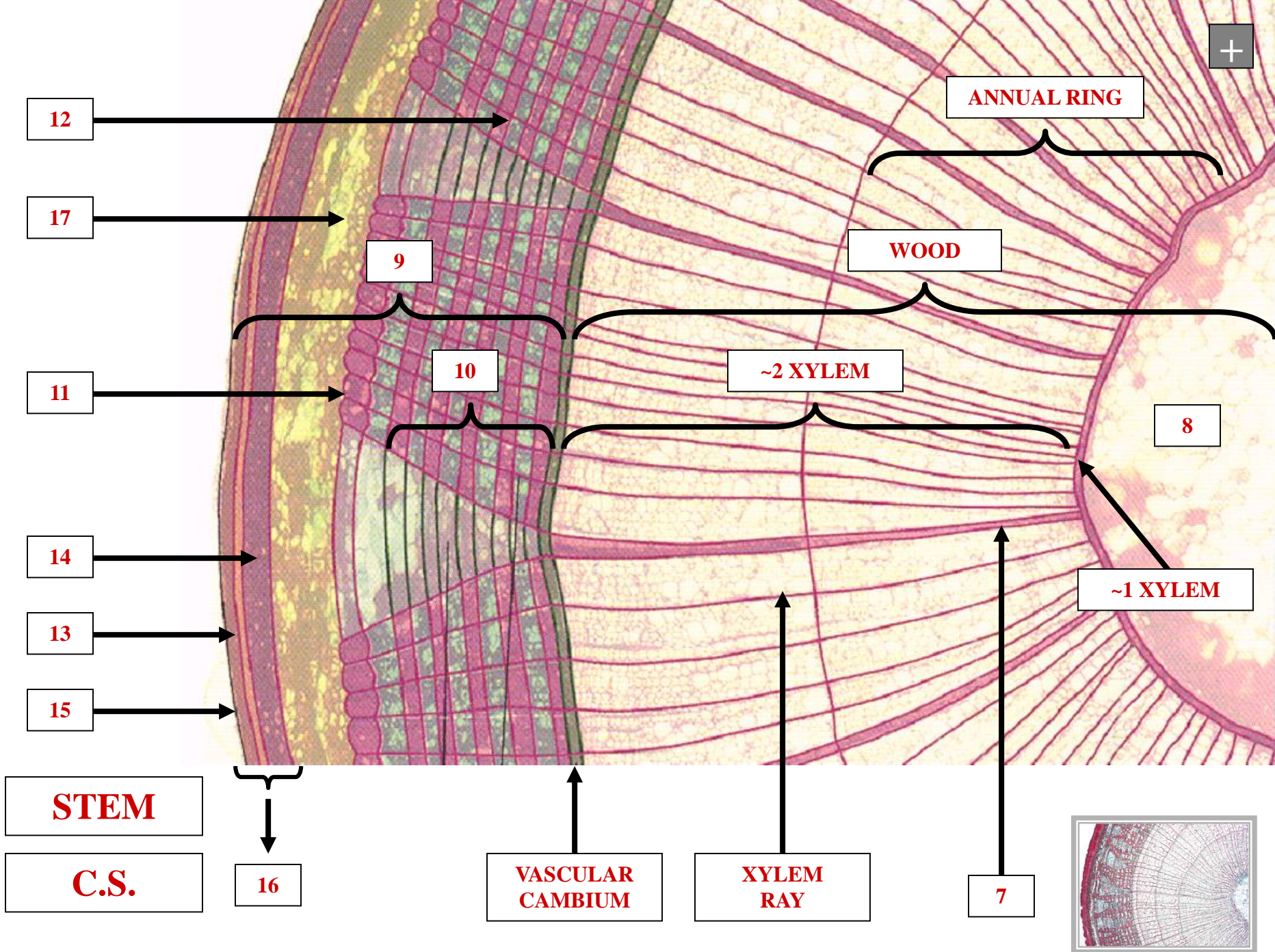


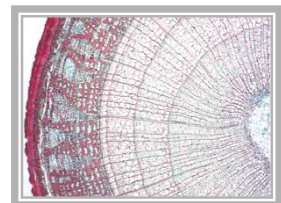
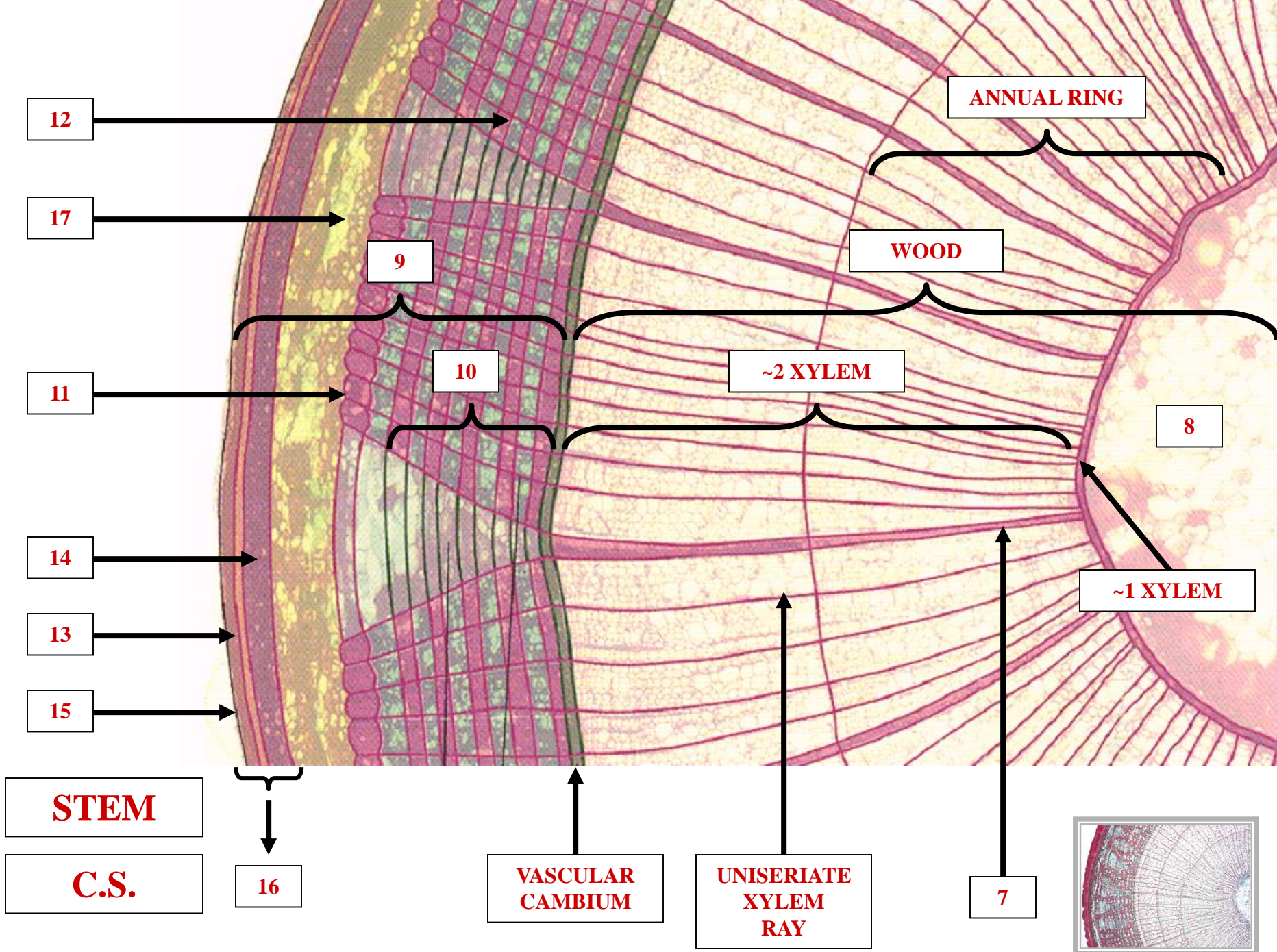


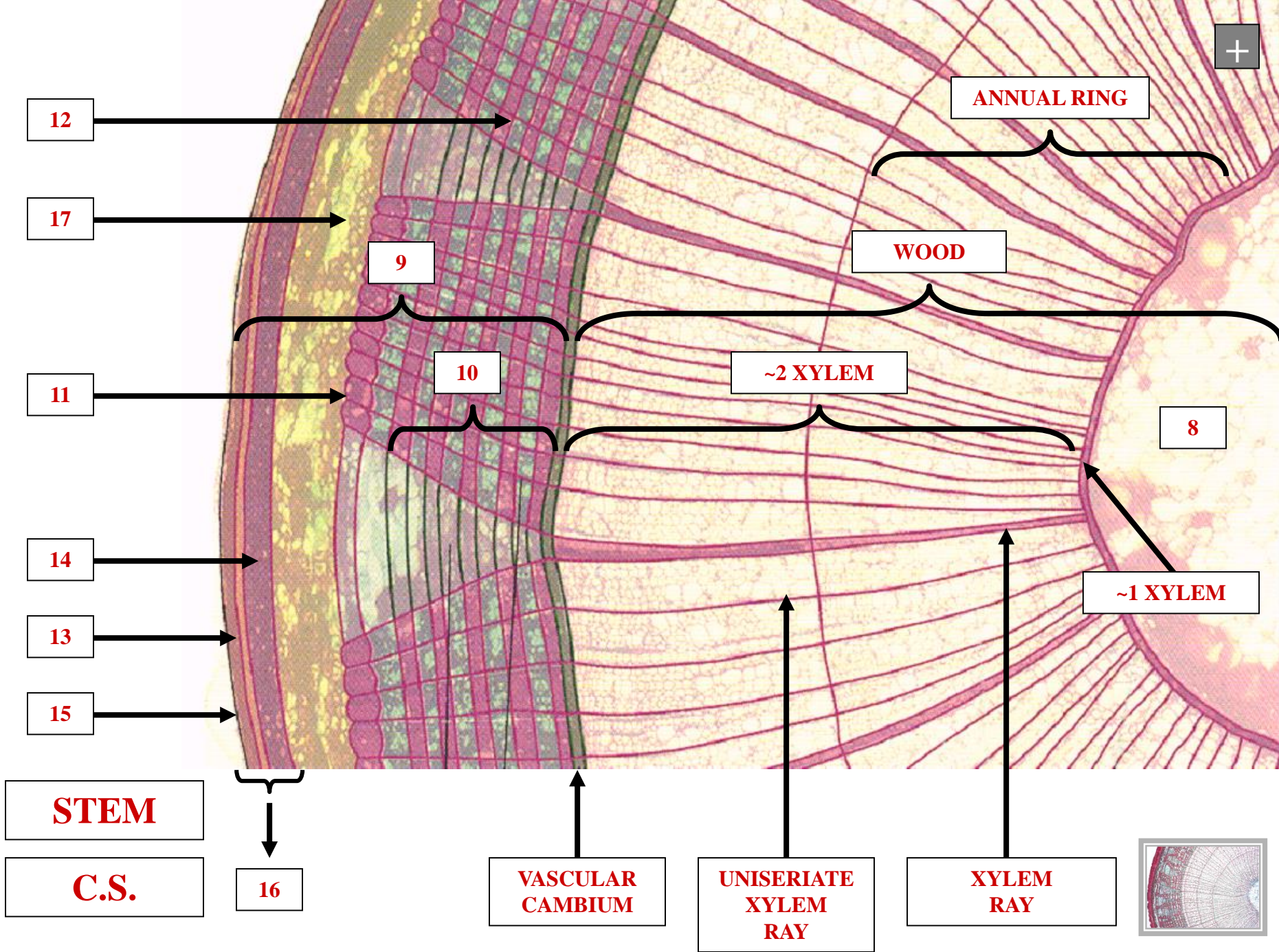


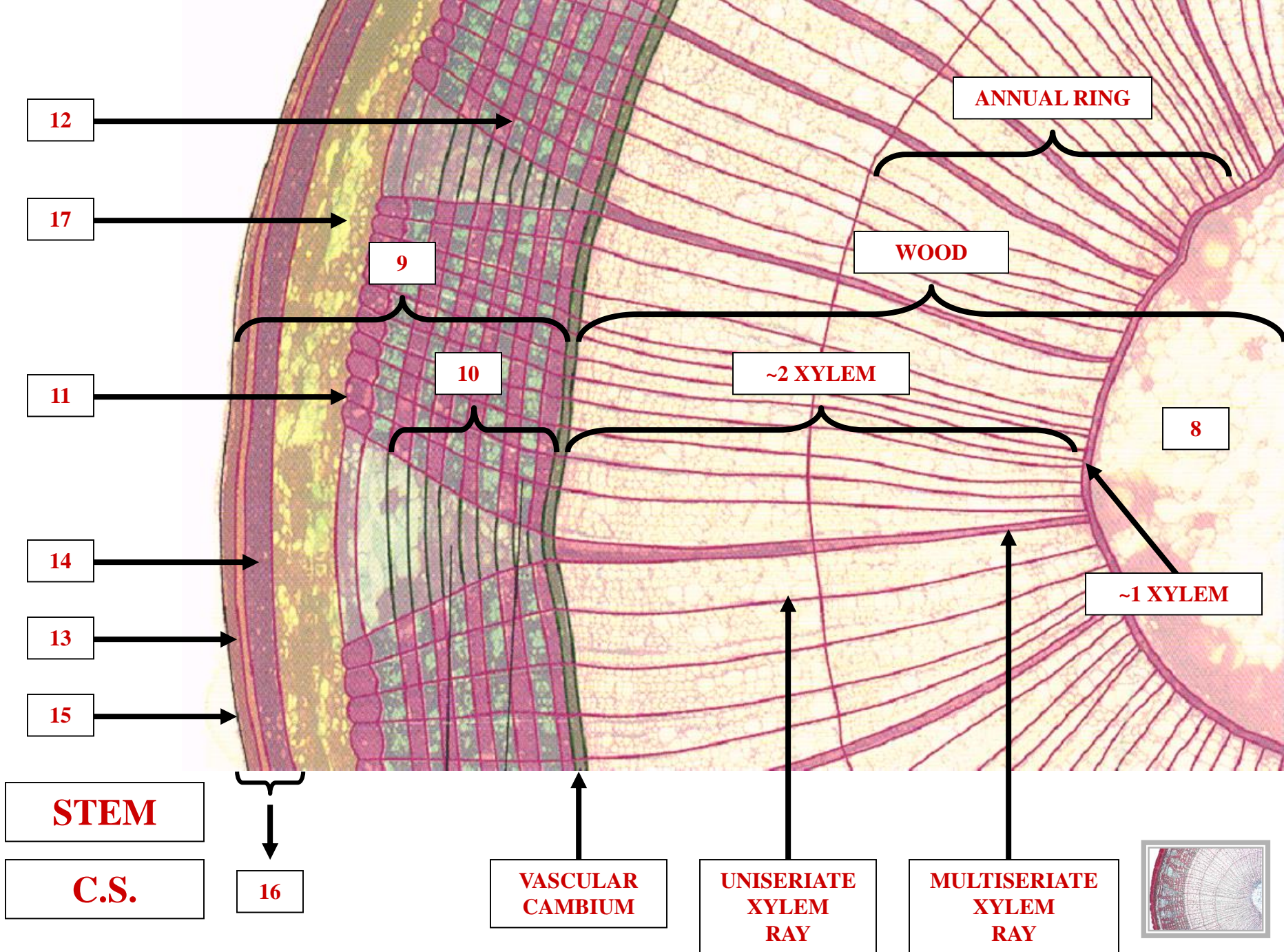


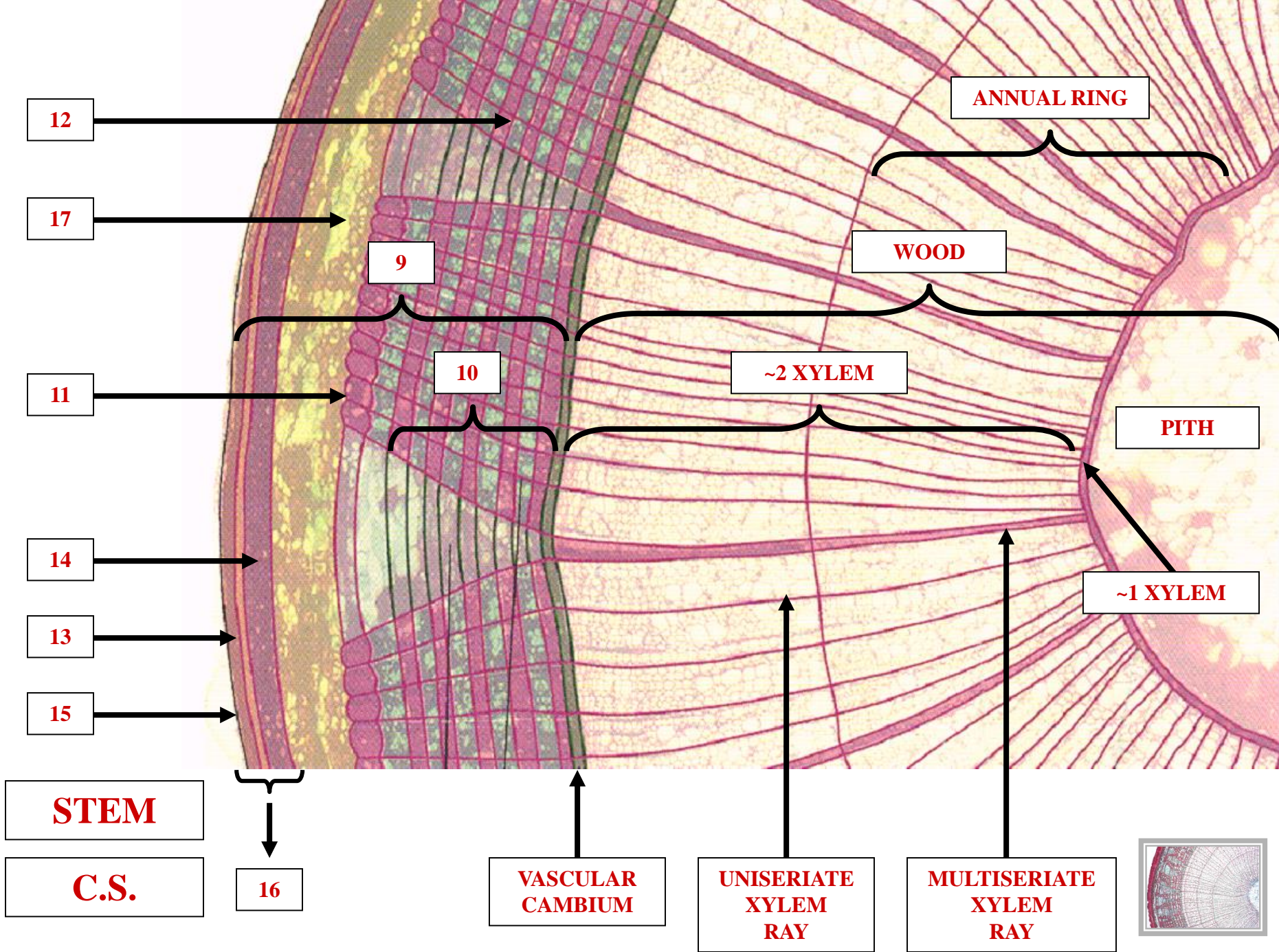




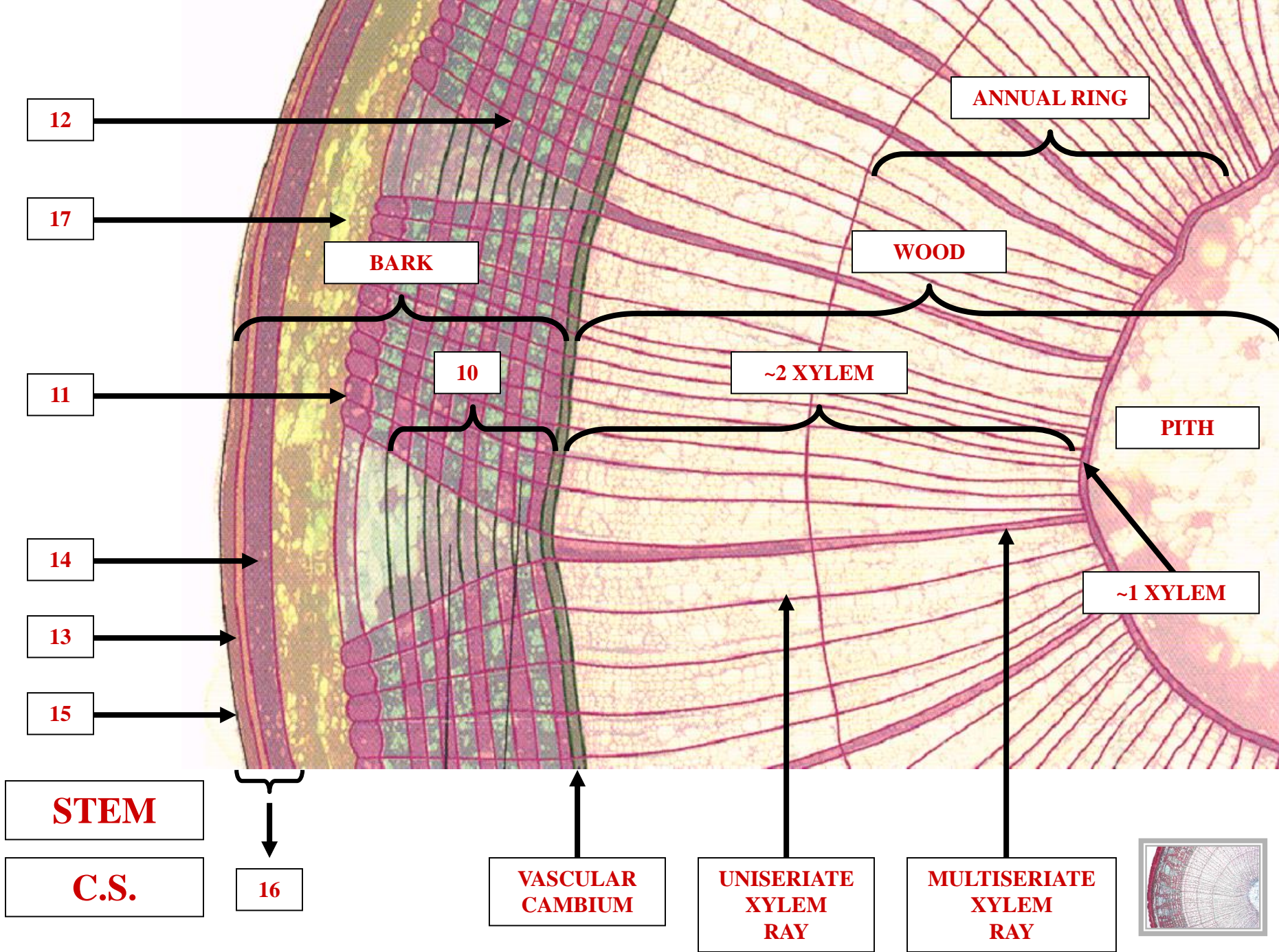


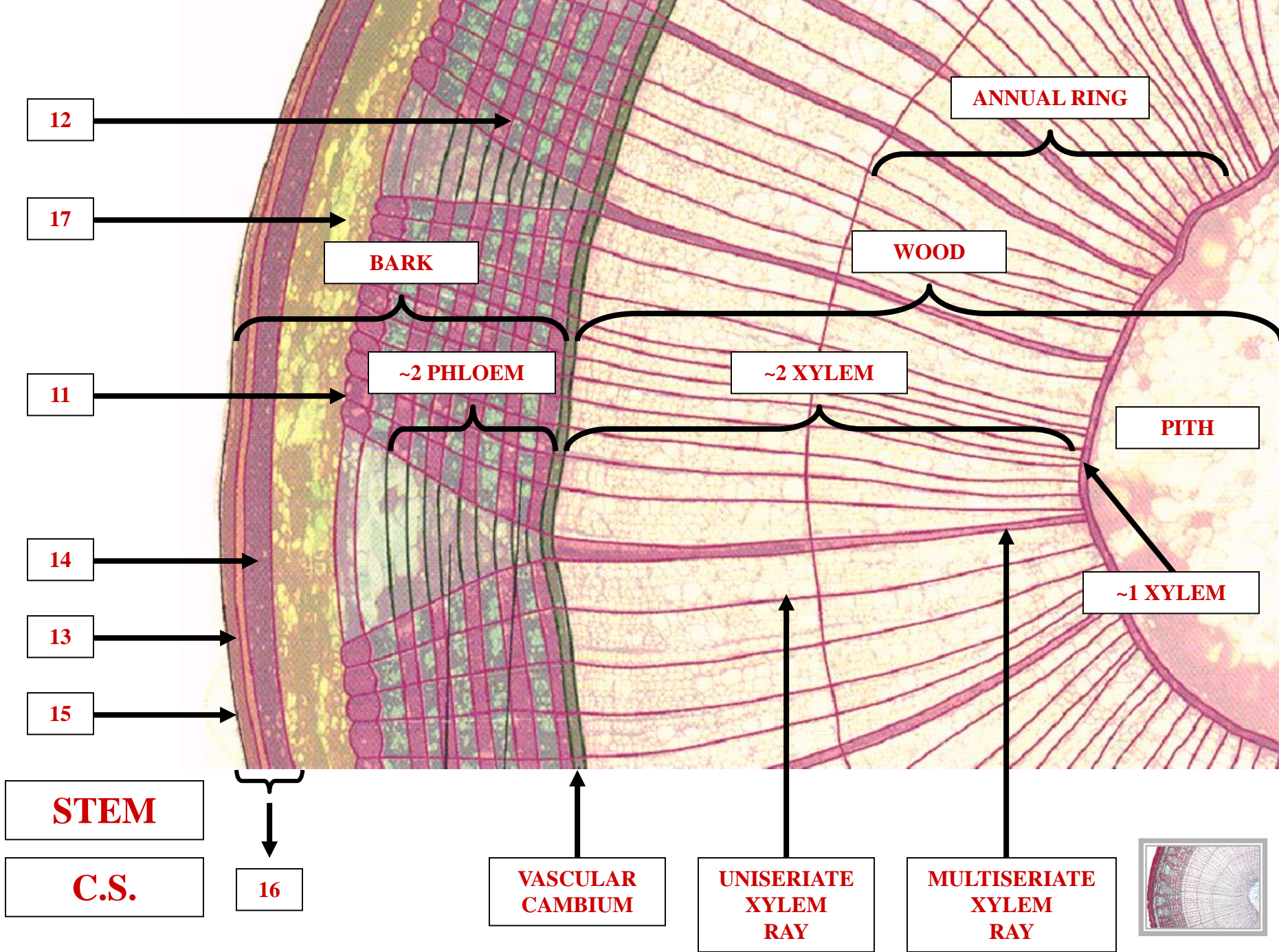


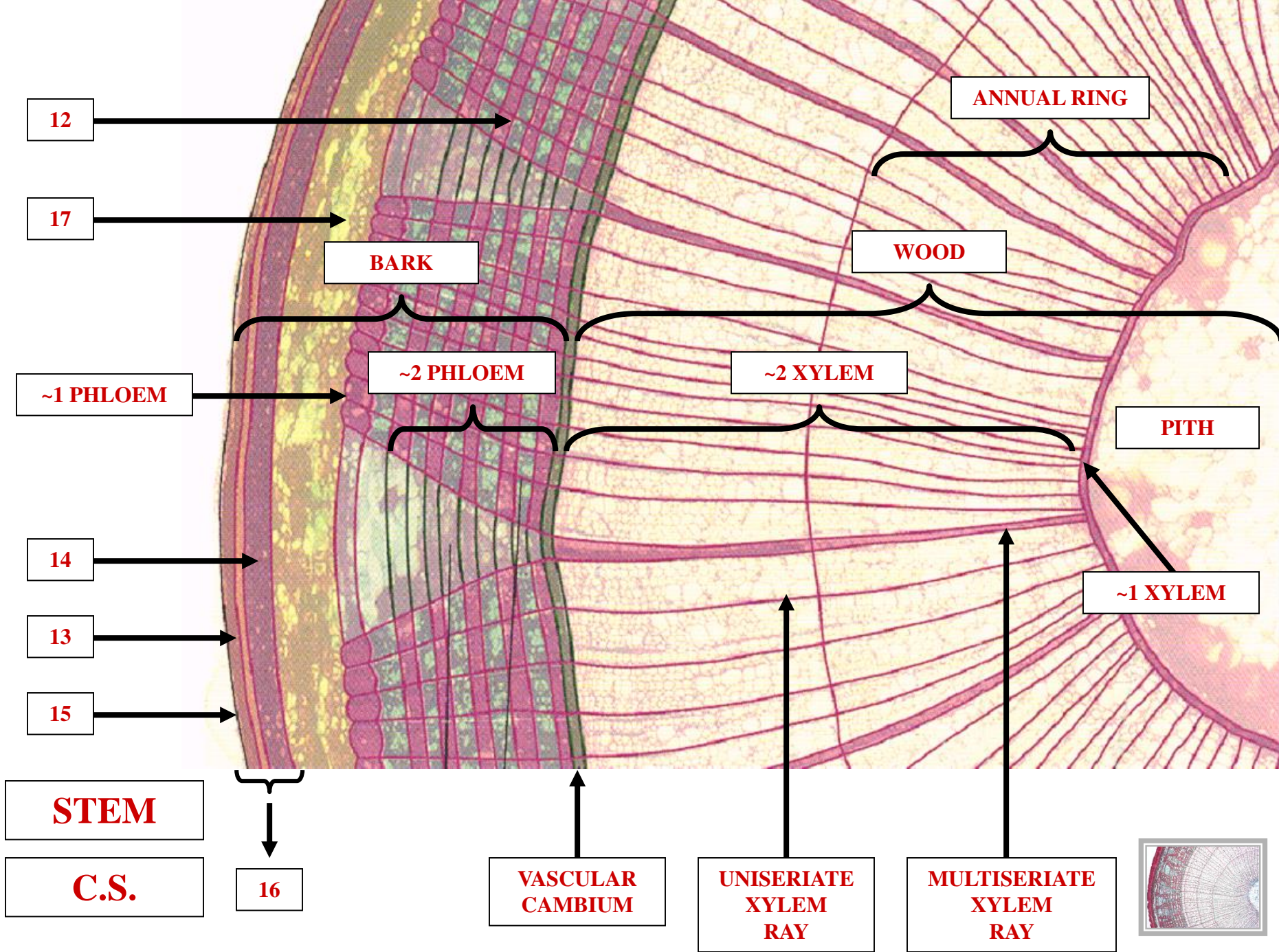


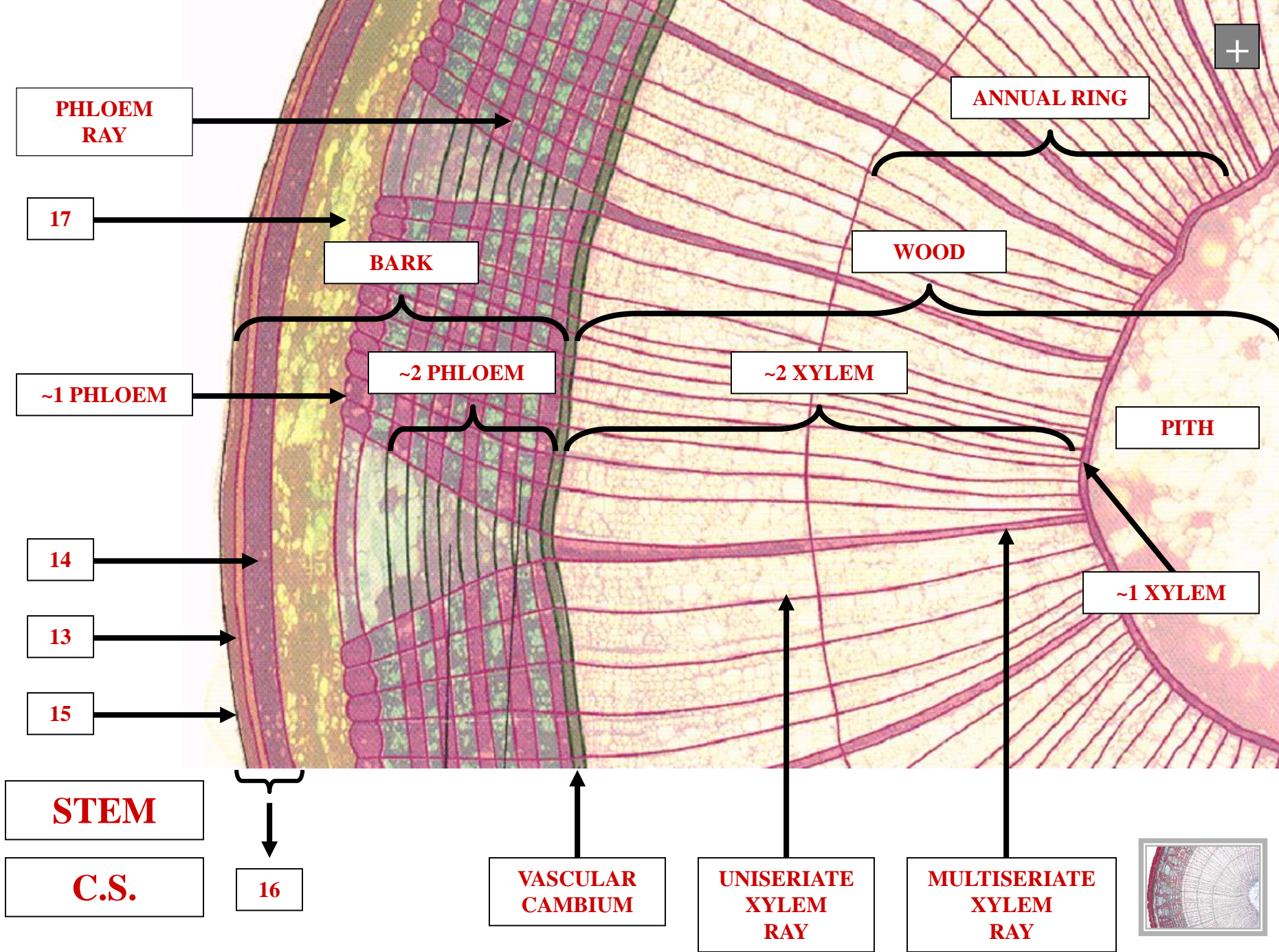


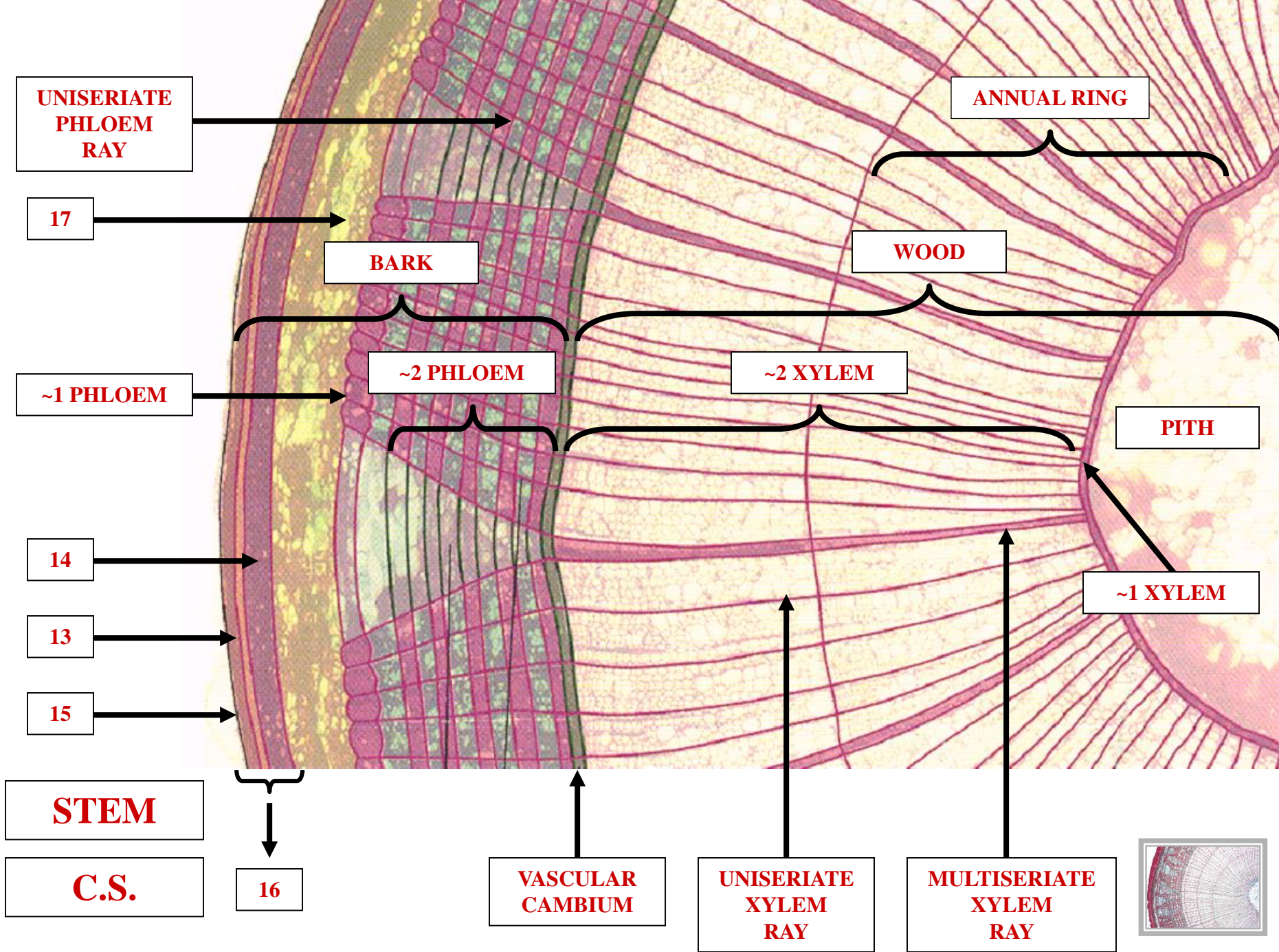


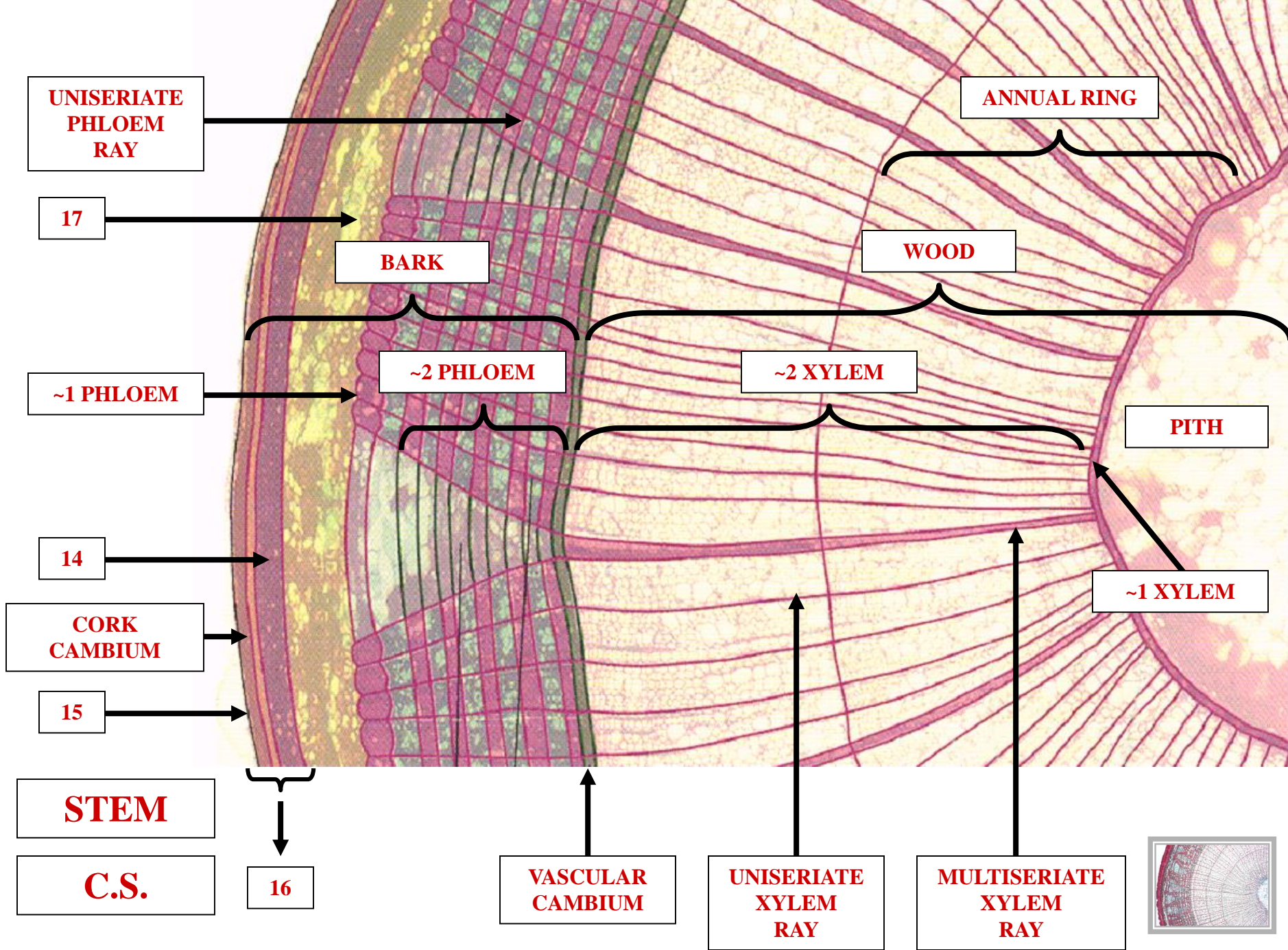


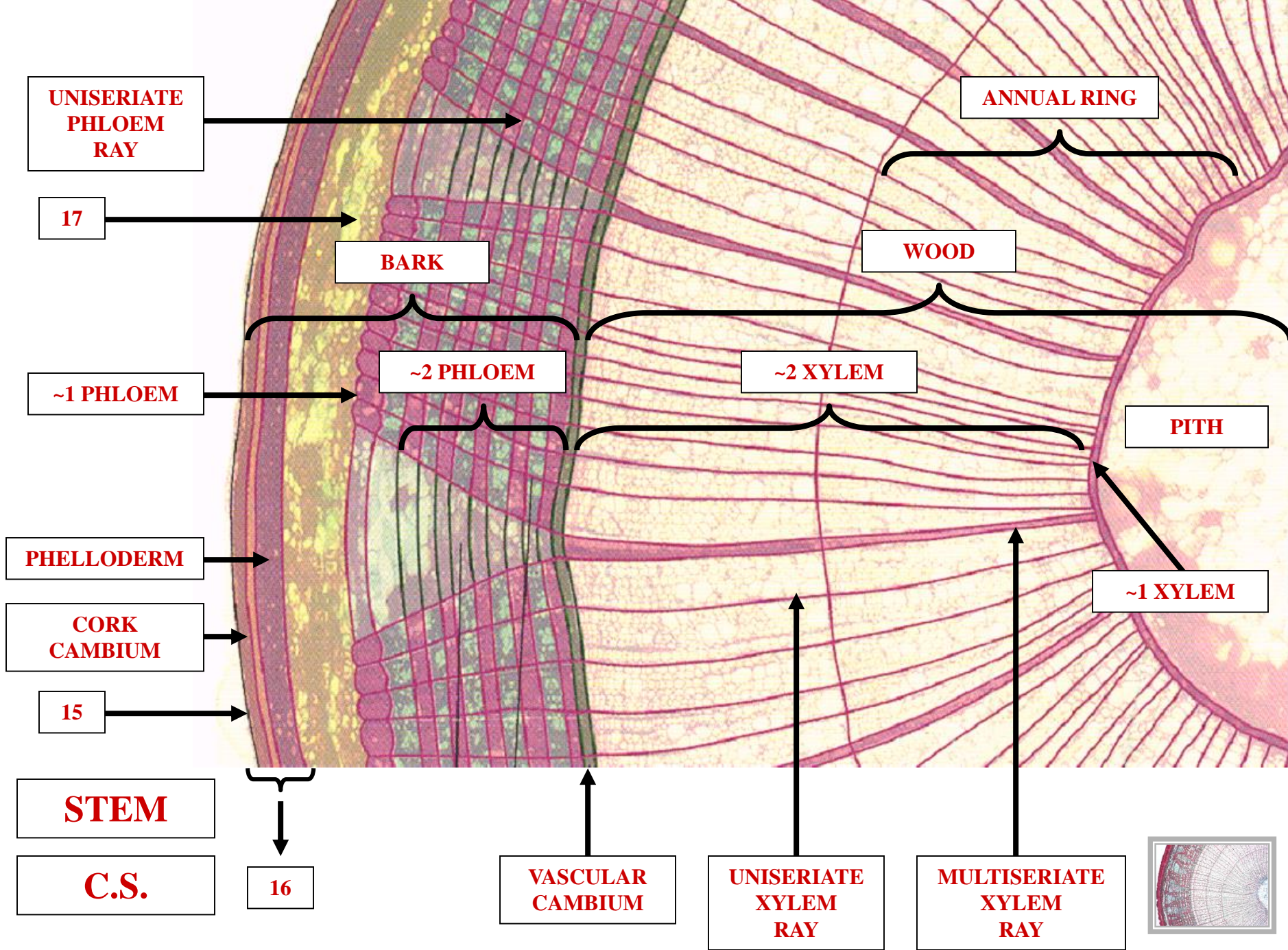


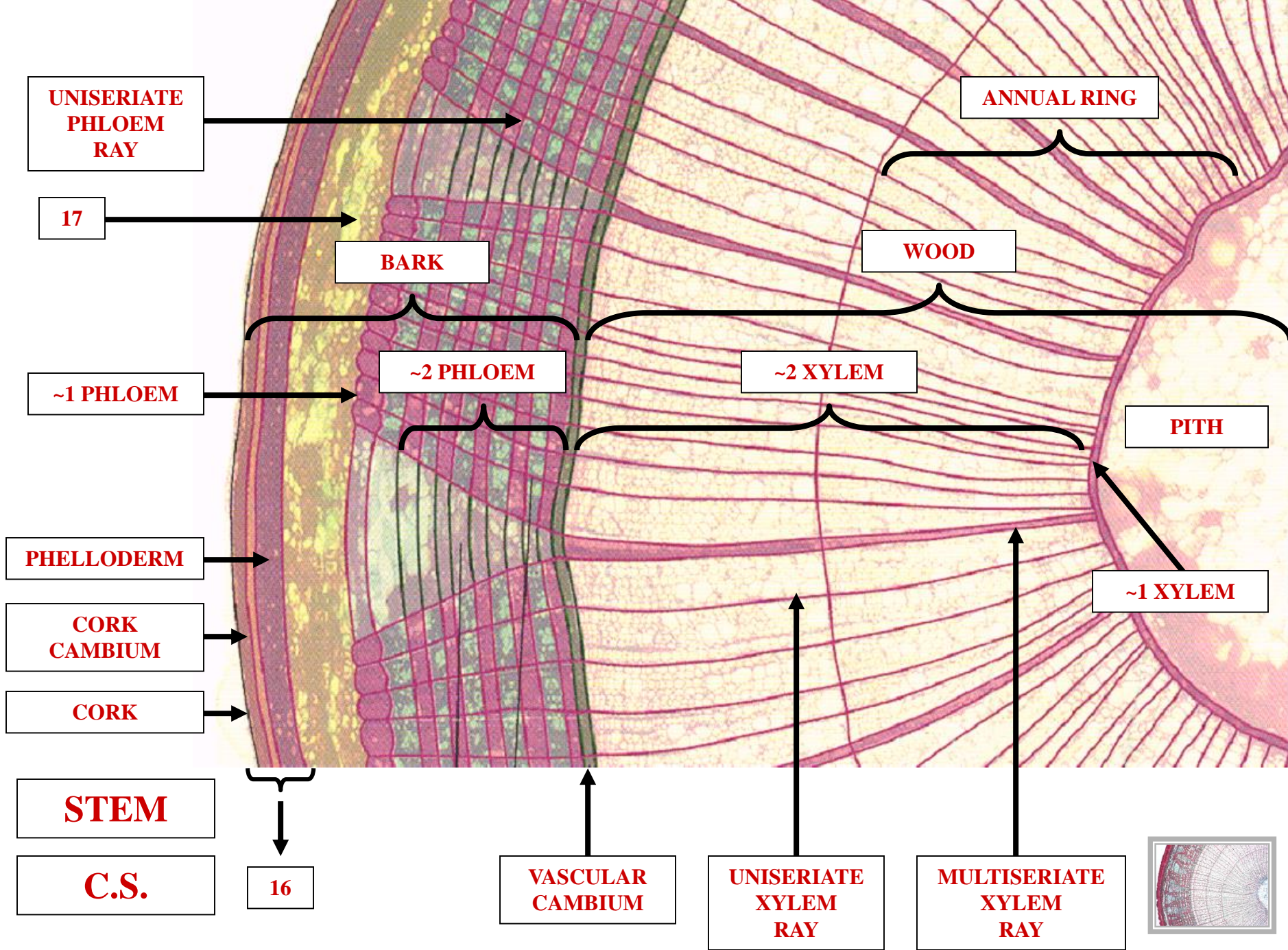




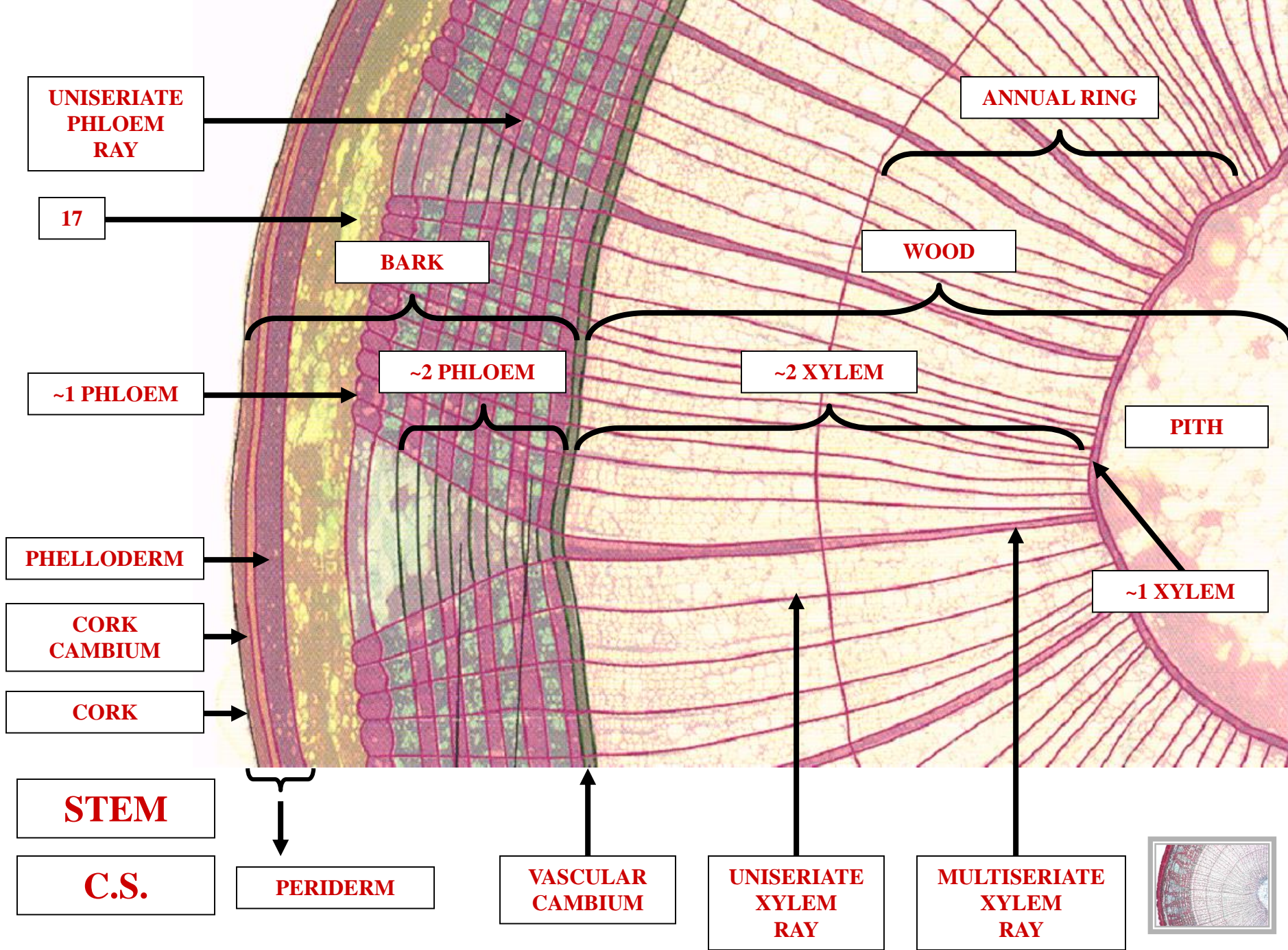


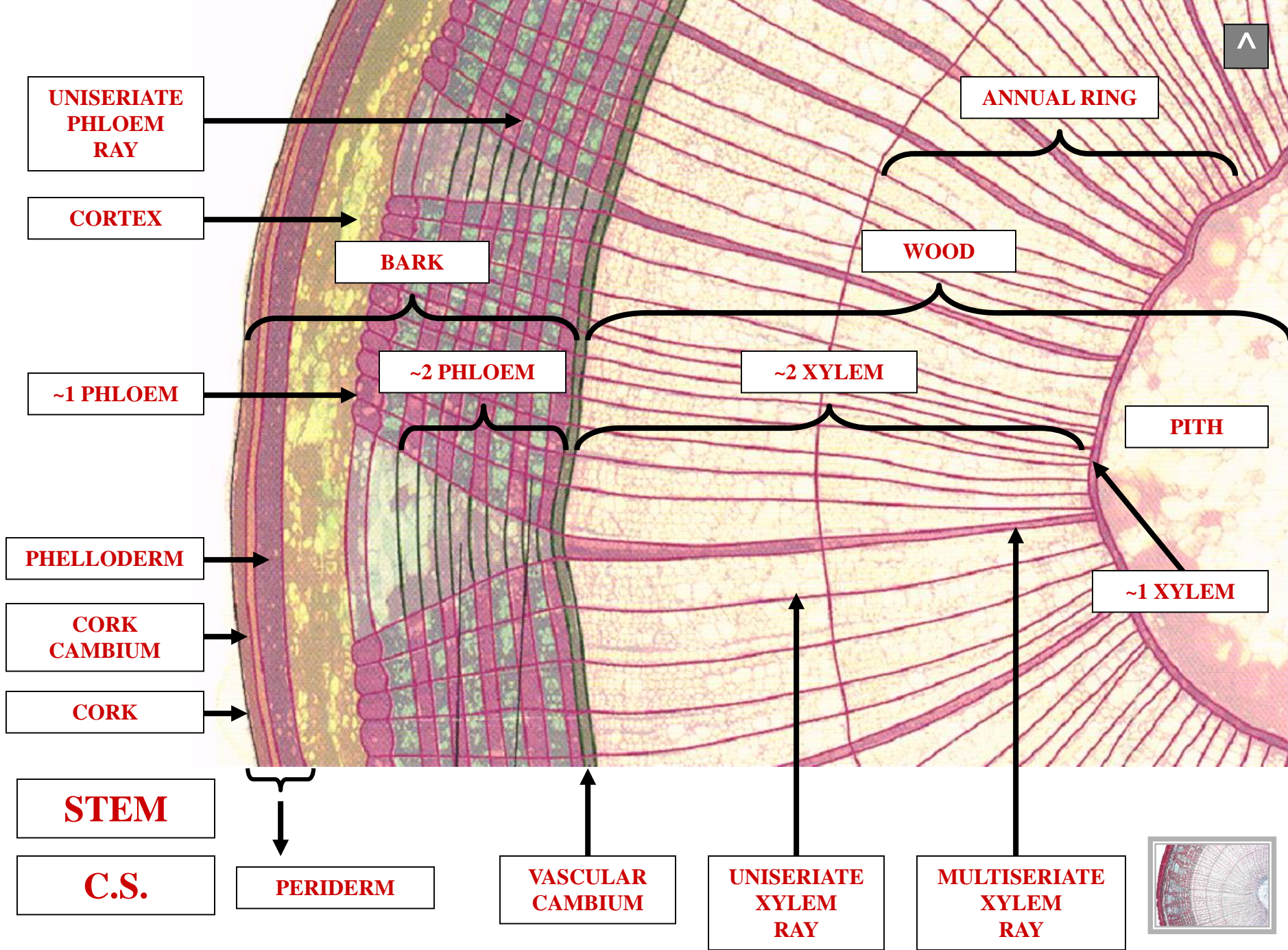






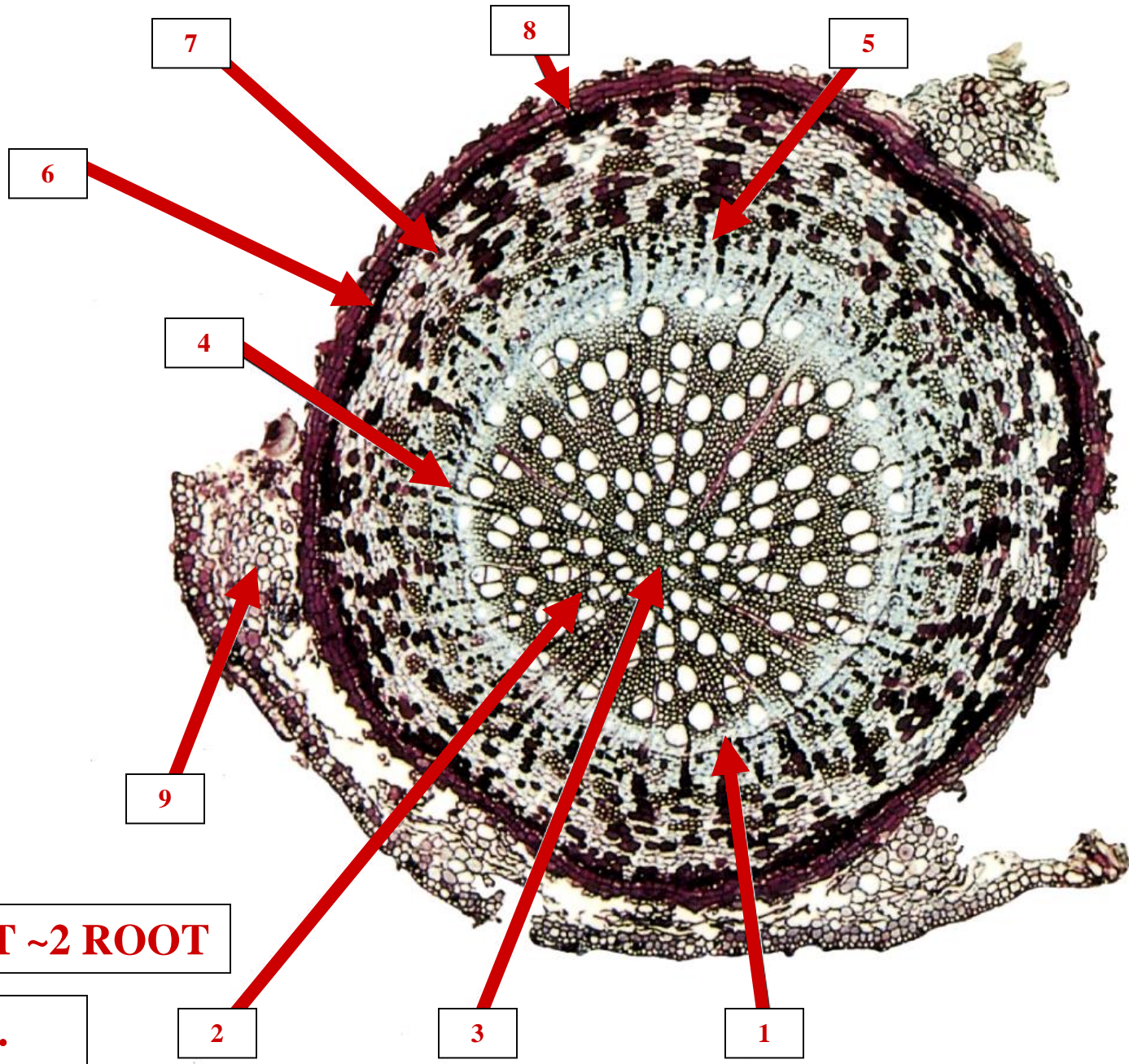








# **DICOT ROOT SECONDARY GROWTH SUMMARY**



**DICOT ~2 ROOT**

**C.S.**

**2**

**3**

**1**

**9**

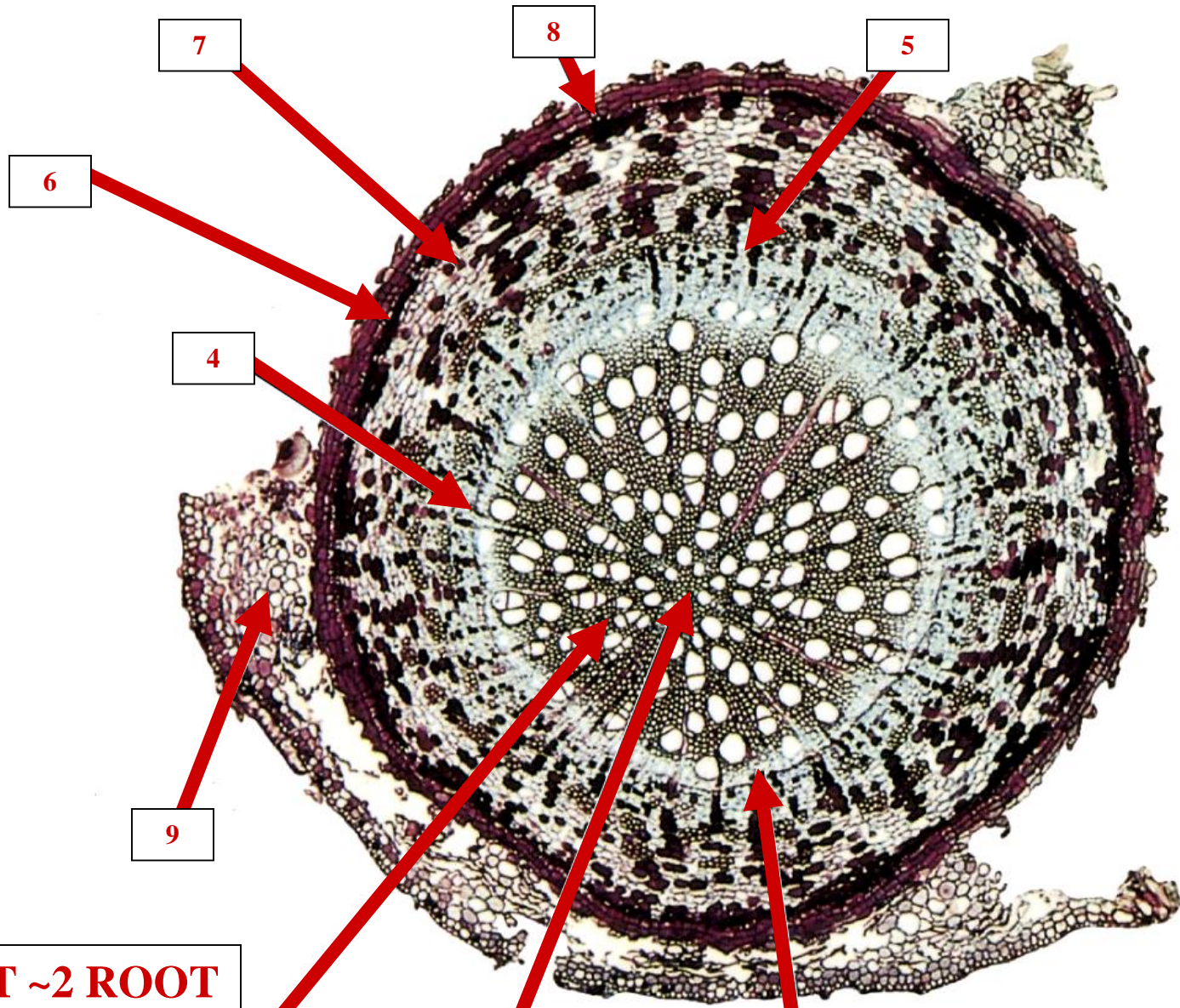
**4**

**6**

**7**

**8**

**5**



**DICOT ~2 ROOT**

**C.S.**

**2**

**3**

**VASCULAR  
CAMBIUM**

**9**

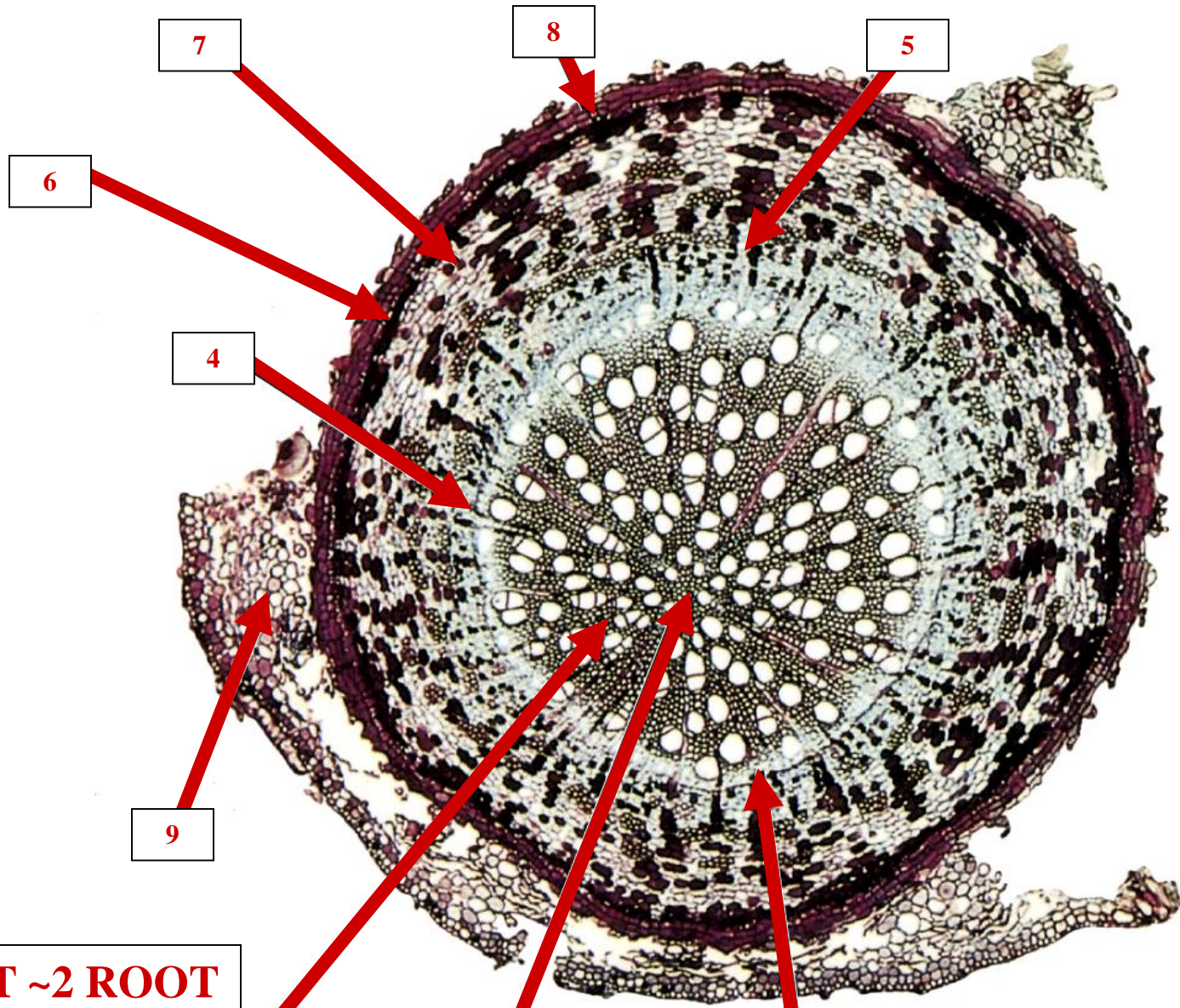
**4**

**6**

**7**

**8**

**5**



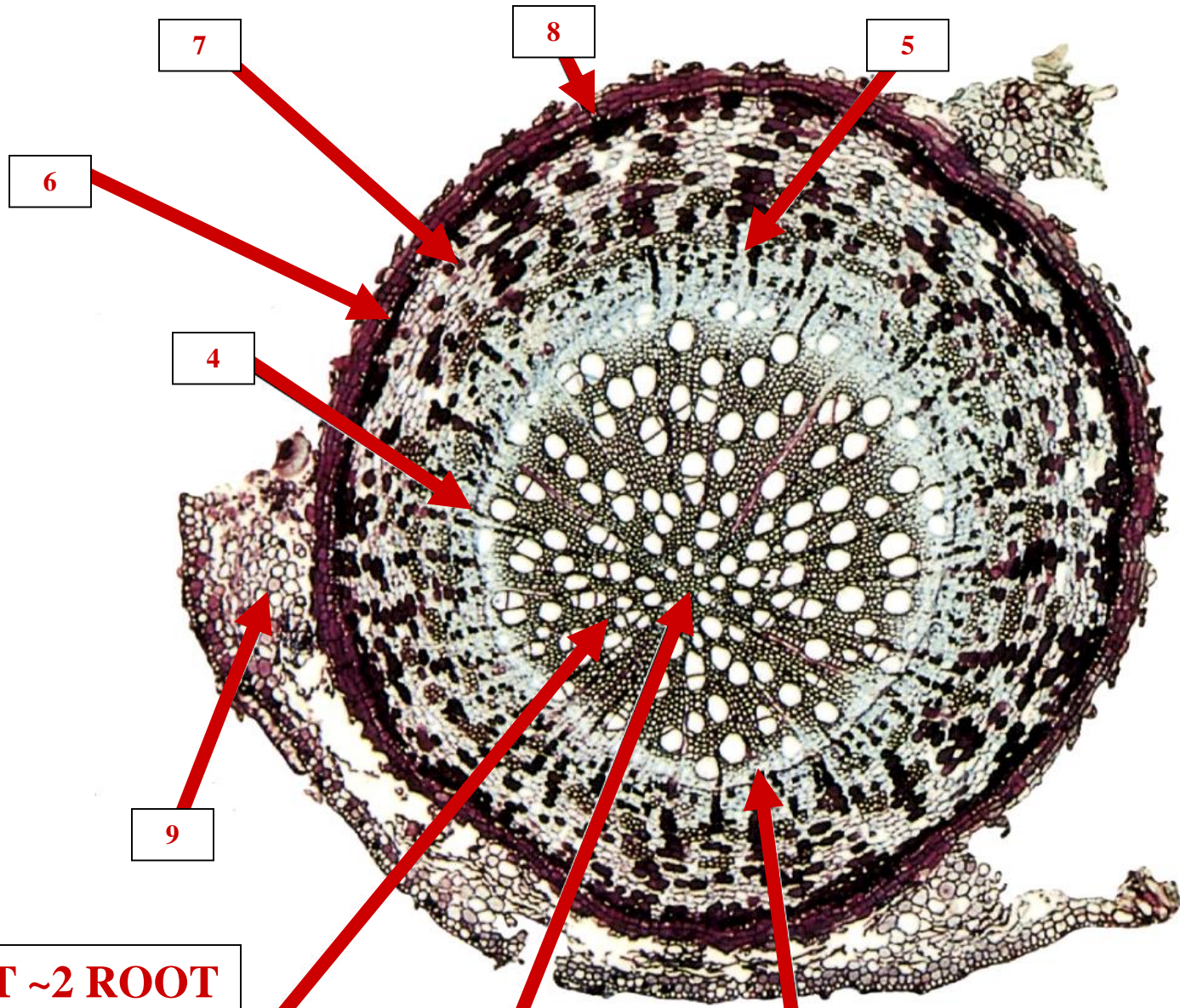
**DICOT ~2 ROOT**

**C.S.**

**~2 XYLEM**

**3**

**VASCULAR  
CAMBIUM**



7

8

5

6

4

9

**DICOT ~2 ROOT**

**C.S.**

**~2 XYLEM**

**~1 XYLEM**

**VASCULAR  
CAMBIUM**

7

8

5

6

~2 PHLOEM

9

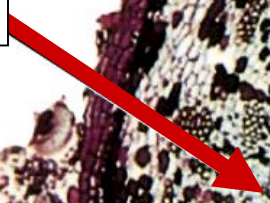
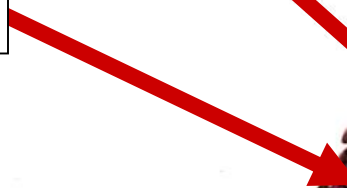
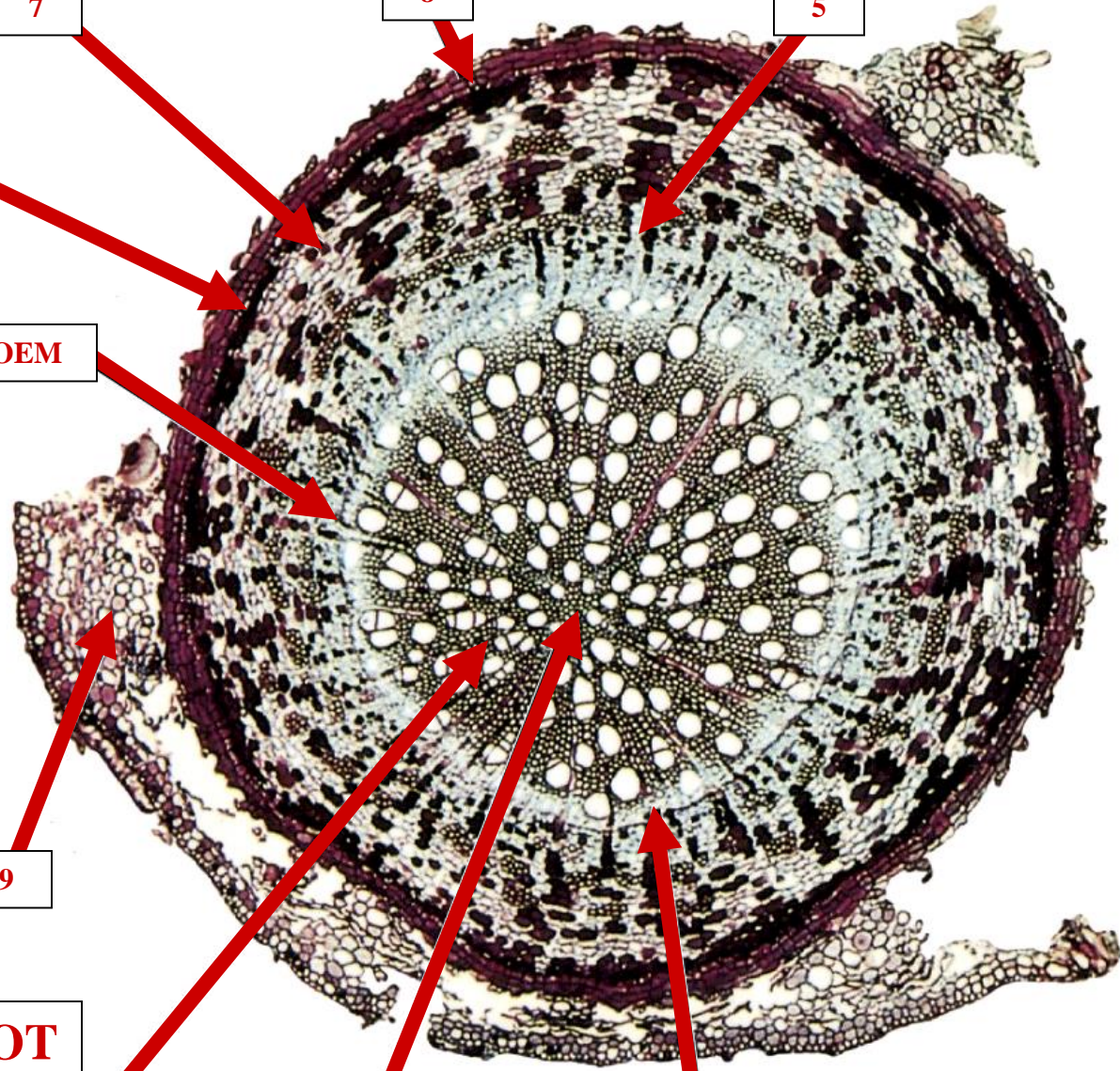
DICOT ~2 ROOT

C.S.

~2 XYLEM

~1 XYLEM

VASCULAR CAMBIUM





7

8

~1 PHLOEM

6

~2 PHLOEM

9

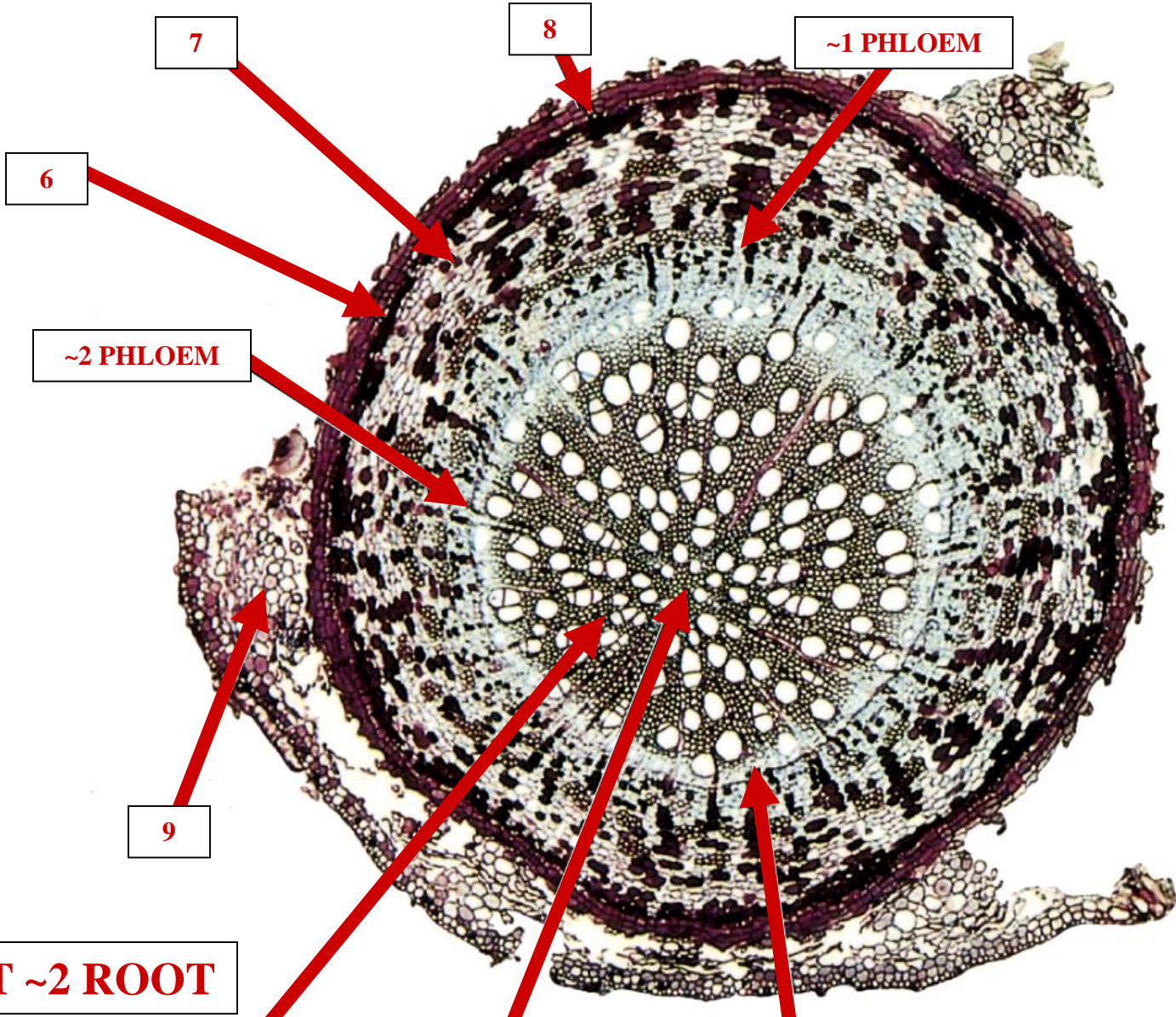
DICOT ~2 ROOT

C.S.

~2 XYLEM

~1 XYLEM

VASCULAR CAMBIUM



7

8

~1 PHLOEM

CORK CAMBIUM

~2 PHLOEM

9

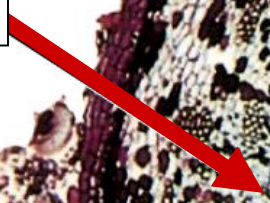
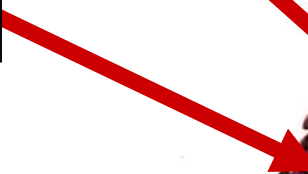
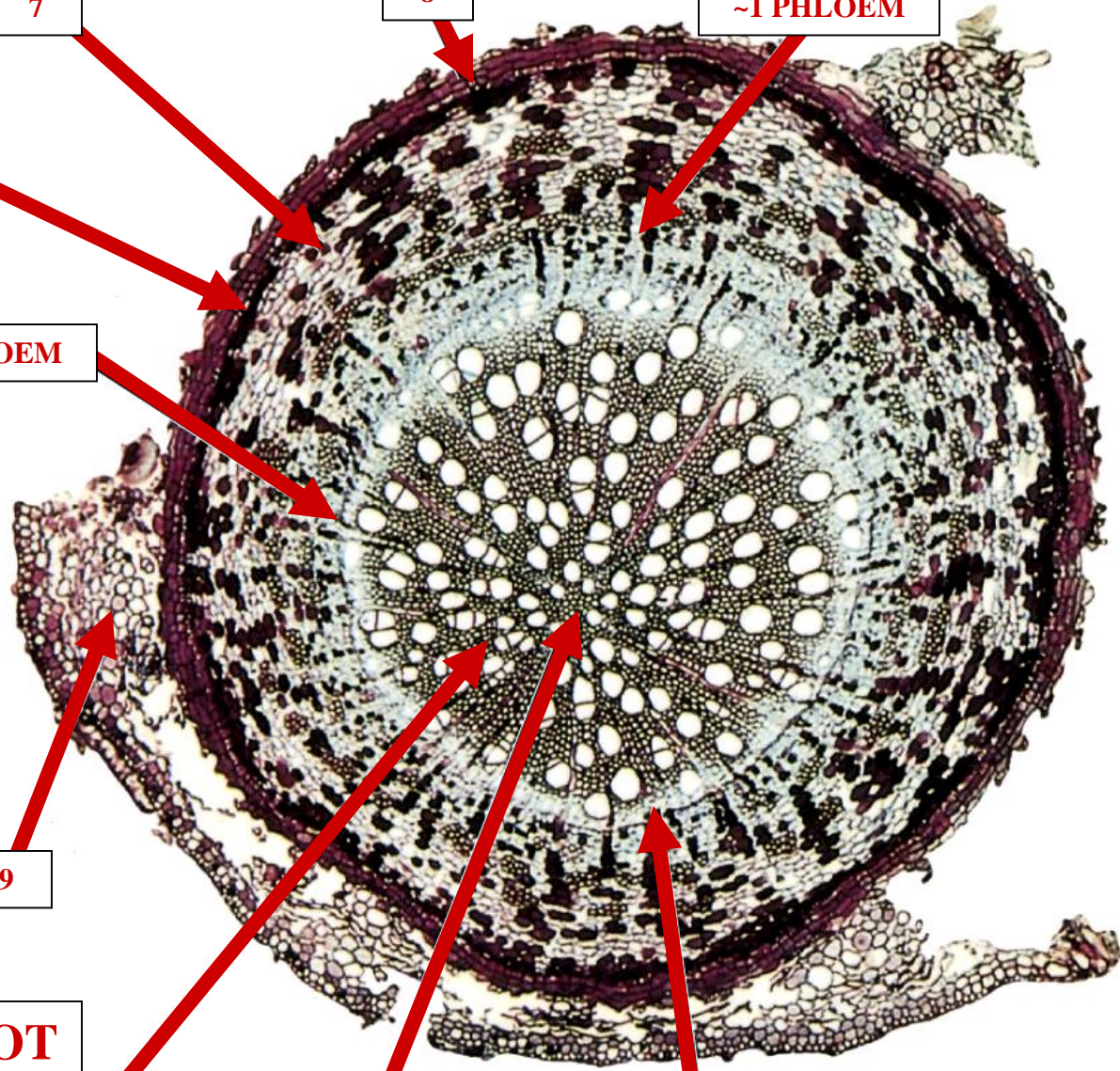
DICOT ~2 ROOT

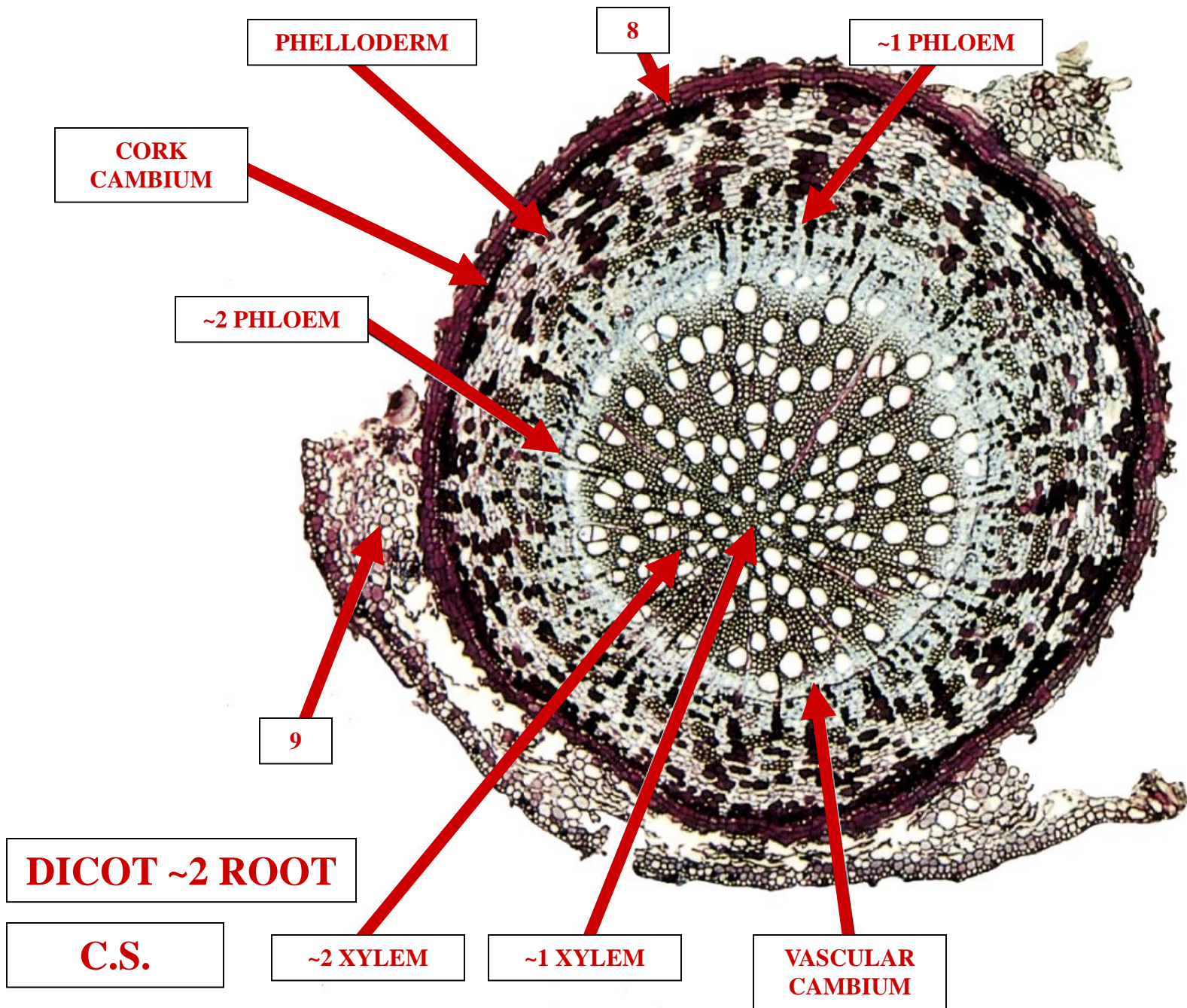
C.S.

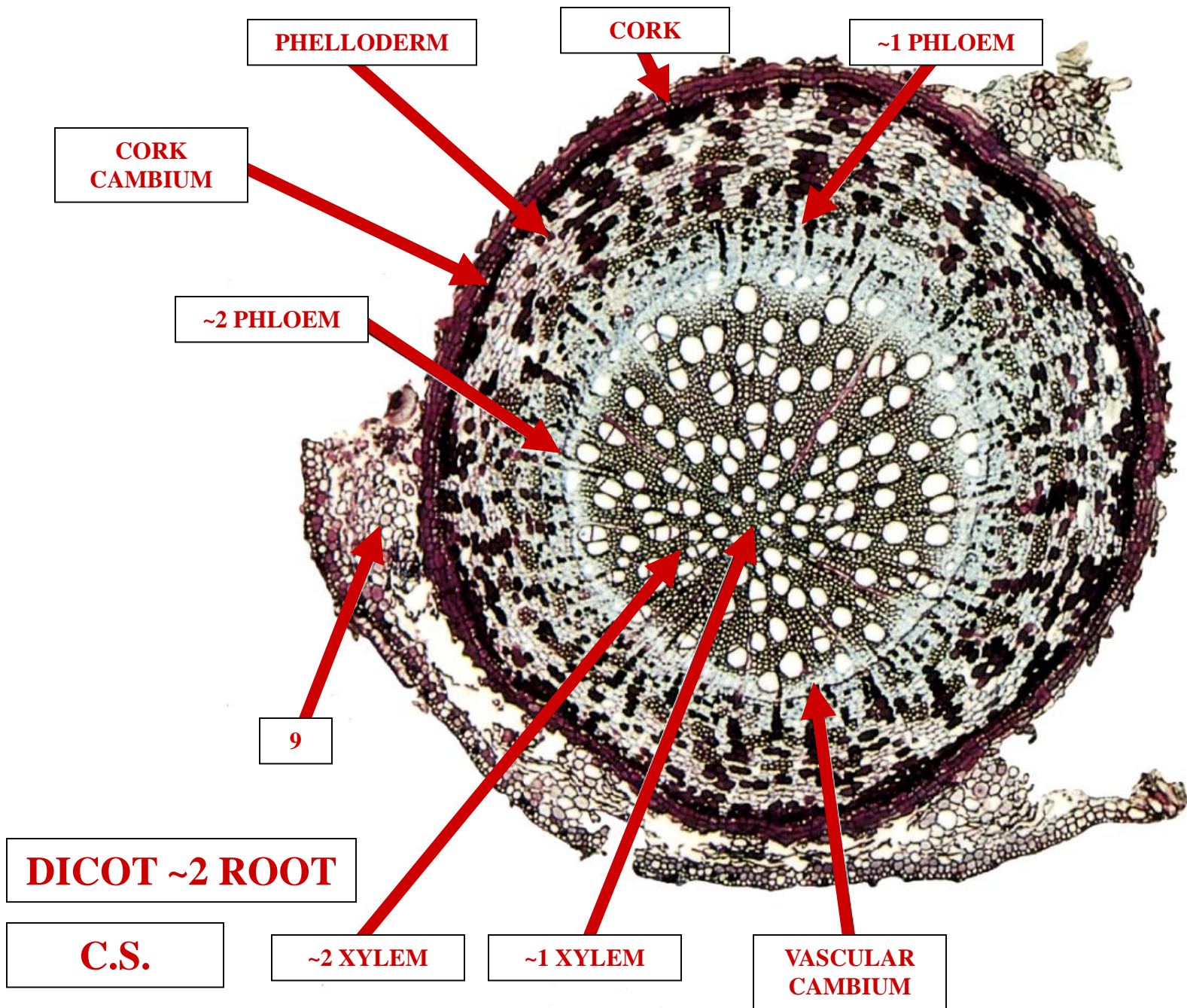
~2 XYLEM

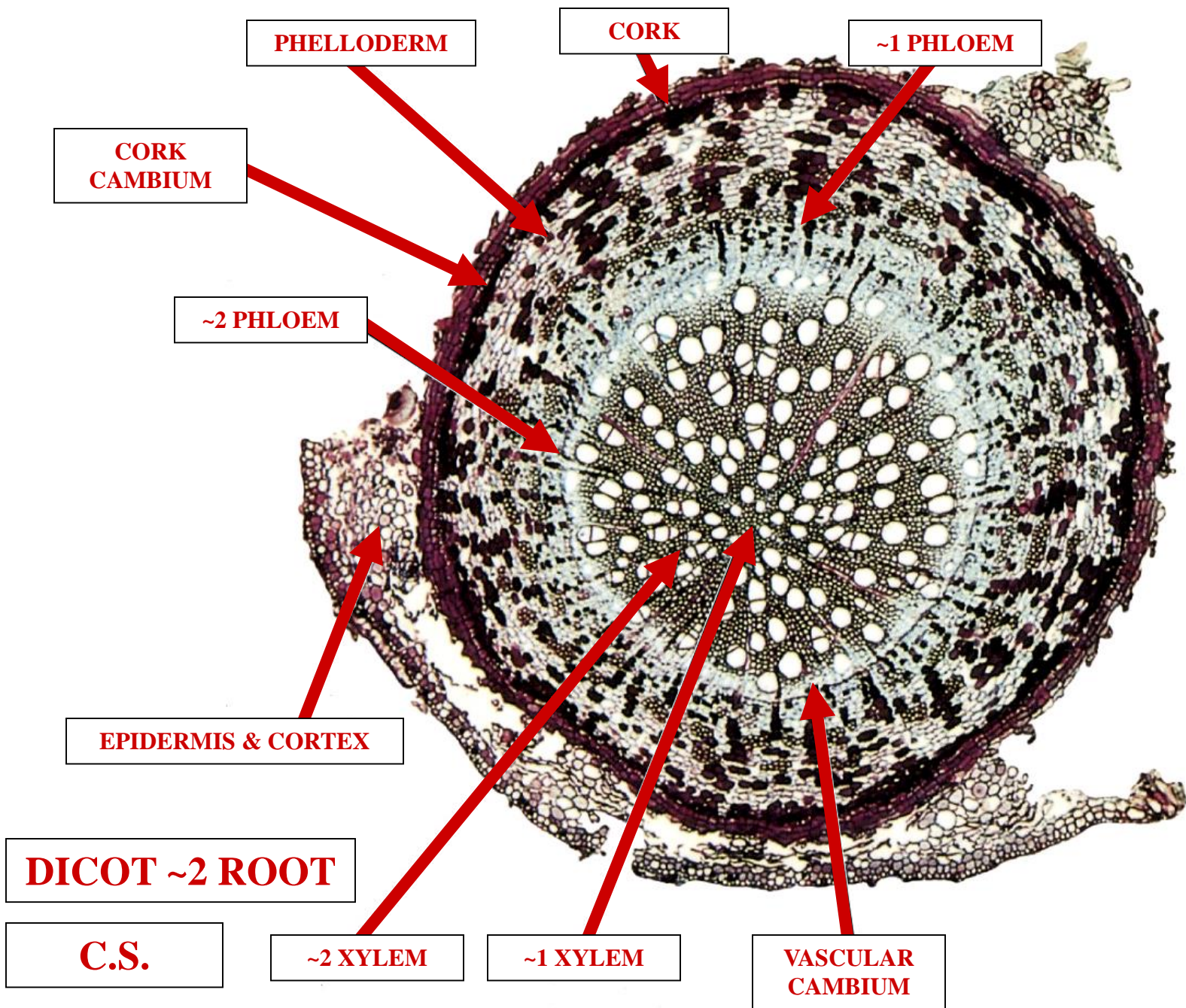
~1 XYLEM

VASCULAR CAMBIUM









# **LECTURE QUIZ**

**MONDAY**

**28 FEBRUARY**

# **LECTURE QUIZ**

**DICOT**

**ROOT & STEM**

**SECONDARY GROWTH**

# **LECTURE QUIZ**

**FORMAT  
FILL IN  
QUESTIONS**





# **LECTURE QUIZ**

**MUST  
SPELL CORRECTLY  
FOR FULL CREDIT**



# **MODIFIED STEMS**



**MODIFIED STEMS  
PROVIDE  
SPECIAL FUNCTION**



# **MODIFIED STEM TYPES**



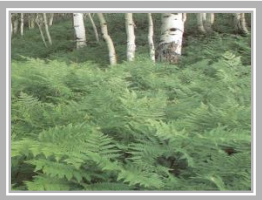
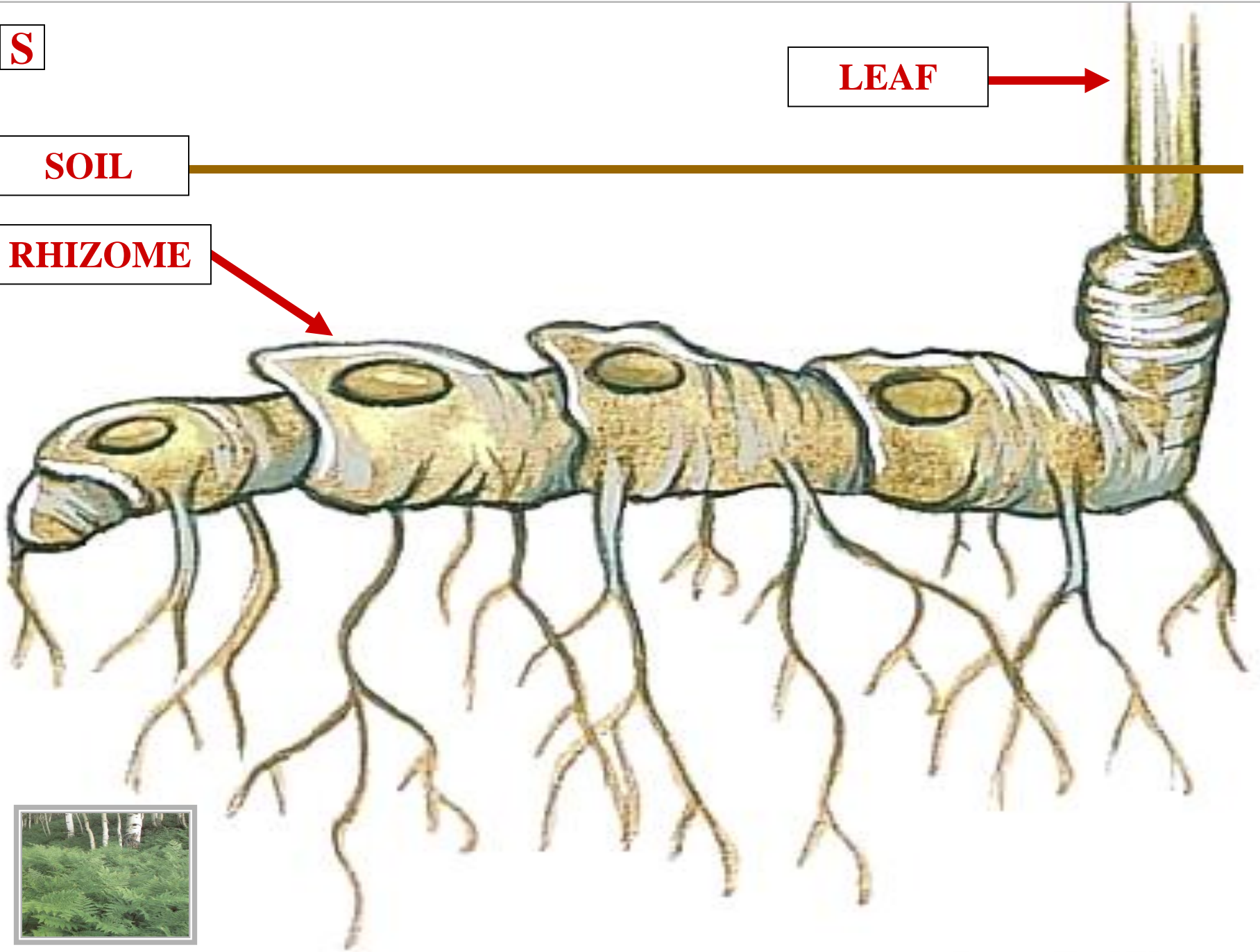
# RHIZOME

**S**

**LEAF**

**SOIL**

**RHIZOME**



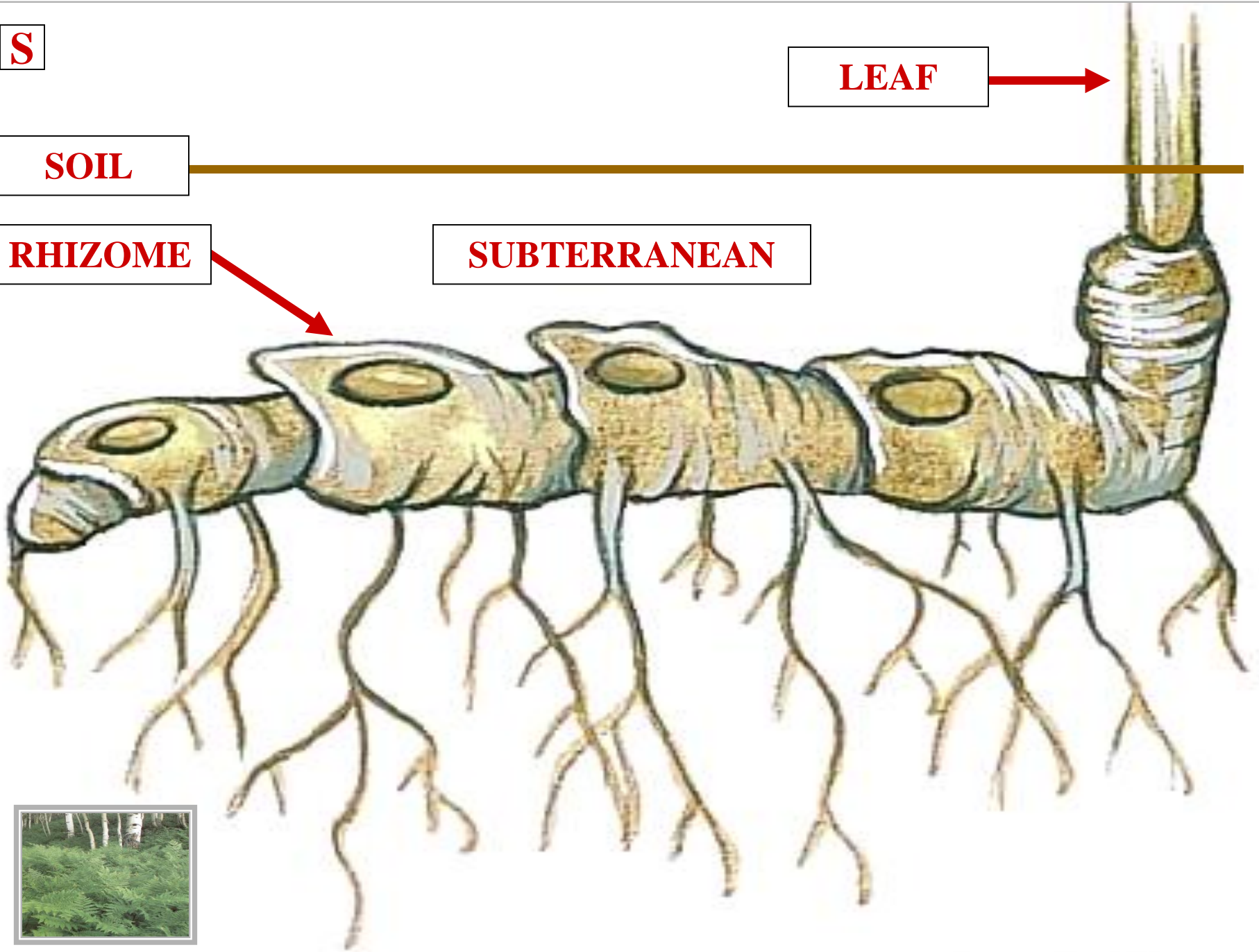
**S**

**LEAF**

**SOIL**

**RHIZOME**

**SUBTERRANEAN**





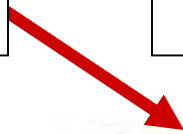
**LEAF**



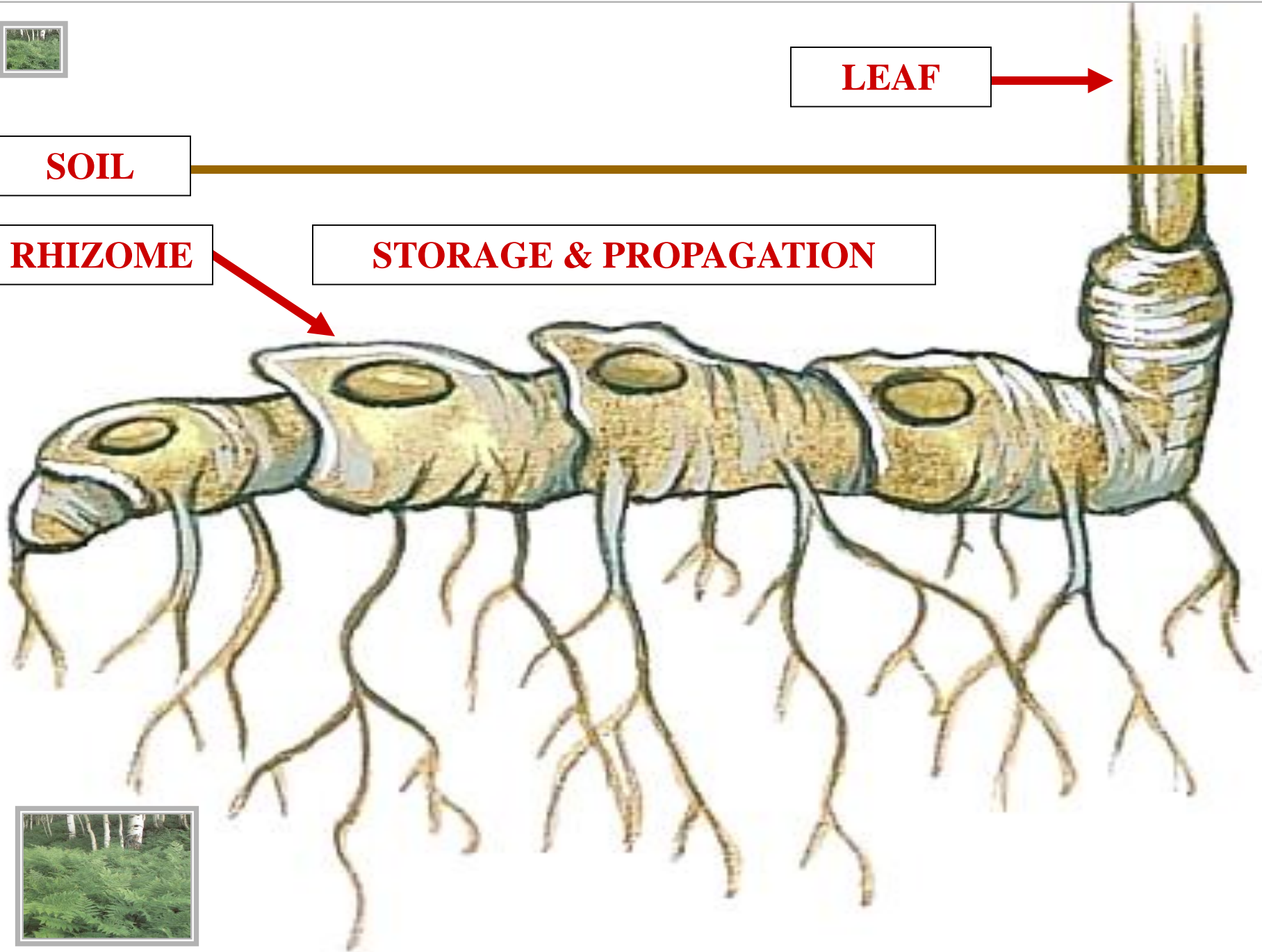
**SOIL**



**RHIZOME**



**STORAGE & PROPAGATION**







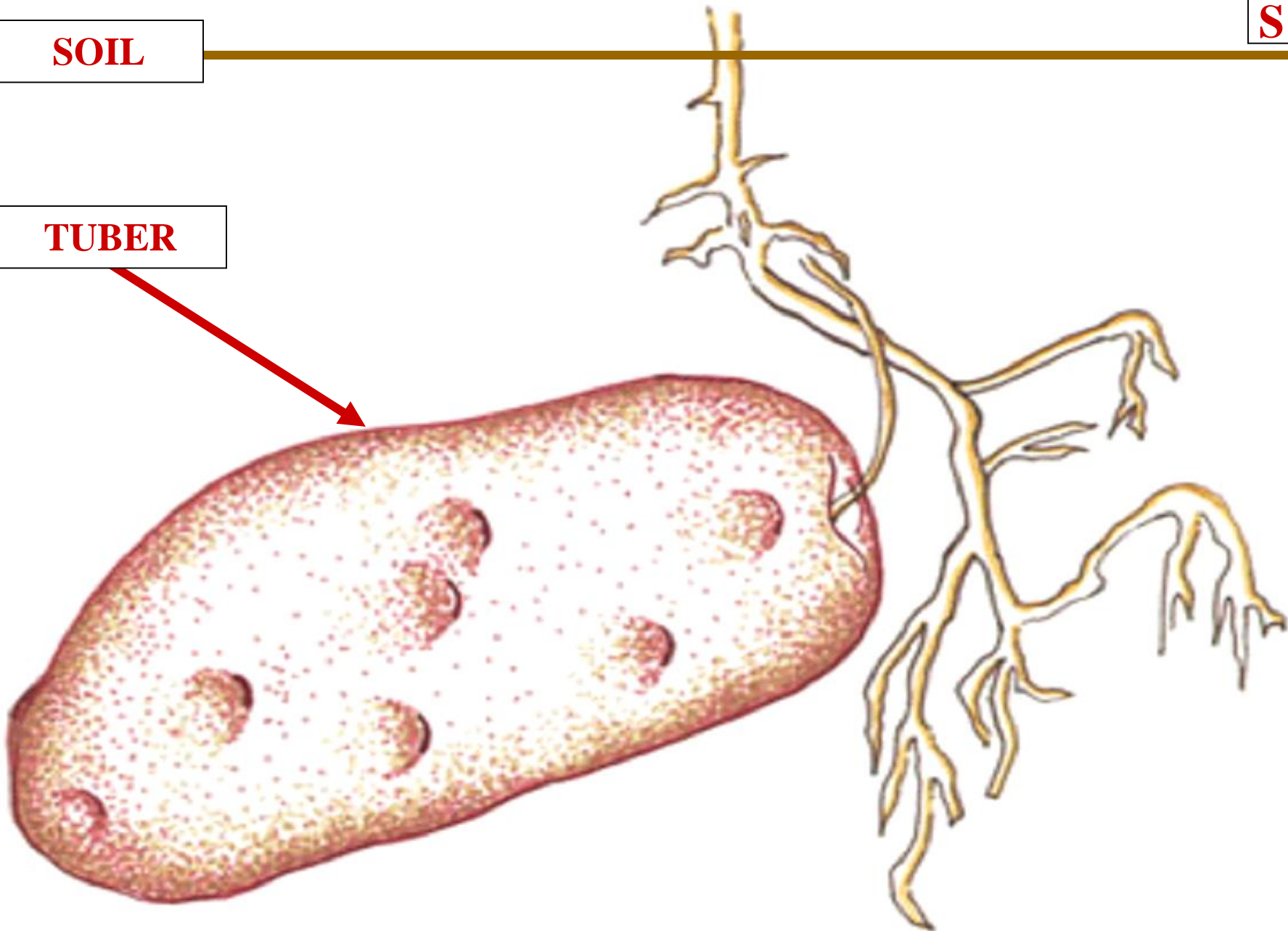
**RHIZOME  
SUBTERRANEAN  
LATERAL GROWTH**



# TUBER

SOIL

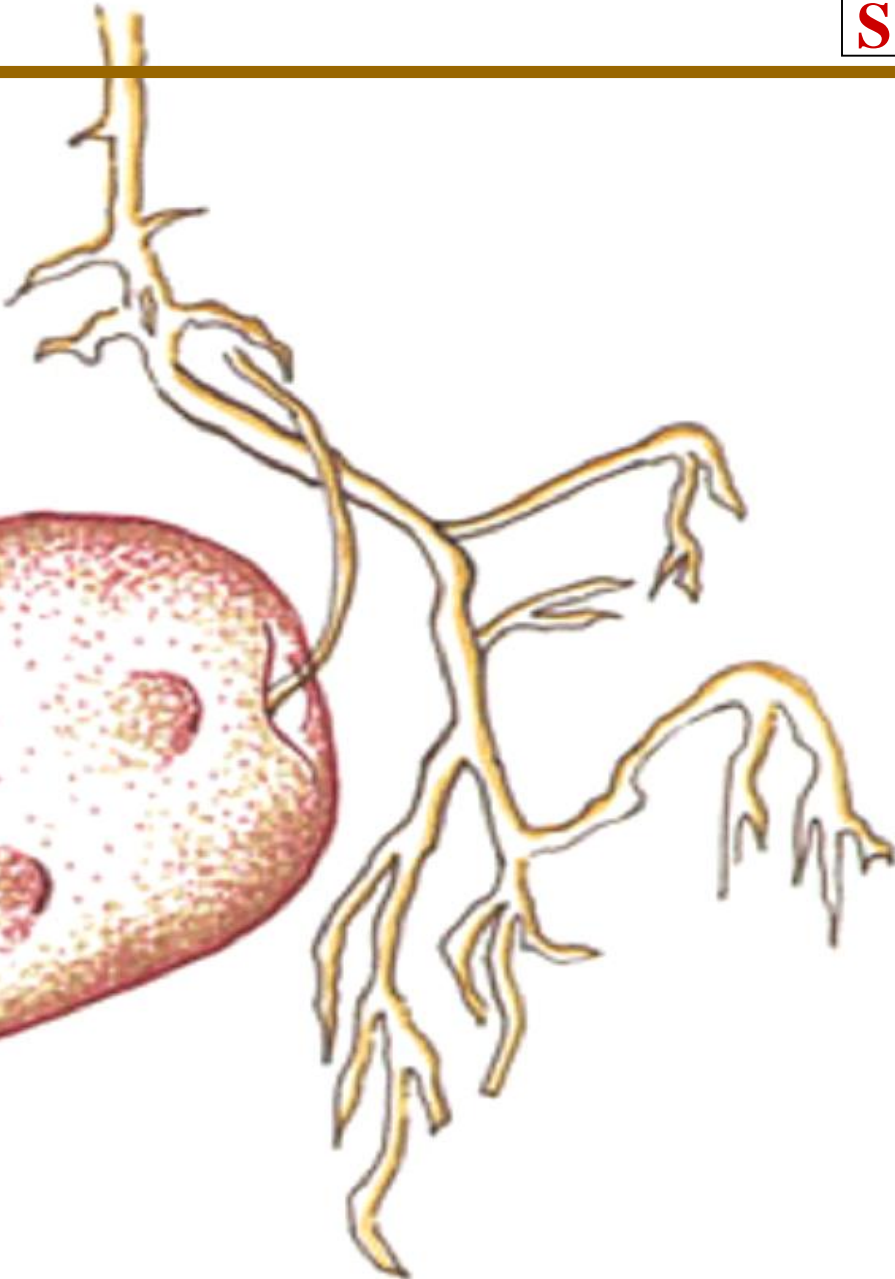
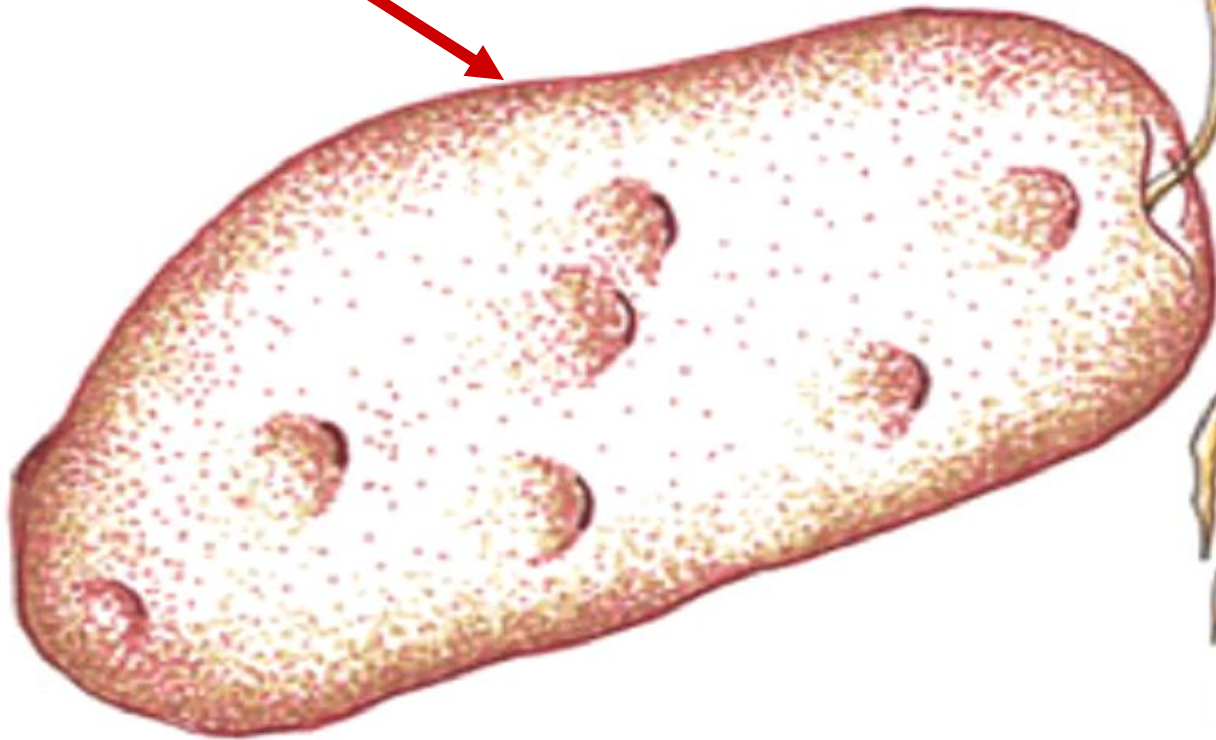
TUBER



SOIL

TUBER

SUBTERRANEAN

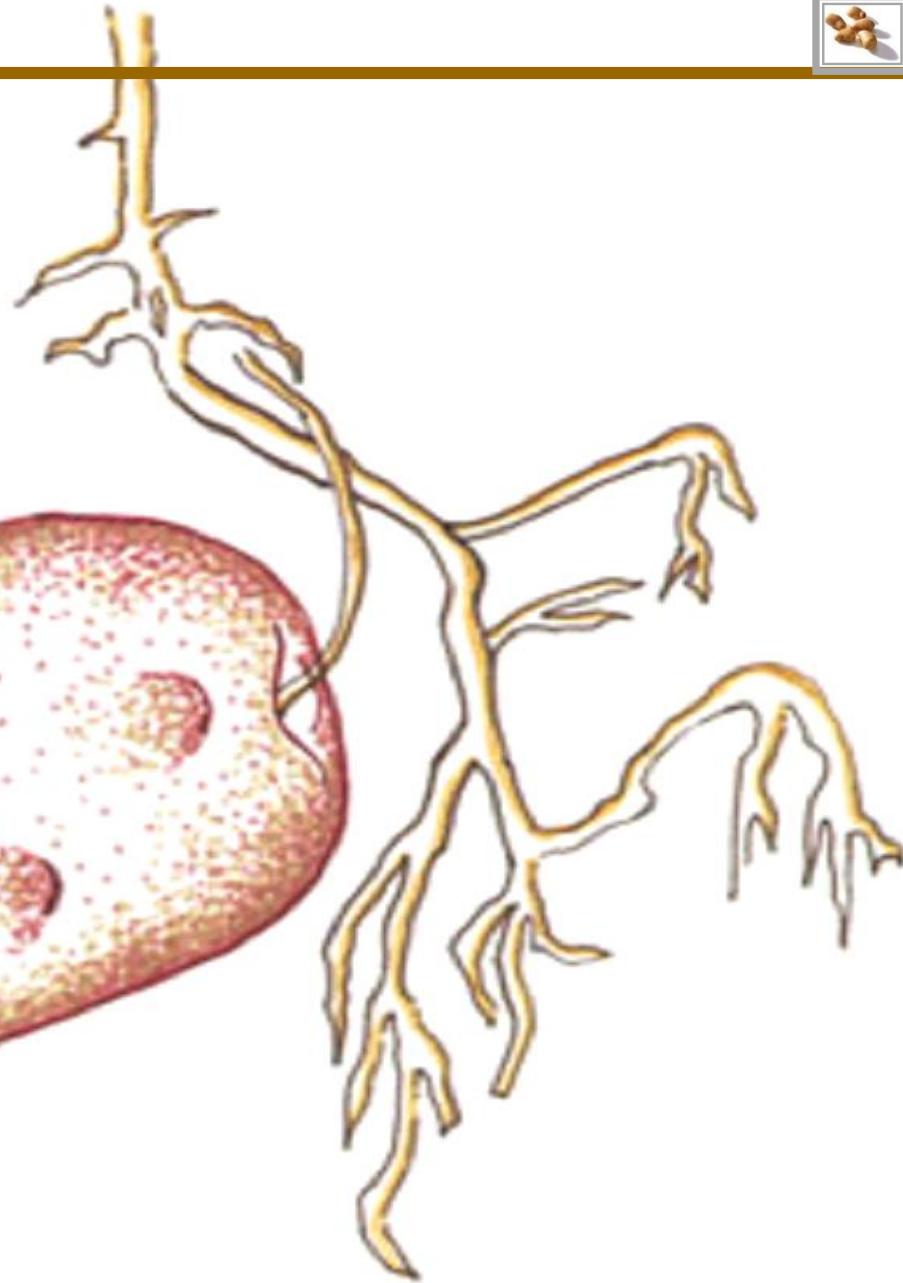
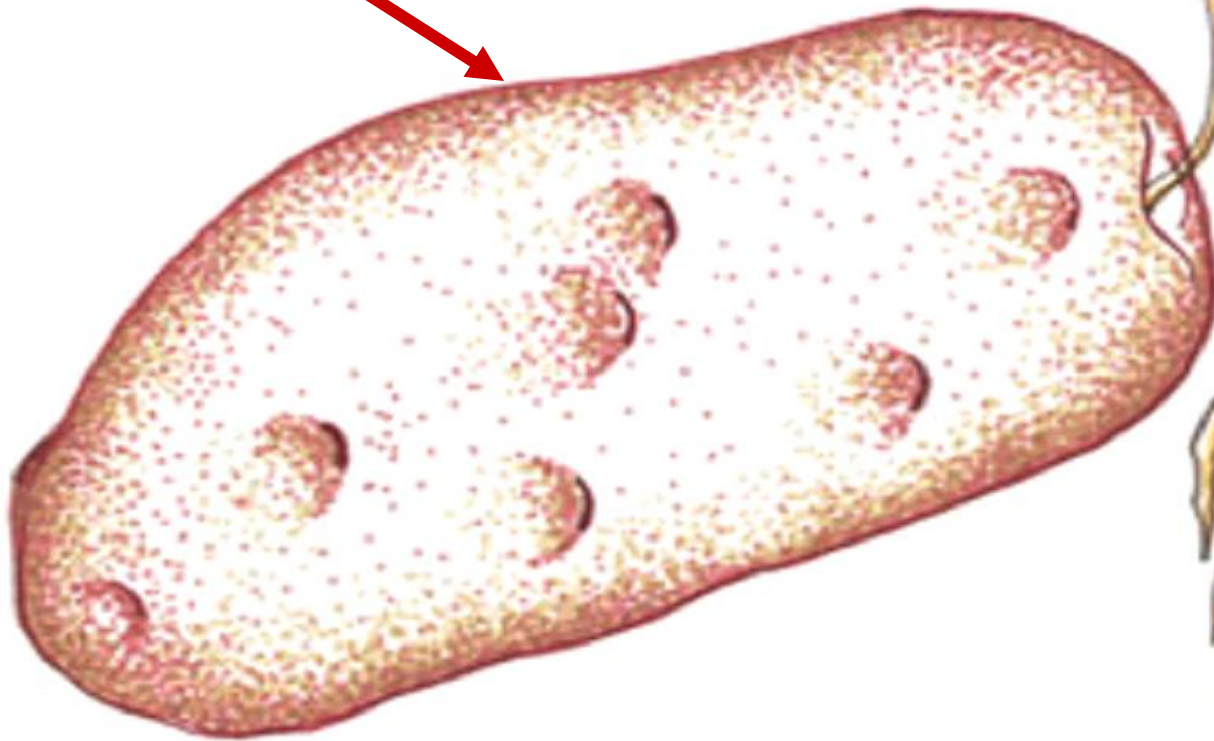


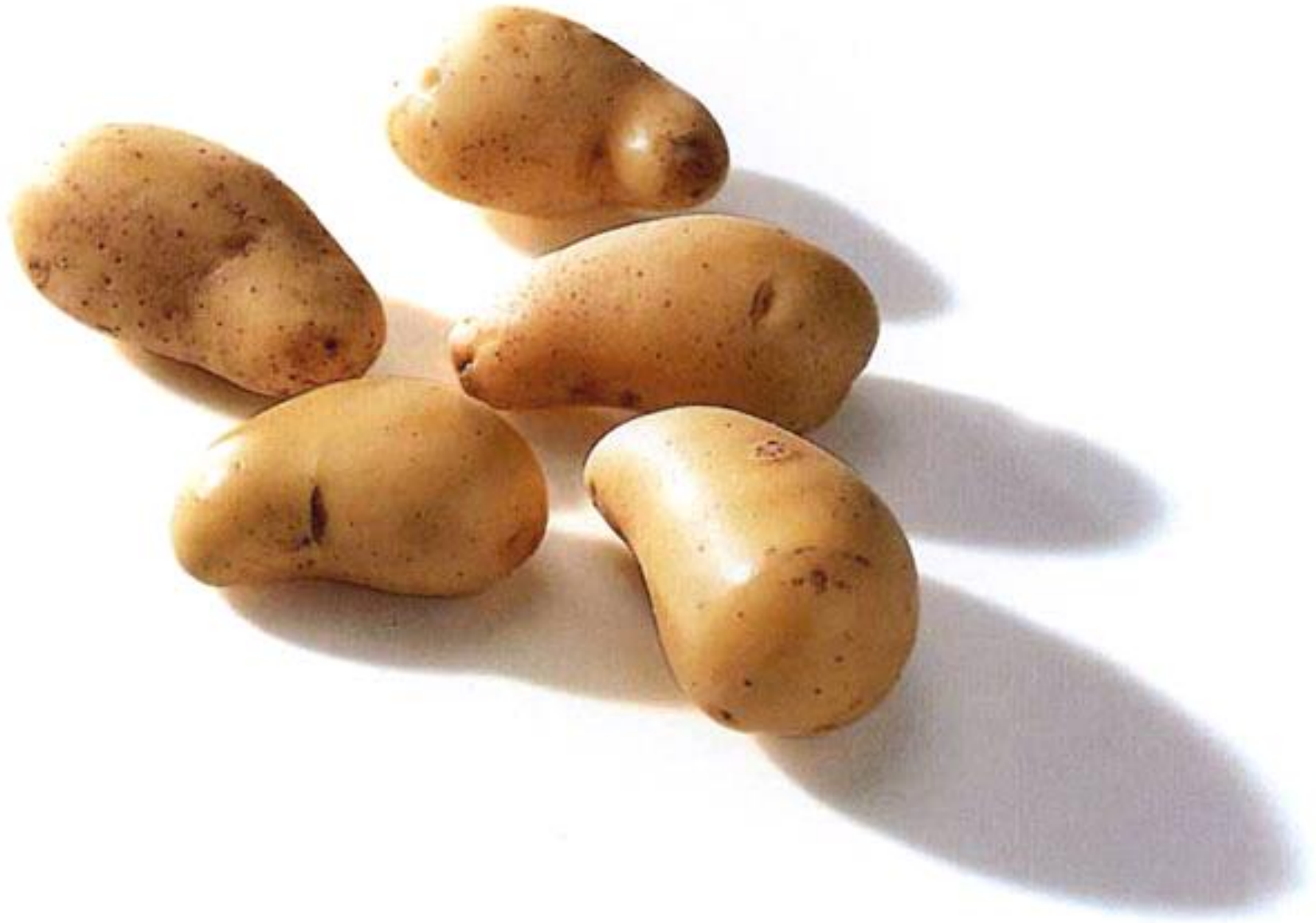


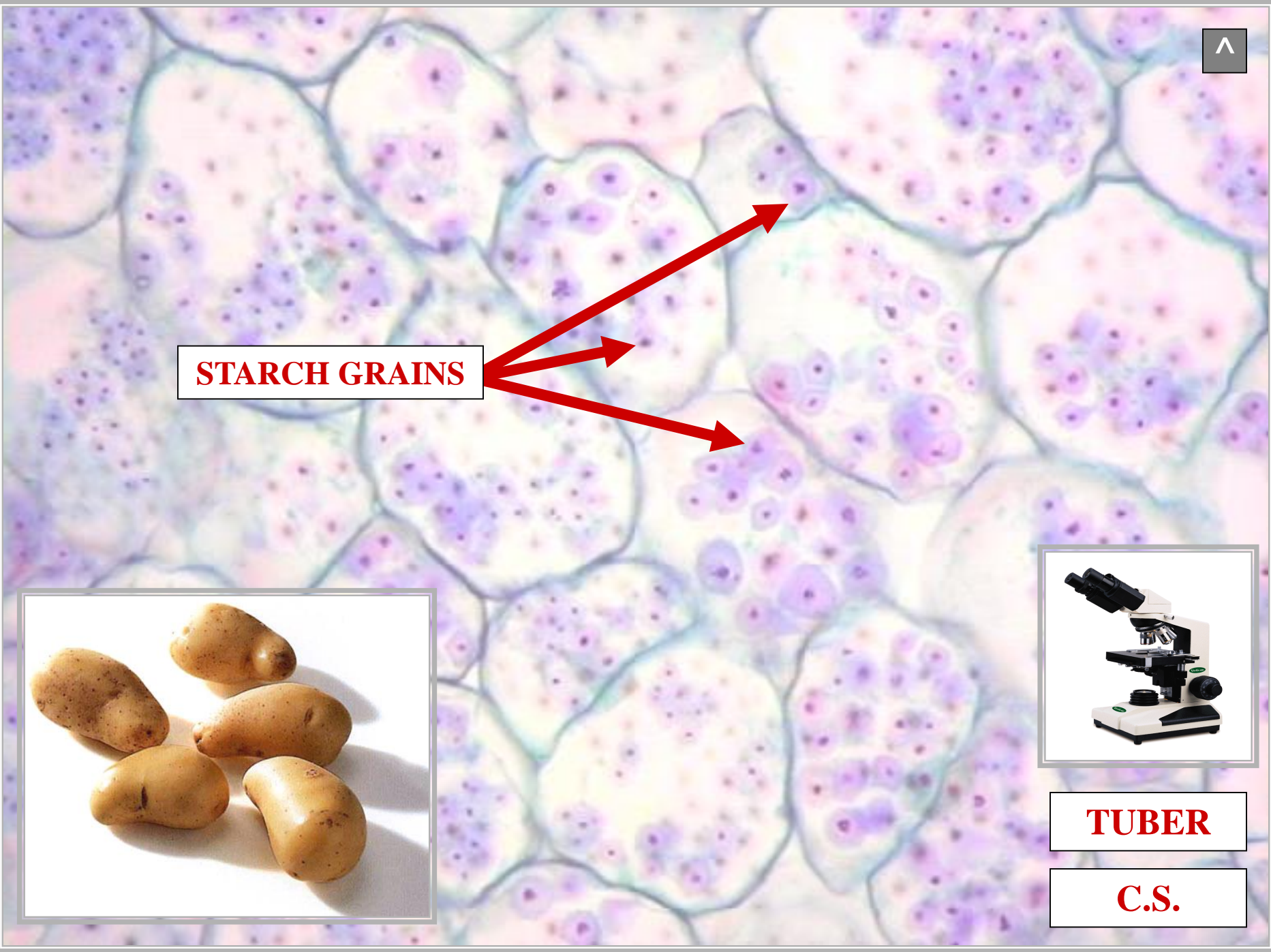
**SOIL**

**TUBER**

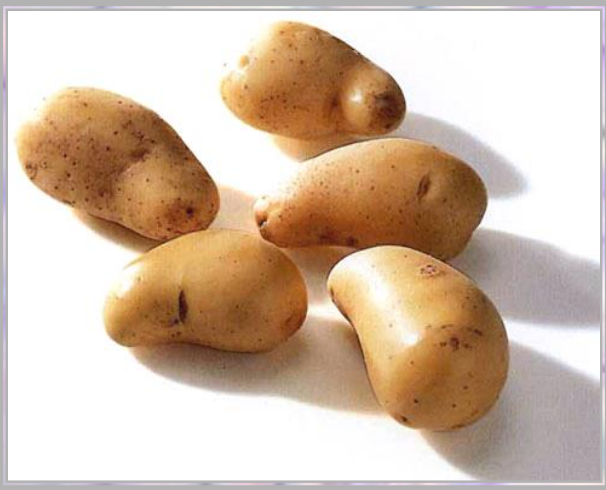
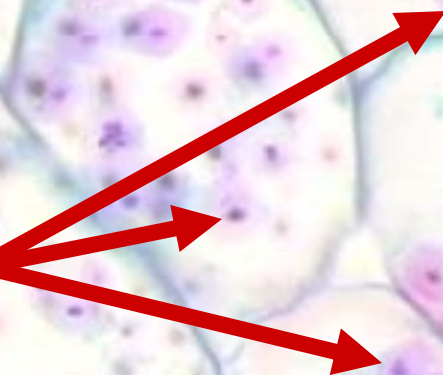
**STARCH STORAGE**







**STARCH GRAINS**



**TUBER**

**C.S.**



# THORN





# THORN

**ACACIA TREE**



**THORN**

**AFRICAN GIRAFFE**



**INHIBITS HERBIVORES**



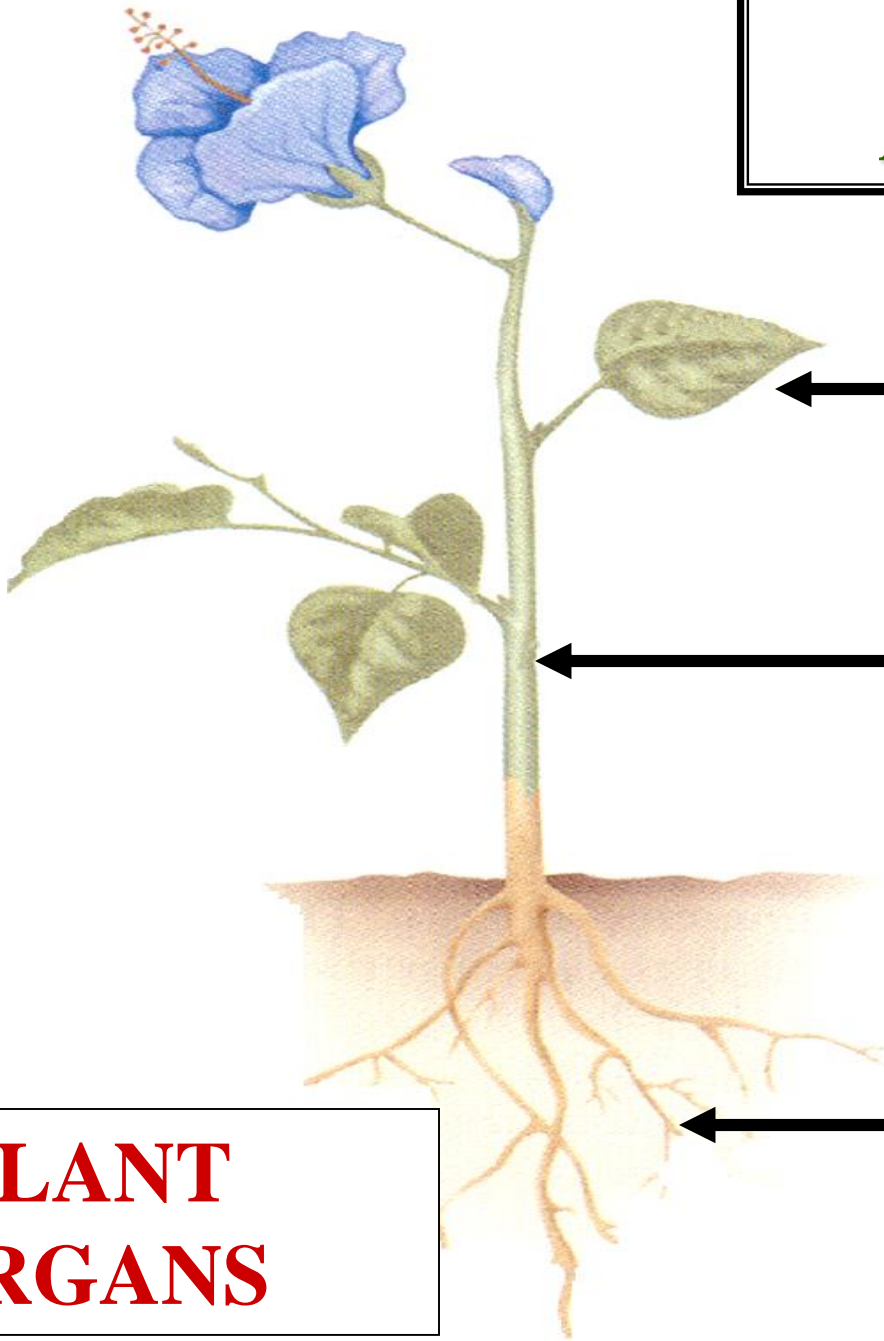
**END**

**MATERIAL**

**EXAM #1**

# TYPICAL ANGIOSPERM

R



← [ ]

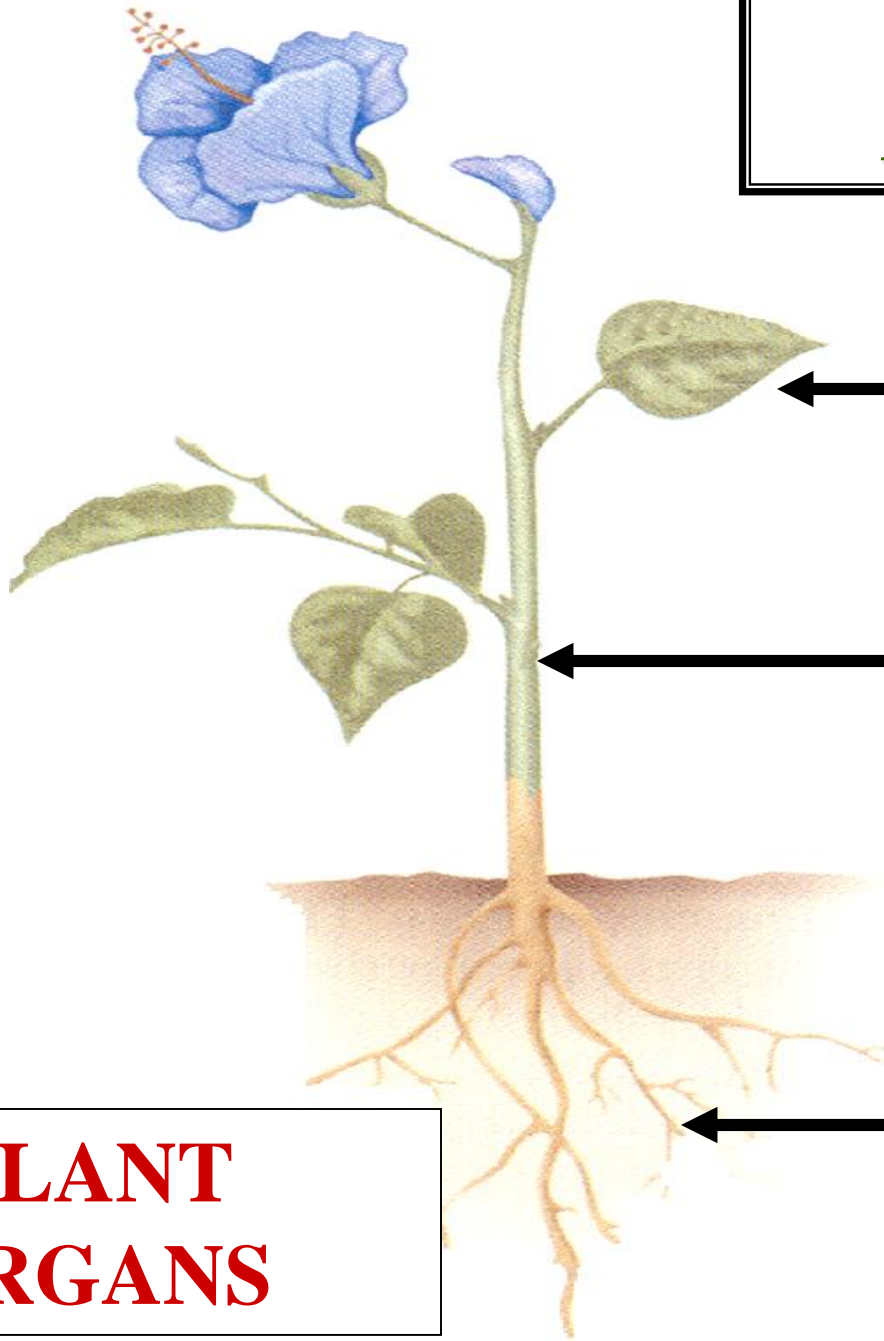
← [ ]

← [ ]

**PLANT  
ORGANS**

# TYPICAL ANGIOSPERM

S



←

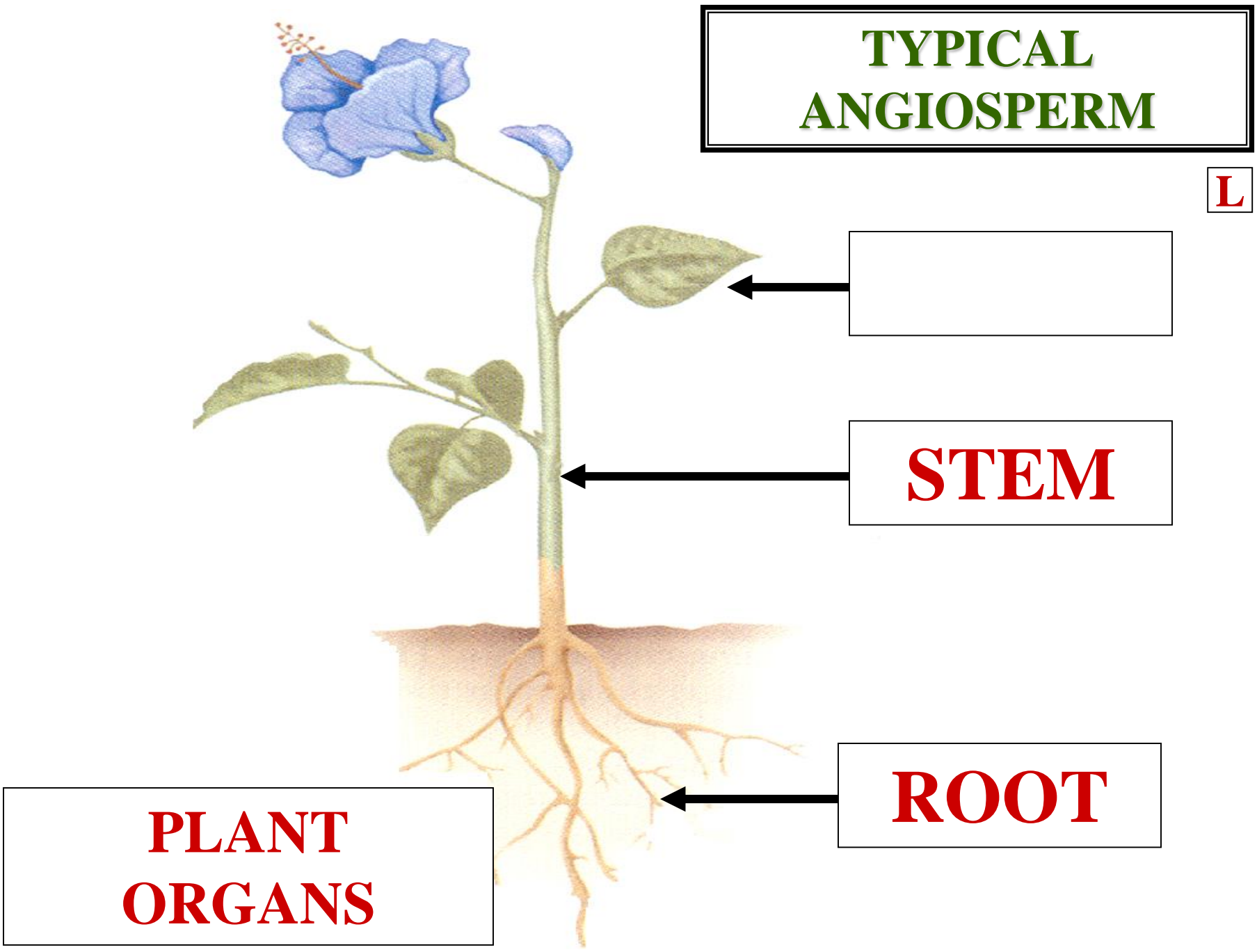
←

← **ROOT**

**PLANT  
ORGANS**

# TYPICAL ANGIOSPERM

L



**STEM**

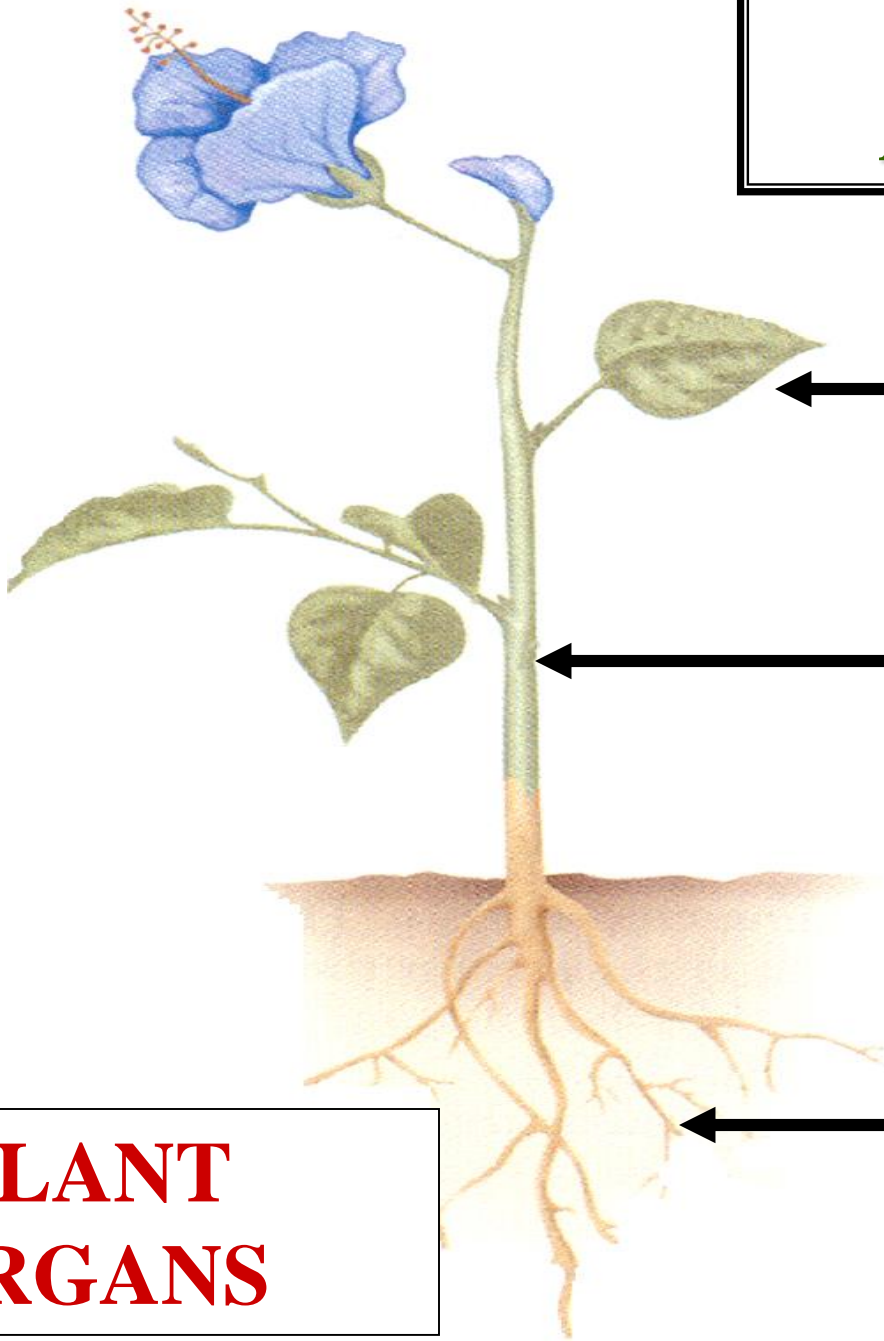
**ROOT**

**PLANT  
ORGANS**

# TYPICAL ANGIOSPERM



**PLANT  
ORGANS**



**LEAF**

**STEM**

**ROOT**

# LEAF



**LEAF**



**LEAF**

**MODIFIED  
STEM OUTGROWTH**

**LEAF**

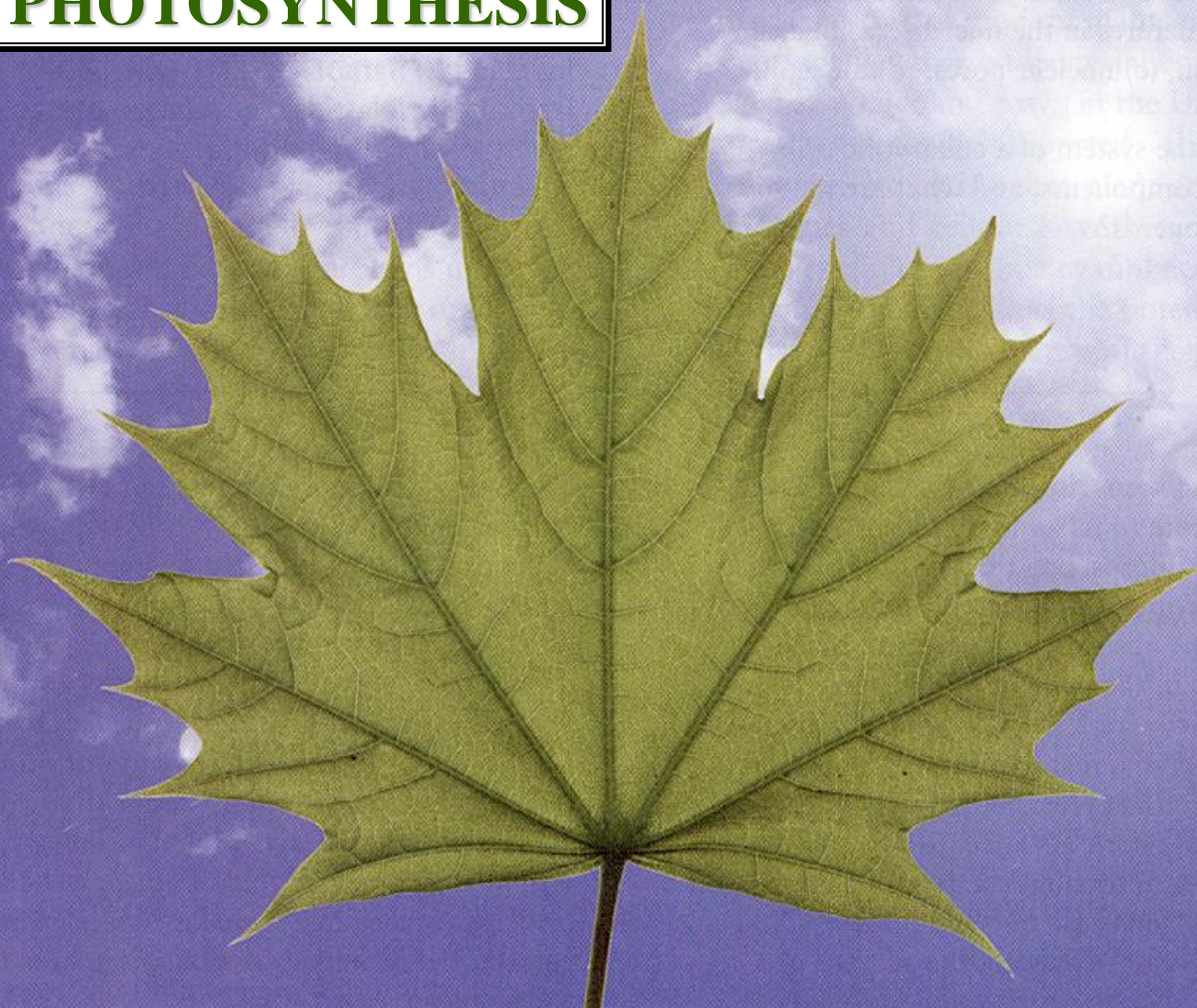


# LEAF FUNCTION

# REPRODUCTION



# PHOTOSYNTHESIS



# GENERAL PHOTOSYNTHESIS LEAF TYPES

# **GENERAL LEAF TYPES**

**MICROPHYLLS**

# **GENERAL LEAF TYPES**



# **GENERAL LEAF TYPES**

**MICROPHYLLS**

**MEGAPHYLLS**

# **GENERAL LEAF TYPES**





# **MICROPHYLLS**

## **VS**

# **MEGAPHYLLS**



# MICROPHYLL



**MICROPHYLLS  
KNOWN ONLY TO  
LYCOPHYTES**

**MICROPHYLLS**

**LYCOPHYTES**



**MICROPHYLLS**

**LYCOPHYTES**

**LYCOPODIOPHYTA**

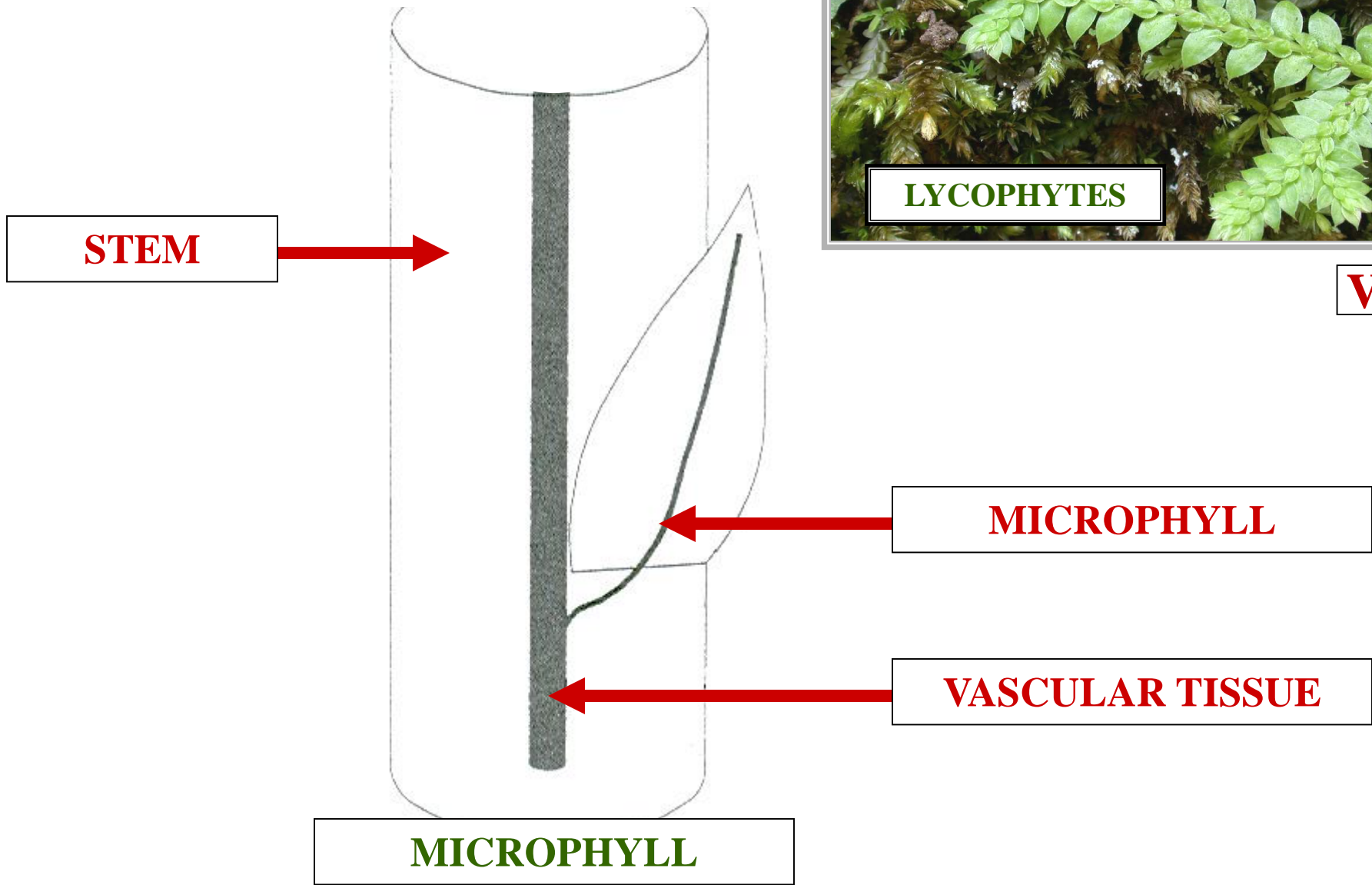


# MICROPHYLL CHARACTERS

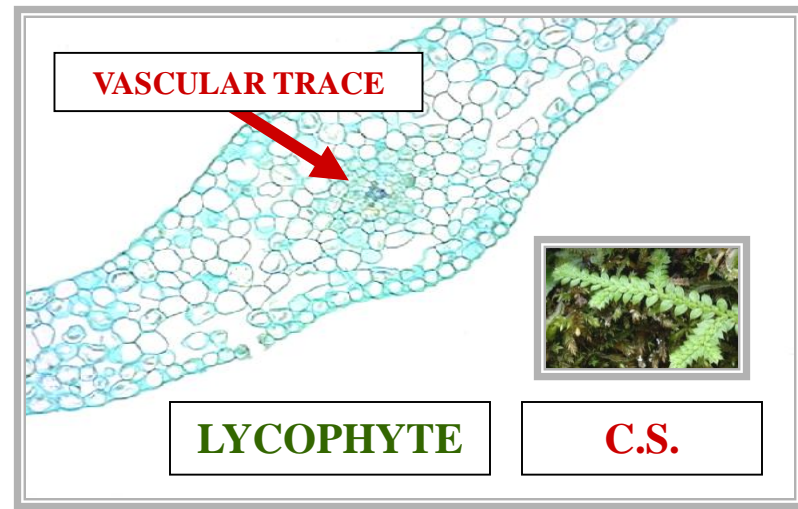
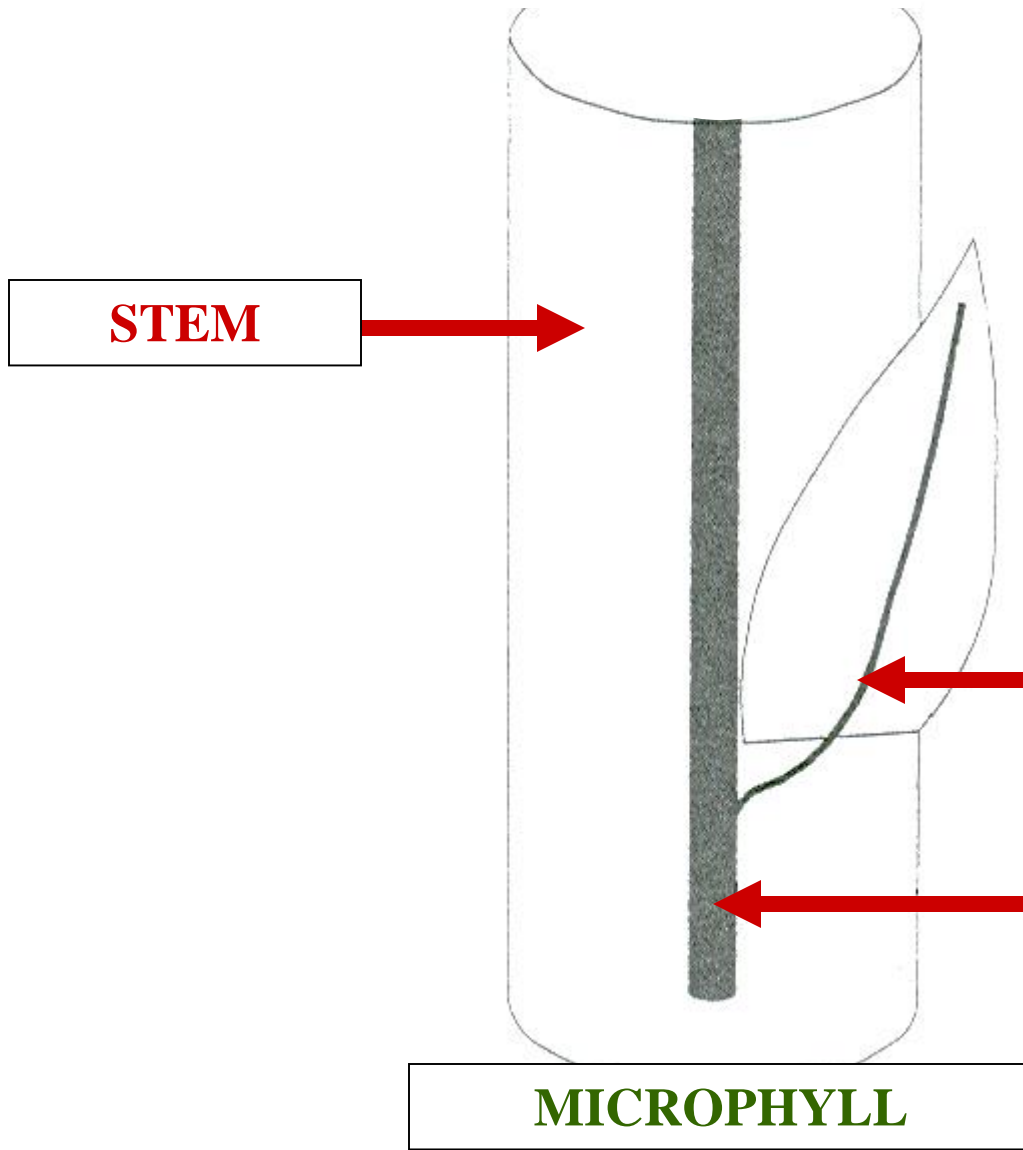
# MICROPHYLL CHARACTERS



**VT**



# MICROPHYLL CHARACTERS



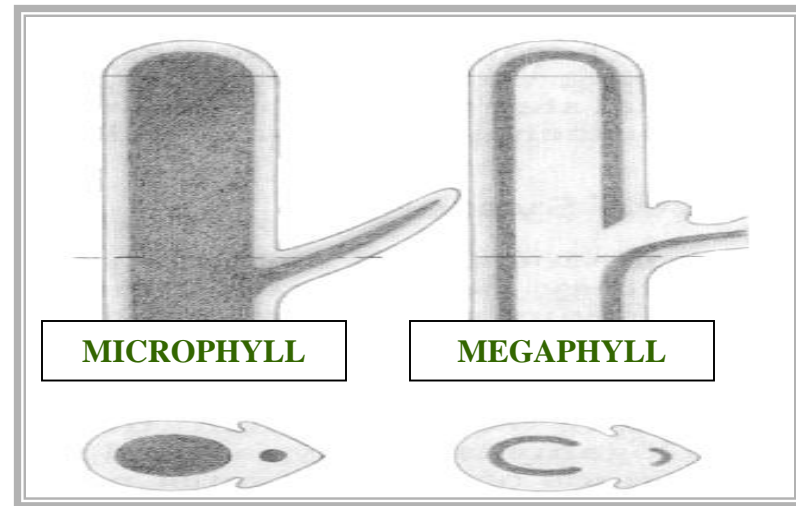
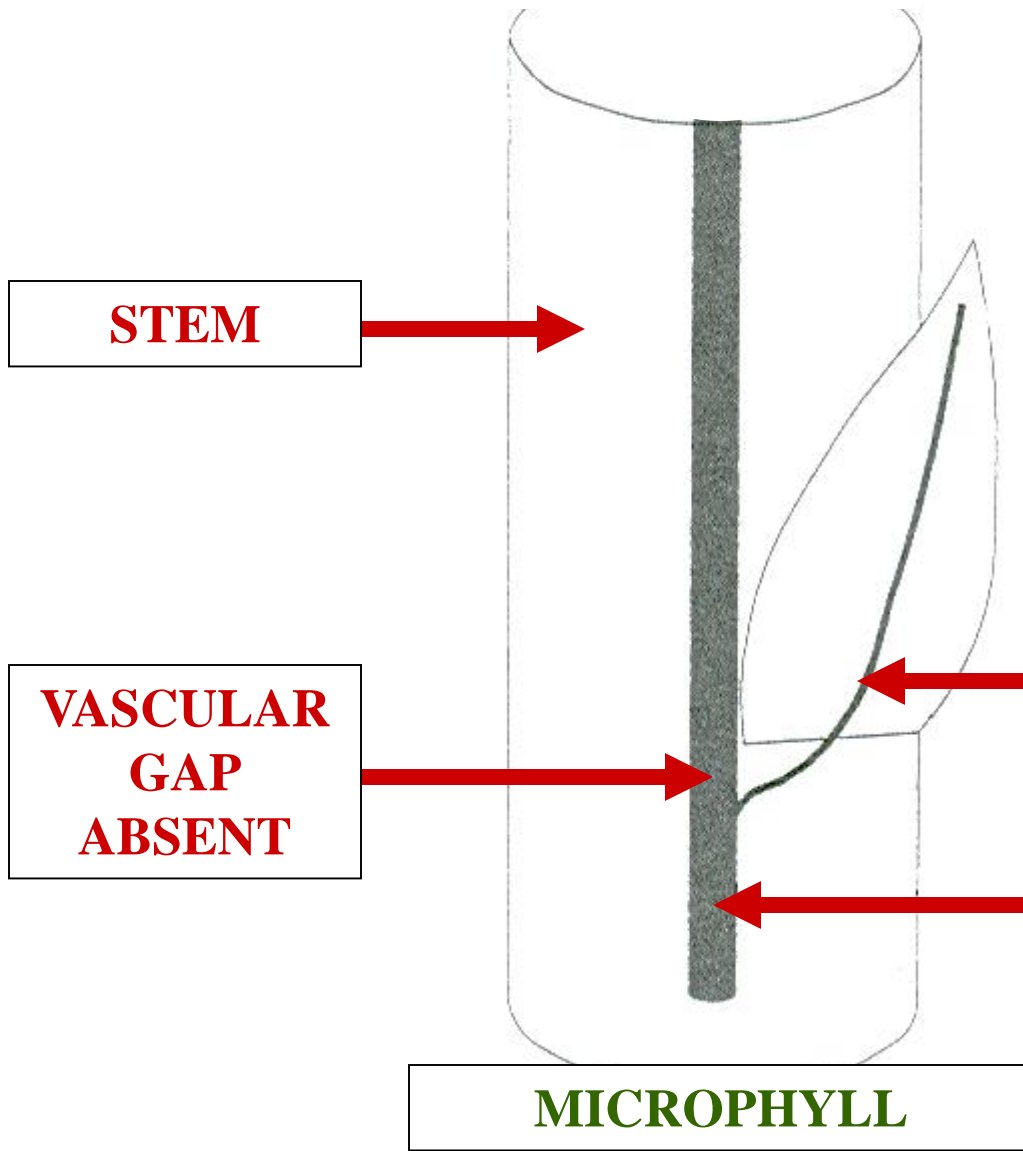
**VG**

**VASCULAR TRACE**

**VASCULAR TISSUE**



# MICROPHYLL CHARACTERS



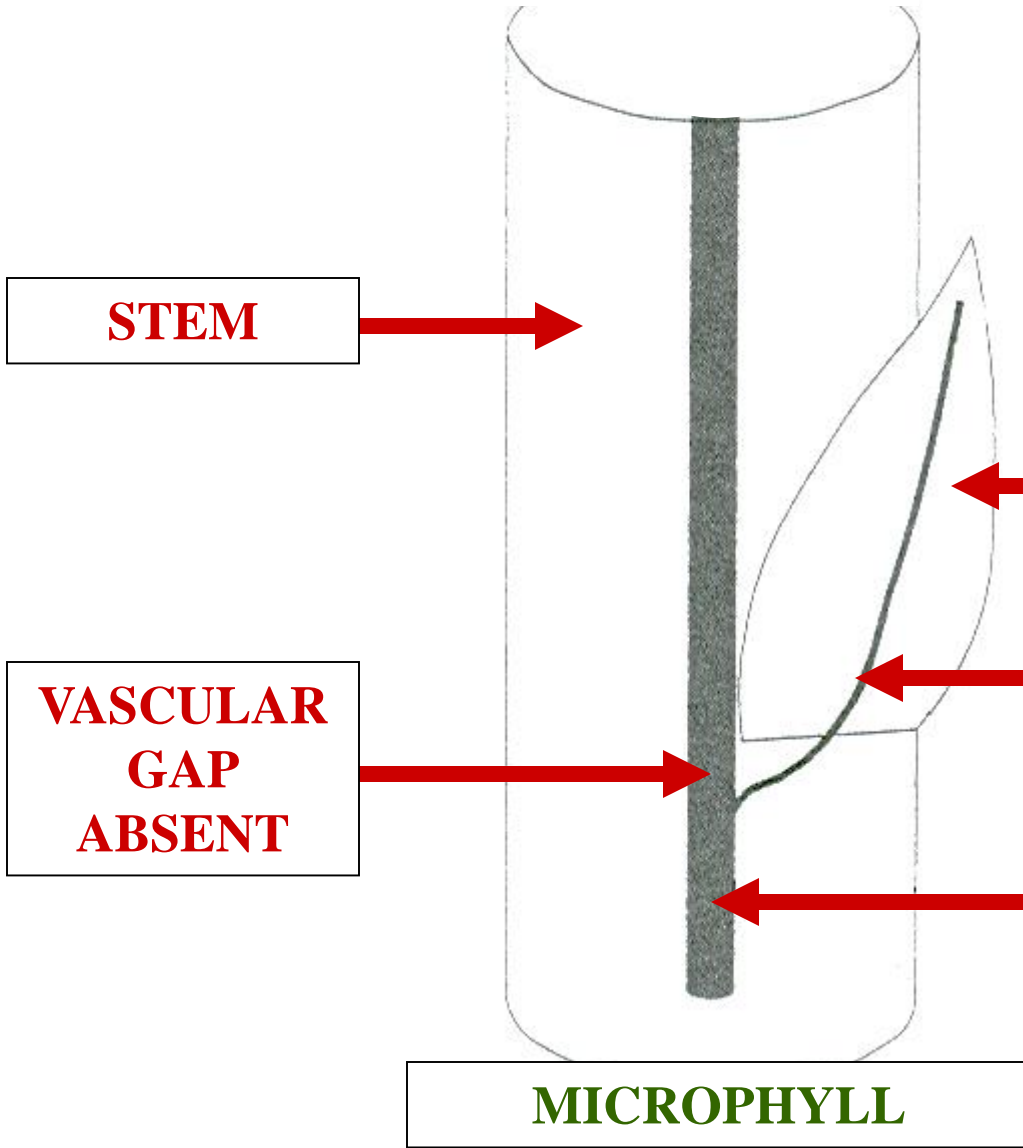
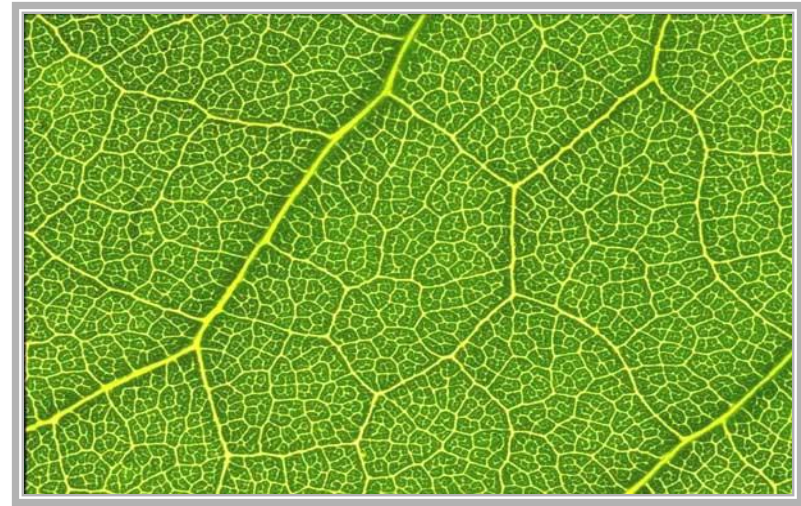
**VN**  
**AB**

**VASCULAR TRACE**

**VASCULAR TISSUE**

**MICROPHYLL**

# MICROPHYLL CHARACTERS



**STEM**

**VASCULAR  
GAP  
ABSENT**

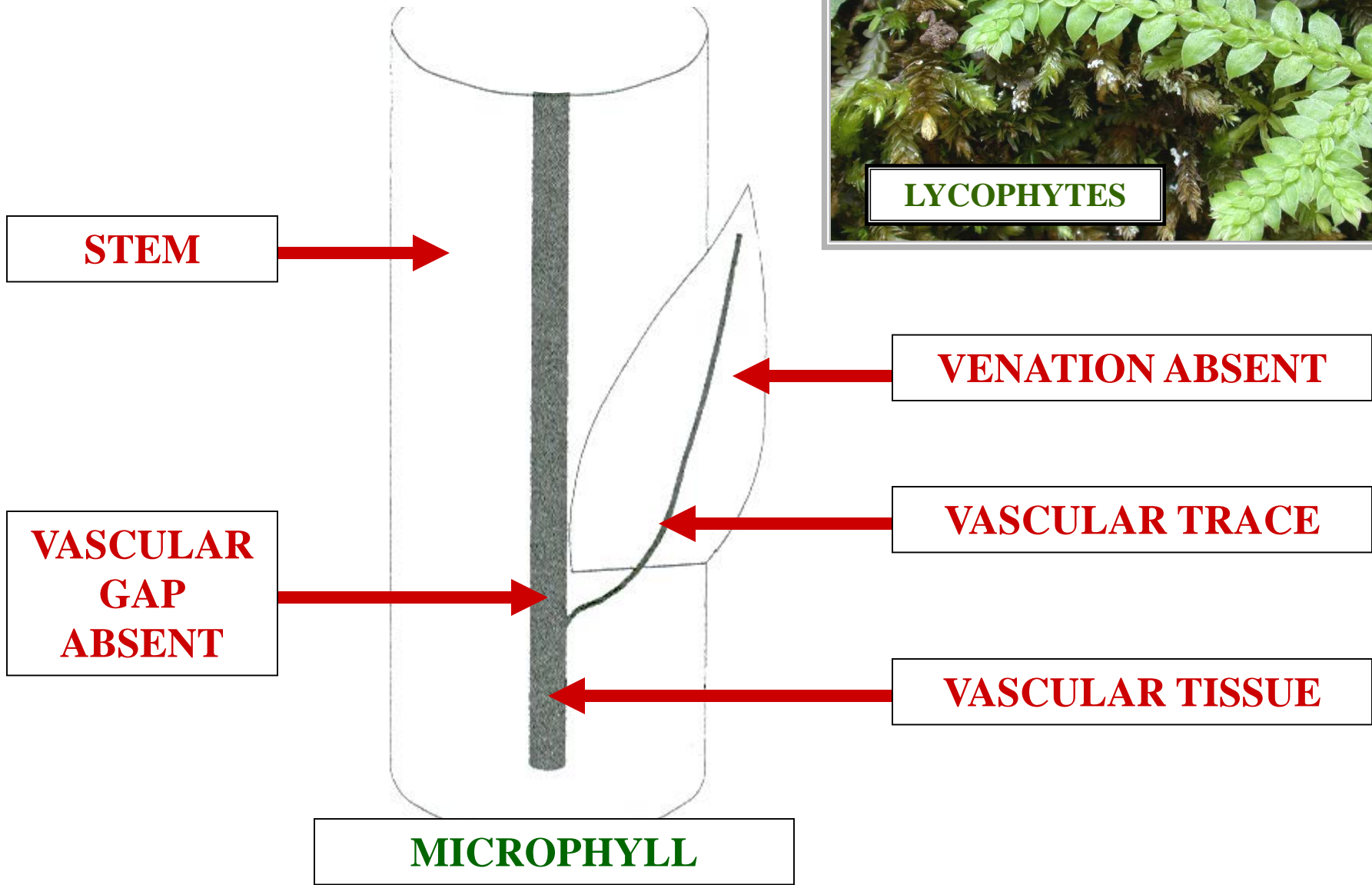
**VENATION ABSENT**

**VASCULAR TRACE**

**VASCULAR TISSUE**

**MICROPHYLL**

# MICROPHYLL CHARACTERS





**MICROPHYLL**  
**EVOLUTION**  
**ENATION THEORY**