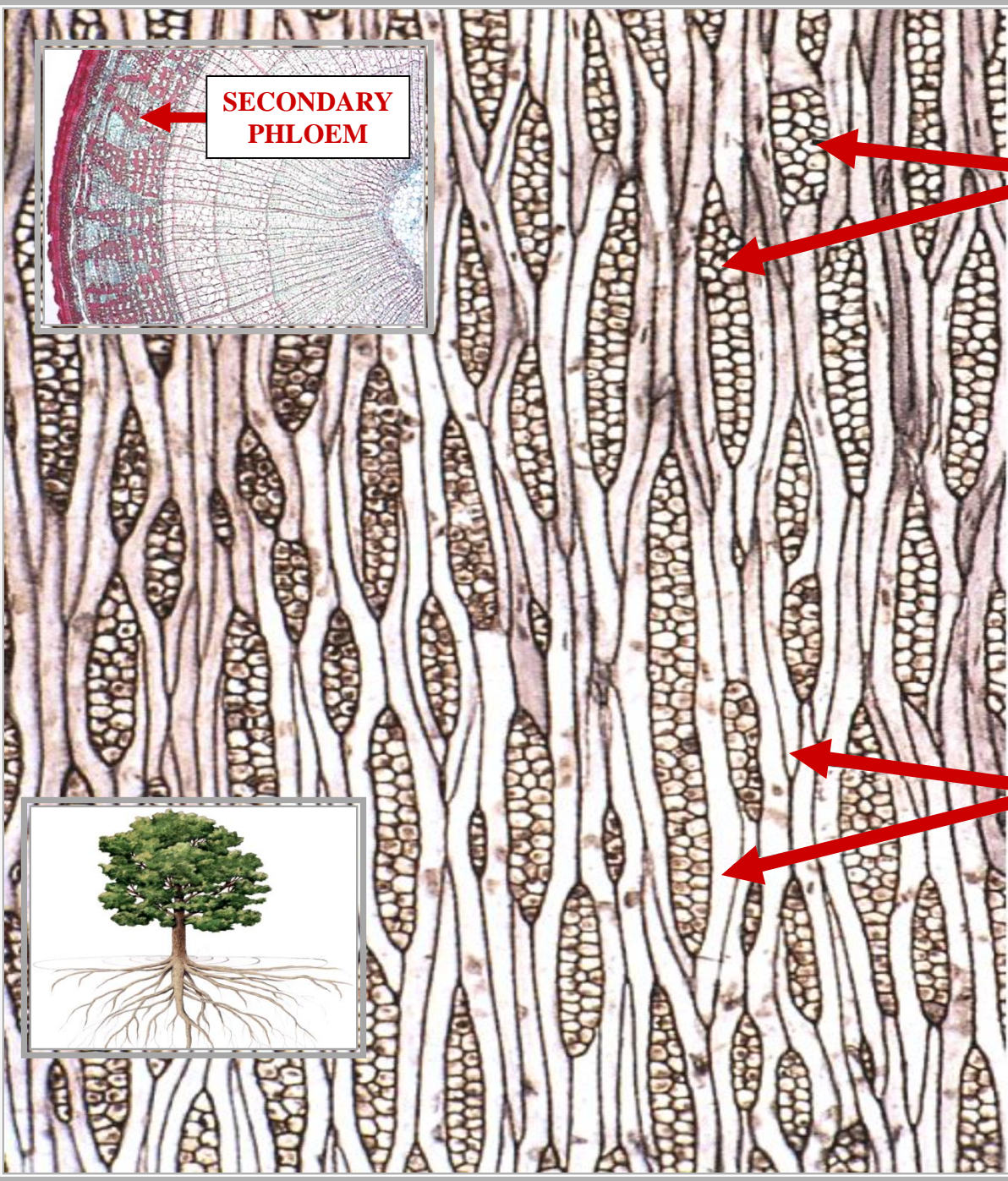
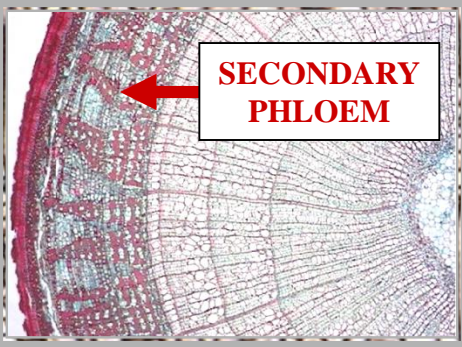


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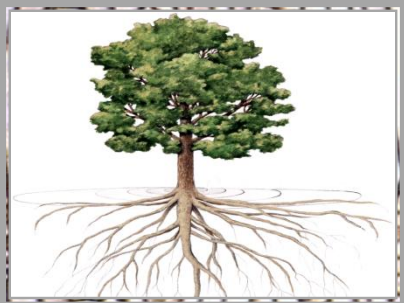


**AXIAL
PARENCHYMA**

~2 PHLOEM TISSUE

DICOT ~2 STEM

L.S.



VT

**SECONDARY
PHLOEM**

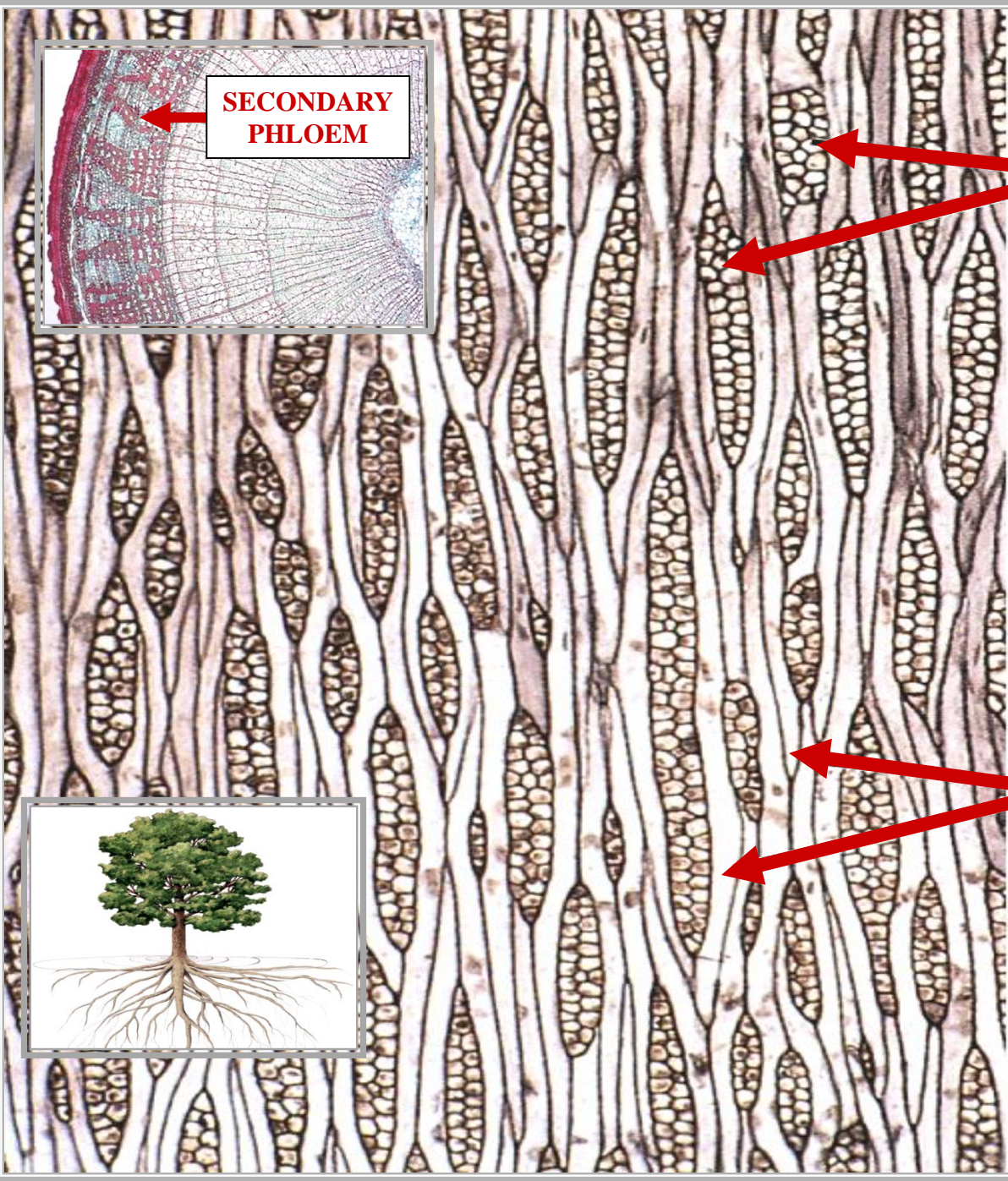
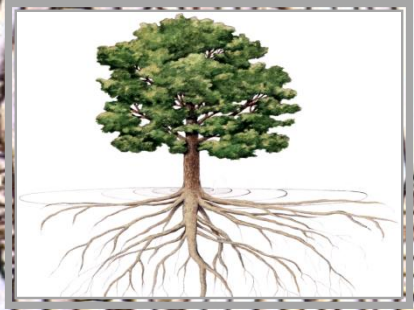
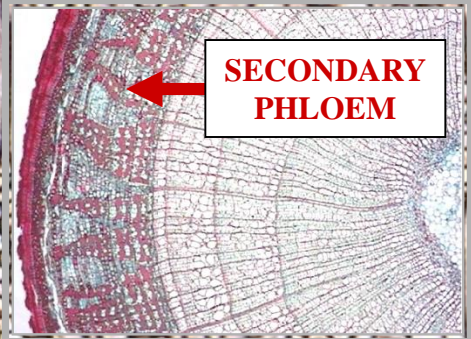


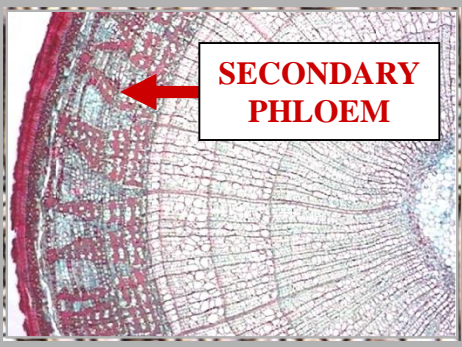
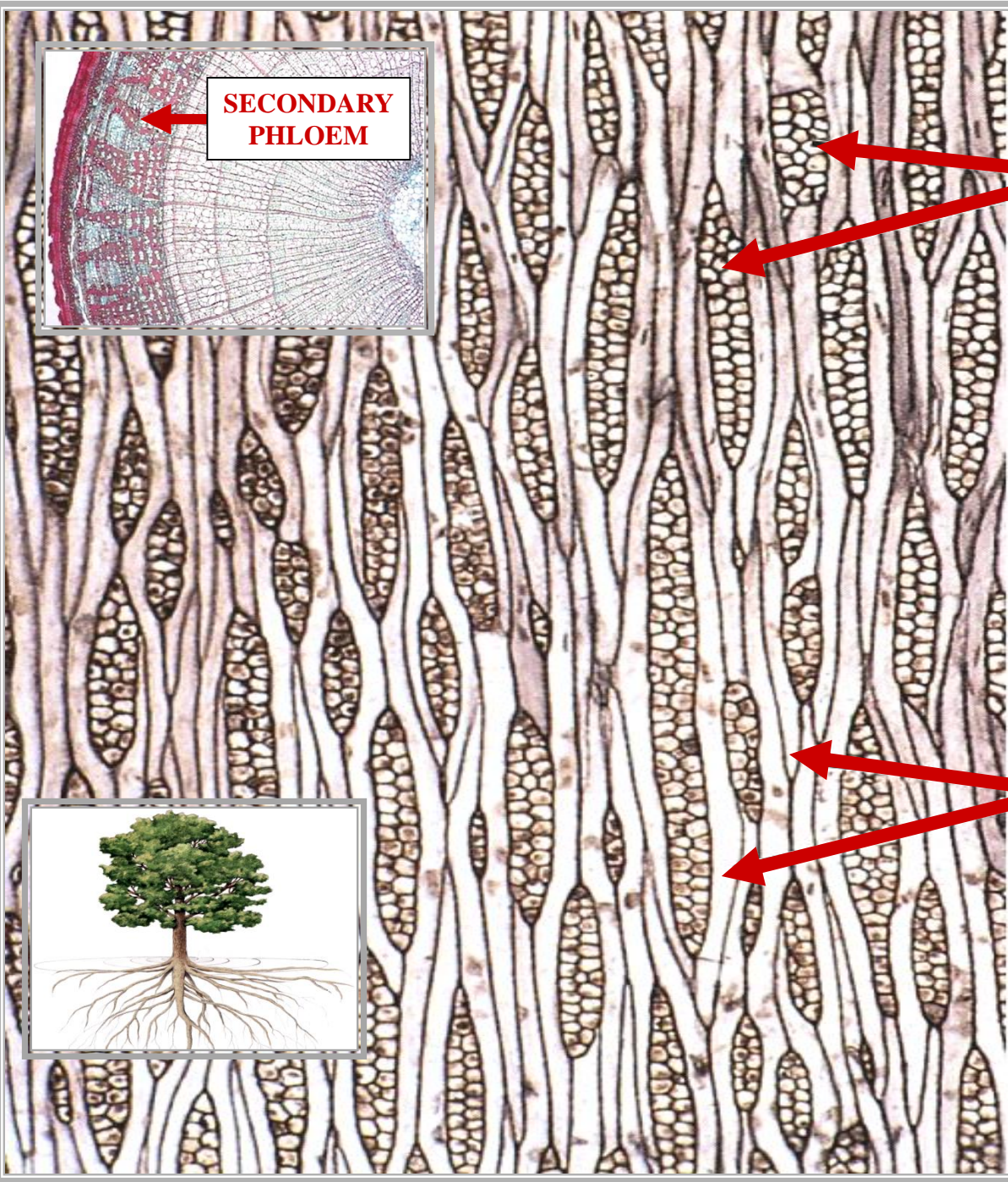
**VERTICAL
ORIENTATION**

~2 PHLOEM TISSUE

DICOT ~2 STEM

L.S.





**SECONDARY
PHLOEM**

VC **FI**

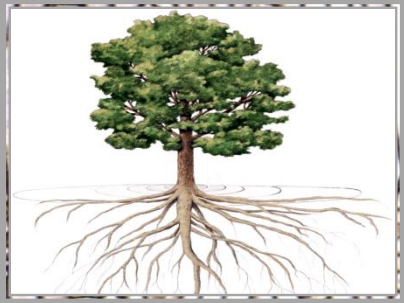


**VERTICAL
TRANSPORT**

~2 PHLOEM TISSUE

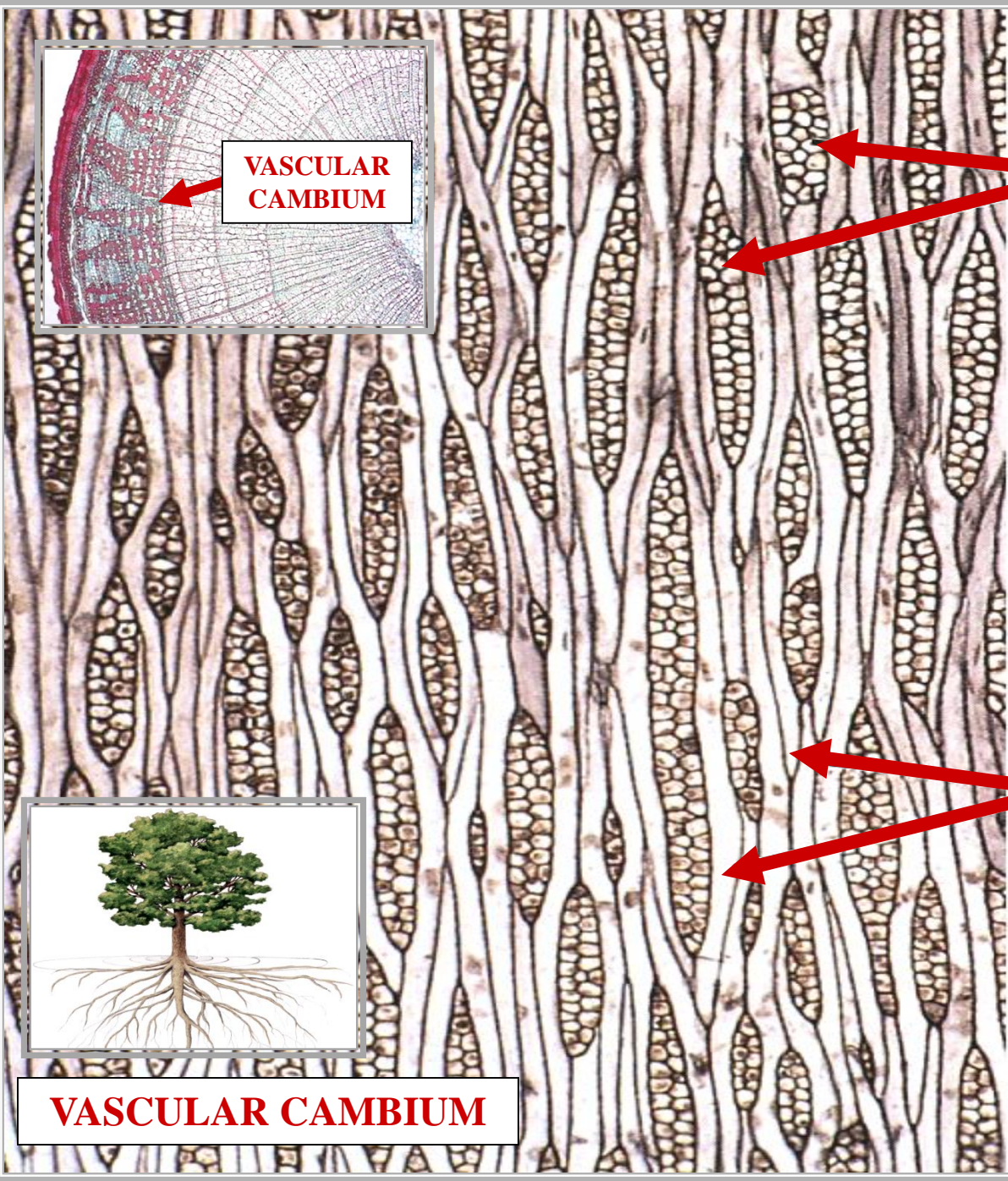
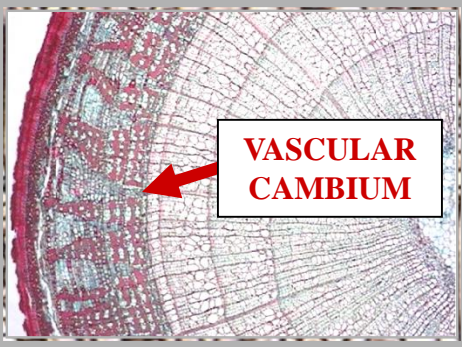
DICOT ~2 STEM

L.S.



+

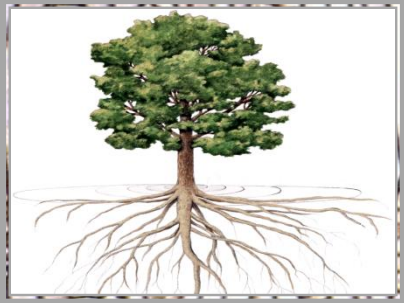
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**FUSIFORM
INITIAL
DERIVED**

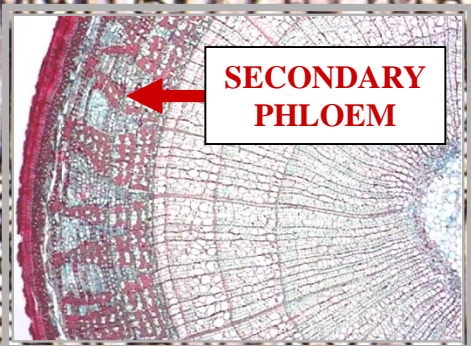
~2 PHLOEM TISSUE

DICOT ~2 STEM

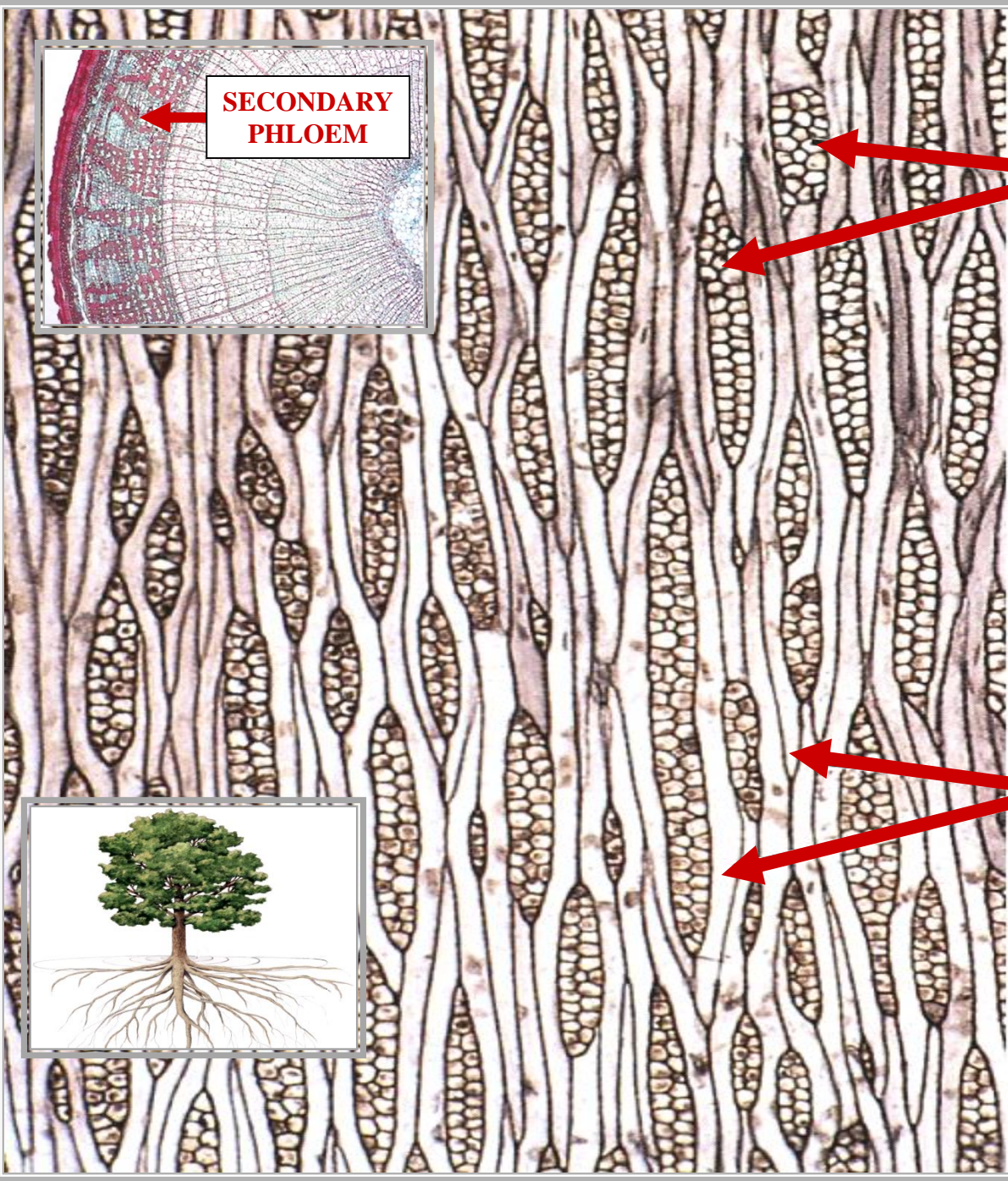


VASCULAR CAMBIUM

L.S.



**SECONDARY
PHLOEM**

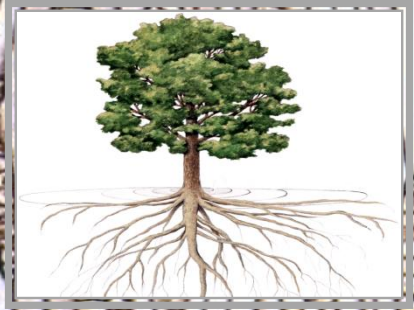


**AXIAL
PARENCHYMA**

~2 PHLOEM TISSUE

DICOT ~2 STEM

L.S.



**AXIAL
PARENCHYMA
CELL TYPES**

**SECONDARY PHLOEM
AXIAL PARENCHYMA
CELL TYPES**

COMPANION CELLS

**SECONDARY PHLOEM
AXIAL PARENCHYMA
CELL TYPES**

COMPANION CELL

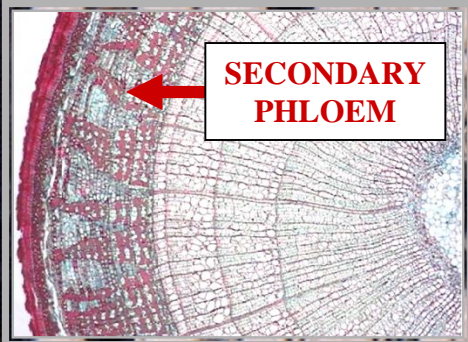
**SECONDARY PHLOEM
AXIAL PARENCHYMA
COMPANION CELL**



**CONTROLS
SIEVE MEMBER
METABOLISM**

**SECONDARY PHLOEM
AXIAL PARENCHYMA
COMPANION CELL**

CC



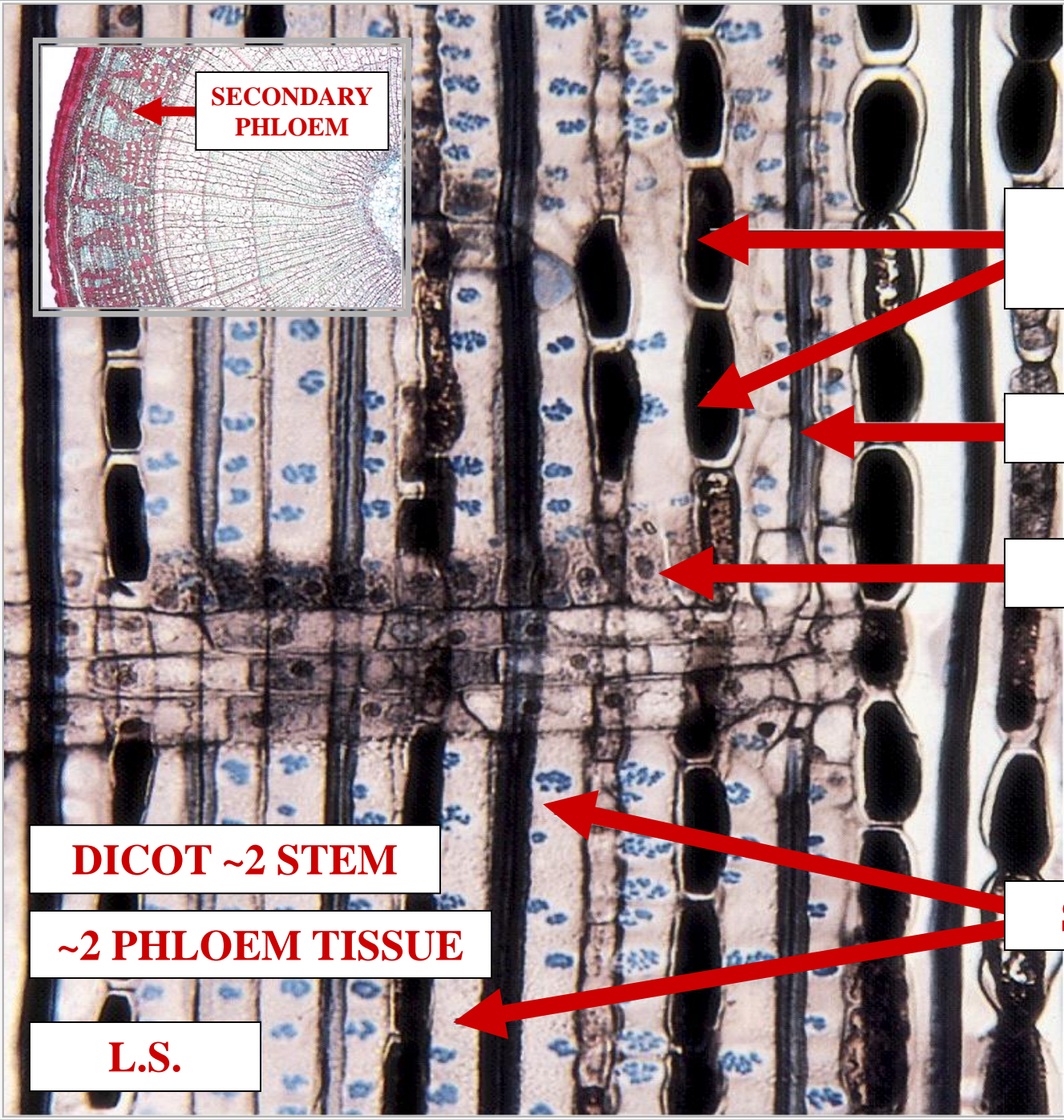
AXIAL PARENCHYMA

DICOT ~2 STEM

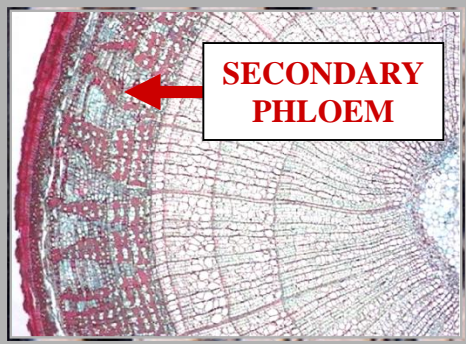
~2 PHLOEM TISSUE

L.S.

SIEVE MEMBERS



CS



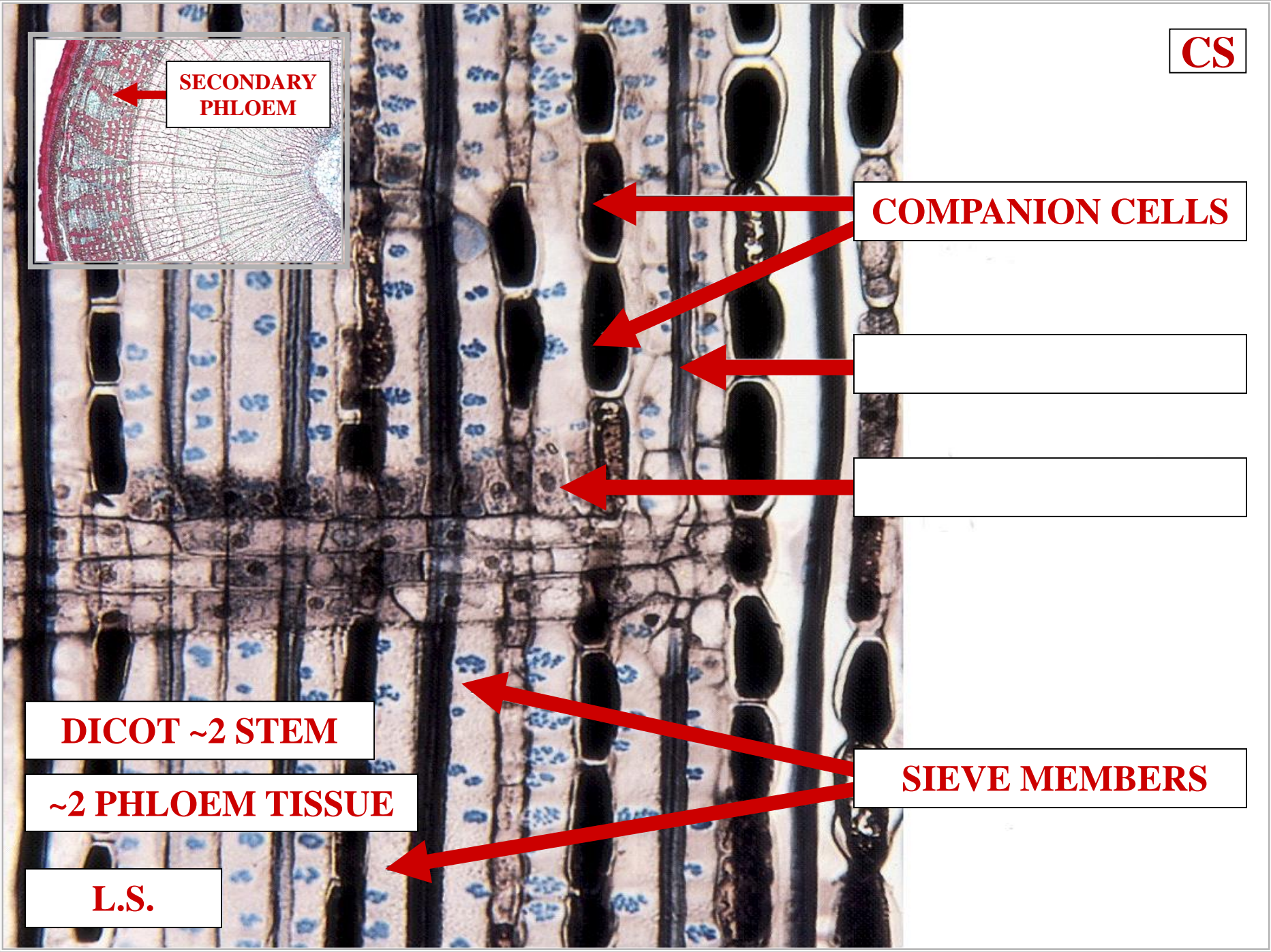
COMPANION CELLS

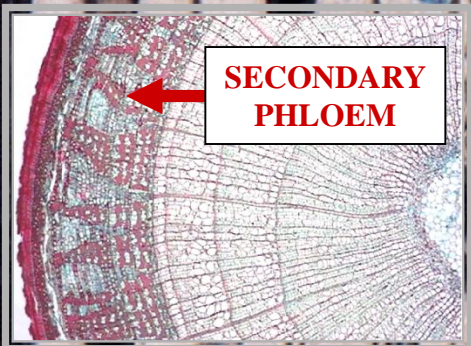
DICOT ~2 STEM

~2 PHLOEM TISSUE

L.S.

SIEVE MEMBERS





**SECONDARY
PHLOEM**

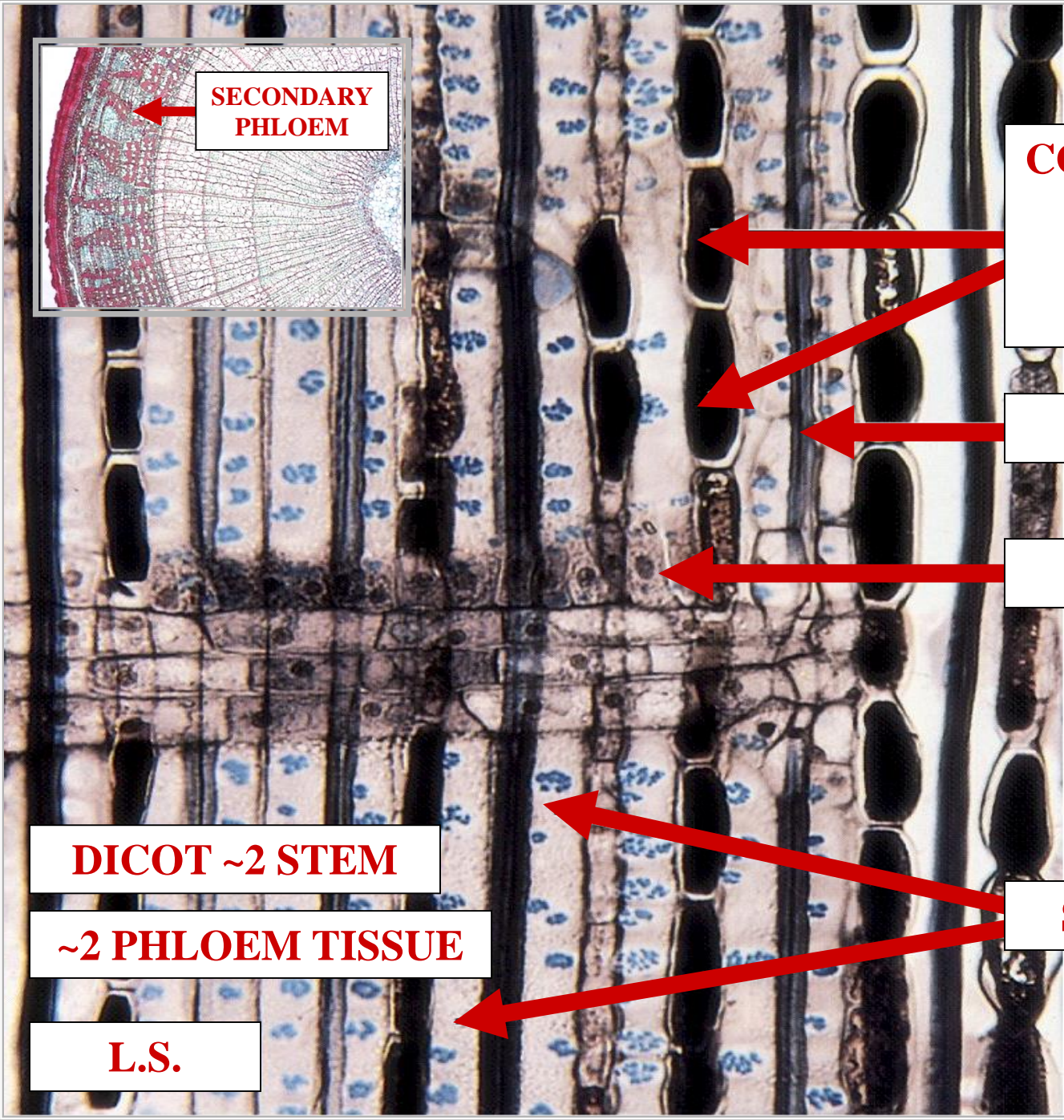
**COMPANION CELLS
CONTROL
SIEVE MEMBER
METABOLISM**

DICOT ~2 STEM

~2 PHLOEM TISSUE

L.S.

SIEVE MEMBERS



**SECONDARY
PHILOEM TISSUE
RAY
PARENCHYMA**

RAY

PARENCHYMA



**SECONDARY PHLOEM
AXIAL PARENCHYMA
RAY PARENCHYMA**

LATERAL ORIENTATION

**SECONDARY PHLOEM
AXIAL PARENCHYMA
RAY PARENCHYMA**



**SECONDARY PHLOEM
AXIAL PARENCHYMA
RAY PARENCHYMA**

LATERAL ORIENTATION

LATERAL TRANSPORT

**SECONDARY PHLOEM
AXIAL PARENCHYMA
RAY PARENCHYMA**

**SECONDARY PHLOEM
AXIAL PARENCHYMA
RAY PARENCHYMA
LATERAL ORIENTATION**

LATERAL TRANSPORT

RAY INITIAL DERIVED

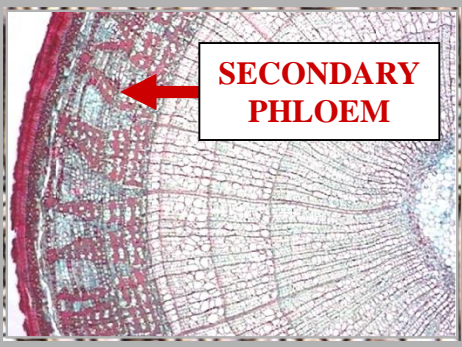
**SECONDARY PHLOEM
AXIAL PARENCHYMA
RAY PARENCHYMA**



TS

**RAY
PARENCHYMA
TANGENTIAL
SECTION**

LO



**RAY
PARENCHYMA**

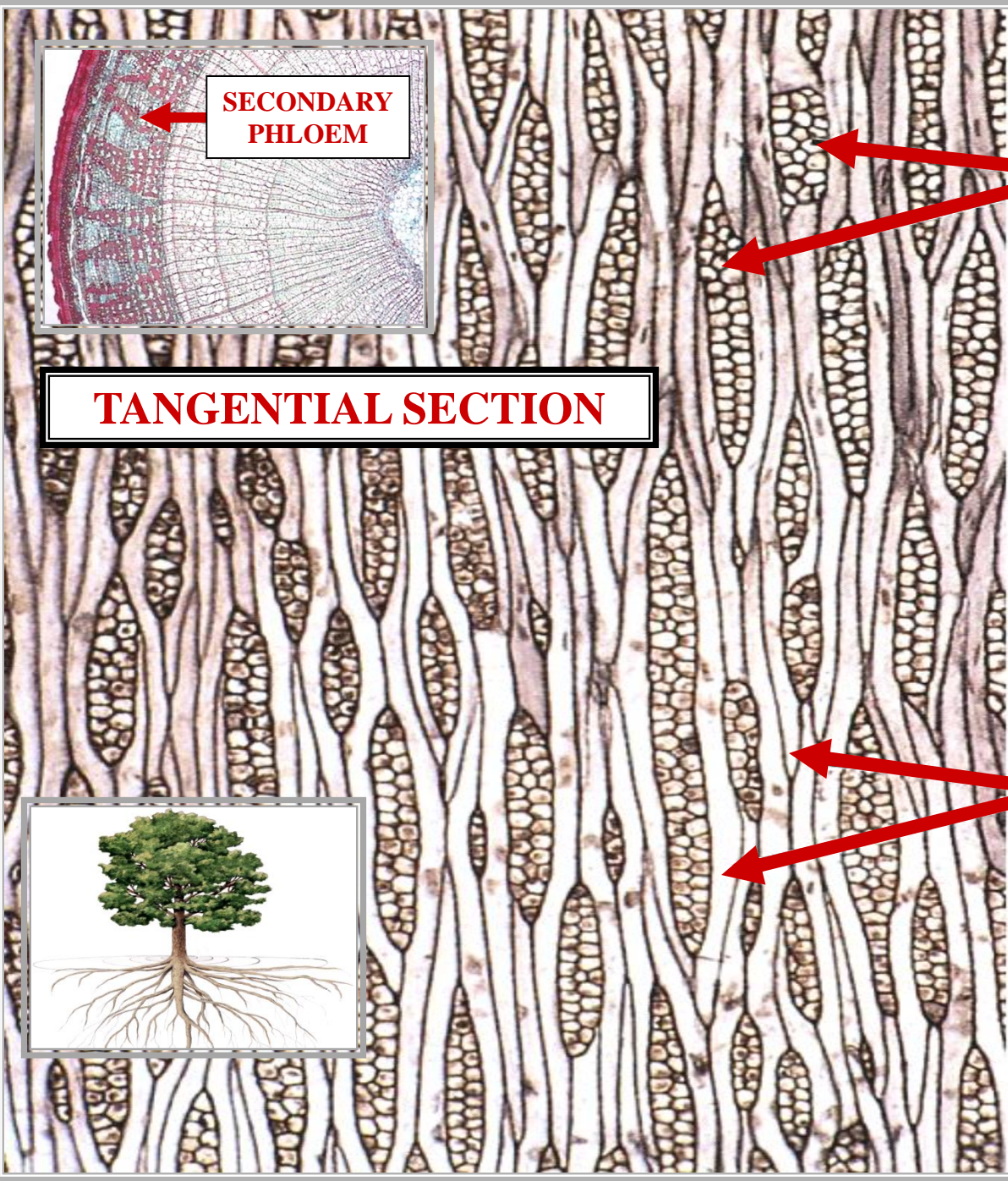
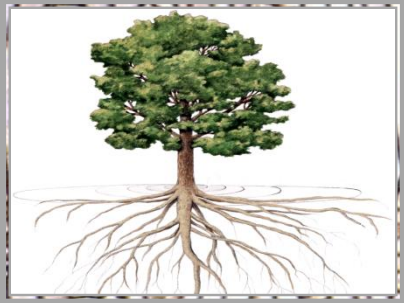
TANGENTIAL SECTION



~2 PHLOEM TISSUE

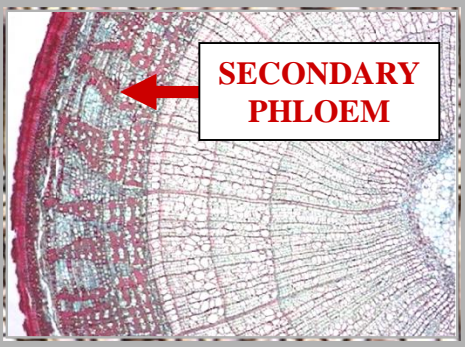
DICOT ~2 STEM

L.S.



LT

**LATERAL
ORIENTATION**



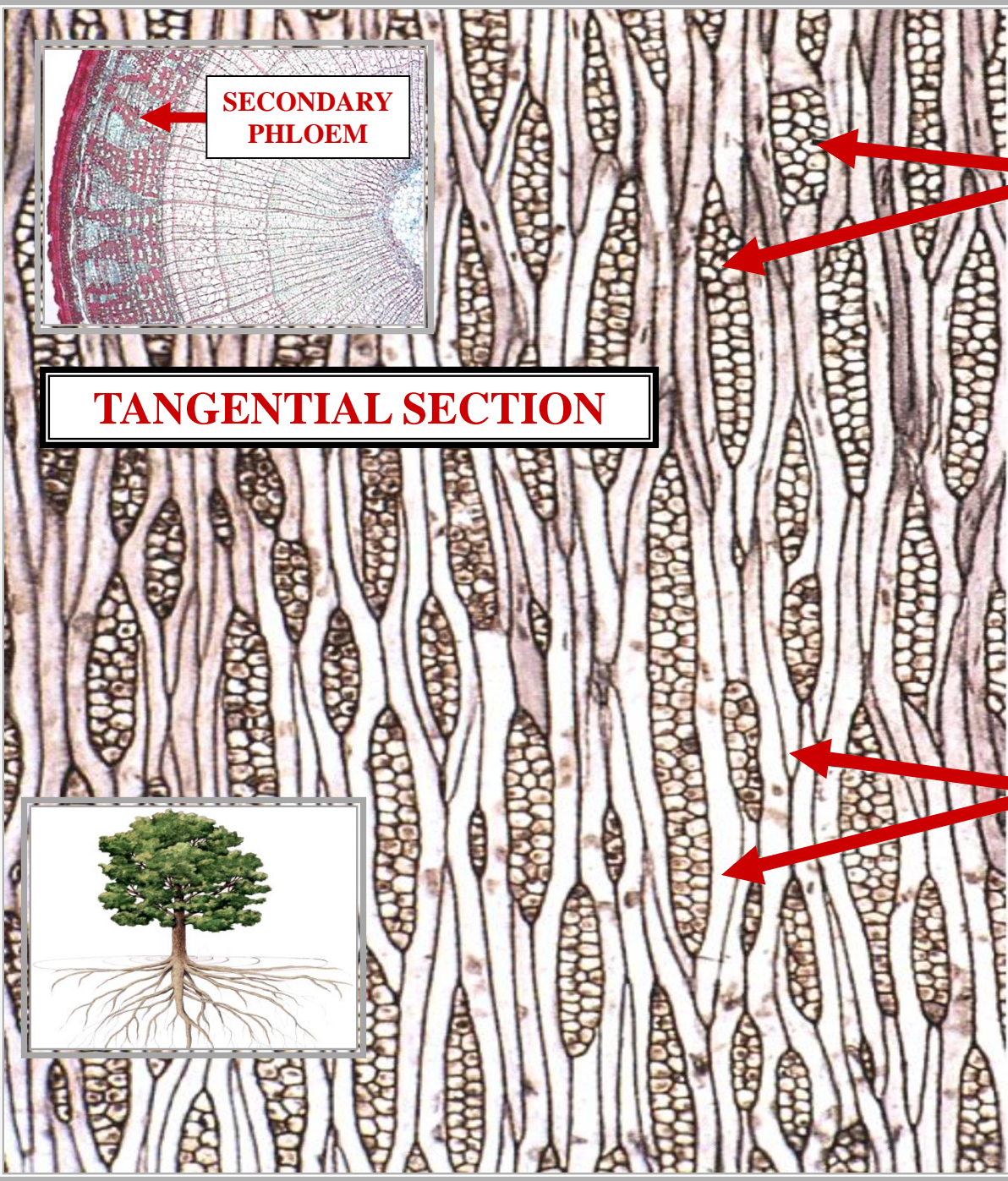
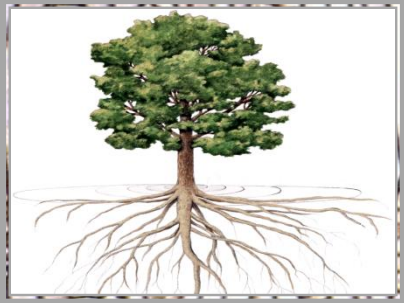
TANGENTIAL SECTION



~2 PHLOEM TISSUE

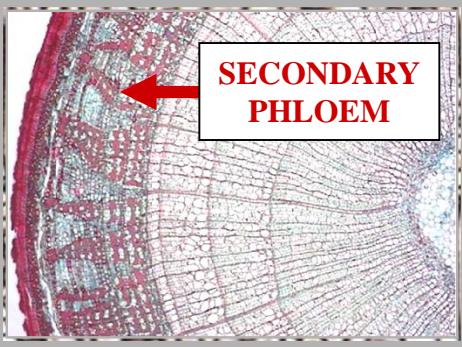
DICOT ~2 STEM

L.S.

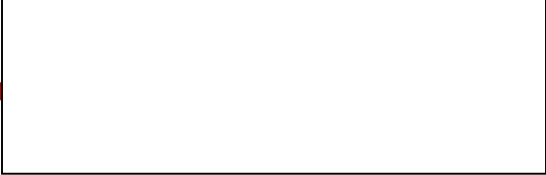
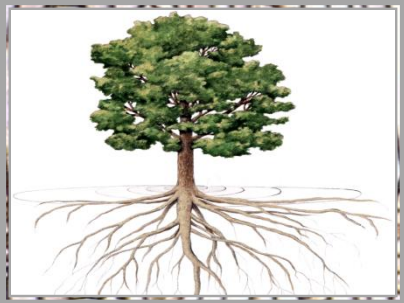


VC RI

LATERAL
TRANSPORT



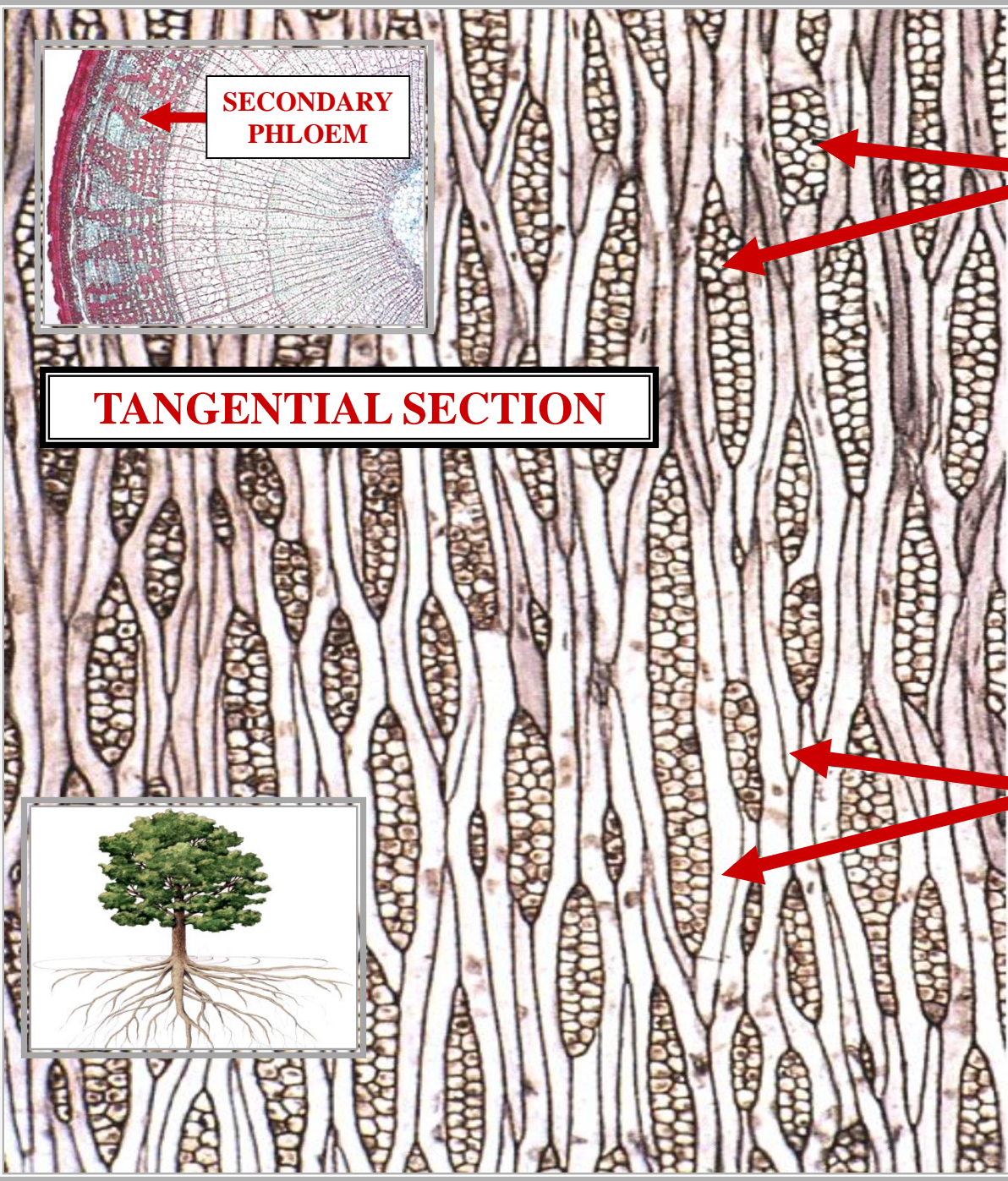
TANGENTIAL SECTION



~2 PHLOEM TISSUE

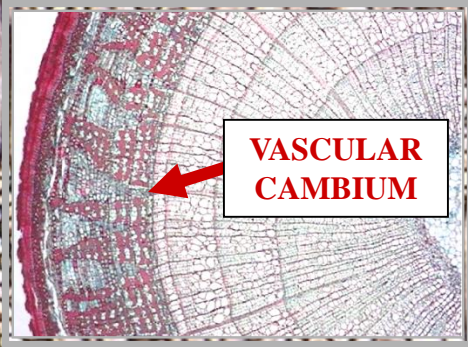
DICOT ~2 STEM

L.S.



+

RP



RAY
INITIAL
DERIVED

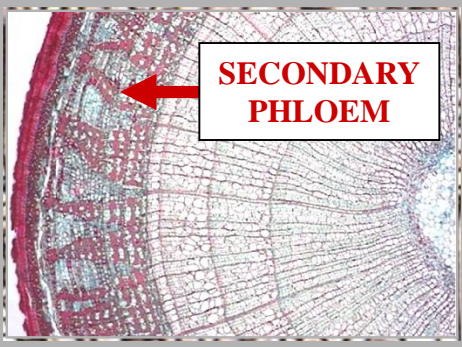
TANGENTIAL SECTION



~2 PHLOEM TISSUE

DICOT ~2 STEM

L.S.



SECONDARY PHLOEM

RAY PARENCHYMA

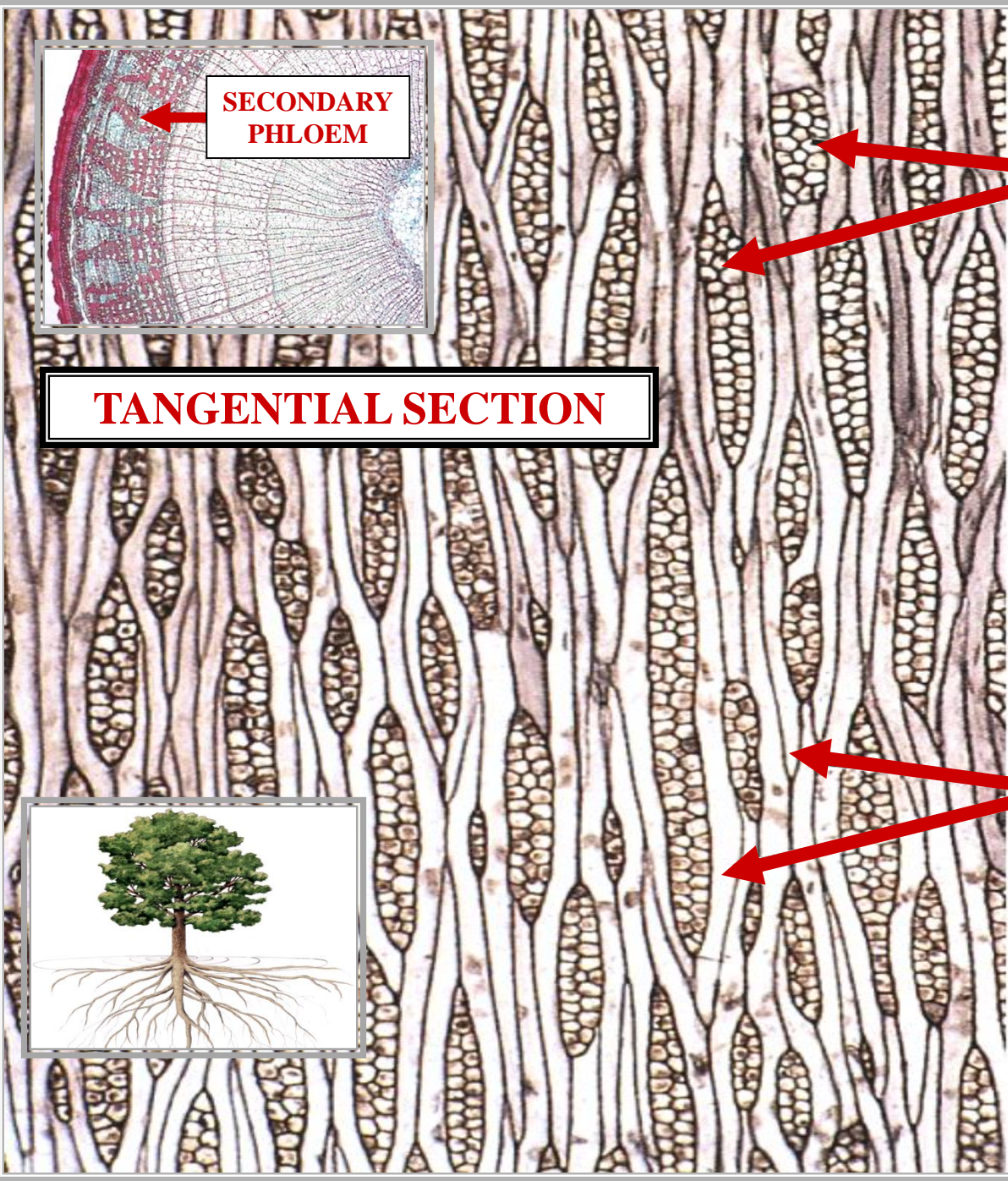
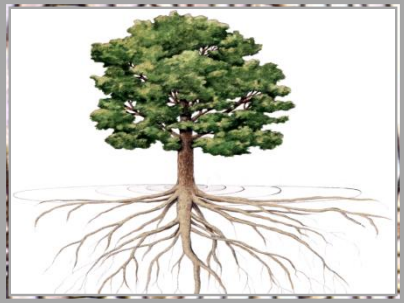
TANGENTIAL SECTION



~2 PHLOEM TISSUE

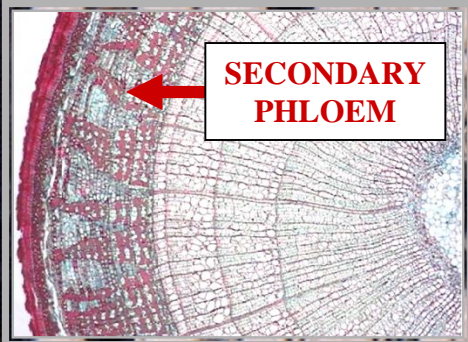
DICOT ~2 STEM

L.S.



**RAY
PARENCHYMA
RADIAL
SECTION**

LO



RAY PARENCHYMA

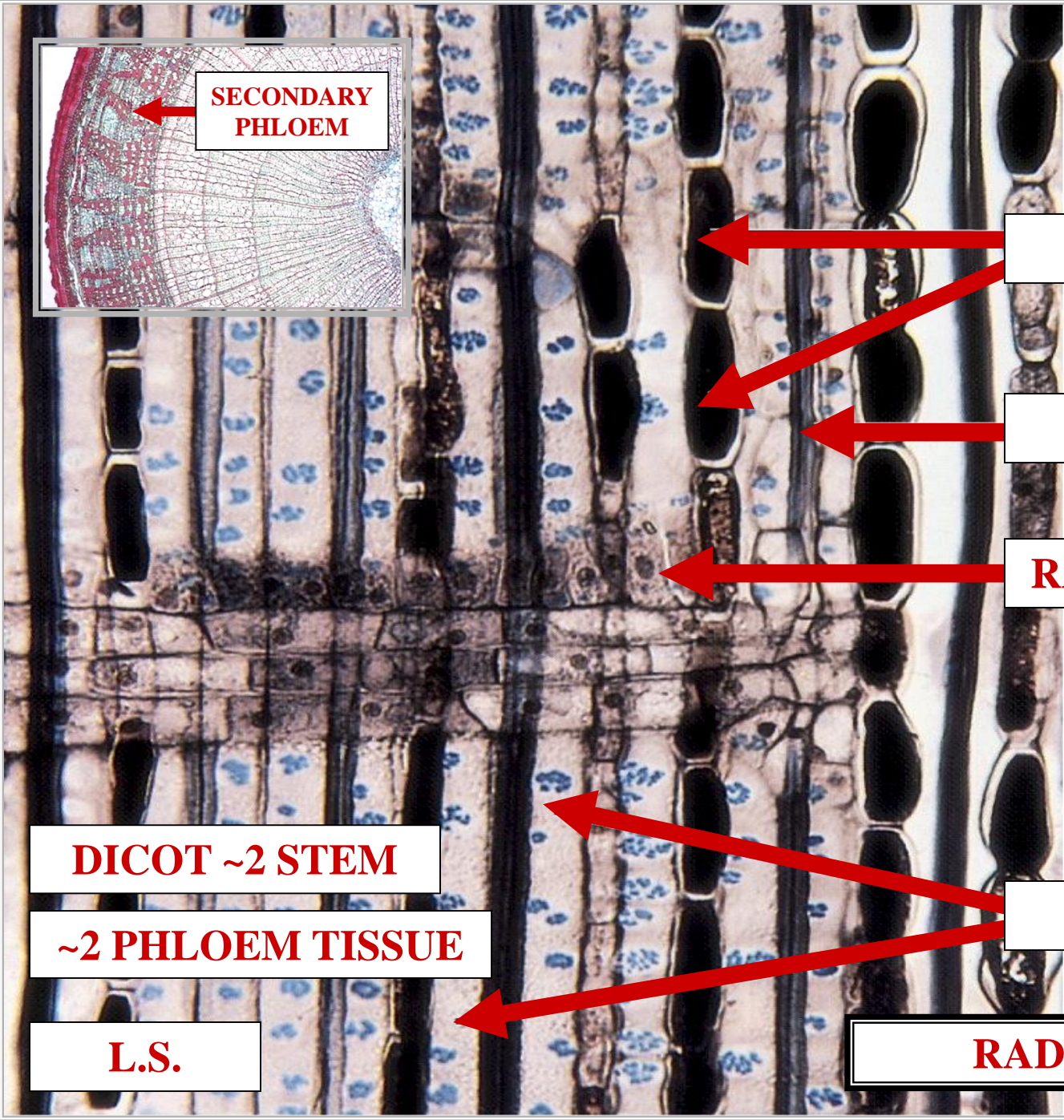


DICOT ~2 STEM

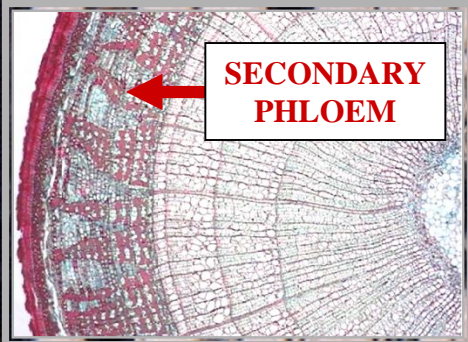
~2 PHLOEM TISSUE

L.S.

RADIAL SECTION



LT



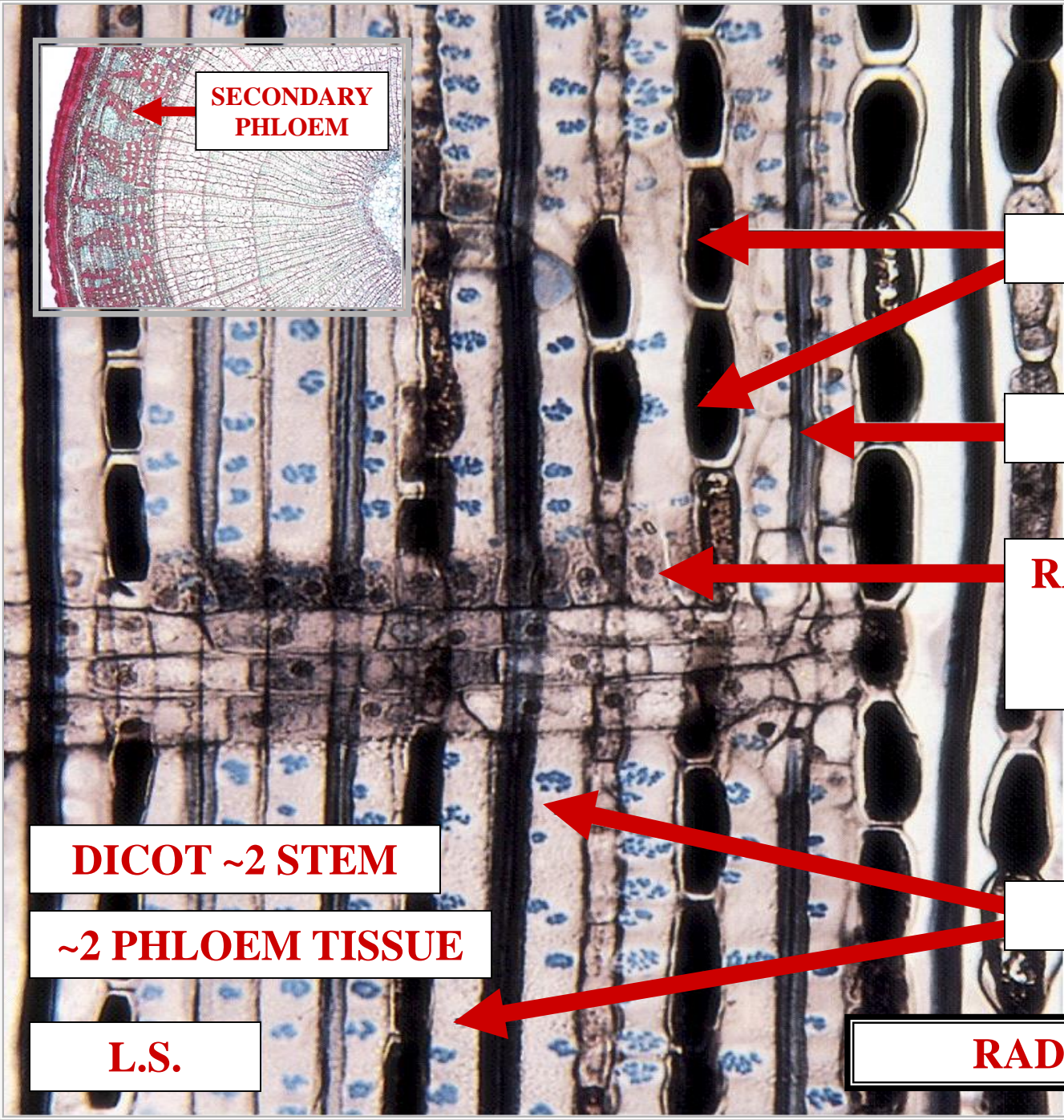
**RAY PARENCHYMA
LATERAL
ORIENTATION**

DICOT ~2 STEM

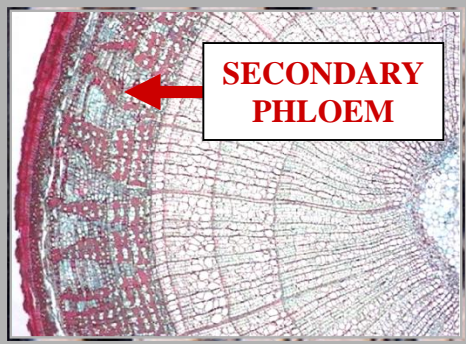
~2 PHLOEM TISSUE

L.S.

RADIAL SECTION



VC **RI**



**RAY PARENCHYMA
LATERAL
TRANSPORT**

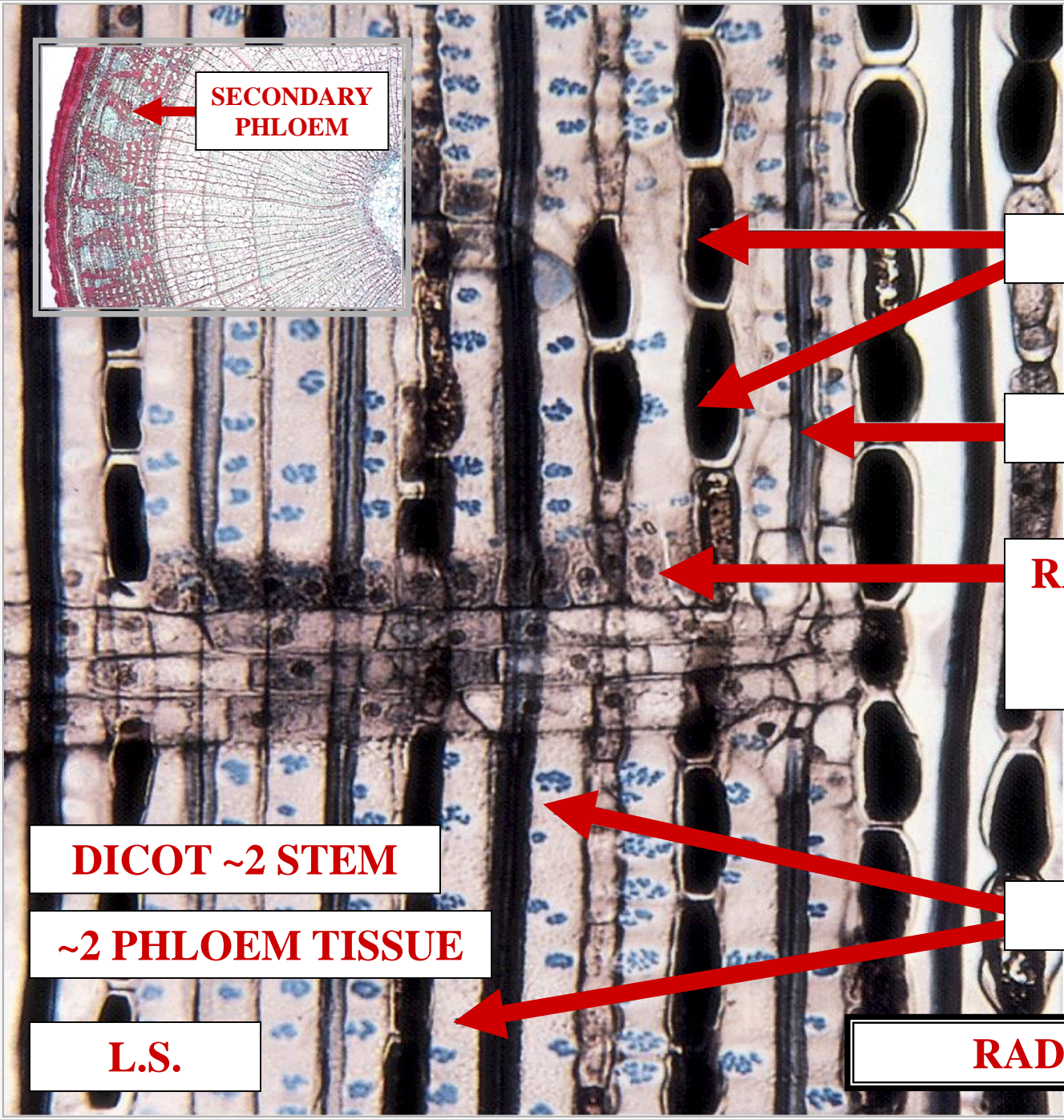
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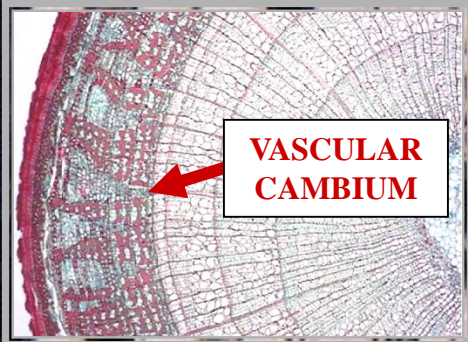
~2 PHLOEM TISSUE

L.S.



RADIAL SECTION





VASCULAR CAMBIUM

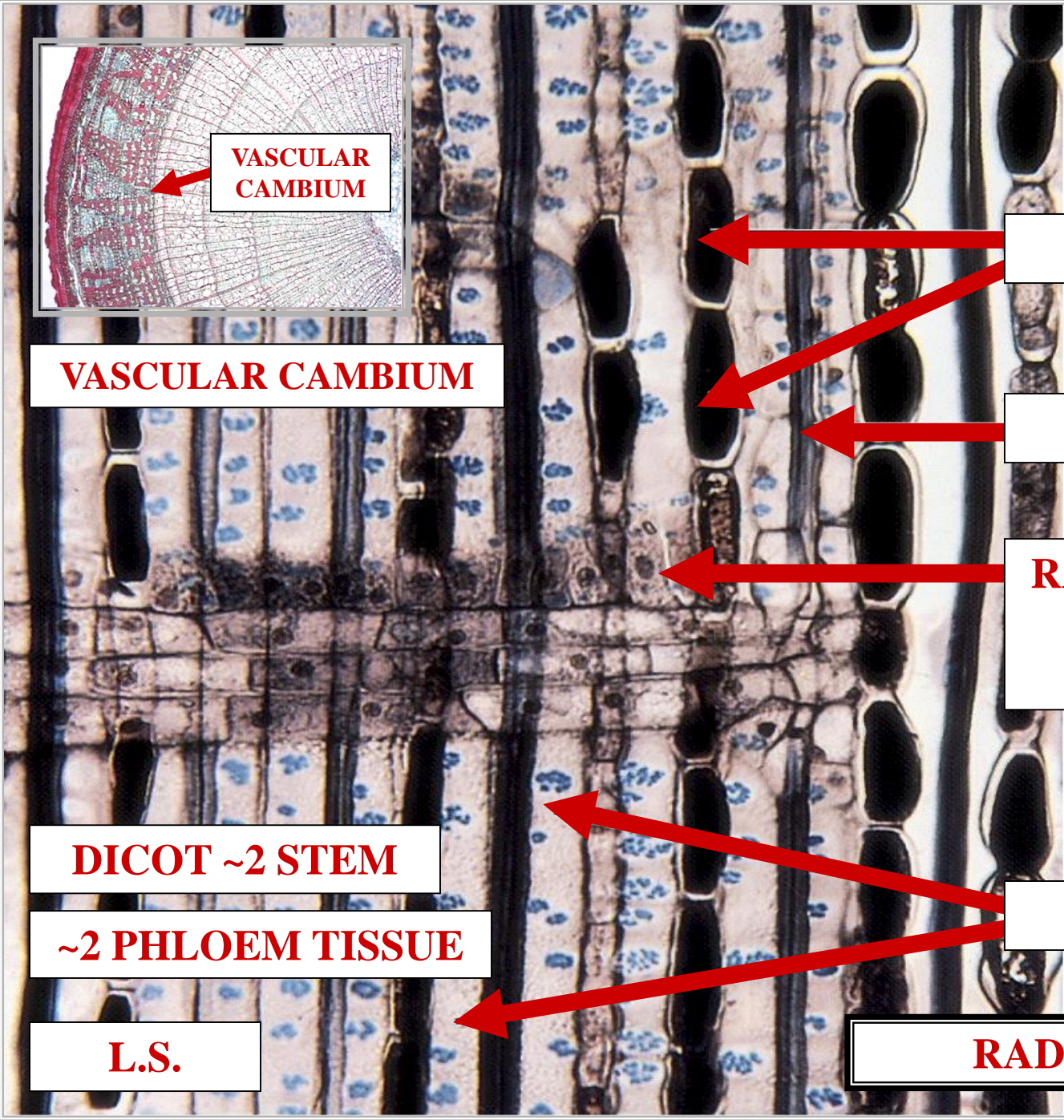
RAY PARENCHYMA
RAY INITIAL
DERIVED

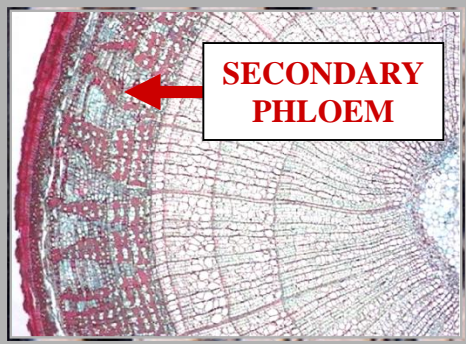
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~2 PHLOEM TISSUE

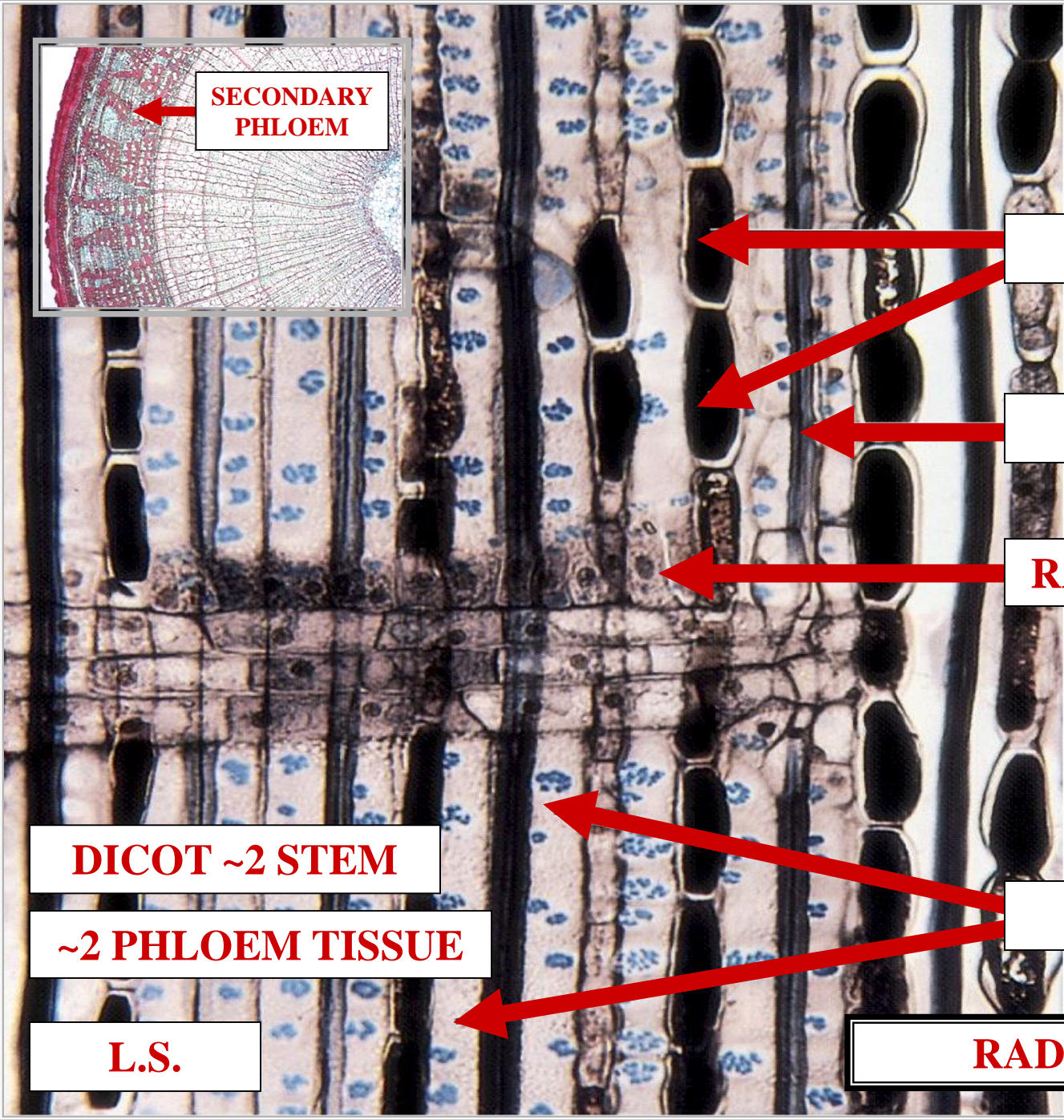
L.S.

RADIAL SECTION





**SECONDARY
PHLOEM**



[Empty label box]

[Empty label box]

RAY PARENCHYMA

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DICOT ~2 STEM

~2 PHLOEM TISSUE

L.S.

RADIAL SECTION

PHLOEM RAY

PHLOEM RAY

**RAY PARENCHYMA
PHLOEM RAY**



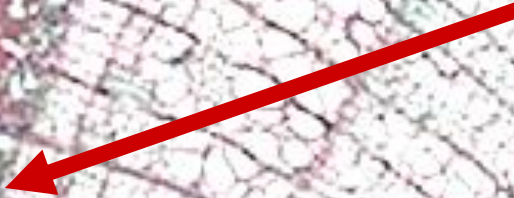
VC

RAY WITHIN PHLOEM

**RAY PARENCHYMA
PHLOEM RAY**

2X

**VASCULAR
CAMBIUM**

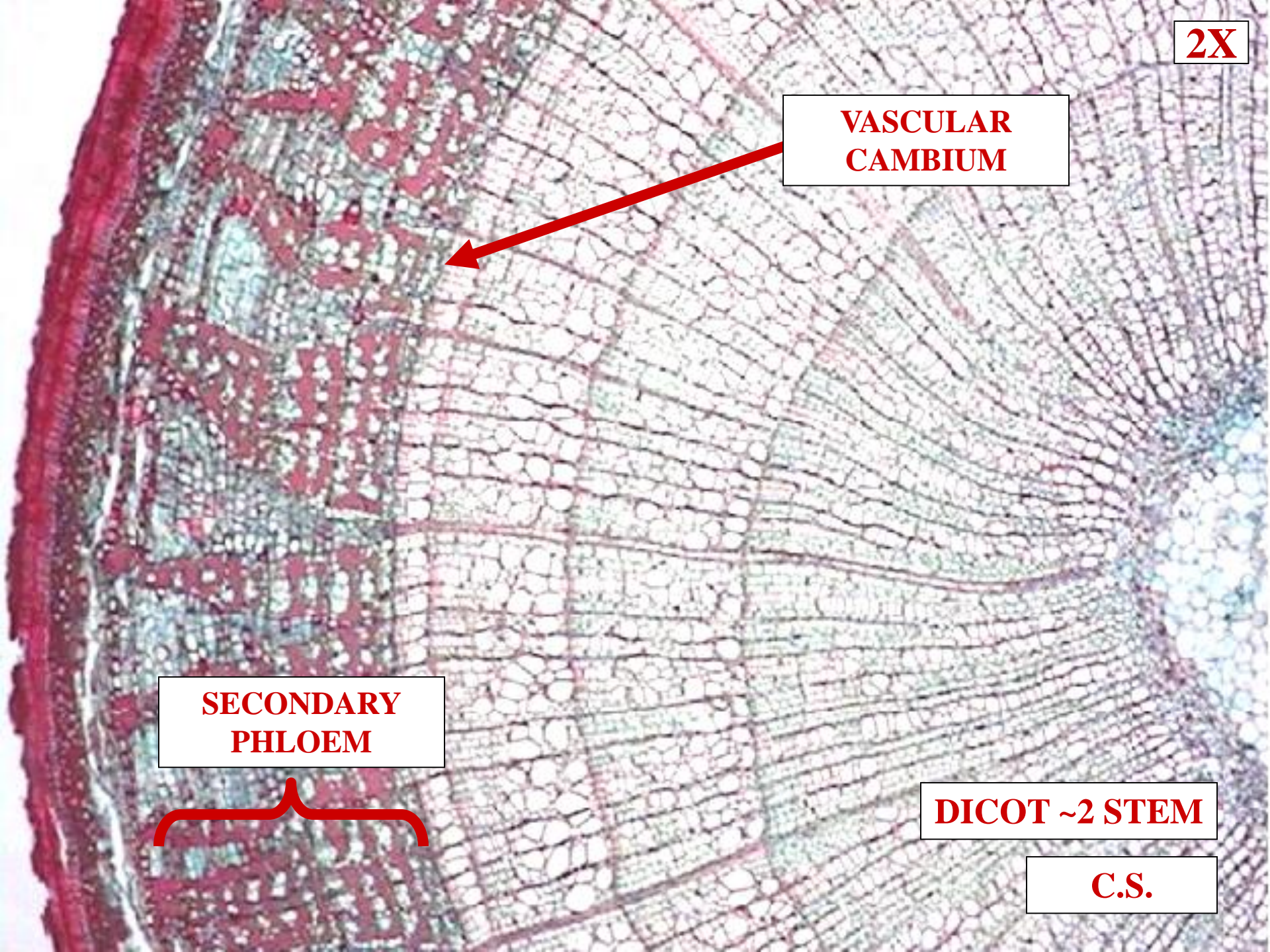


**SECONDARY
PHLOEM**



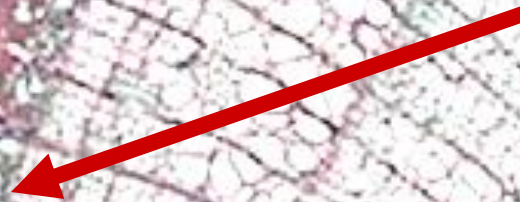
DICOT ~2 STEM

C.S.



XR

**VASCULAR
CAMBIUM**



**SECONDARY
XYLEM**

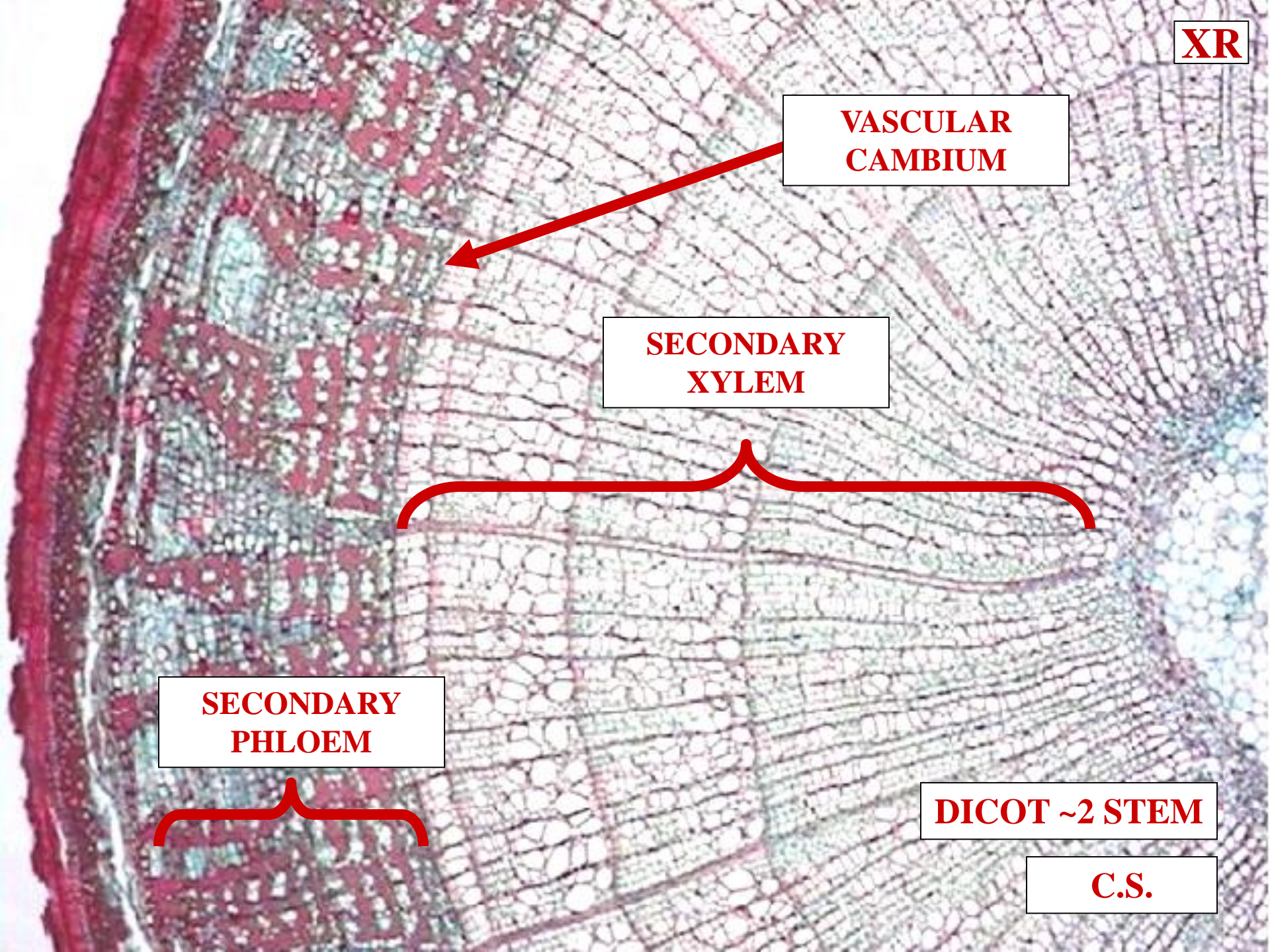


**SECONDARY
PHLOEM**



DICOT ~2 STEM

C.S.



R

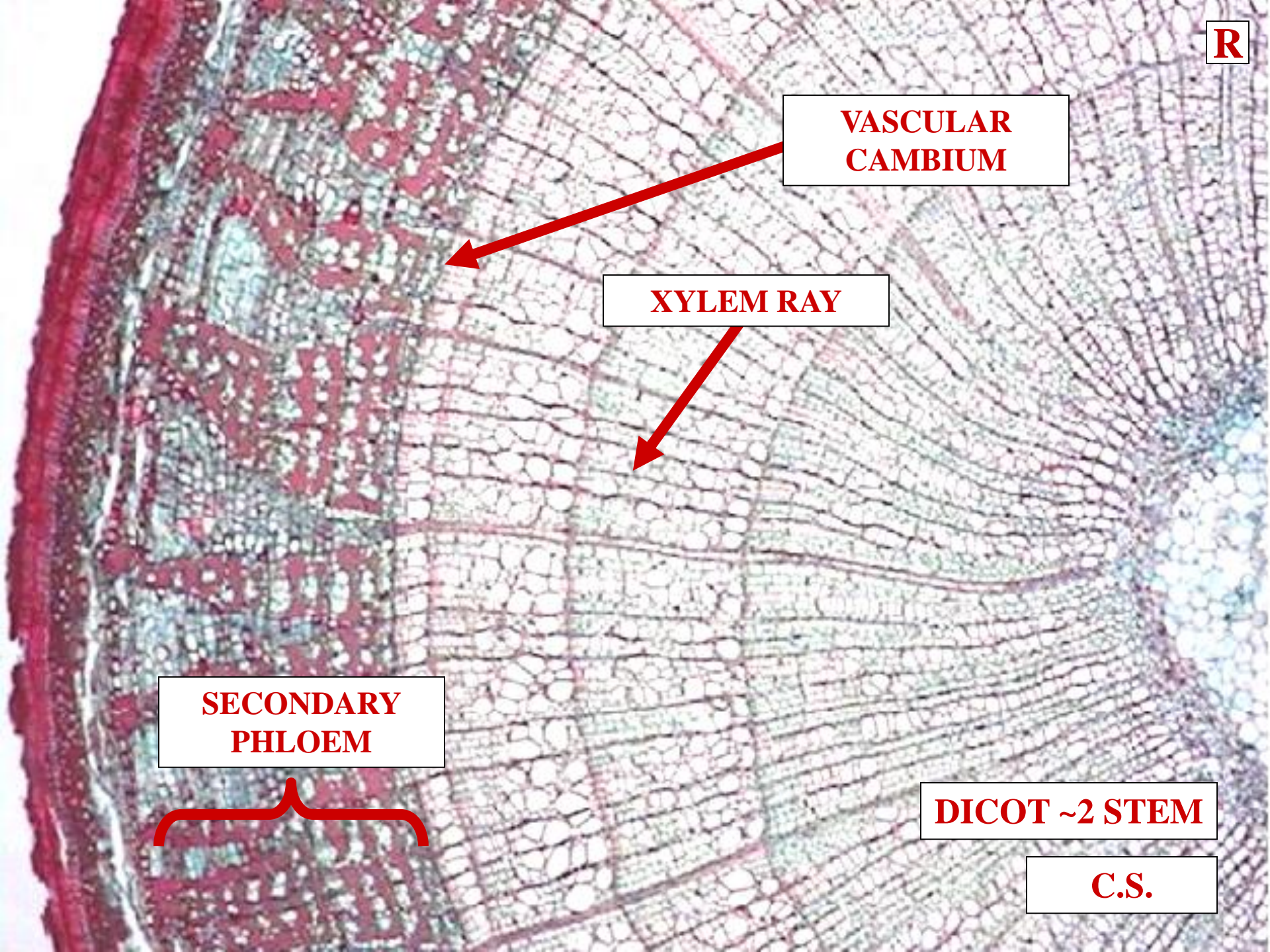
**VASCULAR
CAMBIUM**

XYLEM RAY

**SECONDARY
PHLOEM**

DICOT ~2 STEM

C.S.



PR

**VASCULAR
CAMBIUM**

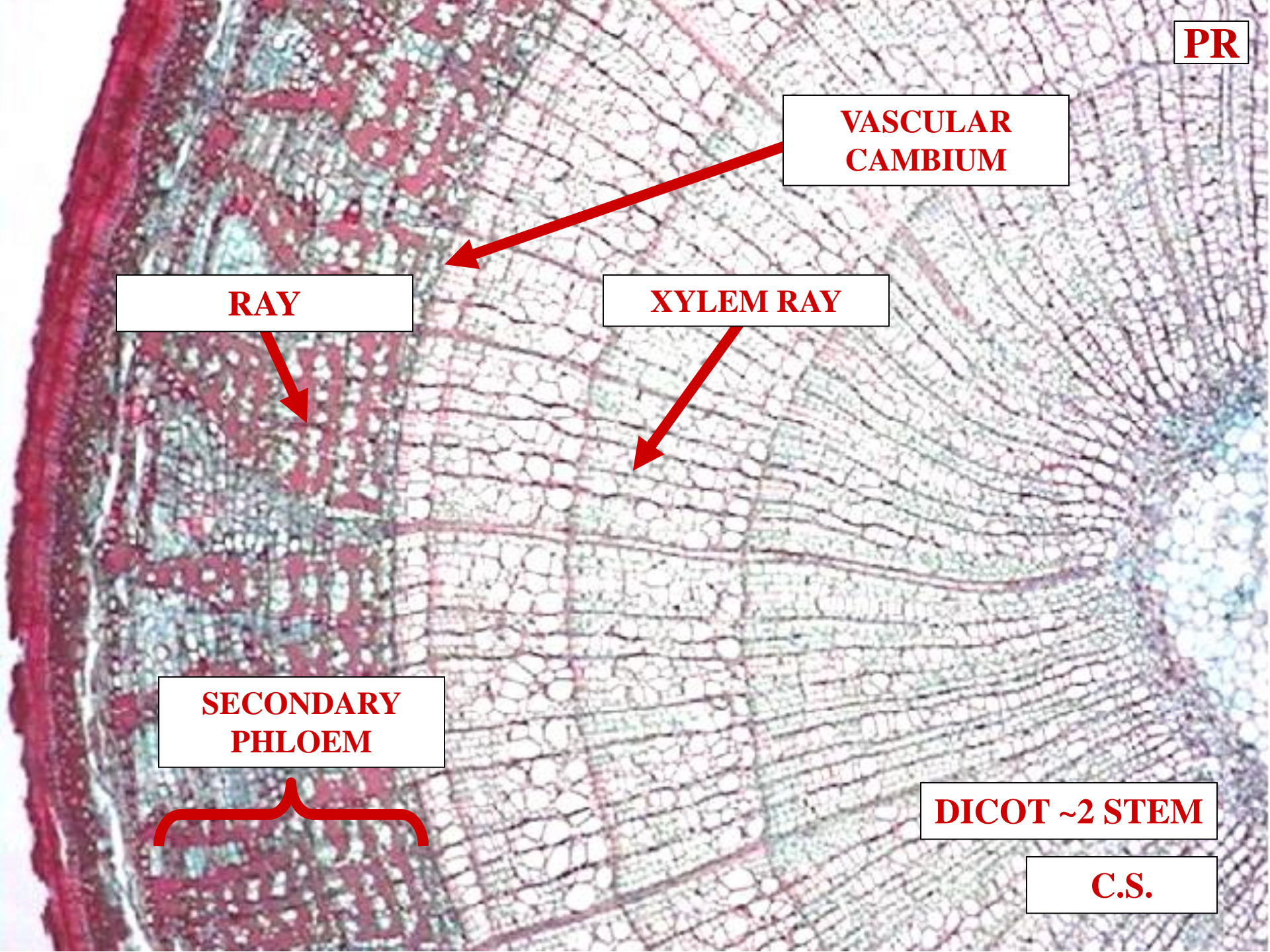
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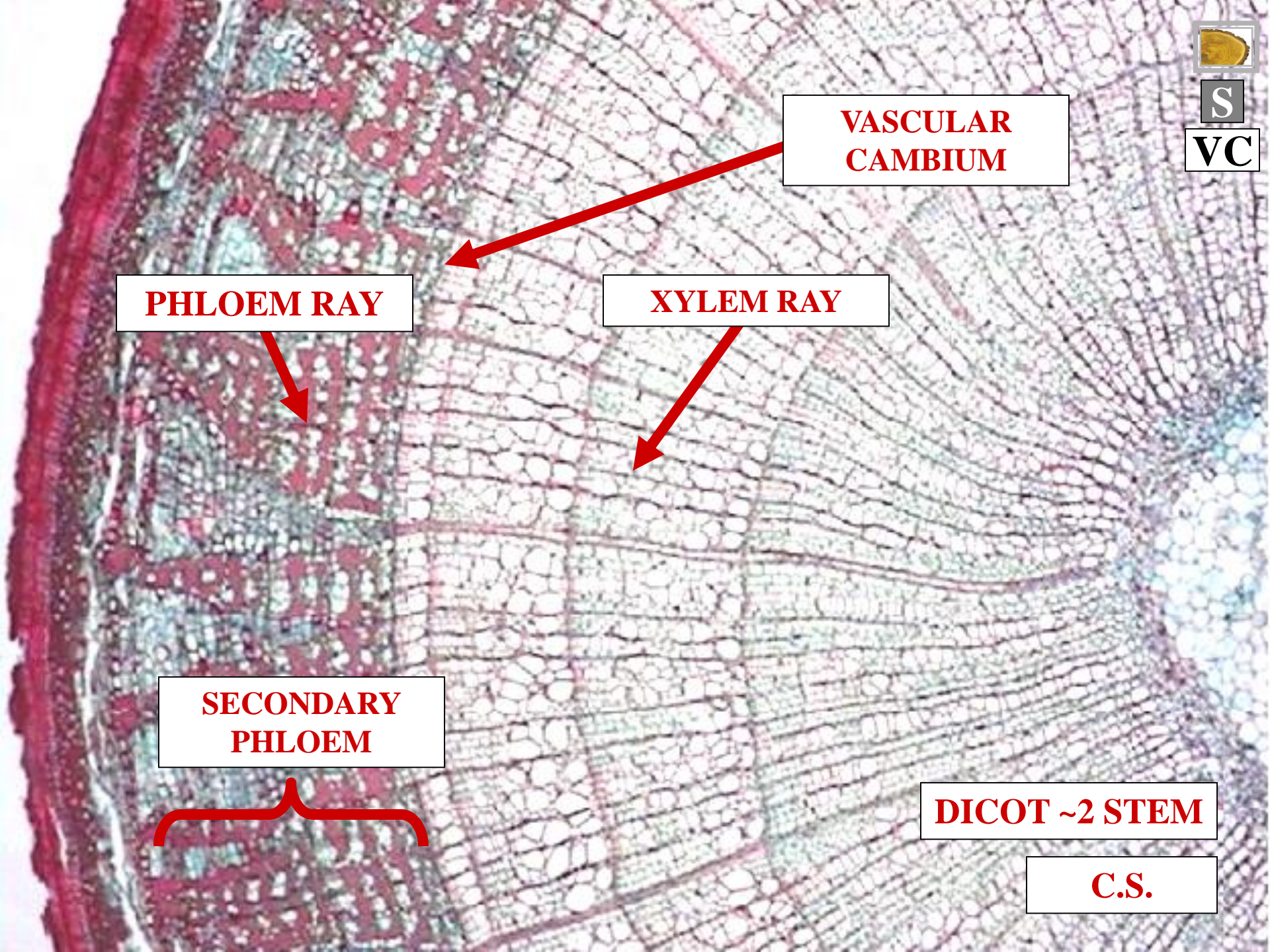
XYLEM RAY

**SECONDARY
PHLOEM**

DICOT ~2 STEM

C.S.





S
VC

**VASCULAR
CAMBIUM**

PHLOEM RAY

XYLEM RAY

**SECONDARY
PHLOEM**

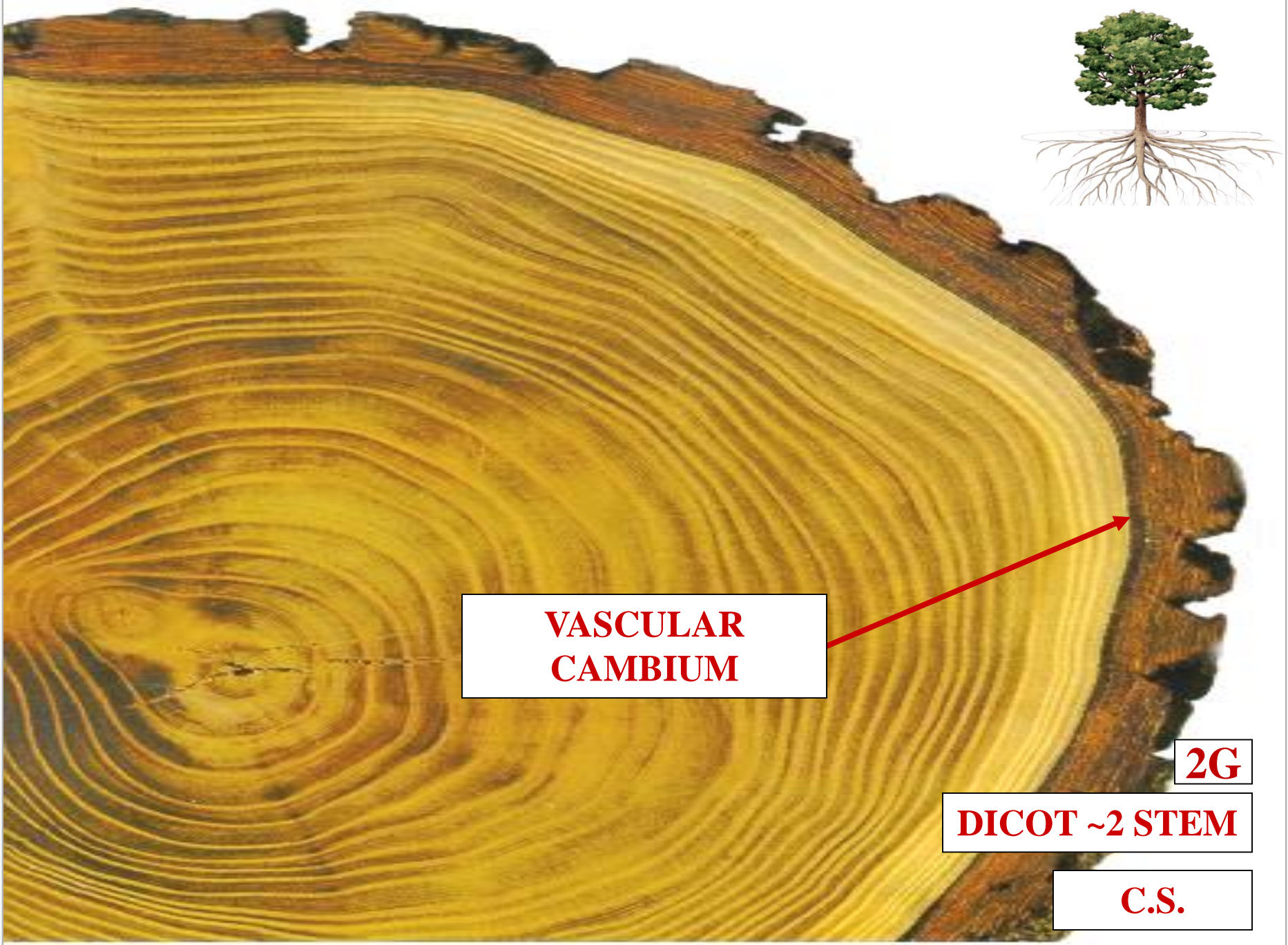
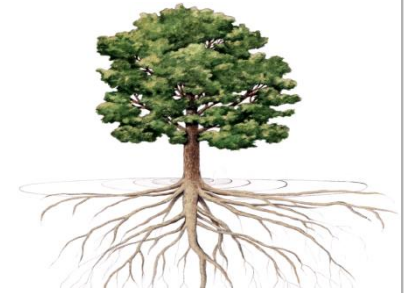
DICOT ~2 STEM

C.S.



VC

VASCULAR CAMBIUM SUMMARY

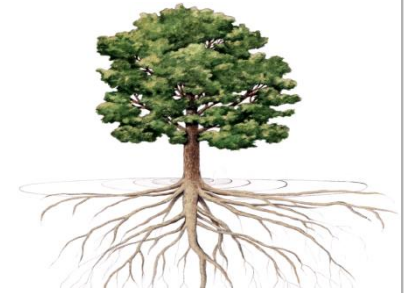


**VASCULAR
CAMBIUM**

2G

DICOT ~2 STEM

C.S.



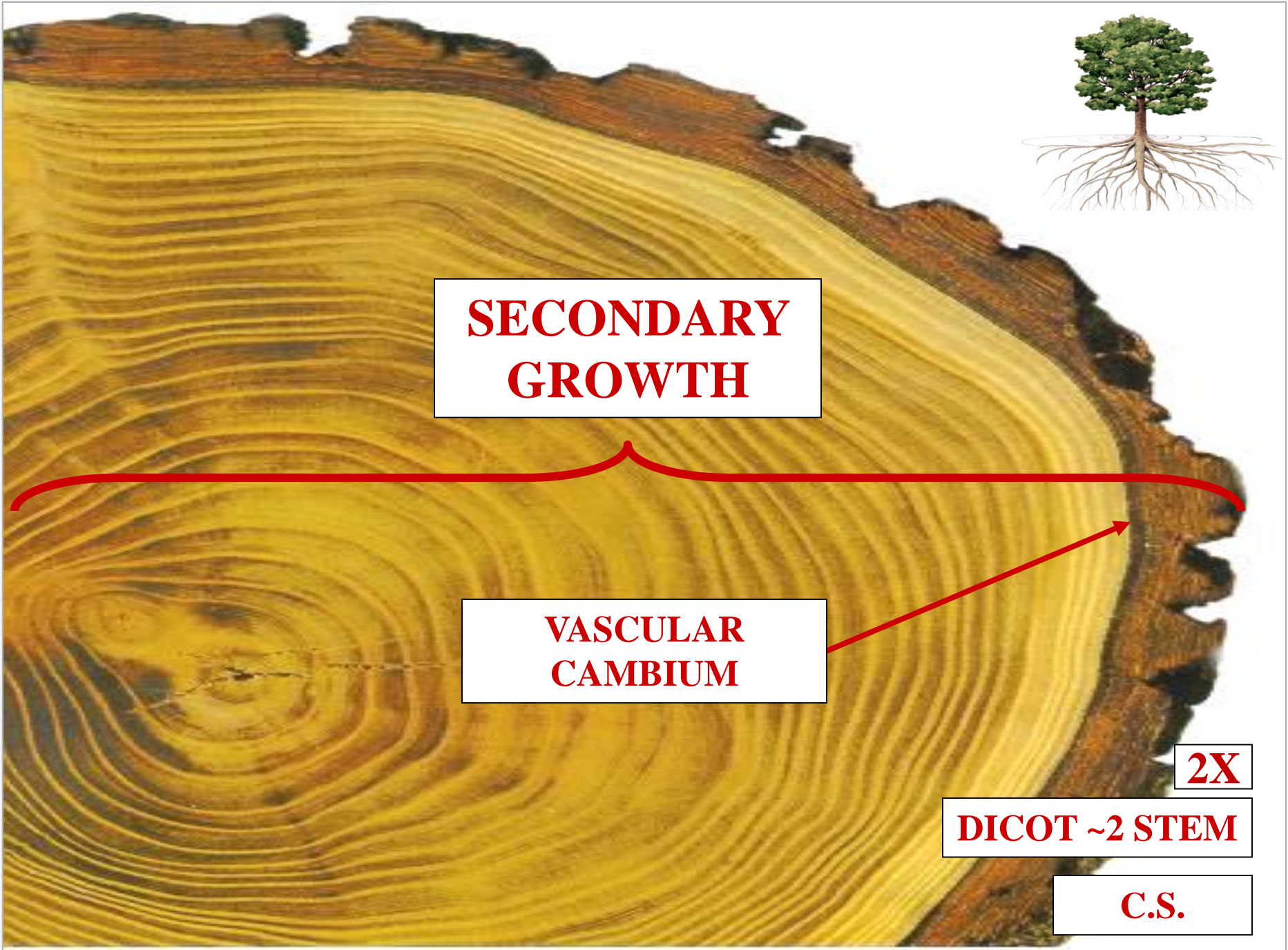
**SECONDARY
GROWTH**

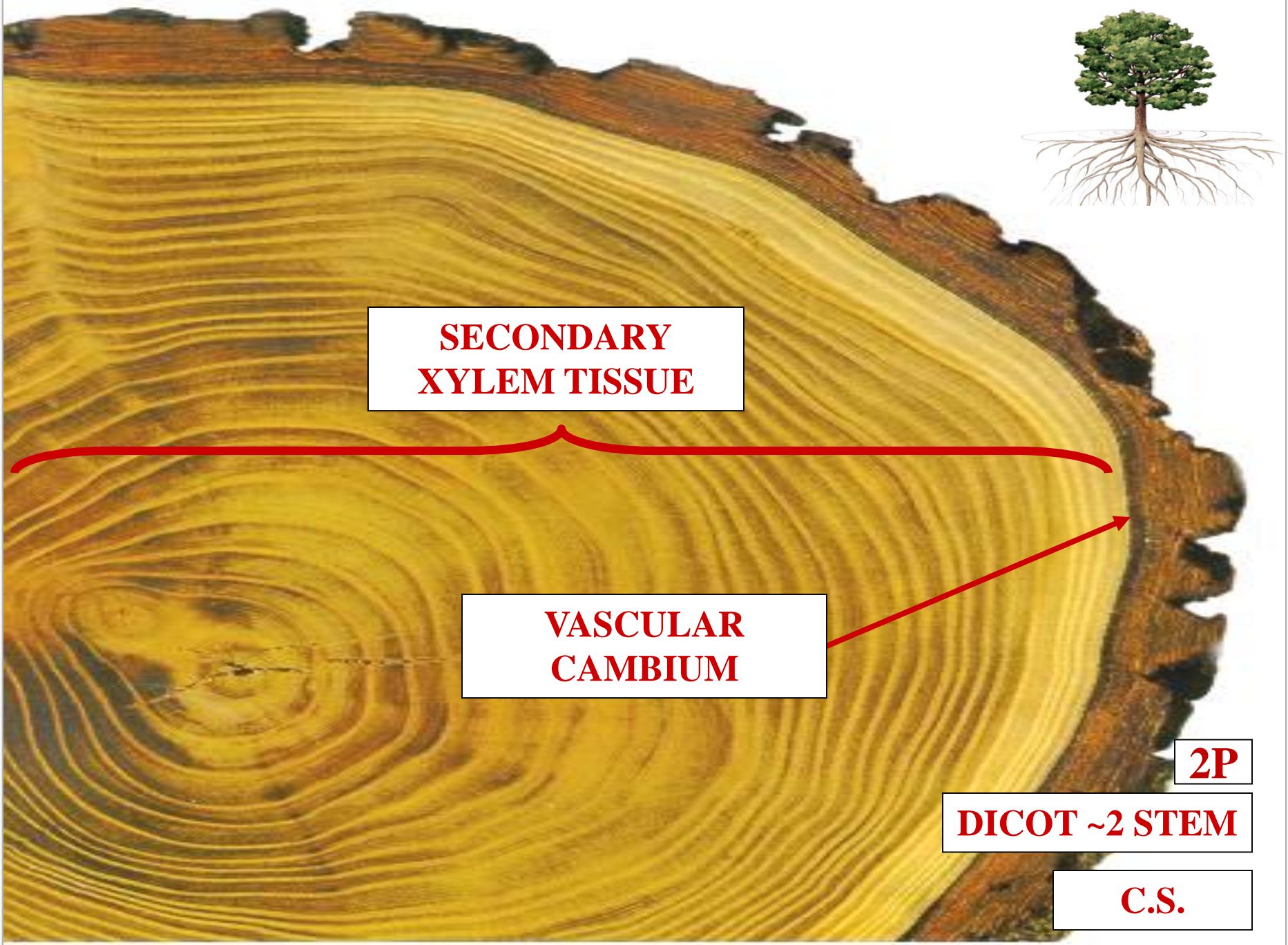
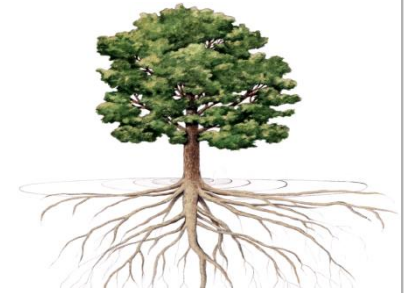
**VASCULAR
CAMBIUM**

2X

DICOT ~2 STEM

C.S.





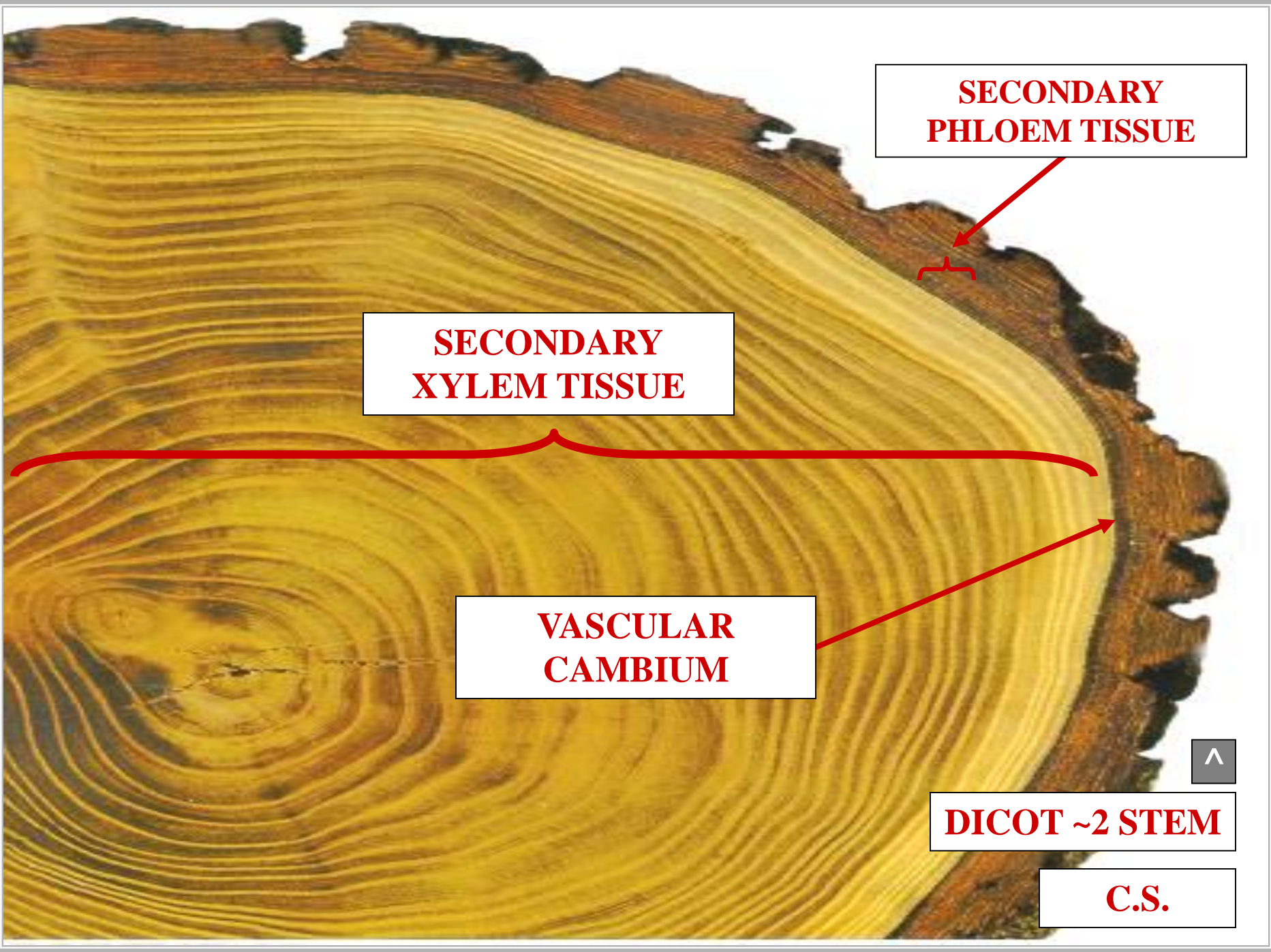
**SECONDARY
XYLEM TISSUE**

**VASCULAR
CAMBIUM**

2P

DICOT ~2 STEM

C.S.



**SECONDARY
PHLOEM TISSUE**

**SECONDARY
XYLEM TISSUE**

**VASCULAR
CAMBIUM**

DICOT ~2 STEM

C.S.



CORK CAMBIUM

CORK
CAMBIUM

SECONDARY GROWTH CORK CAMBIUM



DERIVES OUTER BARK

SECONDARY GROWTH
CORK CAMBIUM

SECONDARY GROWTH CORK CAMBIUM



DERIVES OUTER BARK

CONSISTS PARENCHYMA INITIALS

SECONDARY GROWTH CORK CAMBIUM

SECONDARY GROWTH CORK CAMBIUM



DERIVES OUTER BARK

CONSISTS PARENCHYMA INITIALS

UNDERGO MITOSIS →

SECONDARY GROWTH CORK CAMBIUM

SECONDARY GROWTH CORK CAMBIUM

DERIVES OUTER BARK

CONSISTS PARENCHYMA INITIALS

UNDERGO MITOSIS →

DERIVATIVES

SECONDARY GROWTH
CORK CAMBIUM



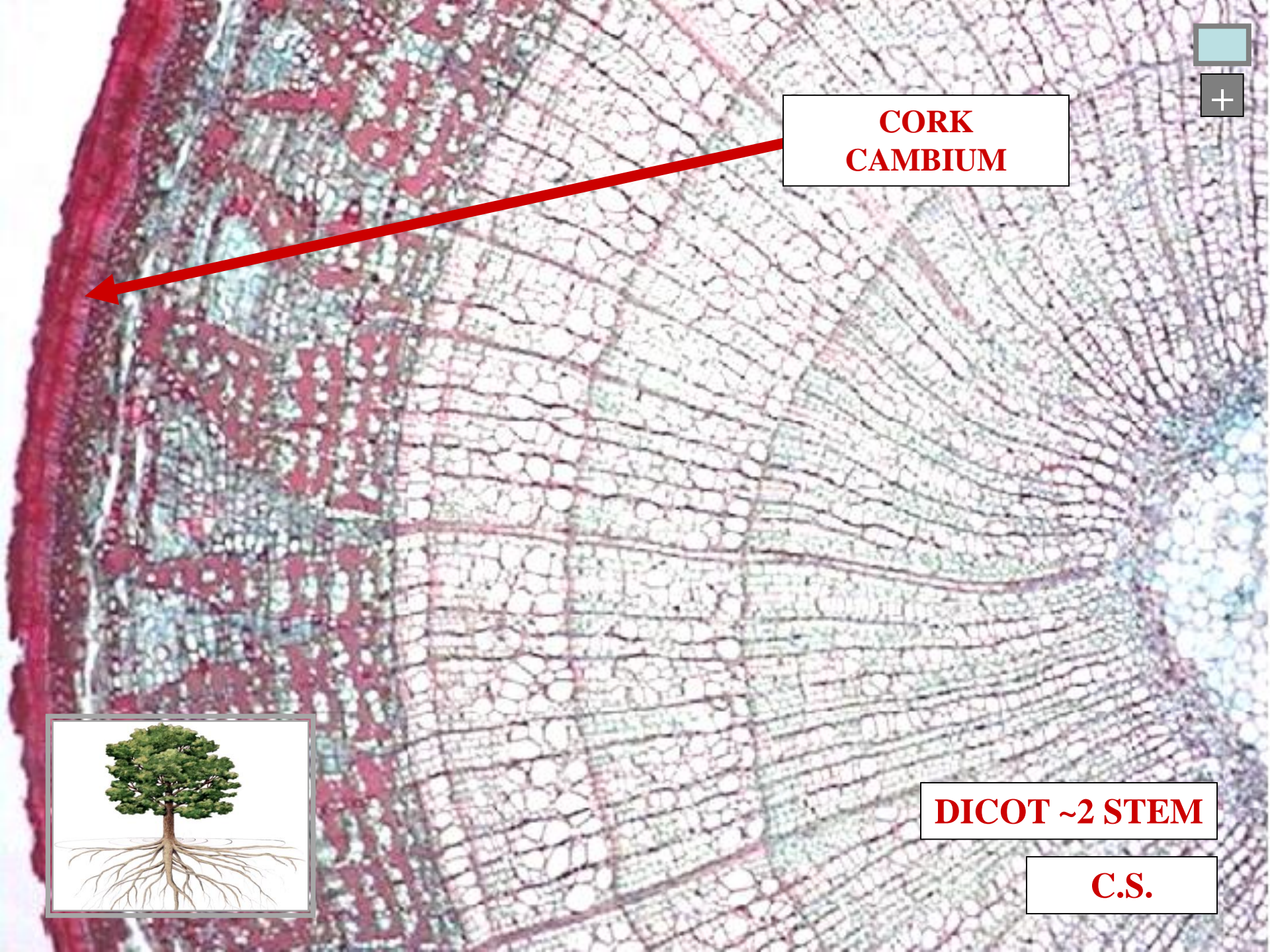


**CORK
CAMBIUM**



DICOT ~2 STEM

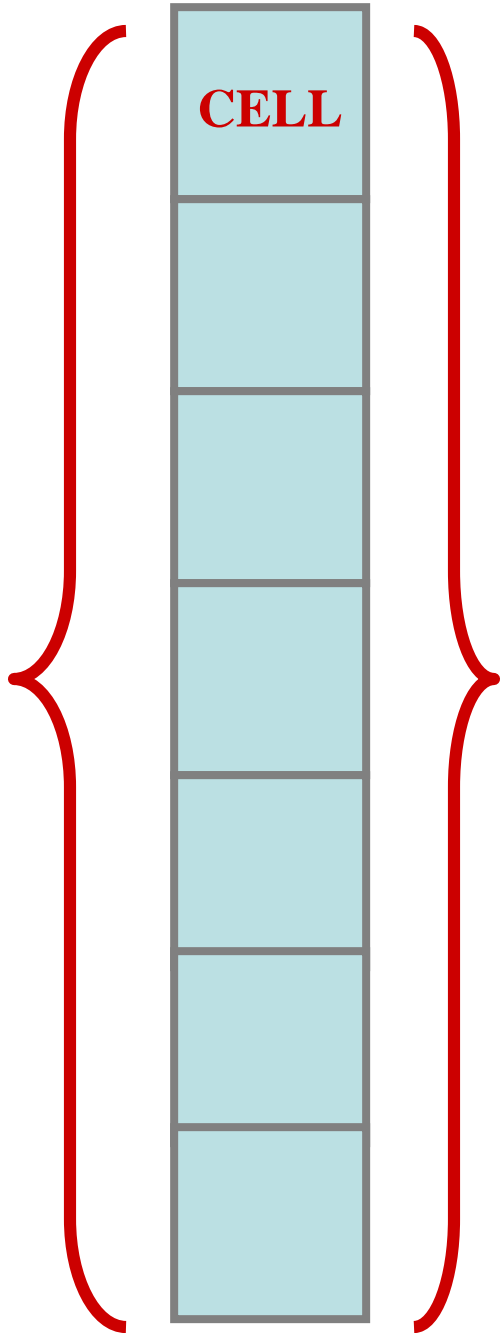
C.S.



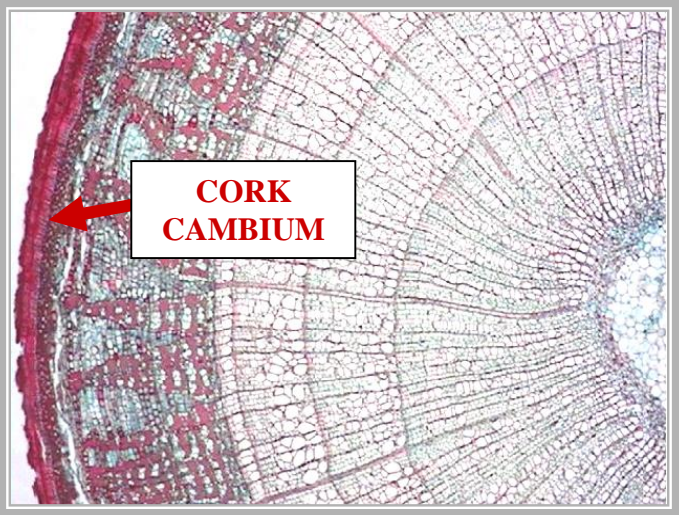


**CORK
CAMBIUM**

DICOT ~ 2 STEM



CELL

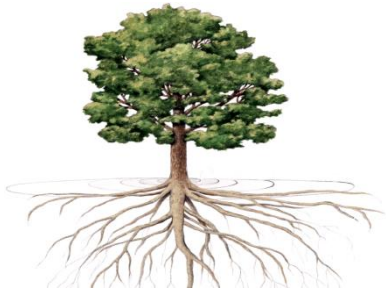


**CORK
CAMBIUM**

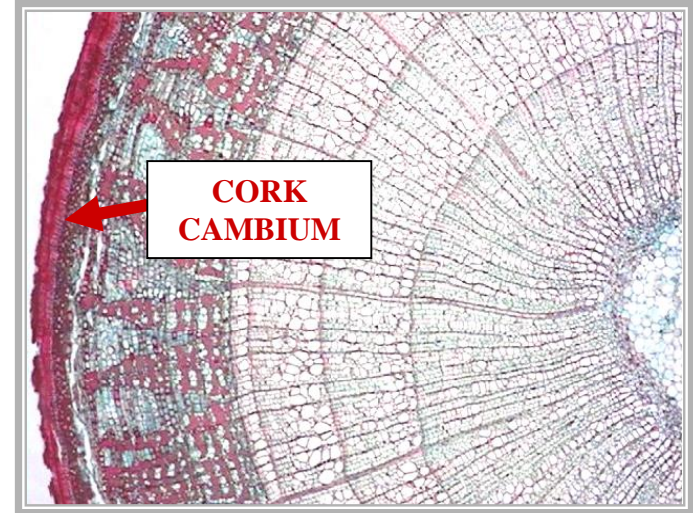
**CORK
CAMBIUM**

PC

C.S.



CELL



**PARENCHYMA
INITIALS**

**PARENCHYMA
INITIALS**

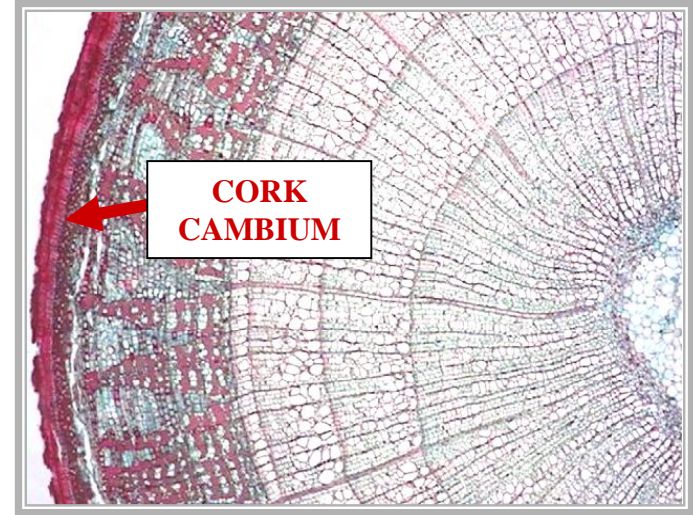
M

DICOT ~ 2 STEM

C.S.



CELL



**CORK
CAMBIUM**

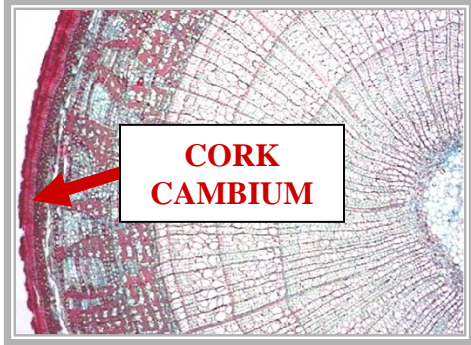
MITOSIS

MITOSIS

DICOT ~ 2 STEM

C.S.

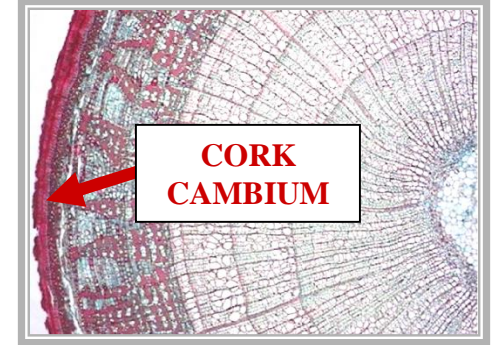
**OUTSIDE
CORK
CAMBIUM**



**CORK
CAMBIUM**

CELL

**INSIDE
CORK
CAMBIUM**



**CORK
CAMBIUM**

MITOSIS

OUTSIDE

**DERIVATIVE
PARENCHYMA
CELLS**

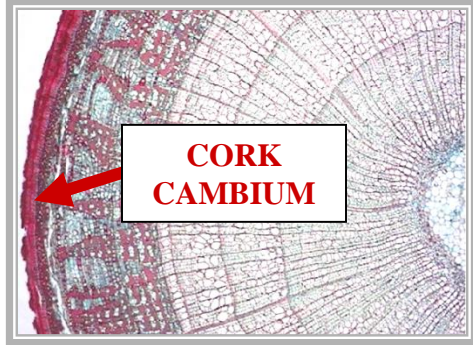
DICOT ~ 2 STEM

**CORK
CAMBIUM**

C.S.



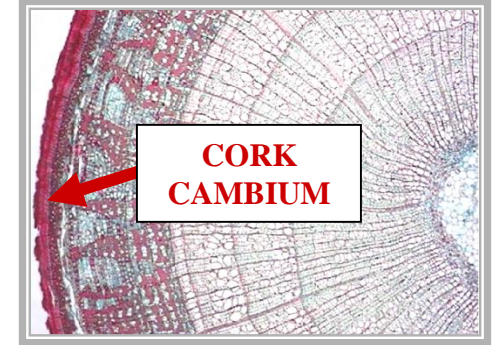
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CAMBIUM**



**CORK
CAMBIUM**

CELL

**INSIDE
CORK
CAMBIUM**



**CORK
CAMBIUM**

MITOSIS

OUTSIDE

INSIDE

**DERIVATIVE
PARENCHYMA
CELLS**

**DERIVATIVE
PARENCHYMA
CELLS**

DICOT ~ 2 STEM

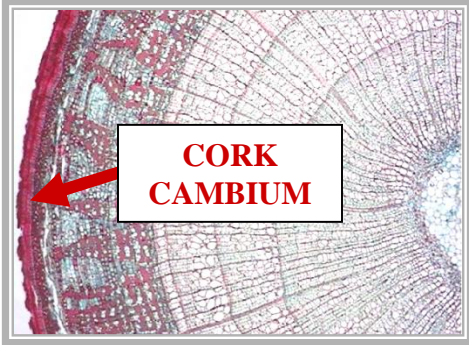
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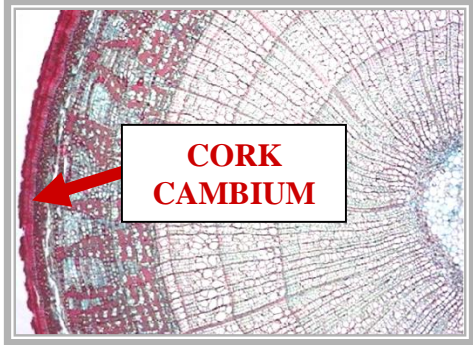
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CAMBIUM**



**INSIDE
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CAMBIUM**



OUTSIDE

**DERIVATIVE
PARENCHYMA
CELLS**

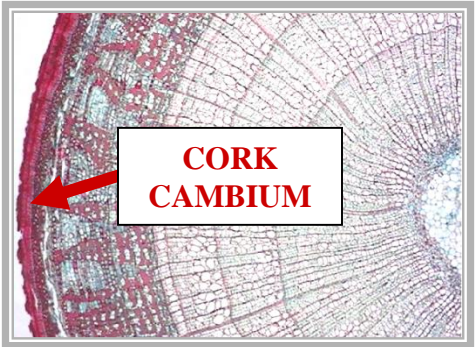
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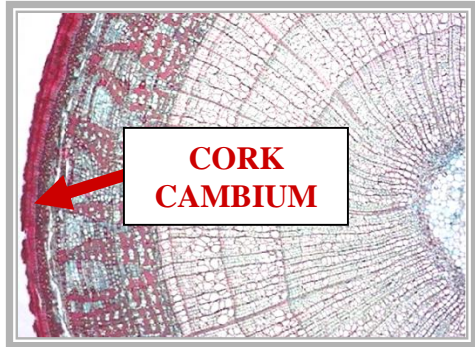
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**OUTSIDE
CORK
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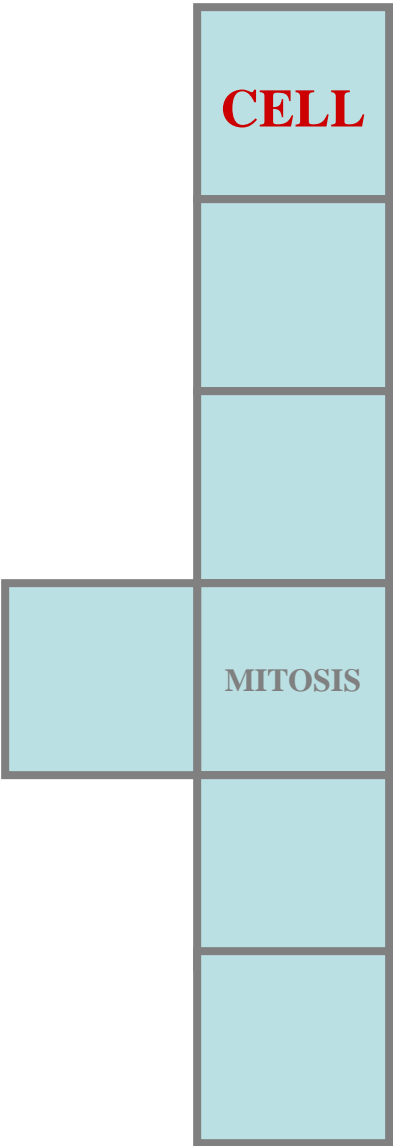
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OUTSIDE

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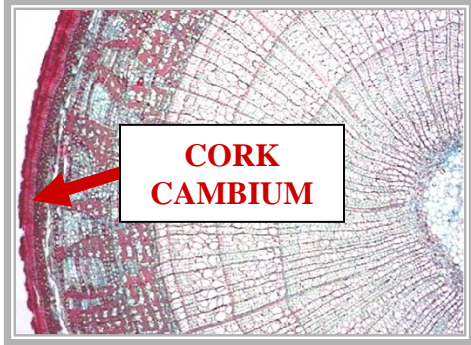
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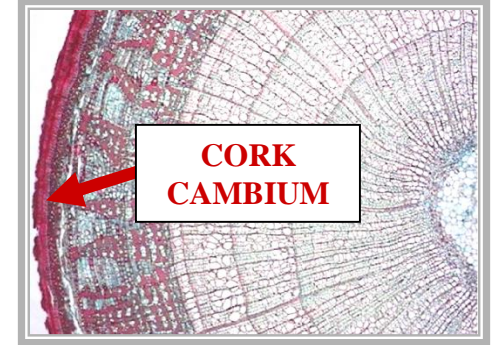
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**CORK
CAMBIUM**

CELL

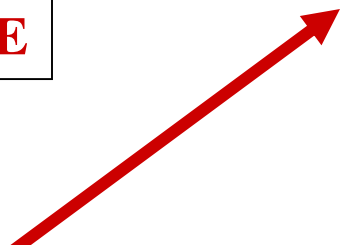
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CAMBIUM**



**CORK
CAMBIUM**

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OUTSIDE



CORK

MITOSIS

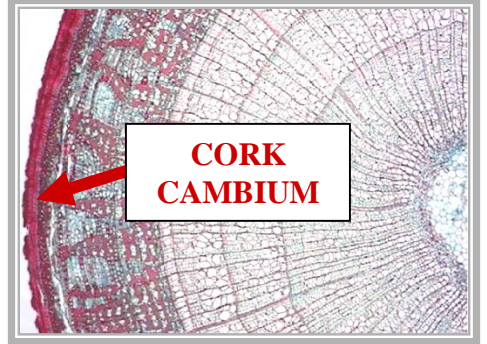
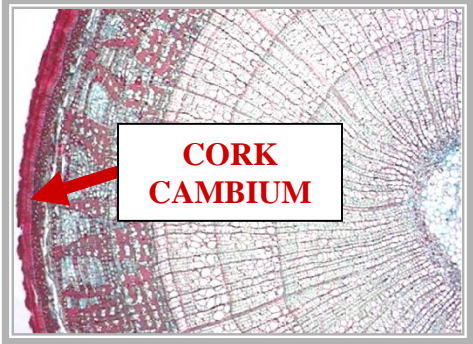
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CAMBIUM**

DICOT ~ 2 STEM

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**OUTSIDE
CORK
CAMBIUM**

**INSIDE
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**CORK
CAMBIUM**

**CORK
CAMBIUM**

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INSIDE

CORK

**DERIVATIVE
PARENCHYMA
CELLS**

DICOT ~ 2 STEM

**CORK
CAMBIUM**

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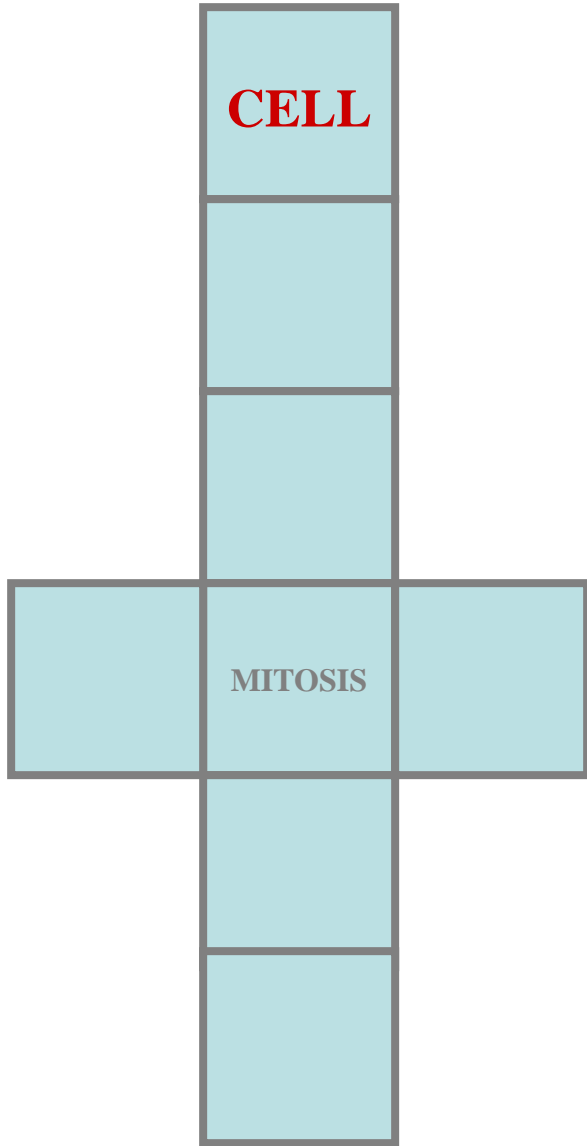
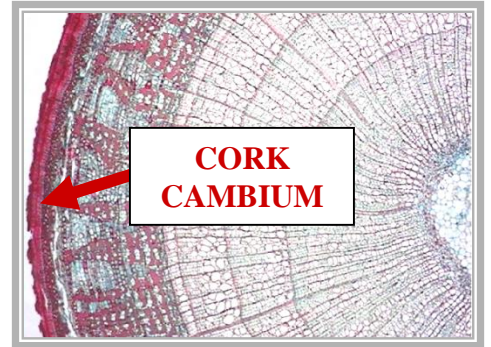
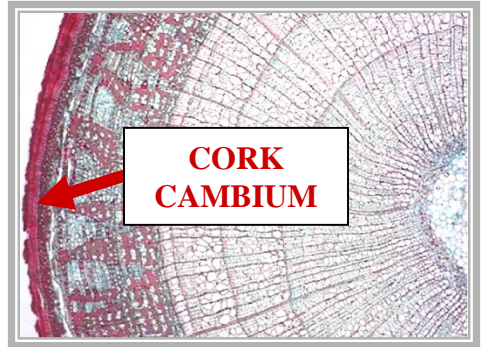


MITOSIS

CELL

**OUTSIDE
CORK
CAMBIUM**

**INSIDE
CORK
CAMBIUM**



OUTSIDE

INSIDE

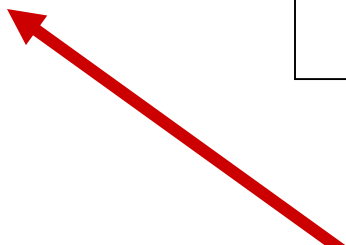
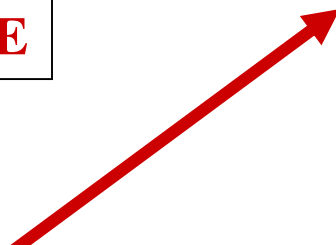
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DIFFERENTIATE

DICOT ~ 2 STEM

**CORK
CAMBIUM**

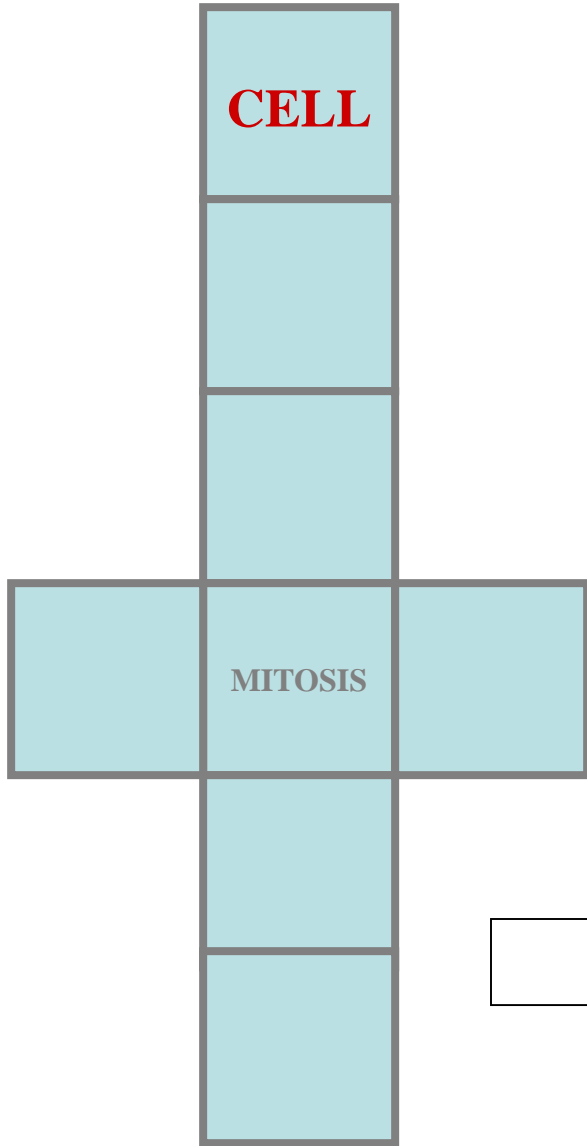
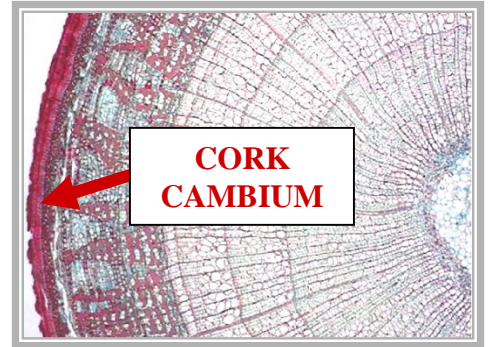
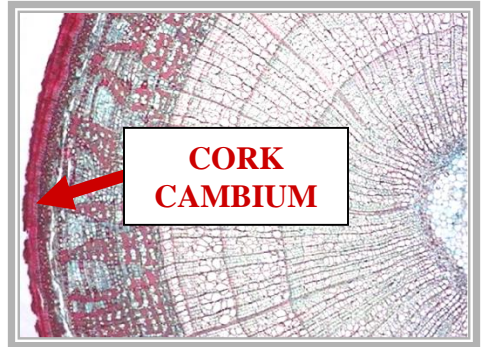
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CAMBIUM**

**INSIDE
CORK
CAMBIUM**



OUTSIDE

INSIDE

CORK

PHELLODERM

DICOT ~ 2 STEM

**CORK
CAMBIUM**

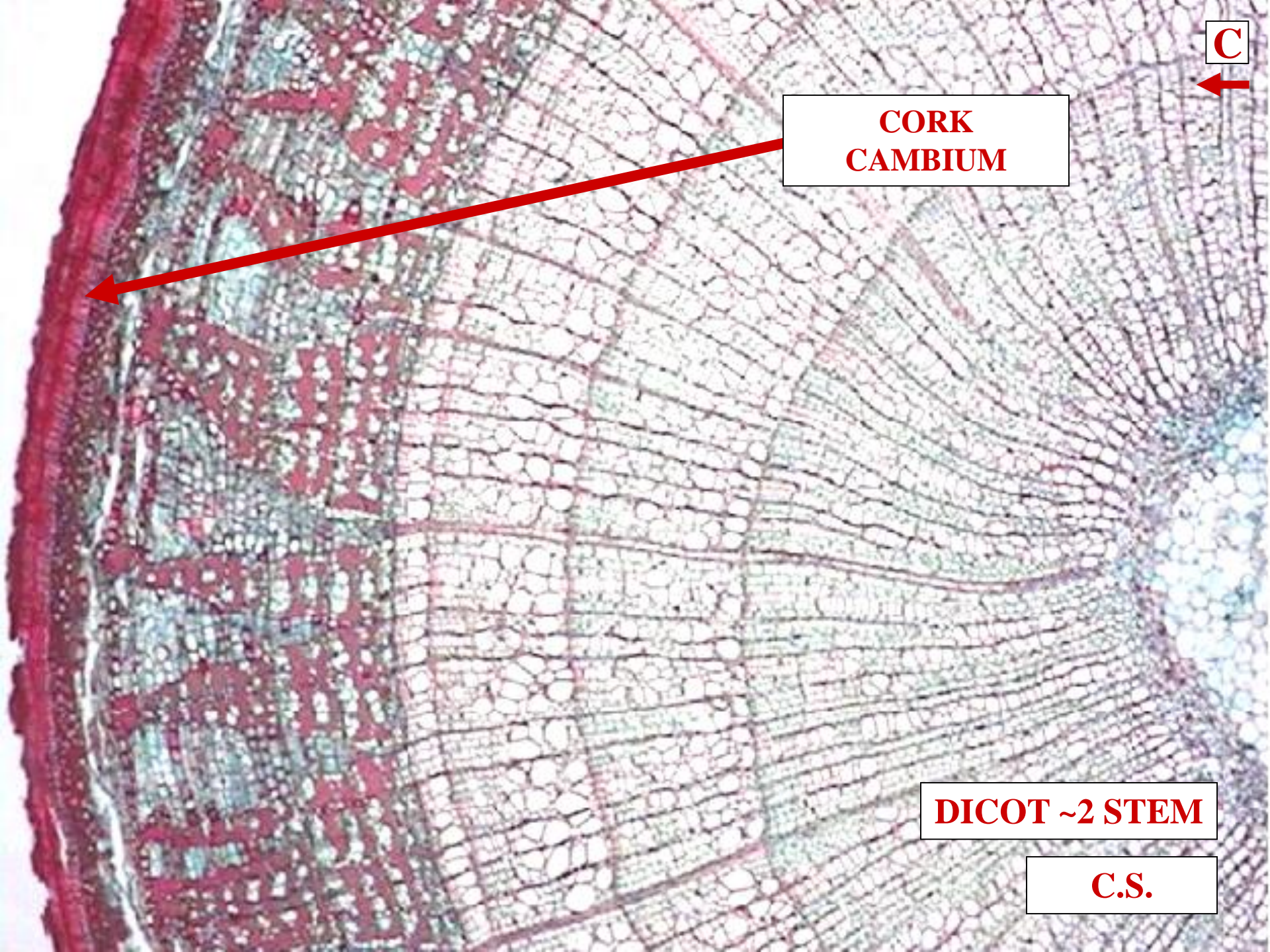
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SUMMARY



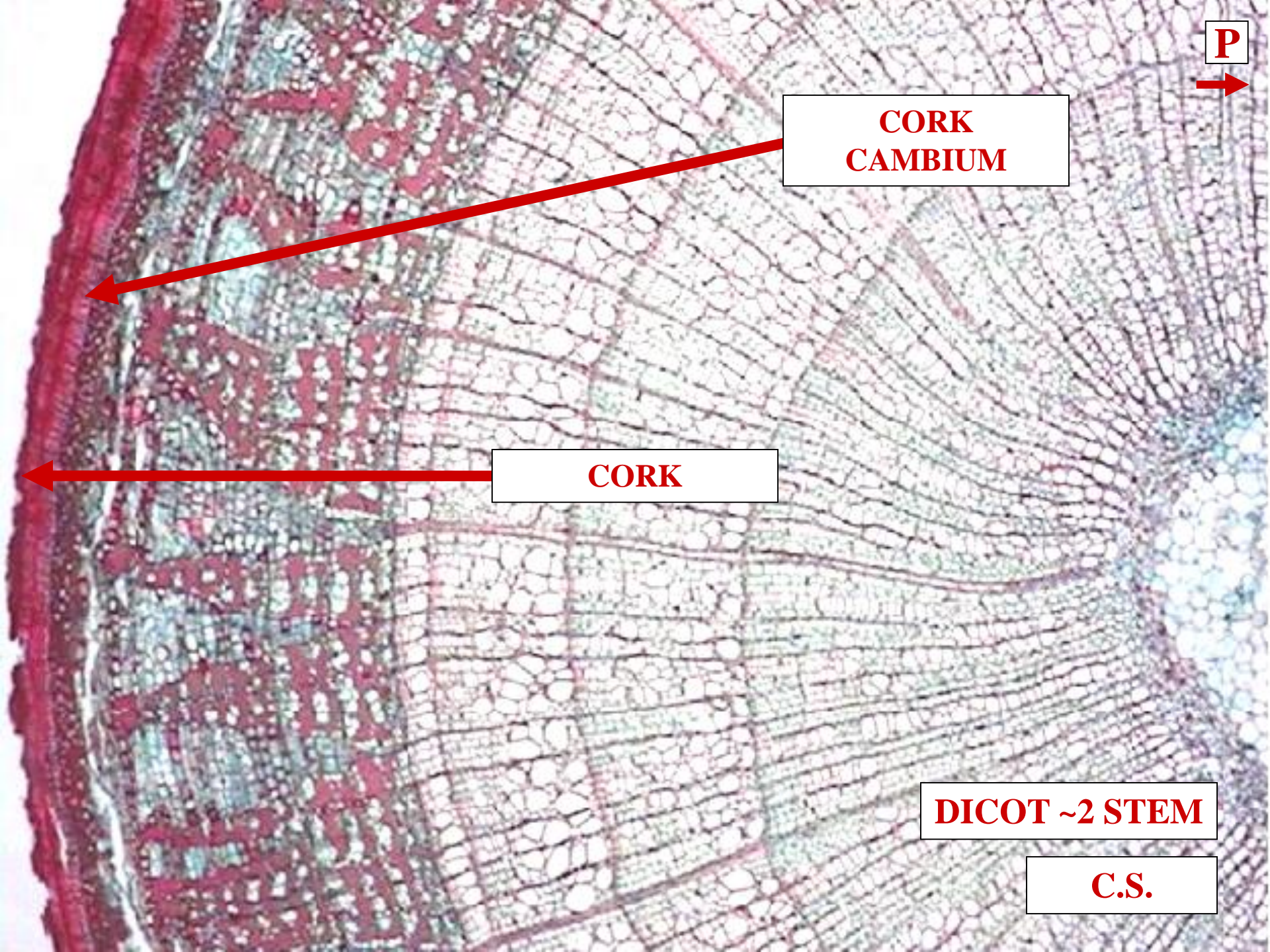
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CAMBIUM**

DICOT ~2 STEM

C.S.



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**CORK
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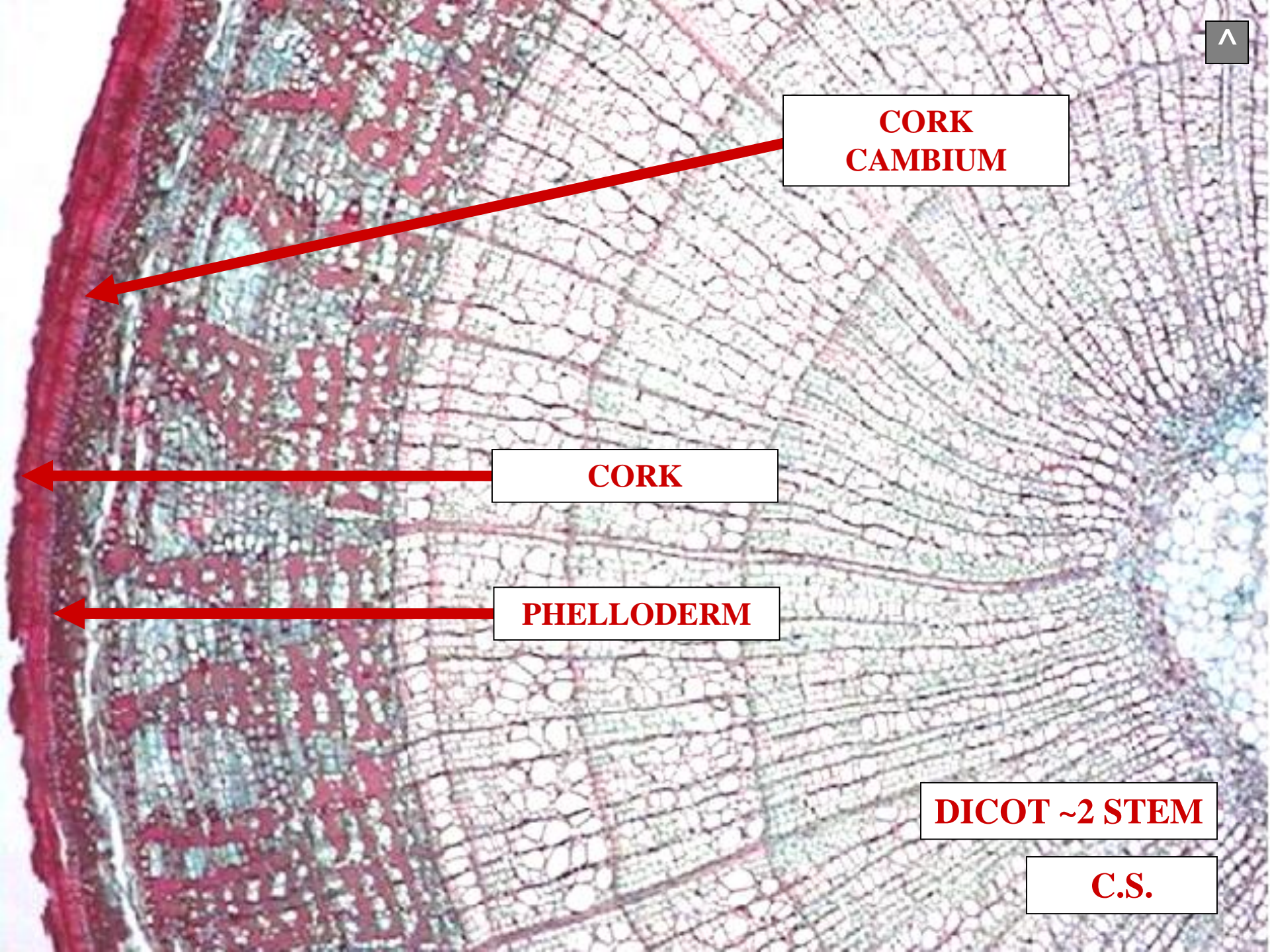


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DICOT ~2 STEM

C.S.



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CORK



PHELLODERM



DICOT ~2 STEM

C.S.

**CORK
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ORIGIN**

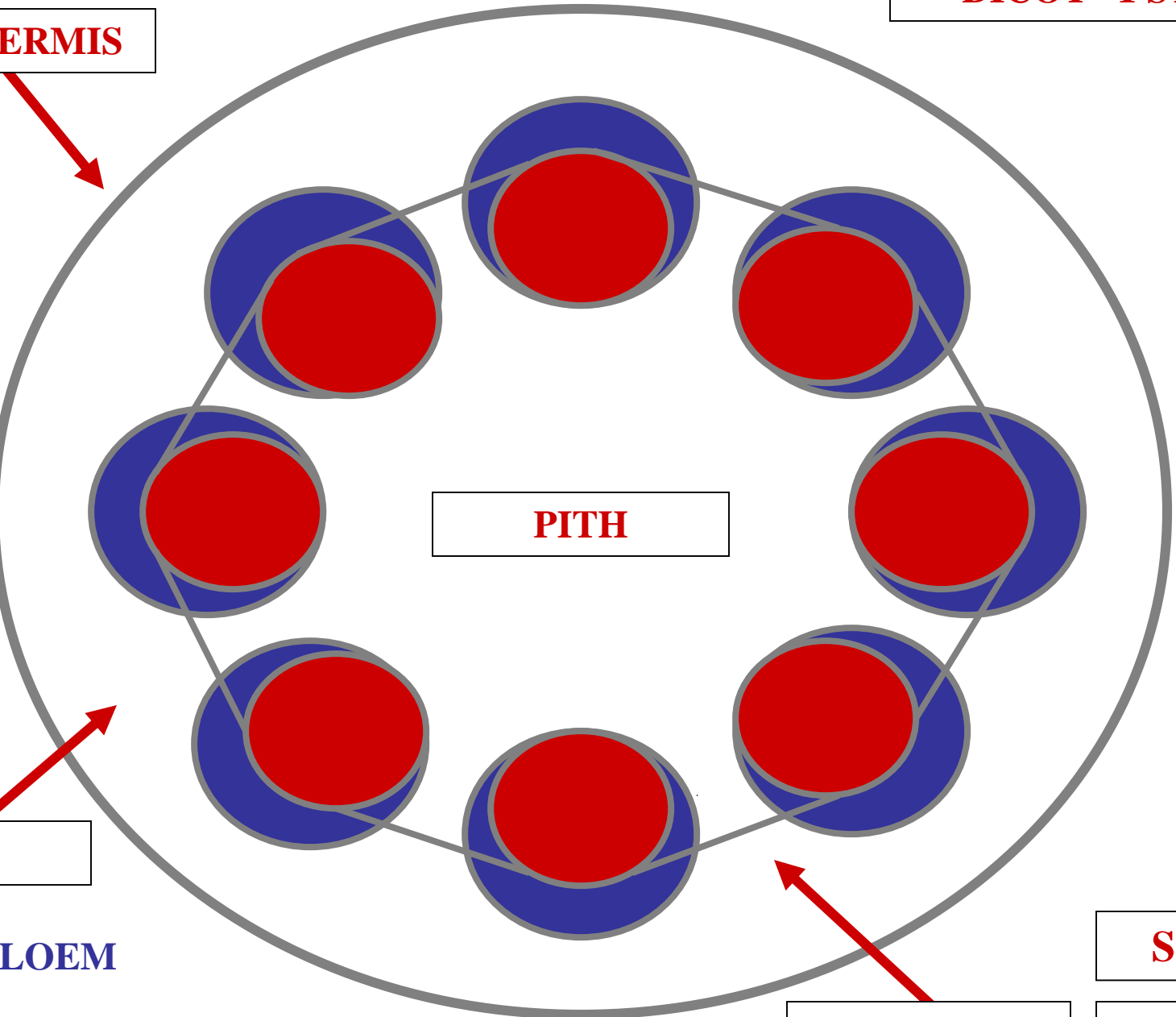


CORK
CAMBIUM
ORIGIN
STEM

DICOT ~1 STEM

C

EPIDERMIS



PITH

?

PHLOEM

XYLEM

STEM

PITH RAY

C.S.

DICOT ~1 STEM

CC

EPIDERMIS



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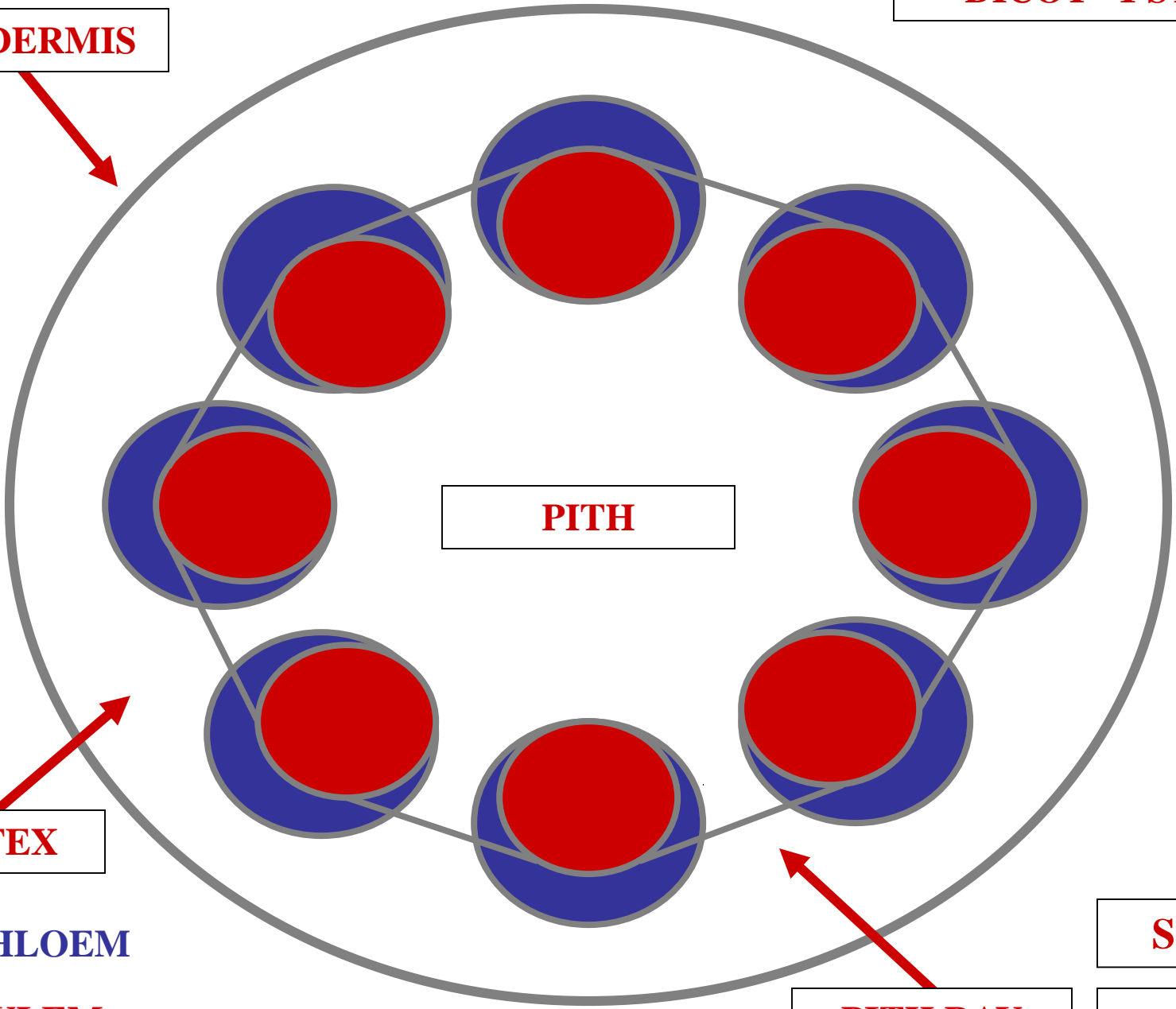
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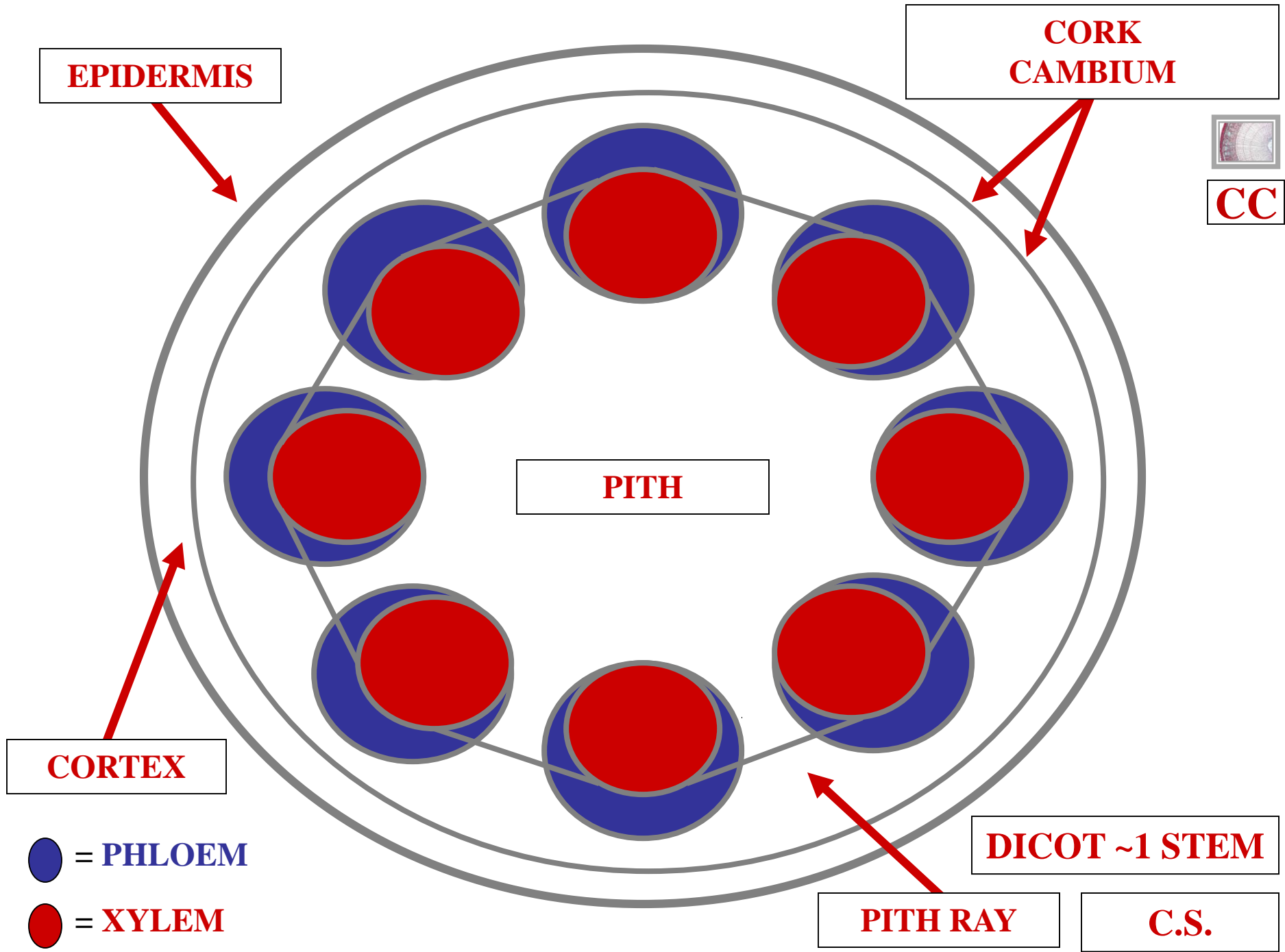
STEM

PITH RAY

C.S.

-  = **PHLOEM**
-  = **XYLEM**







**CORK
CAMBIUM**

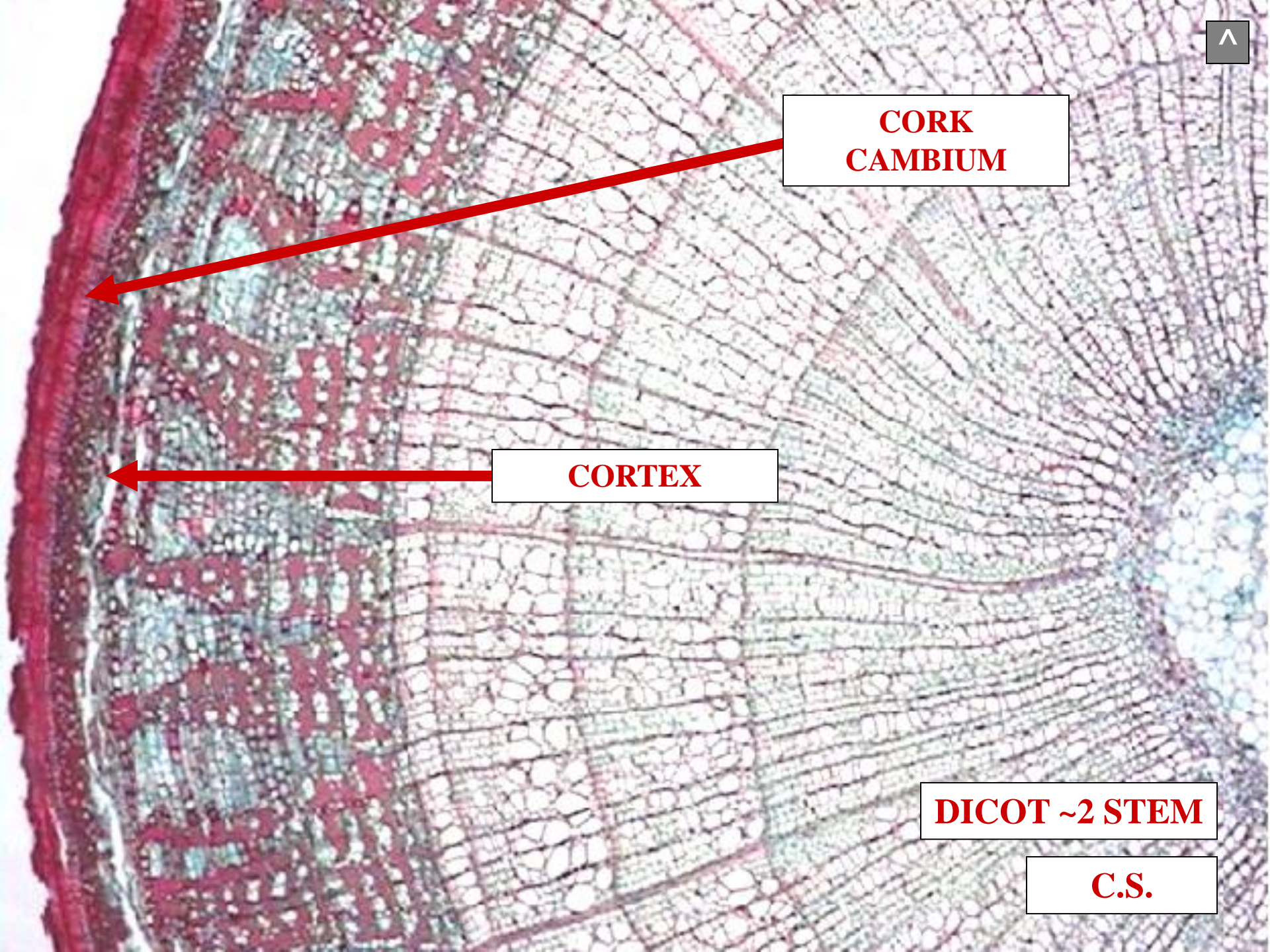


CORTEX



DICOT ~2 STEM

C.S.





CORK
CAMBIUM
ORIGIN
ROOT

DICOT ~1 ROOT

EPIDERMIS

VASCULAR STELE

CORTEX

ENDODERMIS

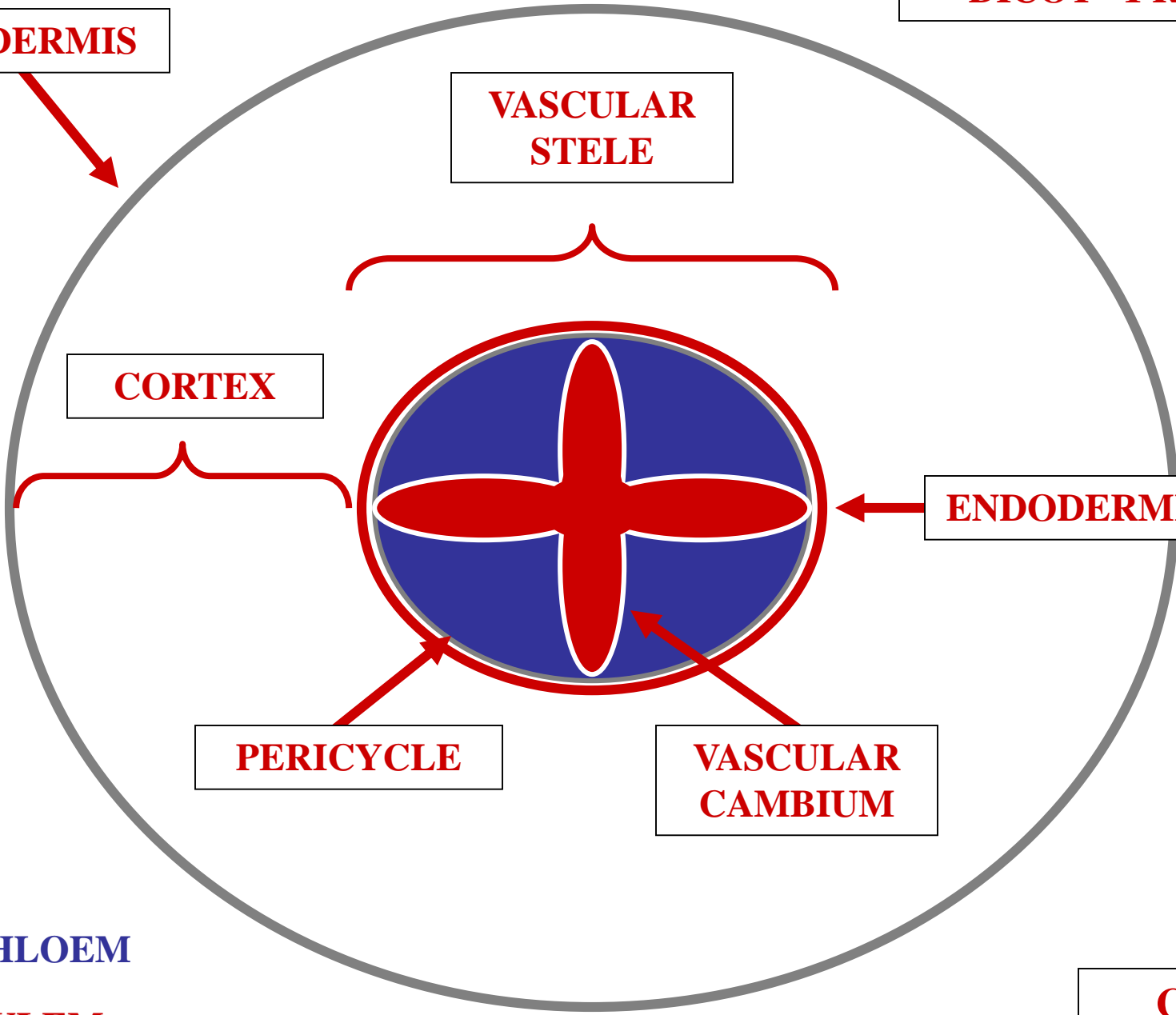
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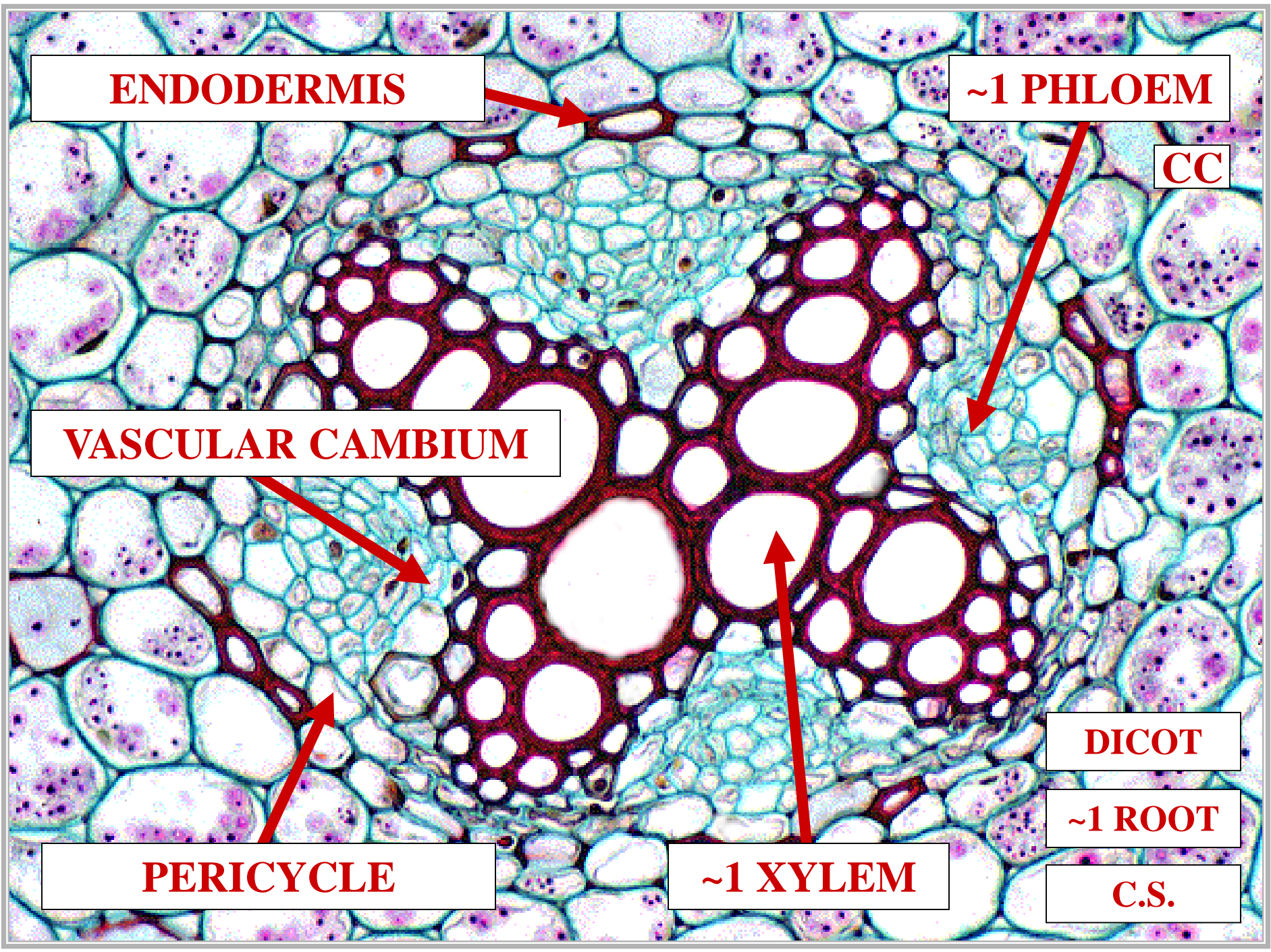
VASCULAR CAMBIUM

C.S.

● = PHLOEM

● = XYLEM





ENDODERMIS

~1 PHLOEM

CC

VASCULAR CAMBIUM

PERICYCLE

~1 XYLEM

DICOT

~1 ROOT

C.S.

ENDODERMIS

~1 PHLOEM

VASCULAR CAMBIUM

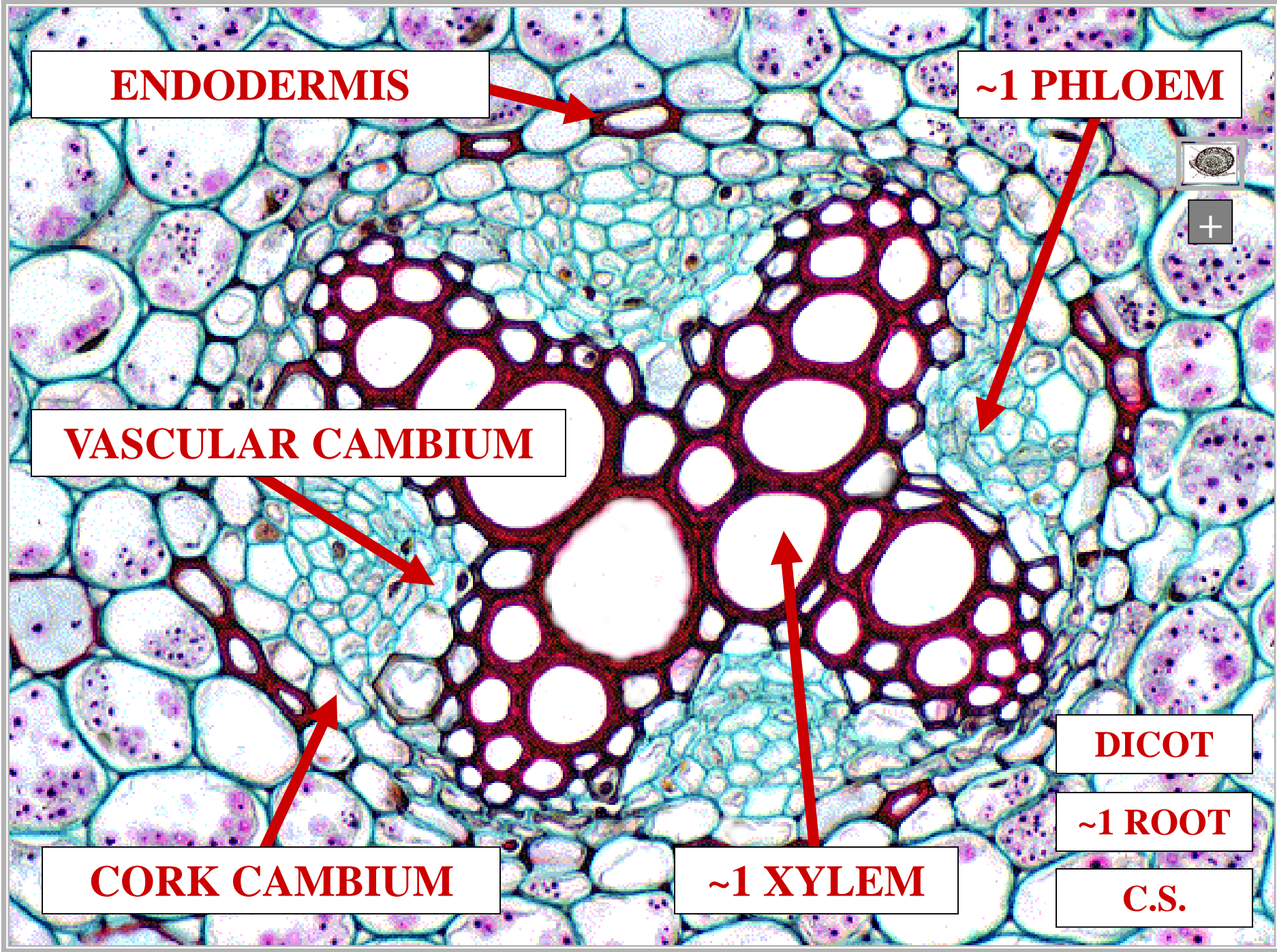
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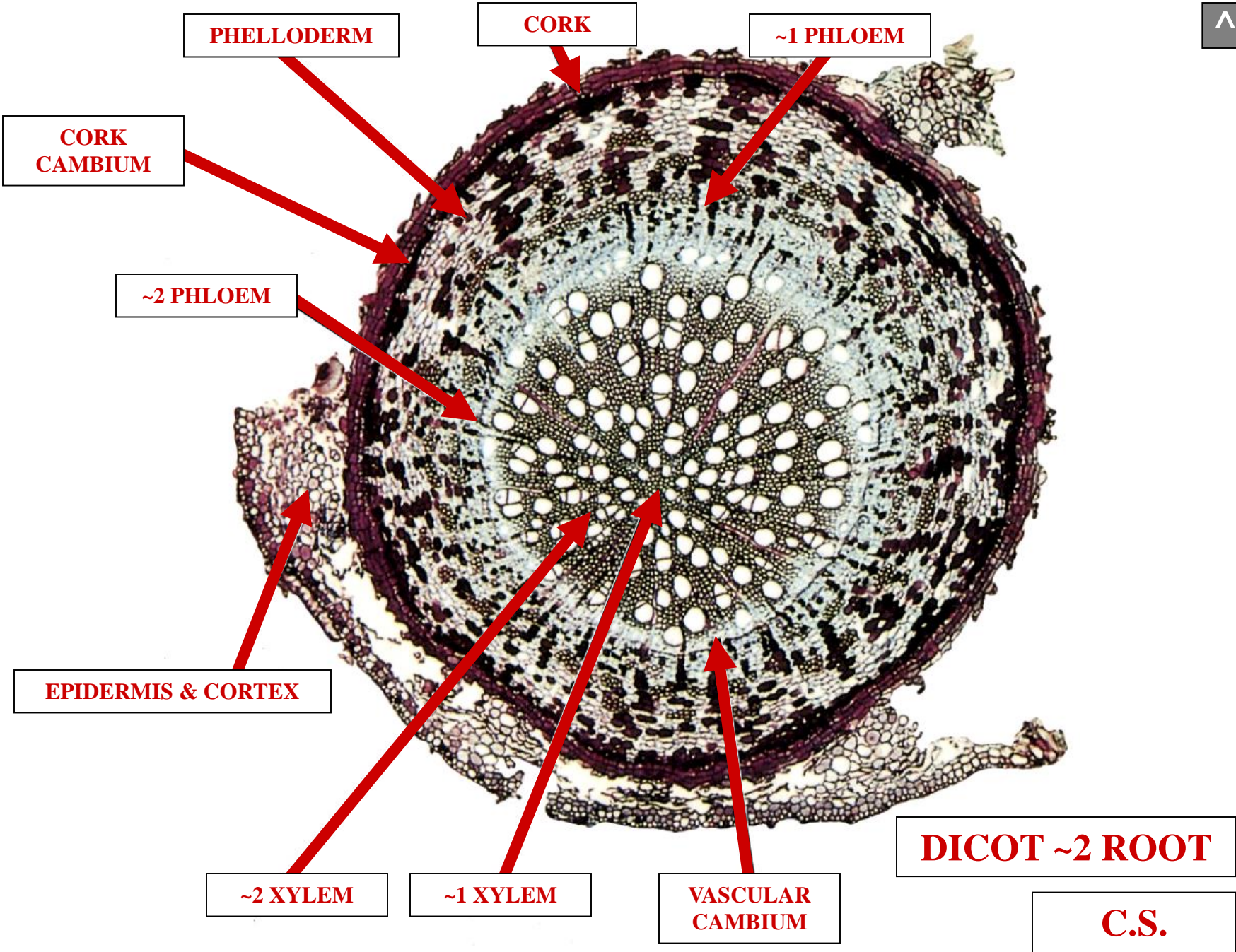
~1 XYLEM

DICOT

~1 ROOT

C.S.

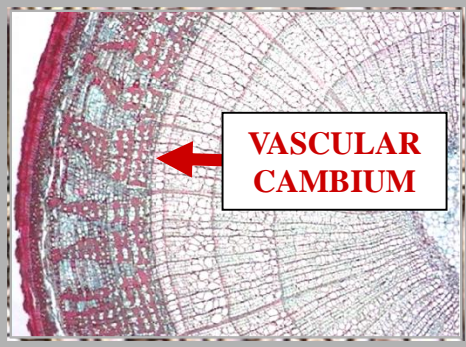






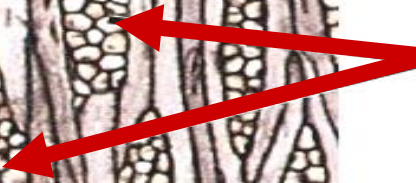
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CORK CAMBIUM INITIALS

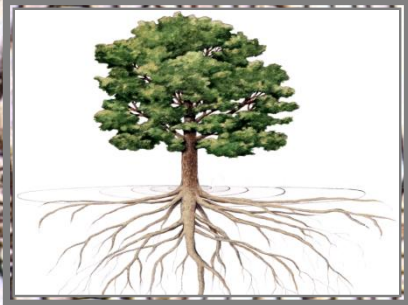


**VASCULAR
CAMBIUM**

**RAY
INITIALS**

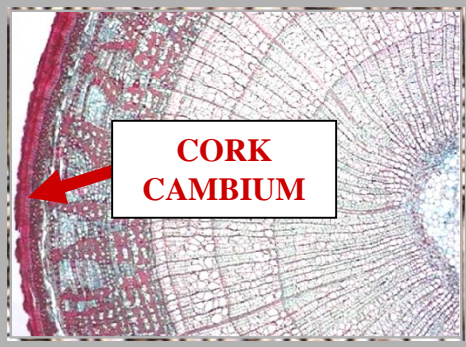


**FUSIFORM
INITIALS**



VASCULAR CAMBIUM

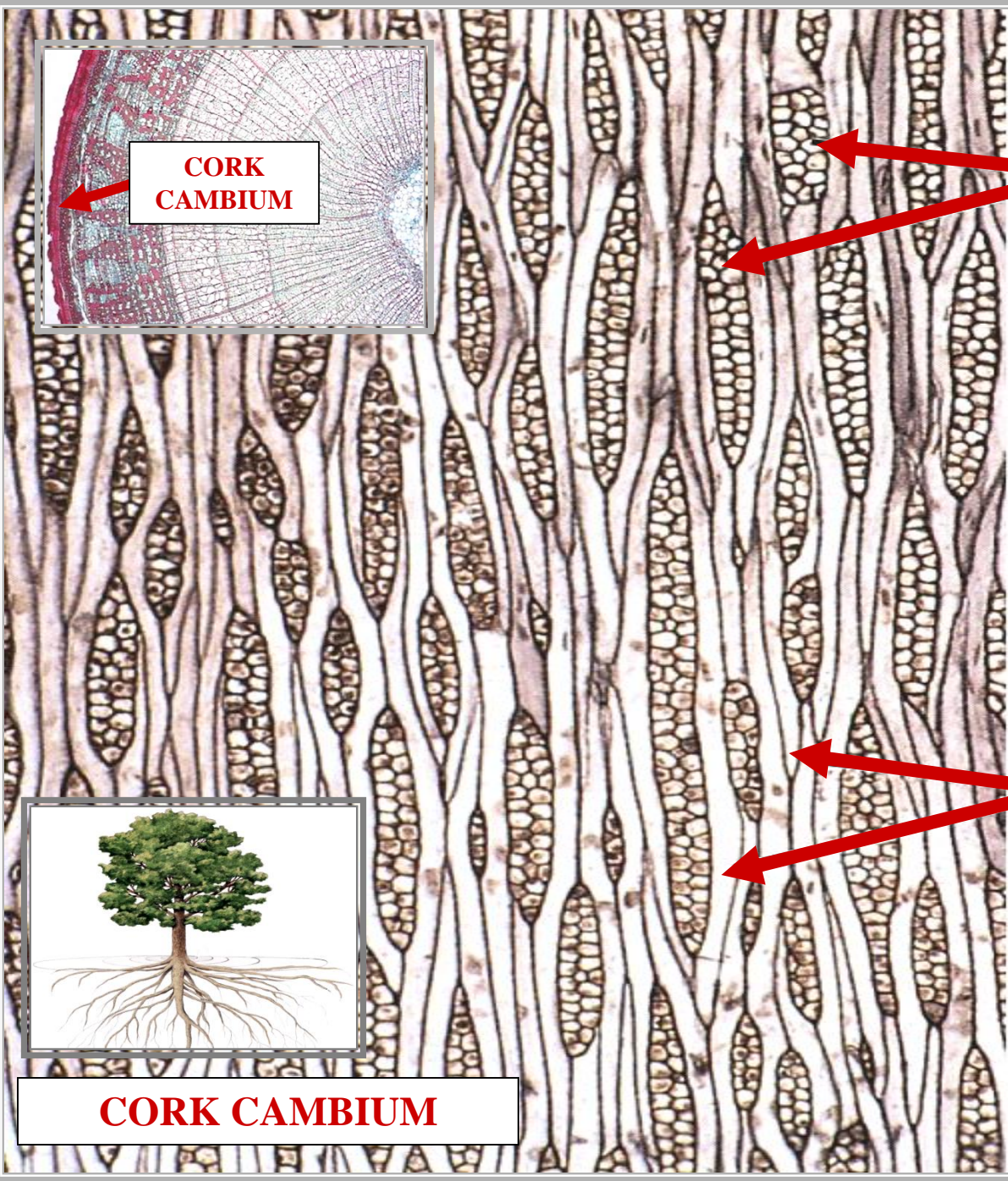
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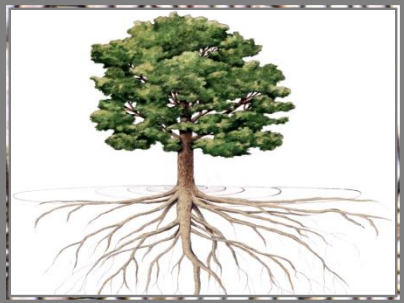
**CORK
CAMBIUM**



**RAY
INITIALS**



**FUSIFORM
INITIALS
ONLY**

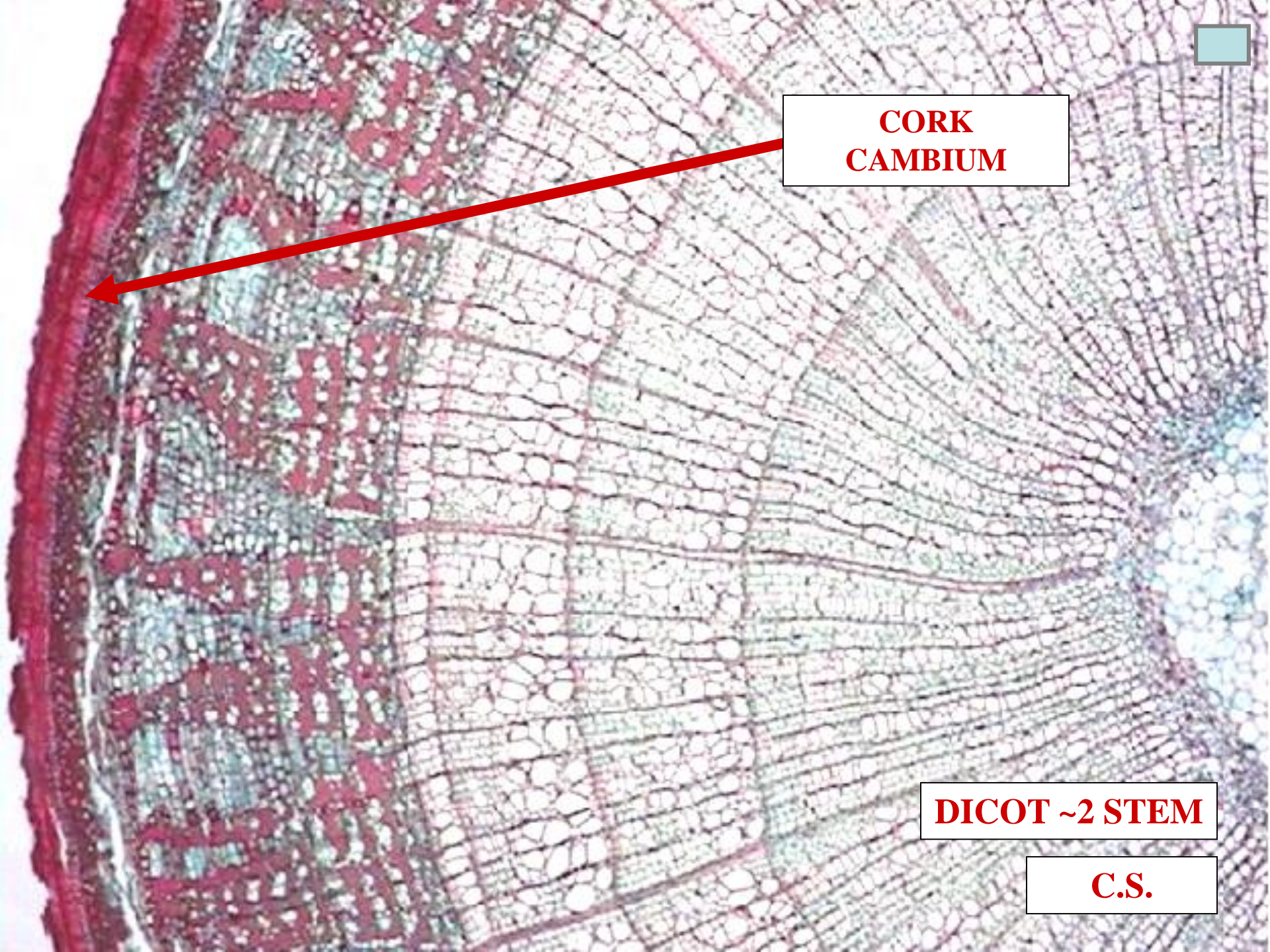


CORK CAMBIUM

L.S.



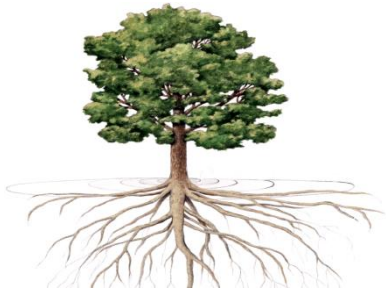
CORK CAMBIUM ACTIVITY



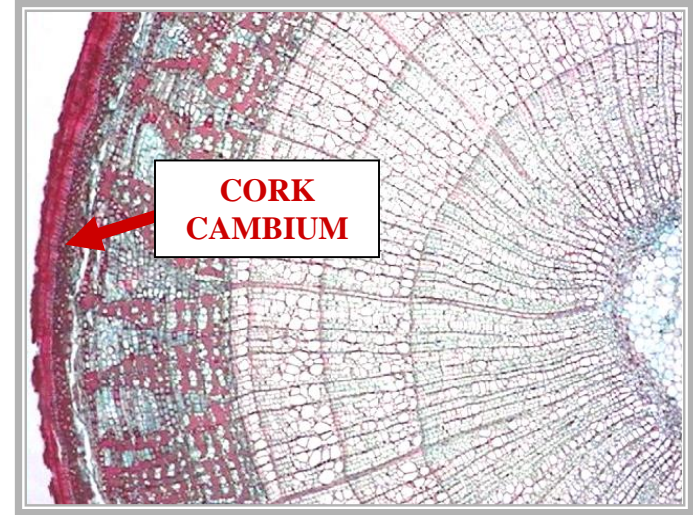
**CORK
CAMBIUM**

DICOT ~2 STEM

C.S.



CELL



**CORK
CAMBIUM**

**CORK
CAMBIUM**

**CORK
CAMBIUM**

PC

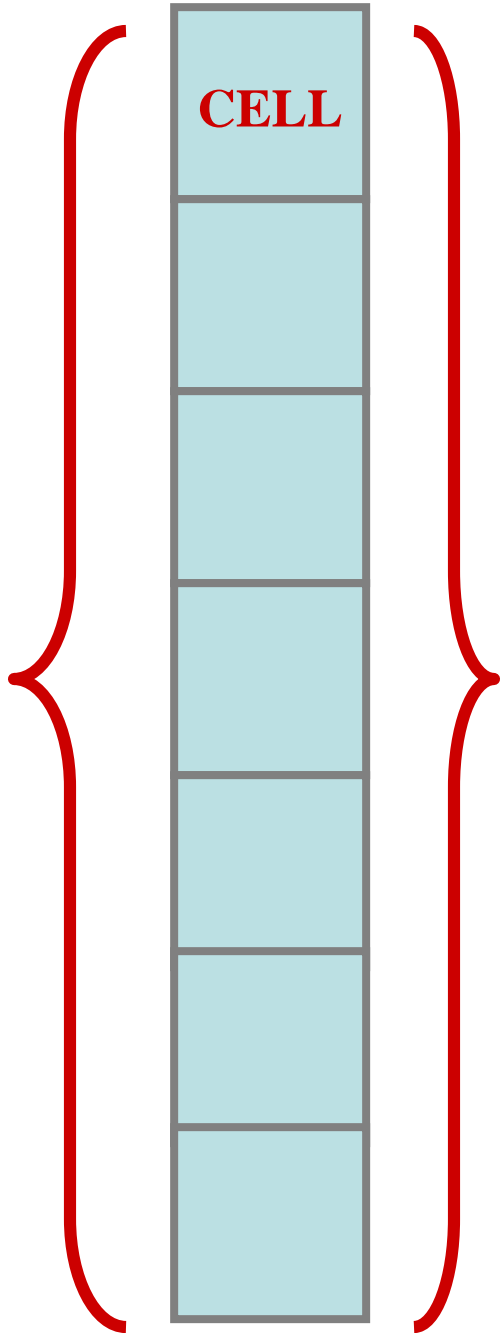
DICOT ~ 2 STEM

C.S.

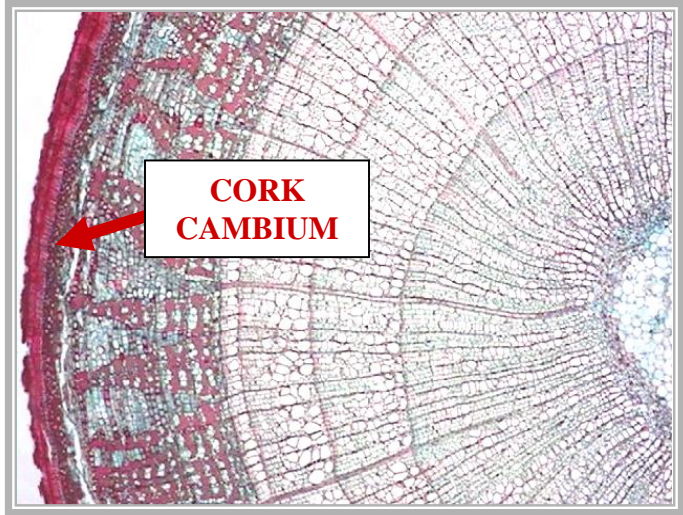


**PARENCHYMA
CELL INITIALS**

DICOT ~ 2 STEM



CELL



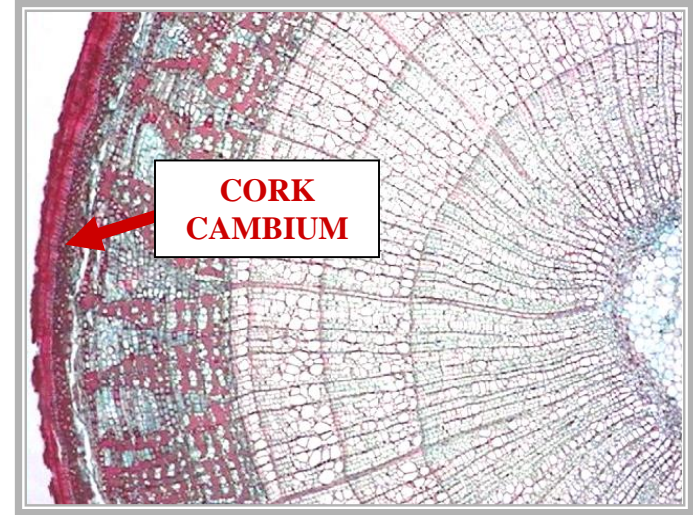
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CELL INITIALS**

M

C.S.



CELL



**CORK
CAMBIUM**

MITOSIS

MITOSIS

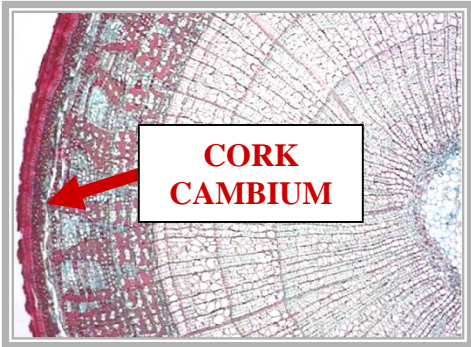
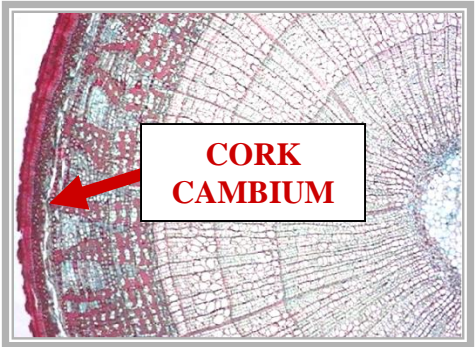
DICOT ~ 2 STEM

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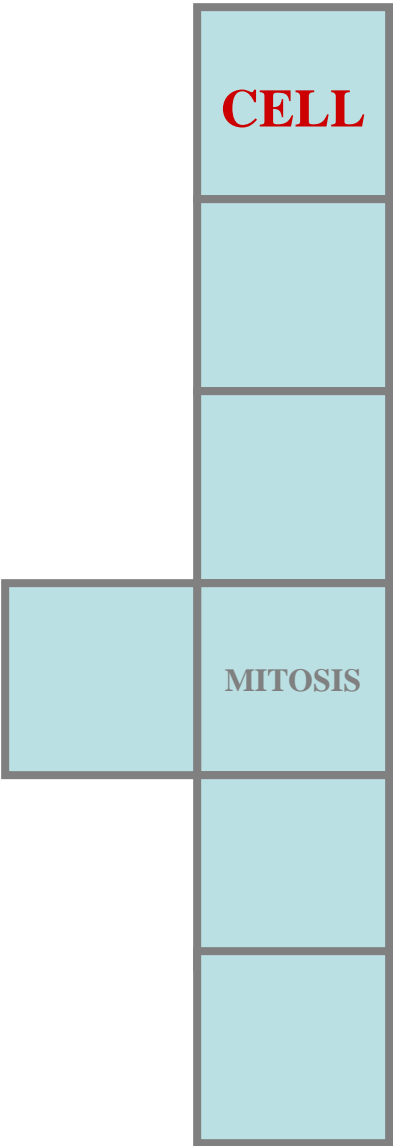
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CAMBIUM**



OUTSIDE

**DERIVATIVE
PARENCHYMA
CELLS**

DICOT ~ 2 STEM

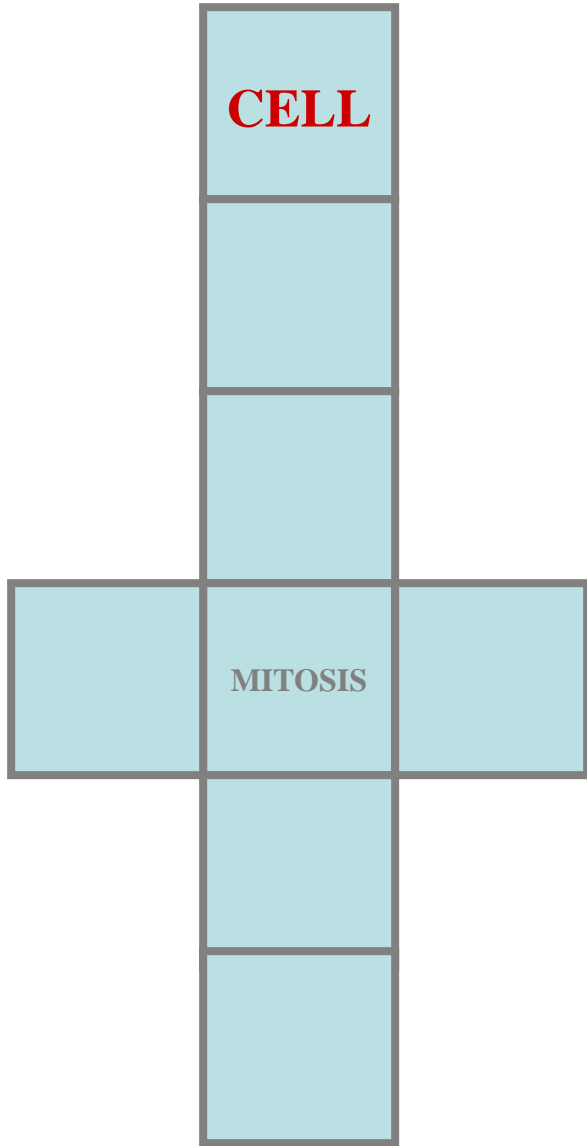
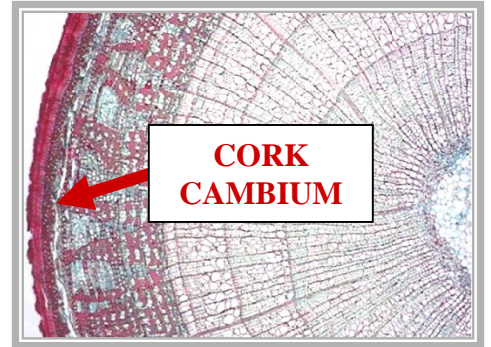
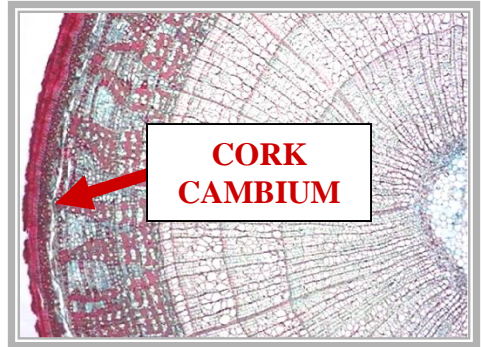


**CORK
CAMBIUM**

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**OUTSIDE
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CAMBIUM**

**INSIDE
CORK
CAMBIUM**



OUTSIDE

INSIDE

**DERIVATIVE
PARENCHYMA
CELLS**

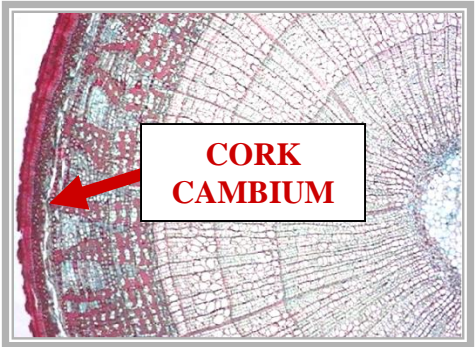
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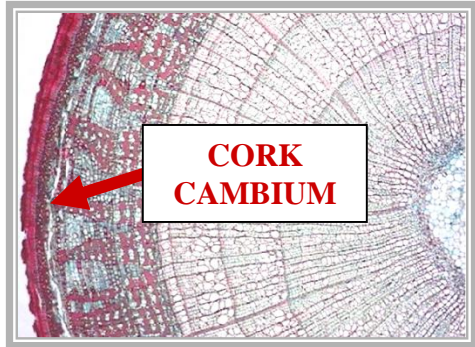
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**OUTSIDE
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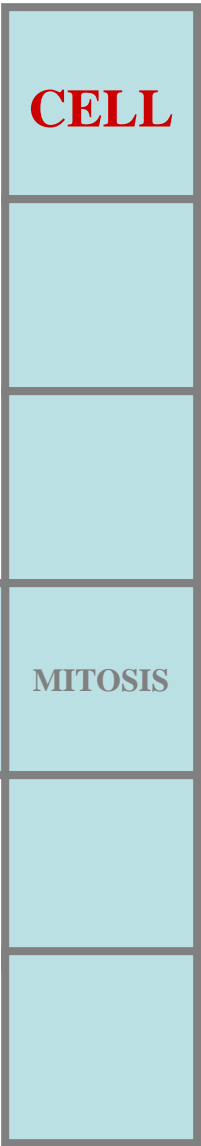
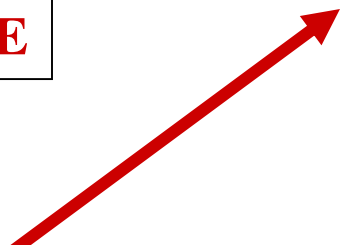


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CAMBIUM**



OUTSIDE

**DERIVATIVE
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CELLS**

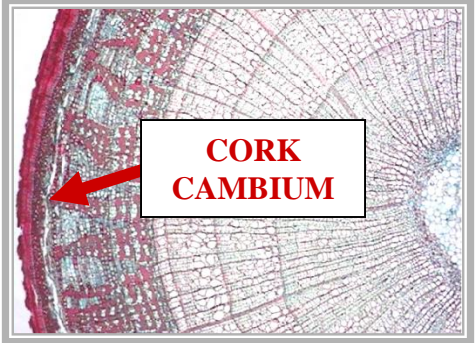


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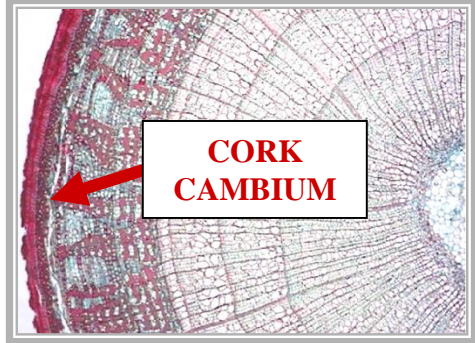
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**OUTSIDE
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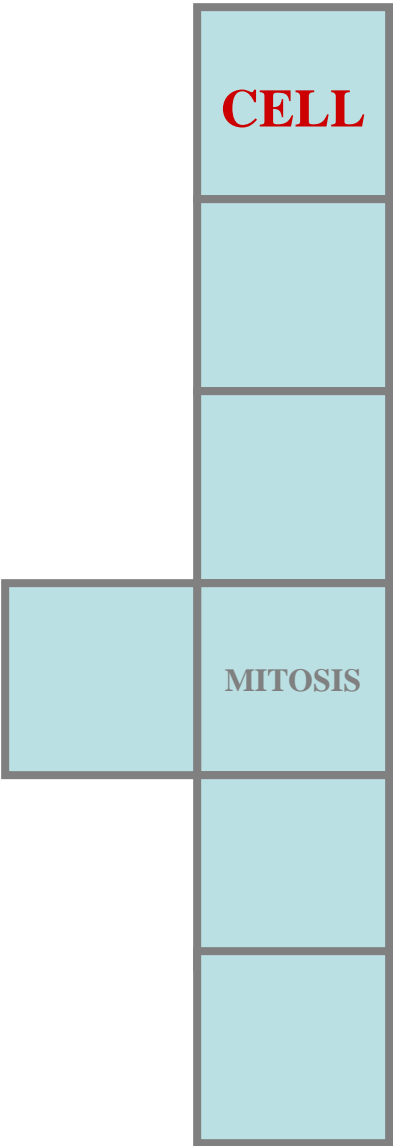
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CAMBIUM**



OUTSIDE

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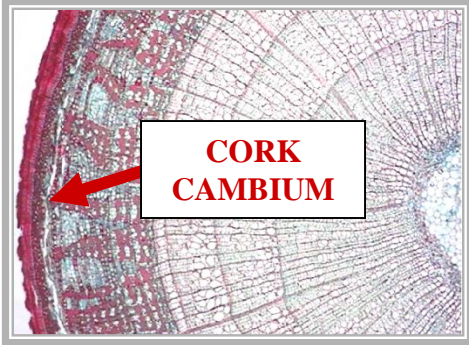
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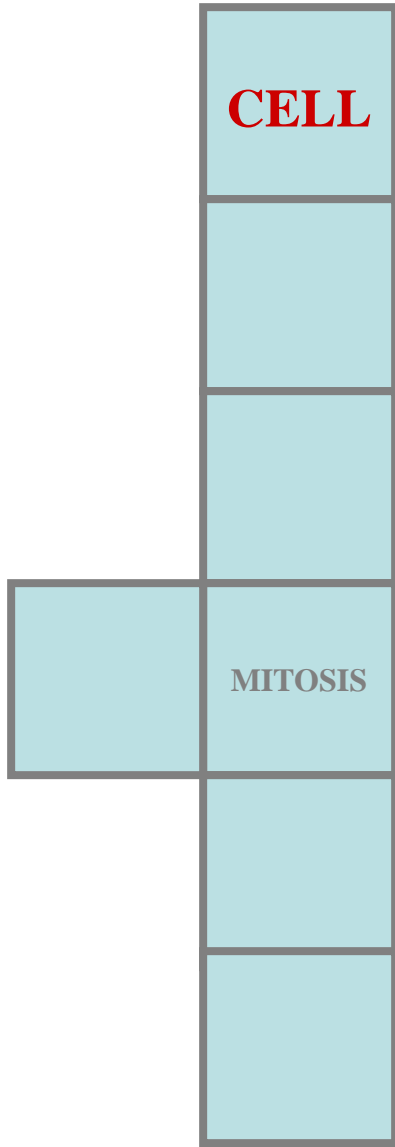


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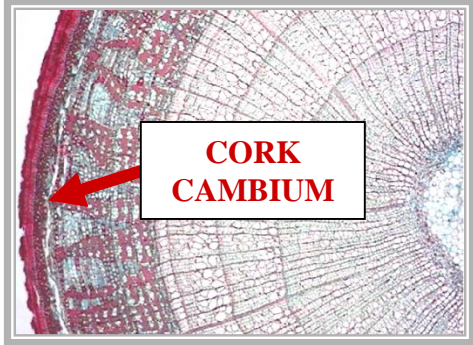
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DICOT ~ 2 STEM



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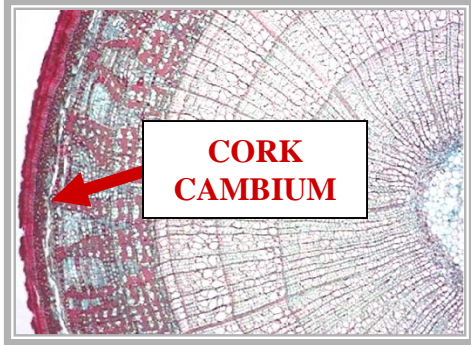
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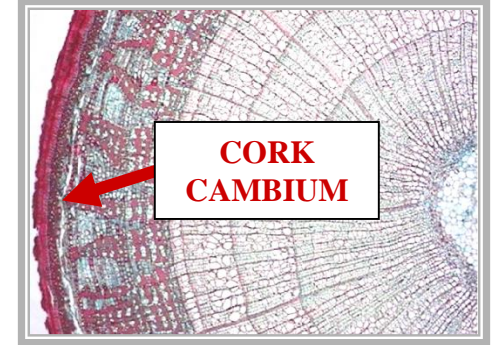
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**OUTSIDE
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CAMBIUM**



CELL

**INSIDE
CORK
CAMBIUM**



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MITOSIS

OUTSIDE

**CORK
HIGH ANNUAL
QUANTITY**

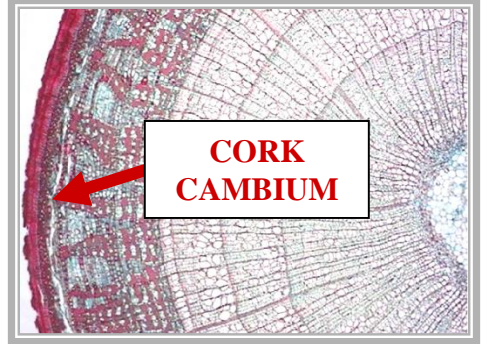
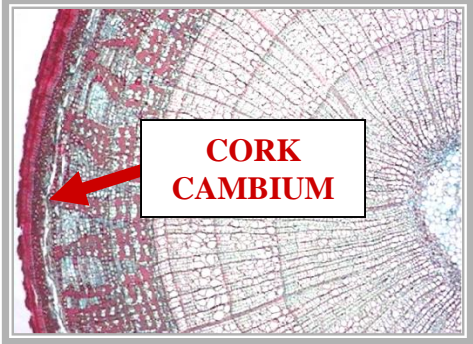
DICOT ~ 2 STEM

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CAMBIUM**

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**OUTSIDE
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CAMBIUM**

**INSIDE
CORK
CAMBIUM**



OUTSIDE

INSIDE

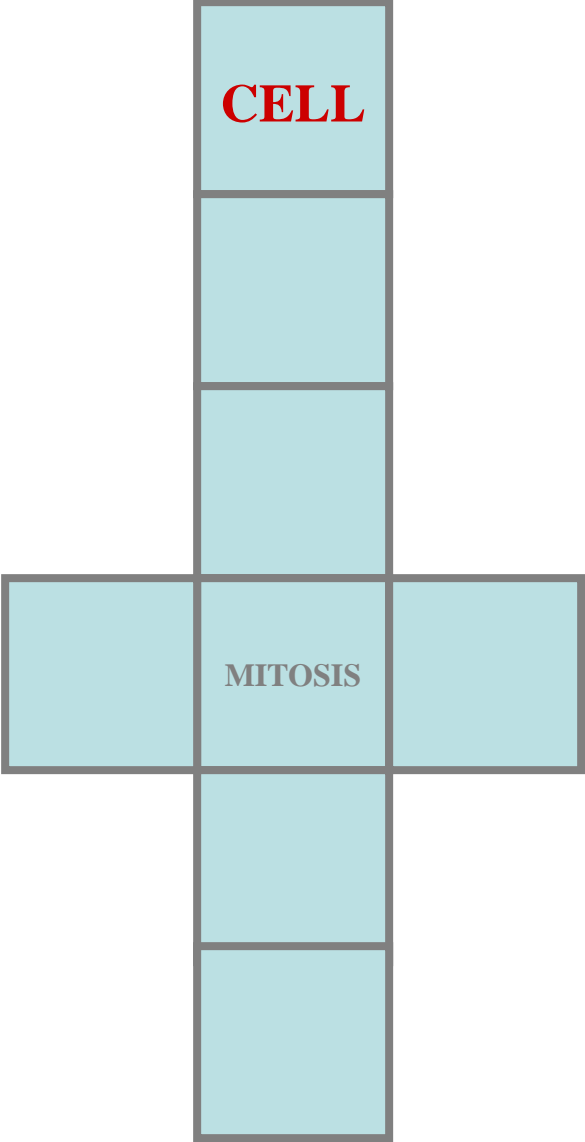
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HIGH ANNUAL
QUANTITY**

**DERIVATIVE
PARENCHYMA
CELLS**

DICOT ~ 2 STEM

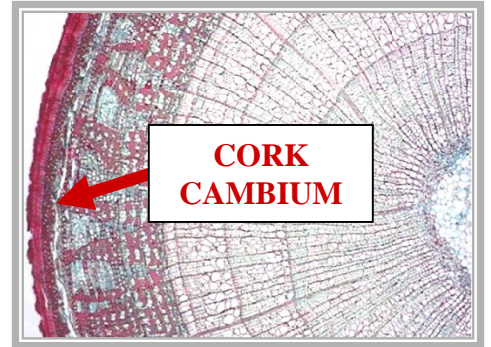
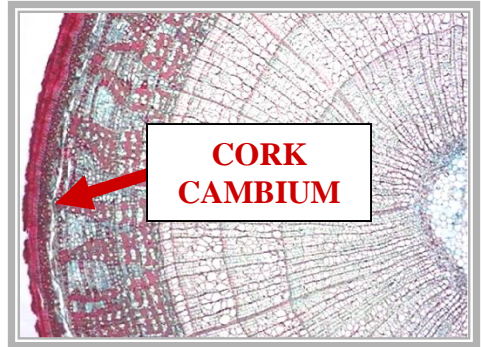
**CORK
CAMBIUM**

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**OUTSIDE
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CAMBIUM**

**INSIDE
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CAMBIUM**



**CORK
CAMBIUM**

**CORK
CAMBIUM**

OUTSIDE

INSIDE

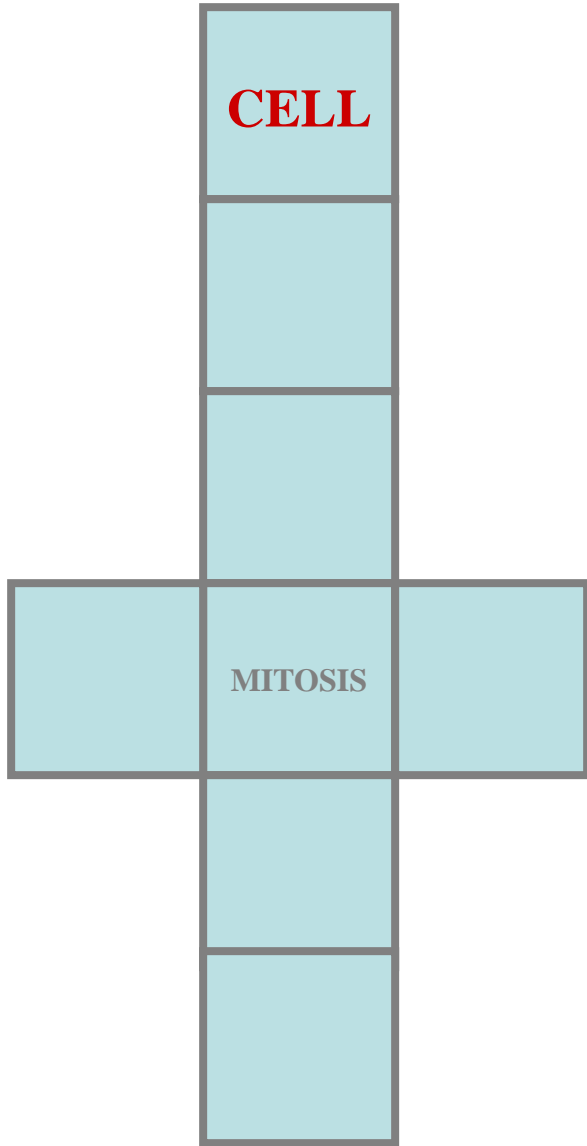
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HIGH ANNUAL
QUANTITY**

DIFFERENTIATE

DICOT ~ 2 STEM

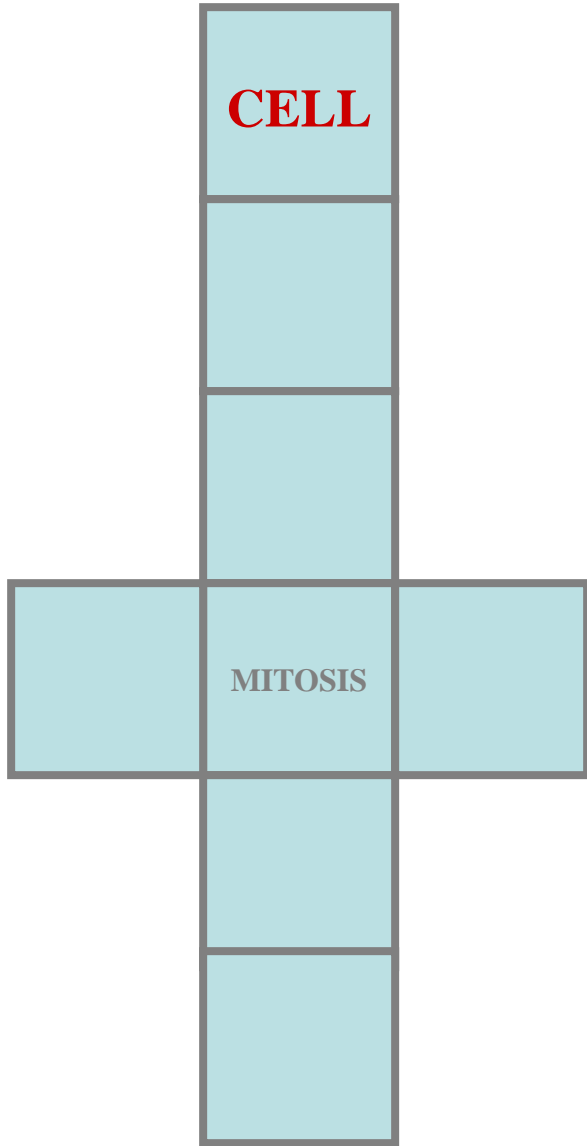
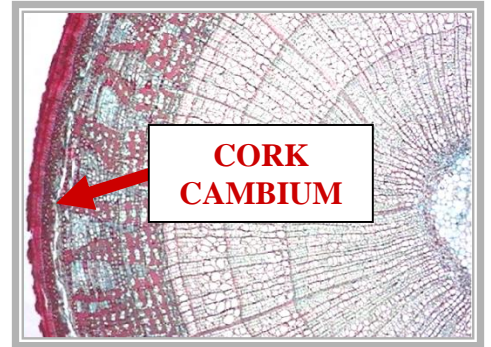
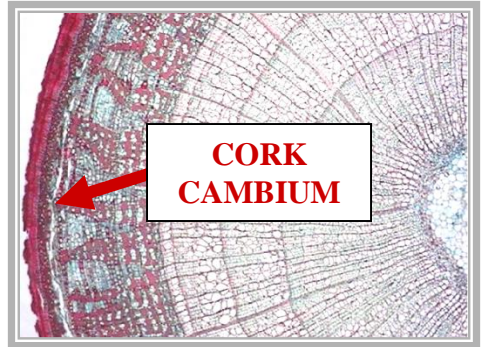
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OUTSIDE

INSIDE

**CORK
HIGH ANNUAL
QUANTITY**

PHELLODERM

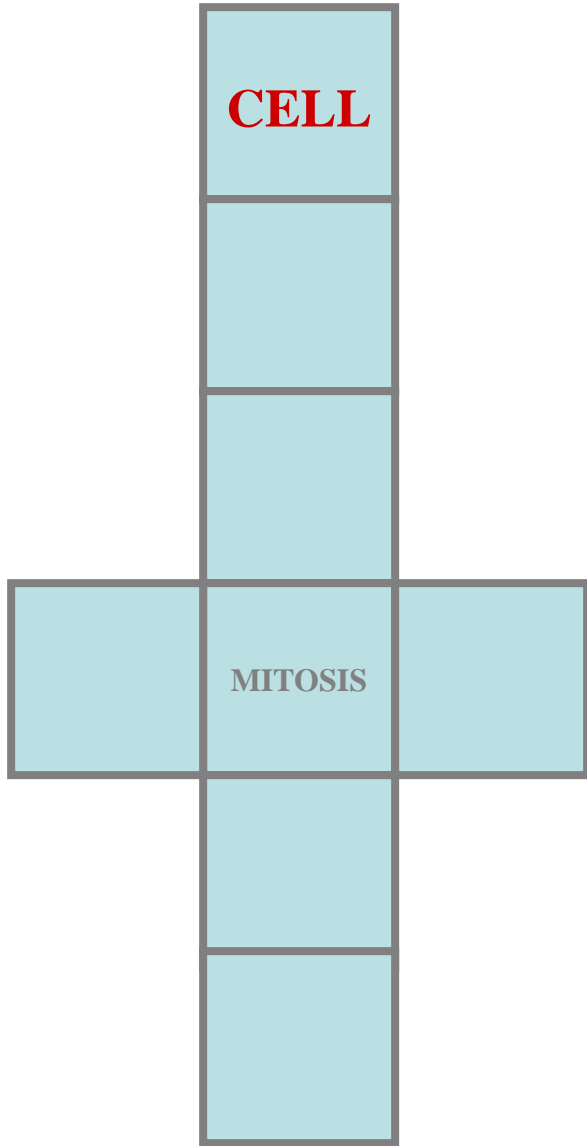
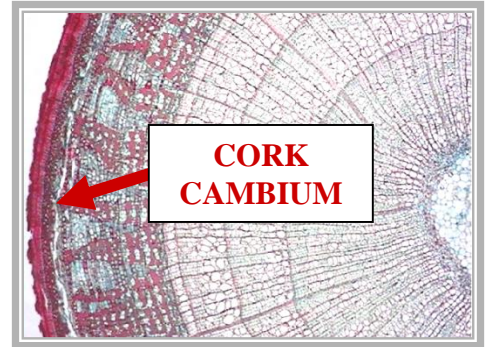
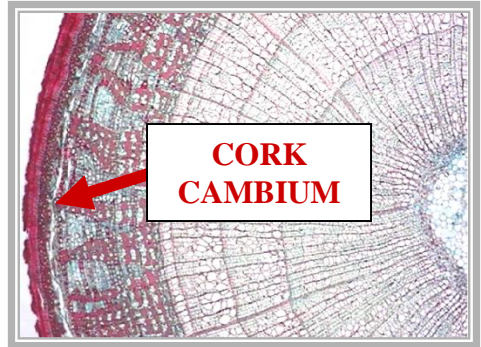
DICOT ~ 2 STEM

**CORK
CAMBIUM**

C.S.

**OUTSIDE
CORK
CAMBIUM**

**INSIDE
CORK
CAMBIUM**



OUTSIDE

INSIDE

**CORK
HIGH ANNUAL
QUANTITY**

**PHELLODERM
LOW ANNUAL
QUANTITY**

DICOT ~ 2 STEM

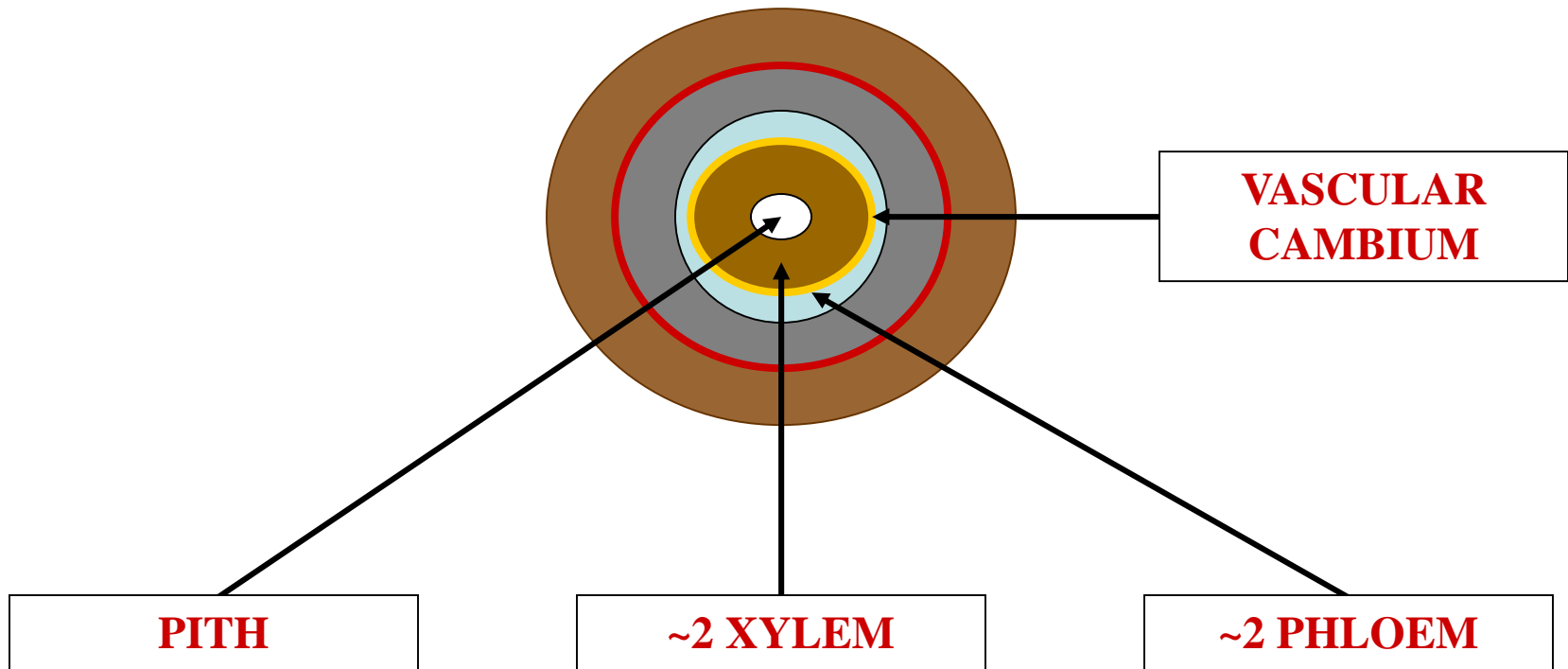
**CORK
CAMBIUM**

C.S.

CORK
CAMBIIUM
ACTIVITY
EXAMPLE

DICOT ~2 STEM

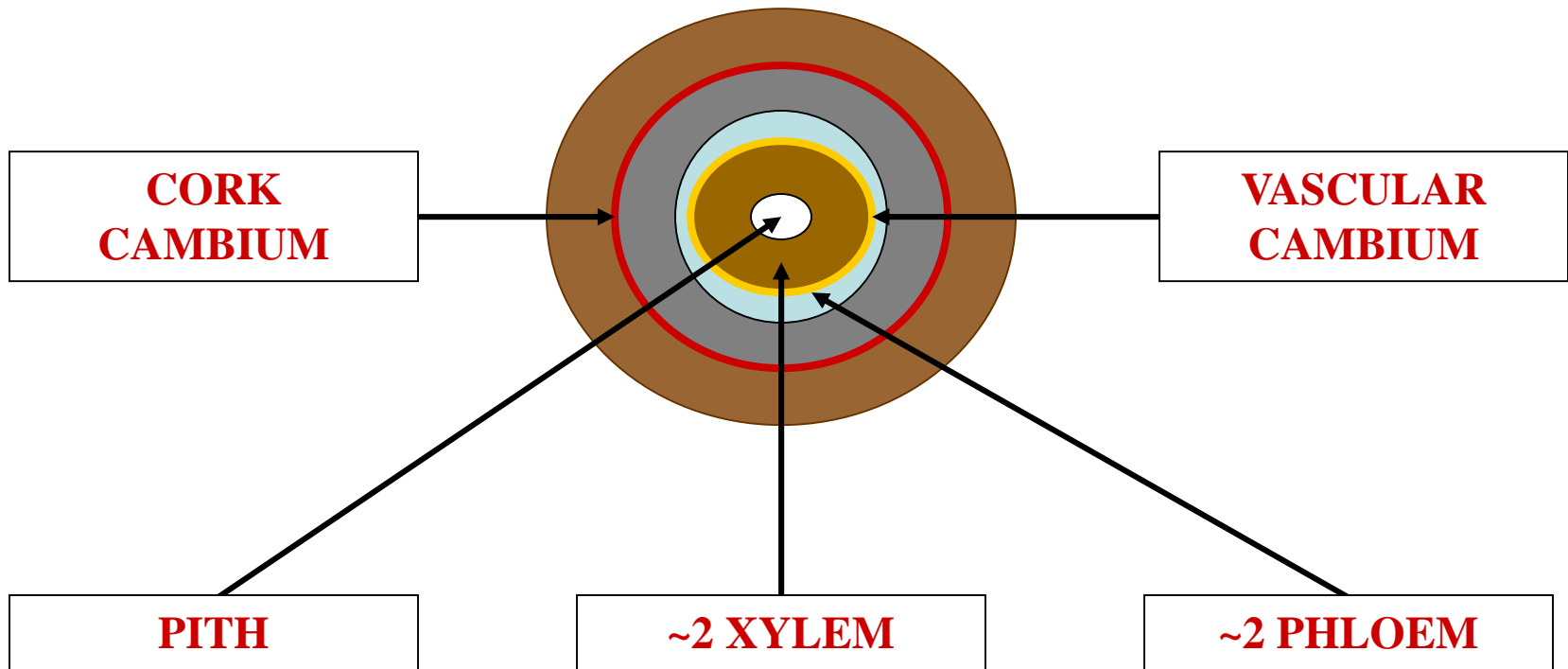
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CORK CAMBIUM ACTIVITY

C.S.

DICOT ~2 STEM



CORK CAMBIUM ACTIVITY

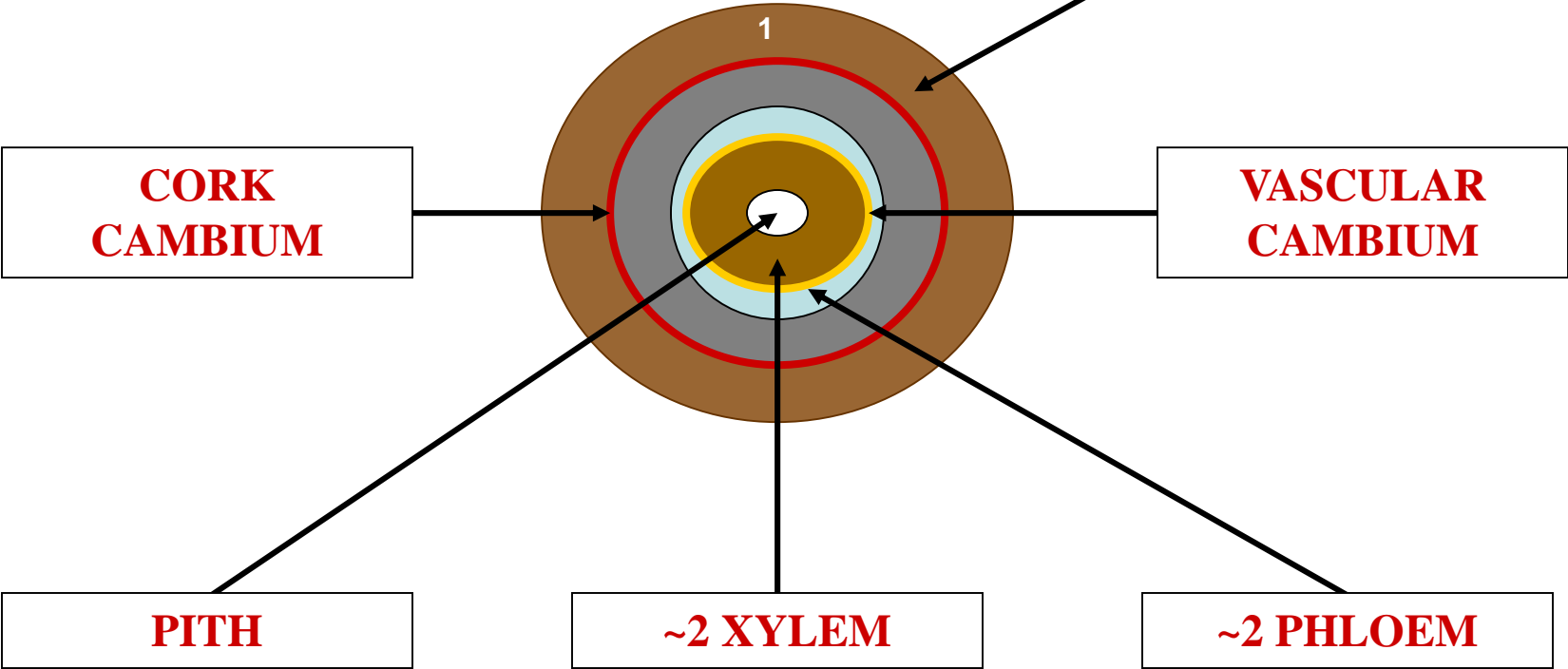
C.S.

DICOT ~2 STEM

C



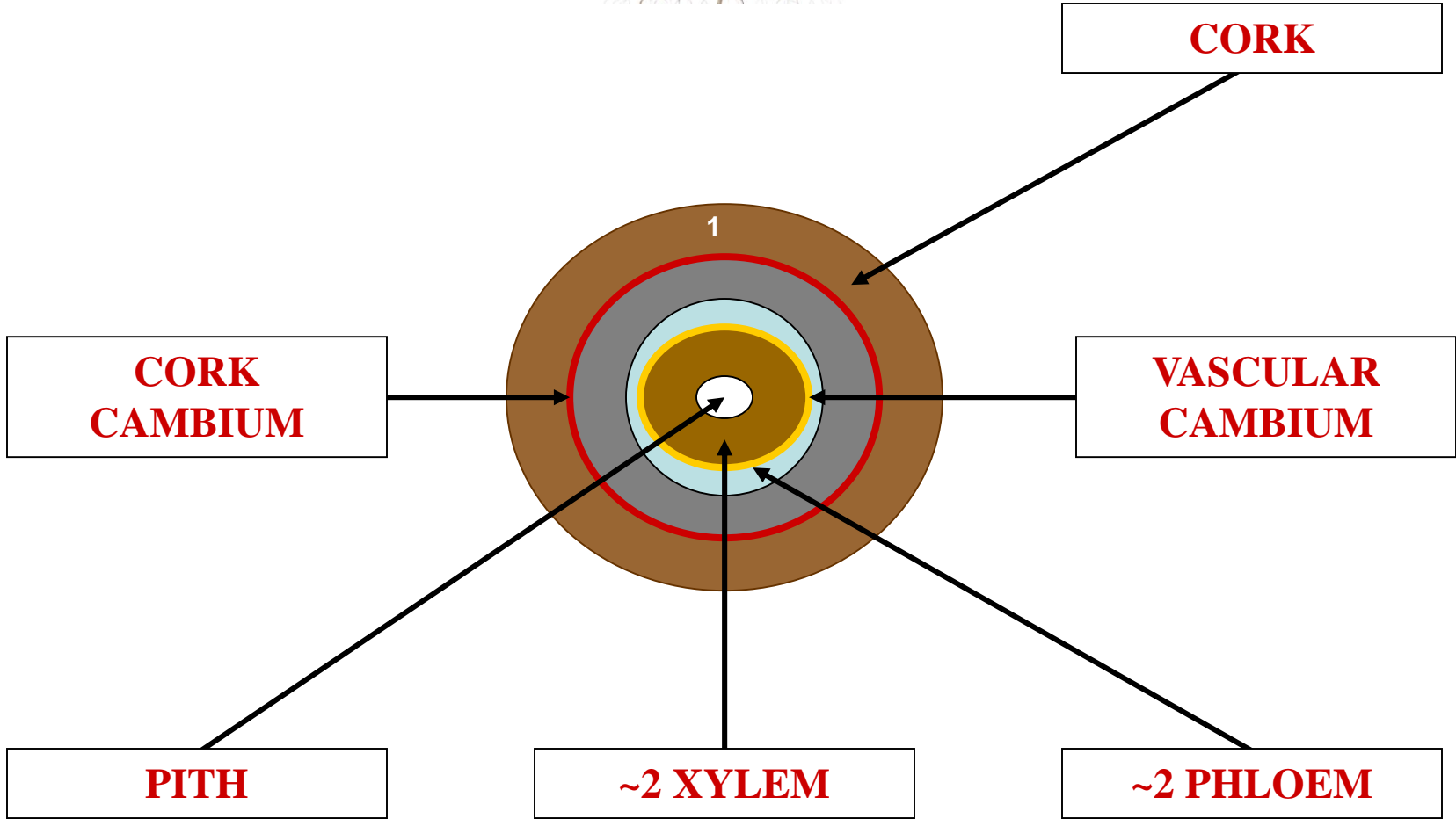
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CORK CAMBIUM ACTIVITY

C.S.

DICOT ~2 STEM



CORK CAMBIUM

CORK

VASCULAR CAMBIUM

PITH

~2 XYLEM

~2 PHLOEM

CORK CAMBIUM ACTIVITY

C.S.

DICOT ~2 STEM

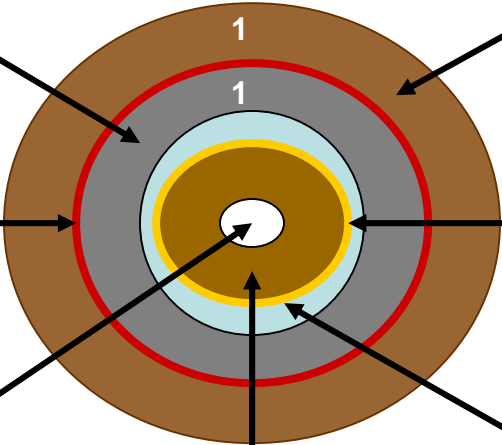


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CORK

**CORK
CAMBIUM**

**VASCULAR
CAMBIUM**



PITH

~2 XYLEM

~2 PHLOEM

CORK CAMBIUM ACTIVITY

C.S.