

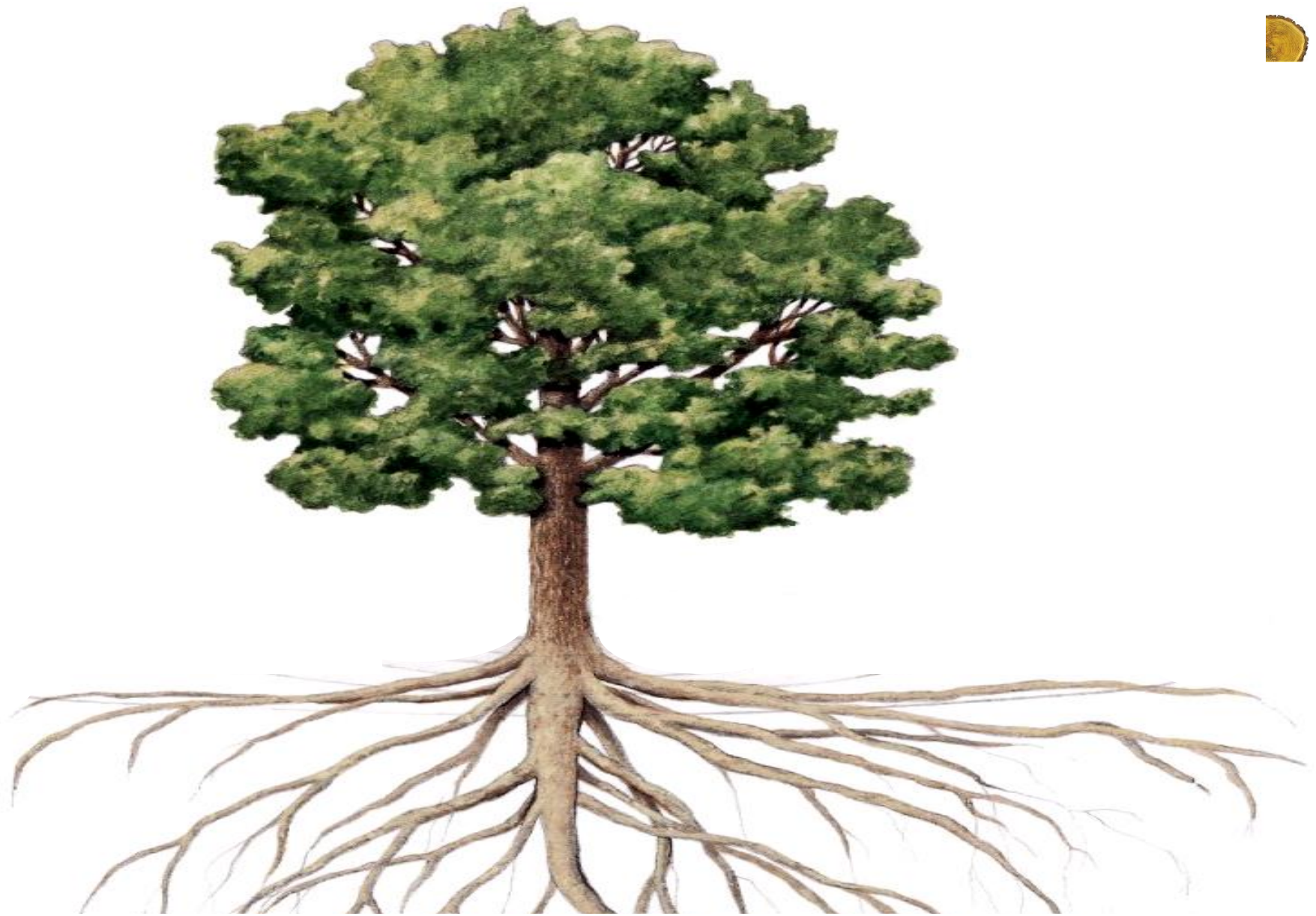
SCLERENCHYMA TISSUE



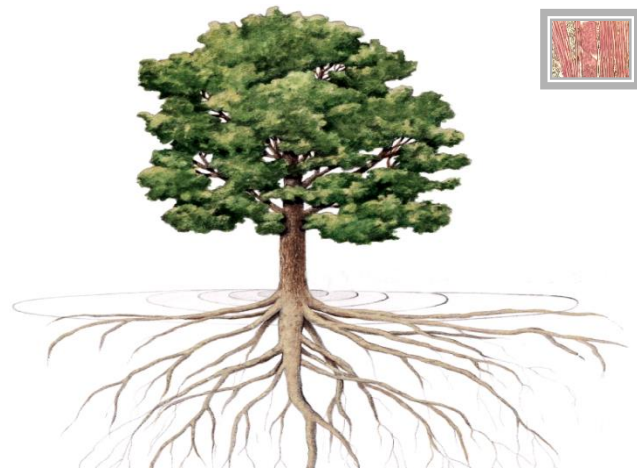
SCLERENCHYMA TISSUE

SCLERENCHYMA CELL AGGREGATE

SCLERENCHYMA TISSUE



WOODY PLANT



STEM

C.S.

S



STEM

L.S.

SCLERENCHYMA TISSUE

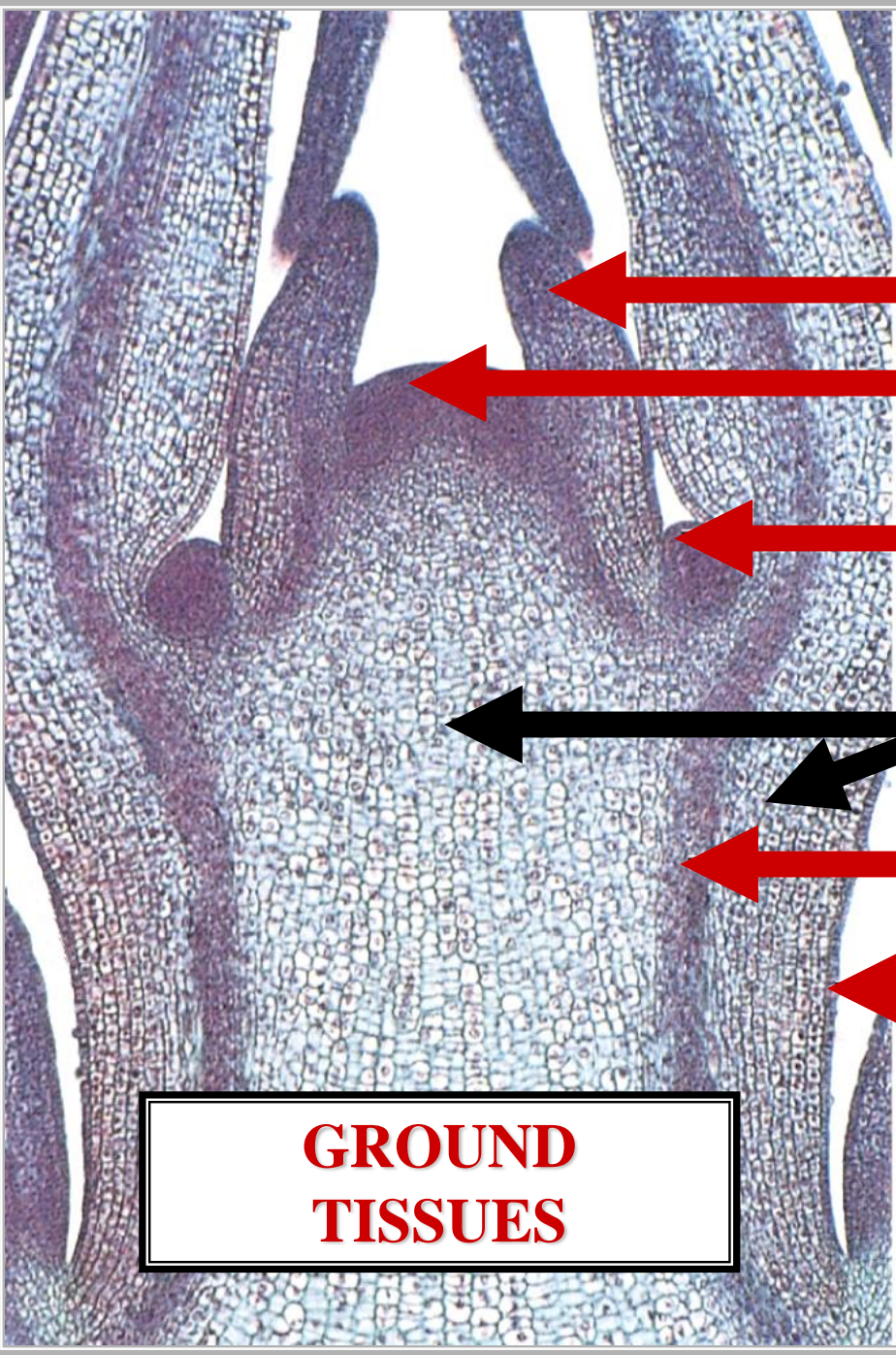
WOOD FIBERS



TRACHEOPHYTE GROUND TISSUES

+

P



[]

**APICAL
MERISTEM**

[]

GROUND TISSUE

[]

[]

**GROUND
TISSUES**

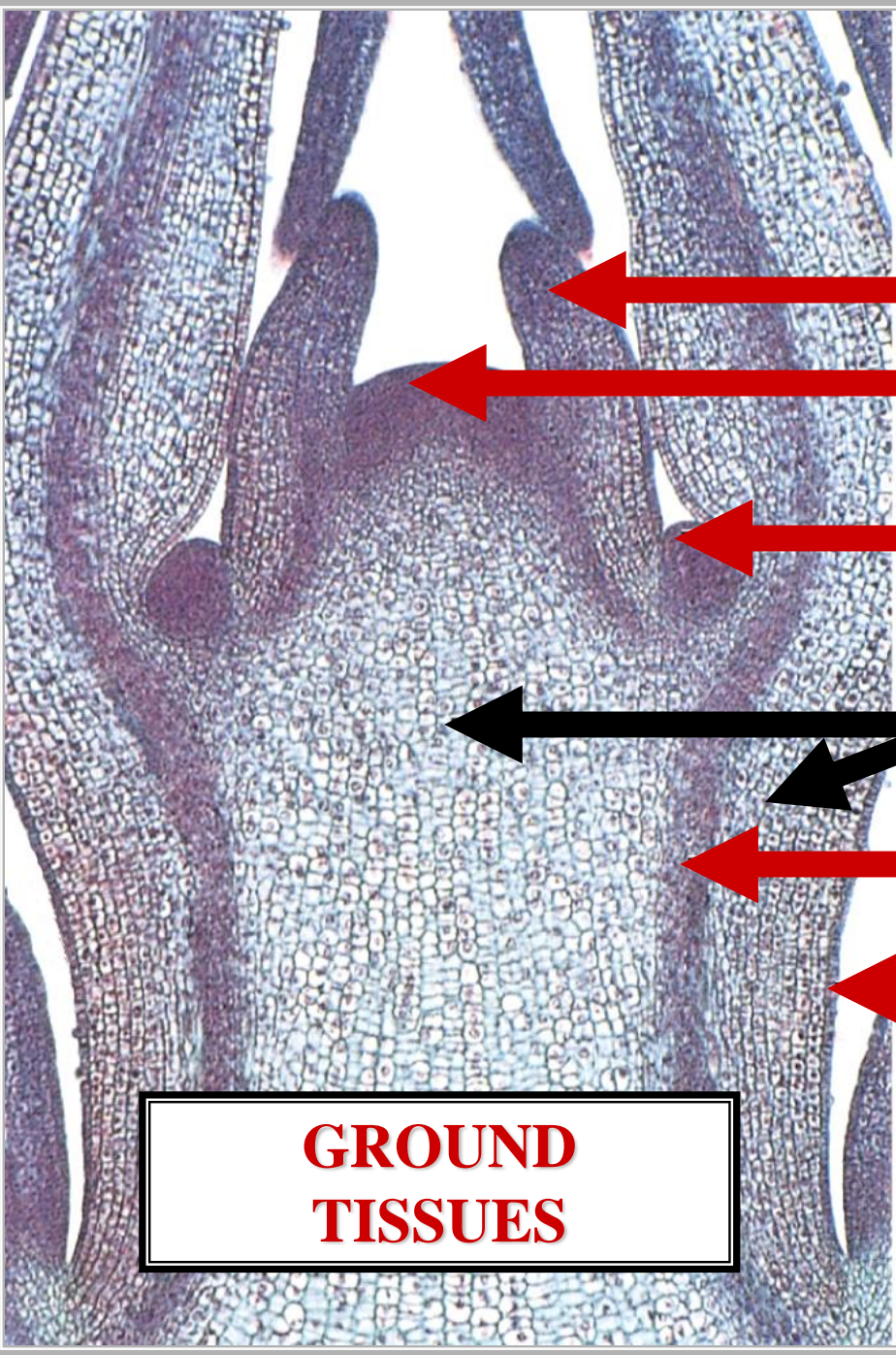
STEM

L.S.

TRACHEOPHYTE GROUND TISSUES

+

C



[]

**APICAL
MERISTEM**

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PARENCHYMA TISSUE

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[]

**GROUND
TISSUES**

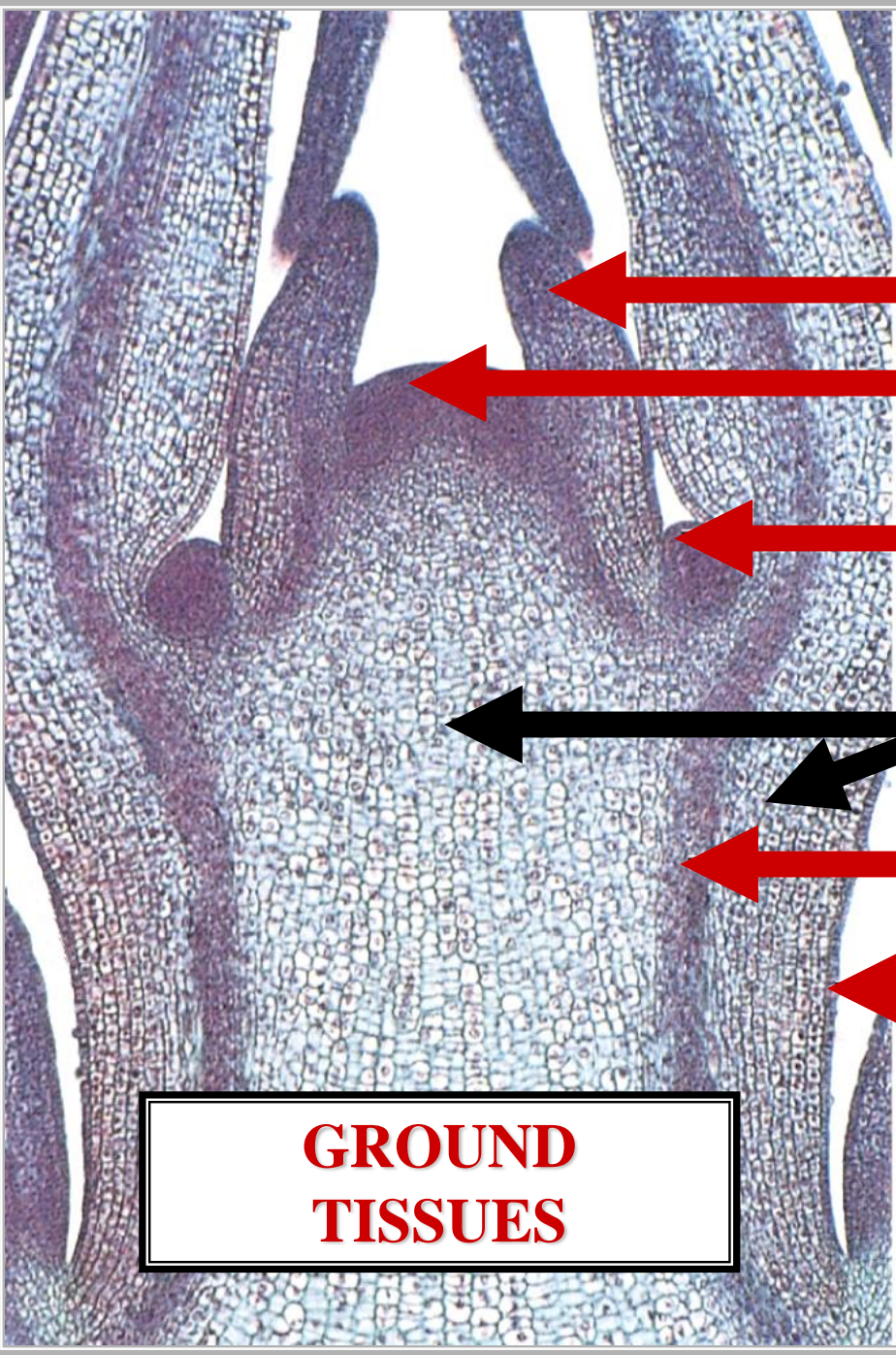
STEM

L.S.

TRACHEOPHYTE GROUND TISSUES

+

S



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**APICAL
MERISTEM**

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COLLENCHYMA TISSUE

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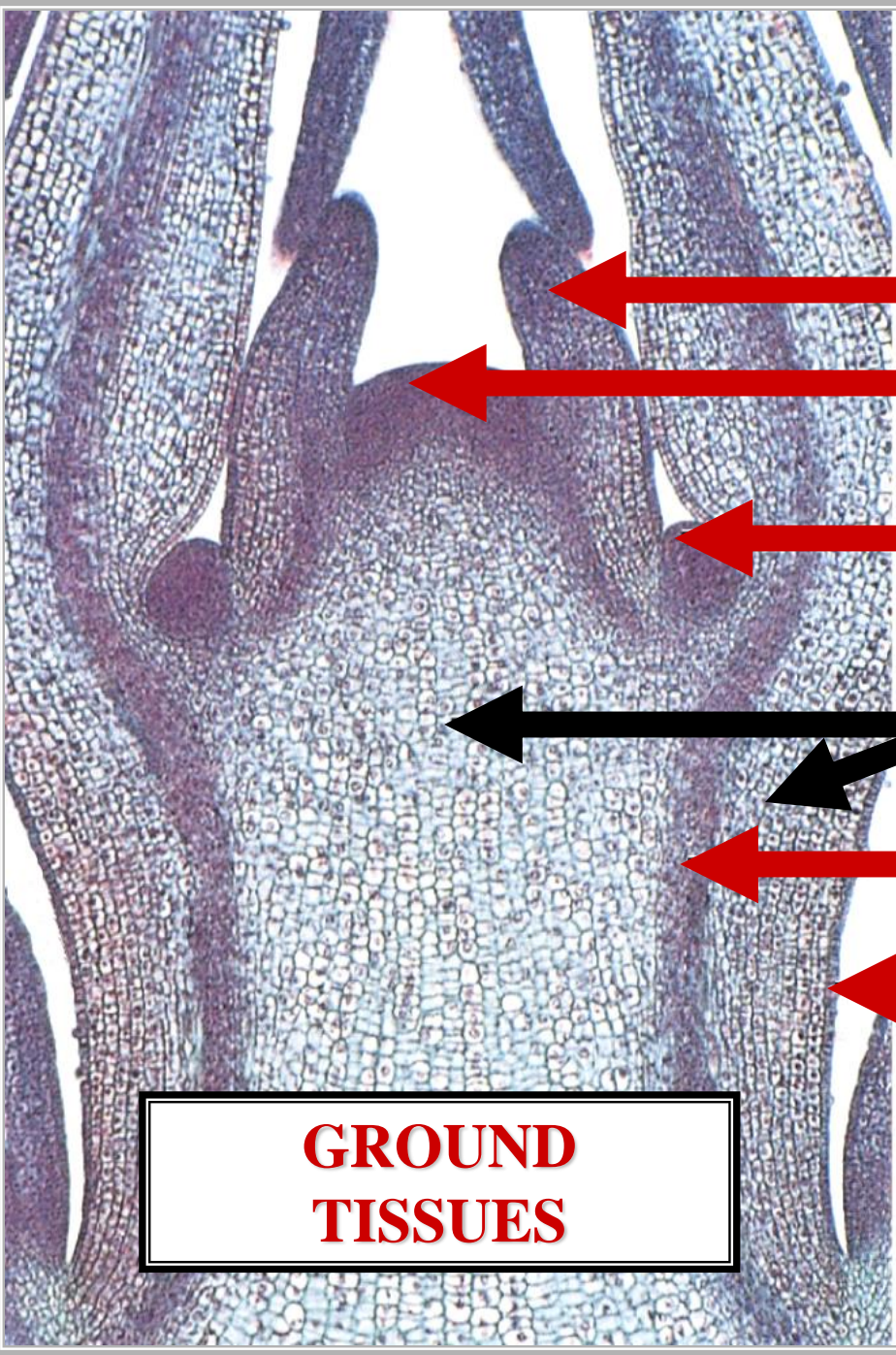
**GROUND
TISSUES**

STEM

L.S.

TRACHEOPHYTE GROUND TISSUES

S
S



[]

**APICAL
MERISTEM**

[]

SCLERNCHYMA TISSUE

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[]

**GROUND
TISSUES**

STEM

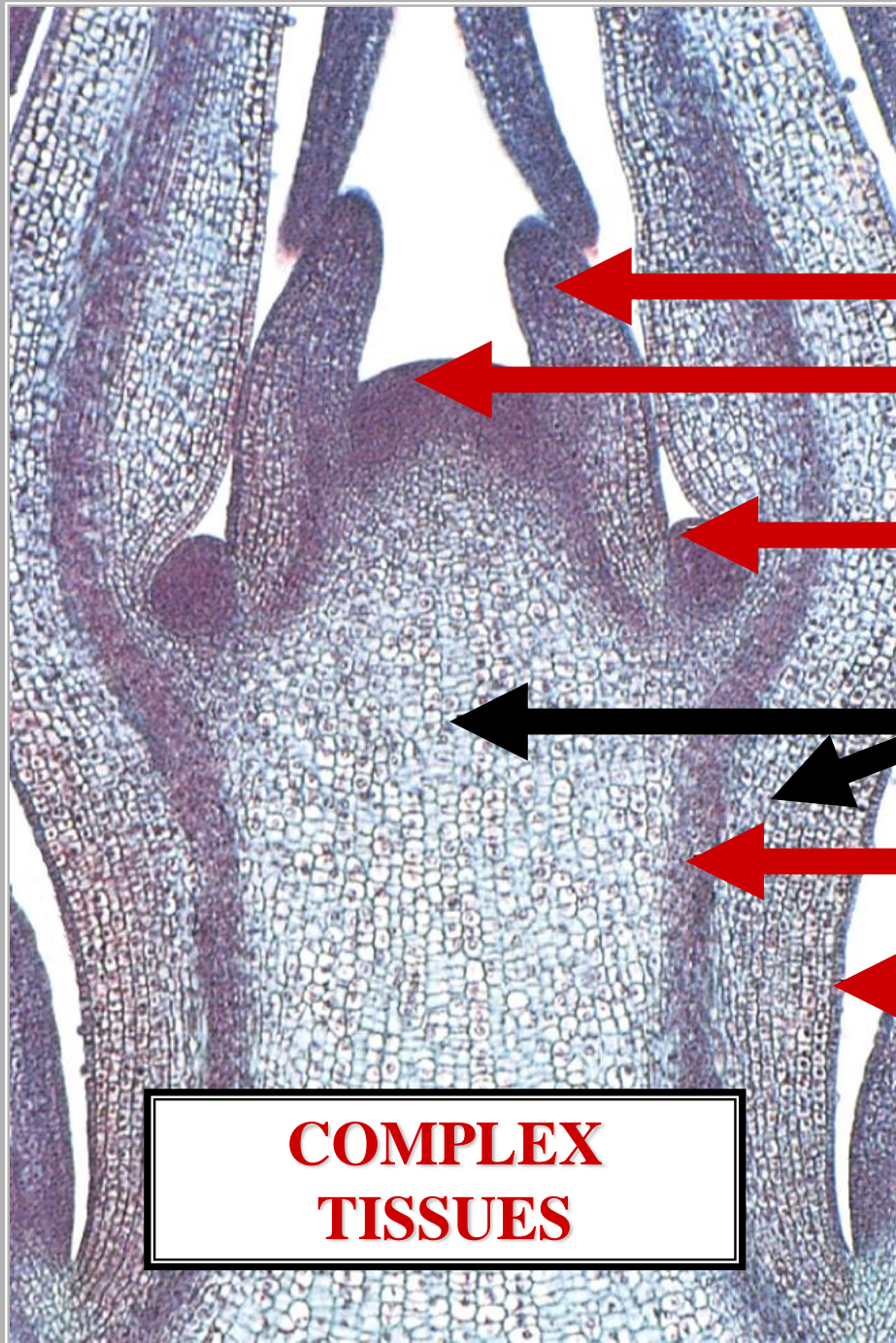
L.S.



TRACHEOPHYTE COMPLEX TISSUES SUMMARY

TRACHEOPHYTE COMPLEX TISSUES

V



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MERISTEM

[Empty box]

GROUND TISSUE

[Empty box]

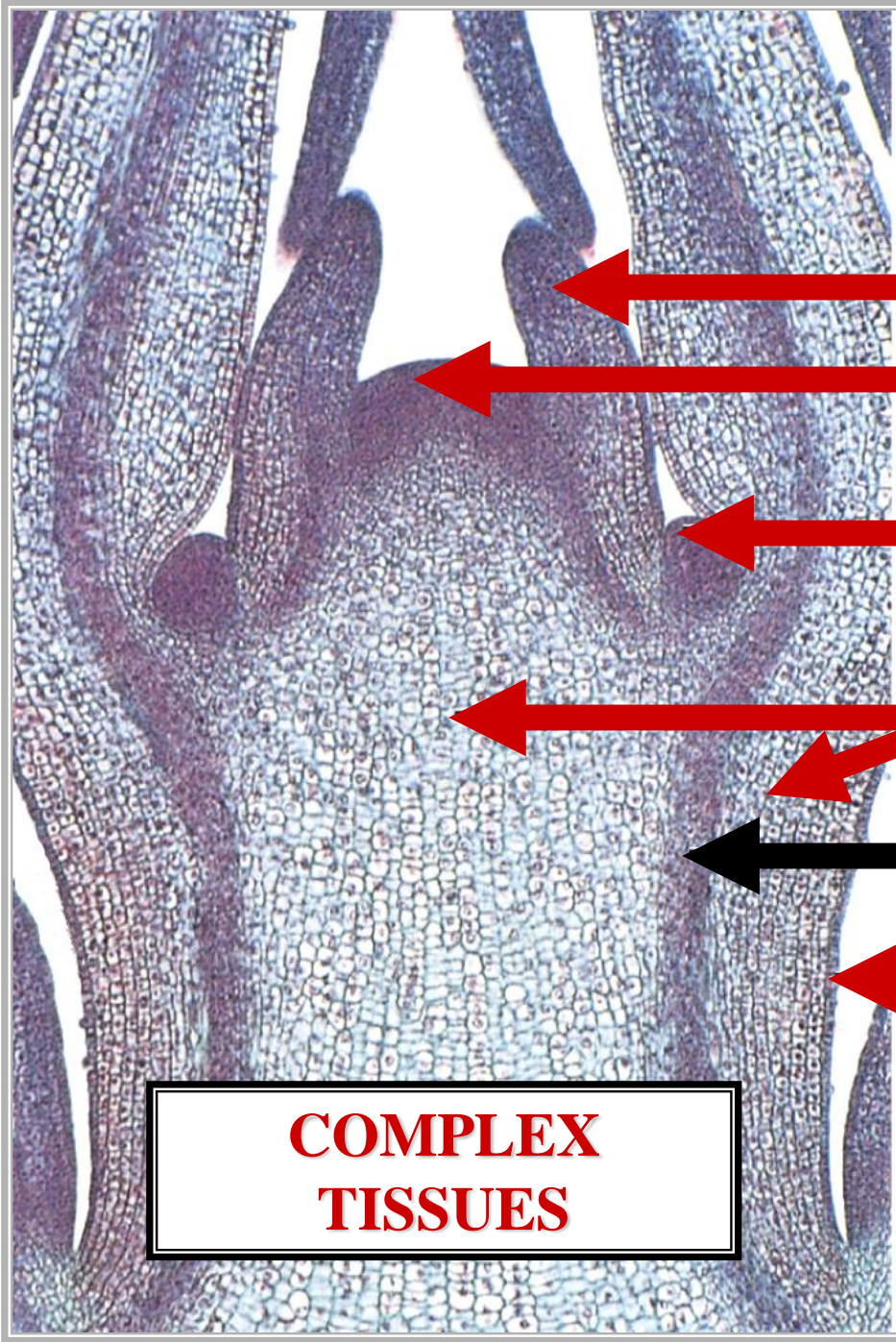
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**COMPLEX
TISSUES**

STEM

L.S.

TRACHEOPHYTE COMPLEX TISSUES



[Empty box]

MERISTEM

[Empty box]

GROUND TISSUE

VASCULAR TISSUE

[Empty box]

**COMPLEX
TISSUES**

STEM

L.S.

VASCULAR TISSUE

VASCULAR TISSUE



VASCULAR TISSUE

CONDUCTING TISSUE

VASCULAR TISSUE

VASCULAR TISSUES TYPES

VASCULAR TISSUE TYPES

XYLEM

VASCULAR TISSUE TYPES

VASCULAR TISSUE TYPES



XYLEM

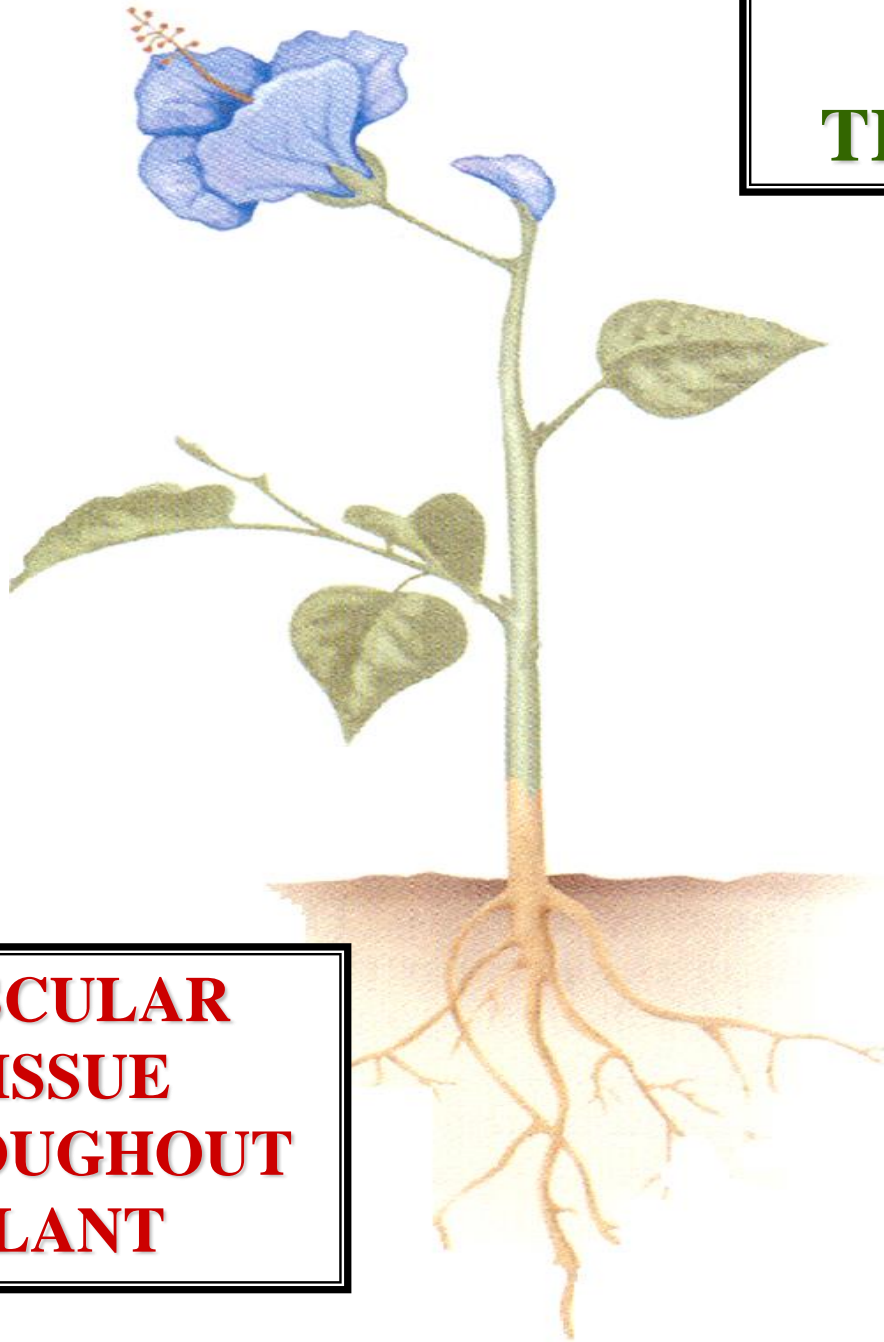
PHLOEM

VASCULAR TISSUE TYPES

TYPICAL TRACHEOPHYTE

L

**VASCULAR
TISSUE
THROUGHOUT
PLANT**

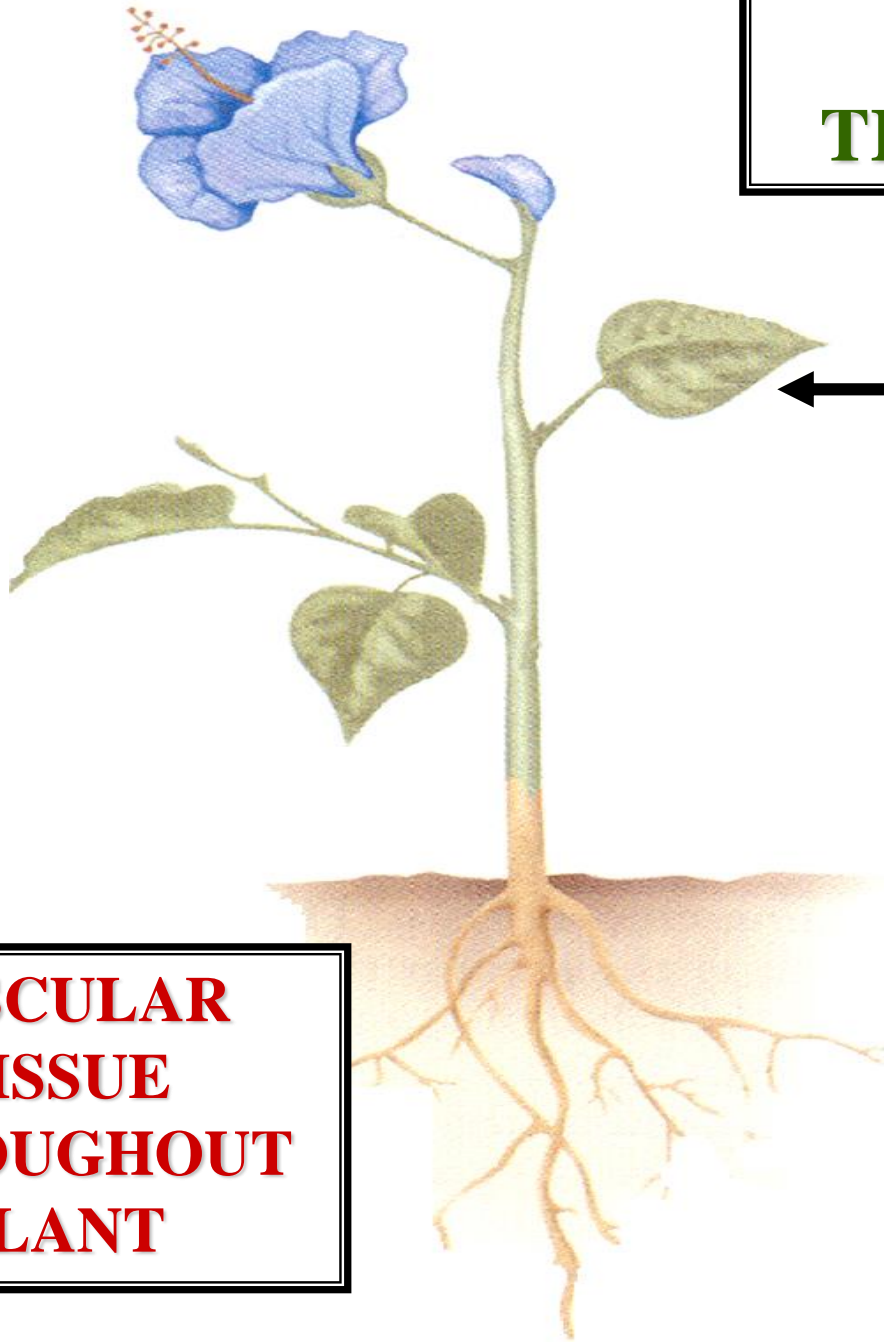


**TYPICAL
TRACHEOPHYTE**

S

LEAF

**VASCULAR
TISSUE
THROUGHOUT
PLANT**



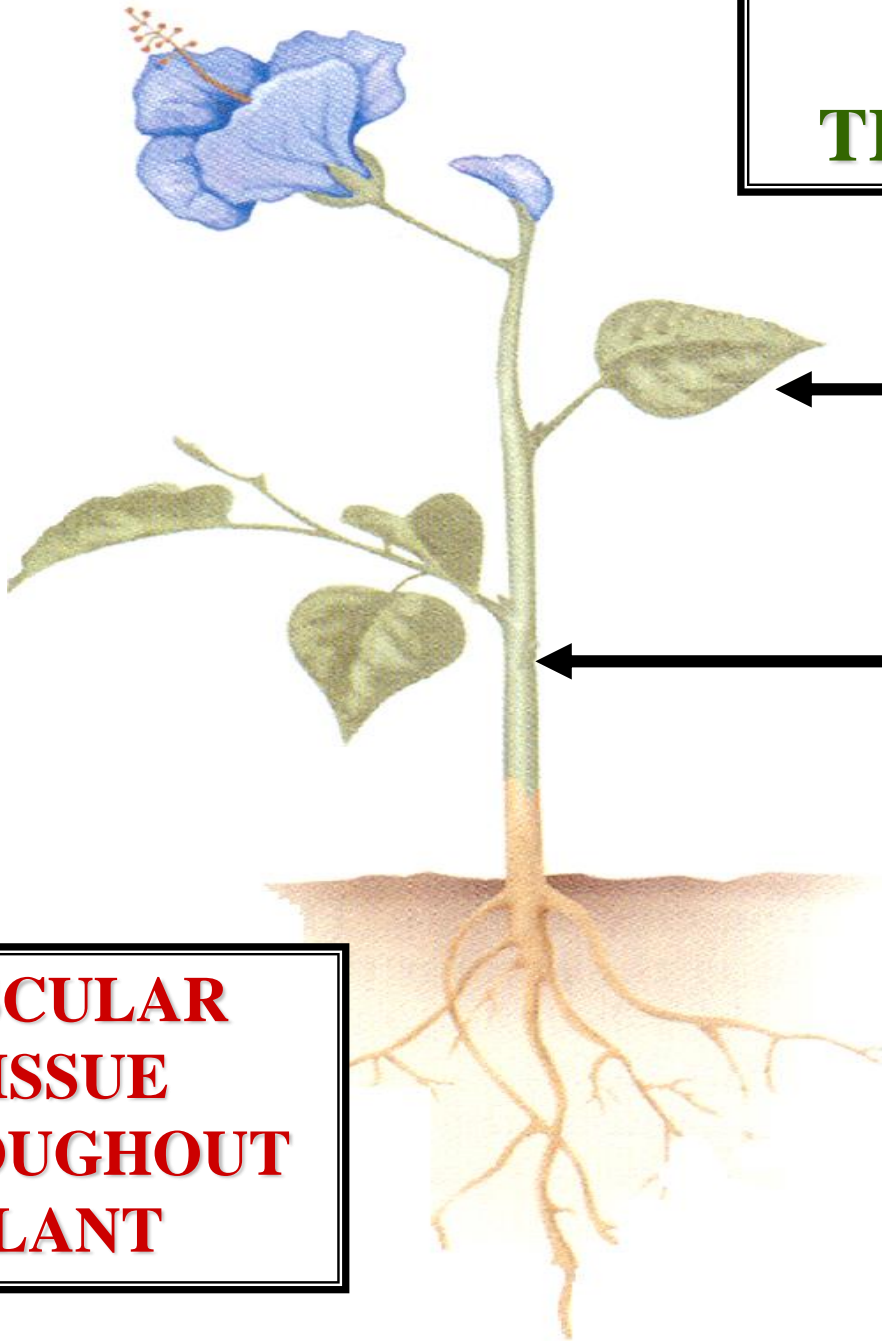
TYPICAL TRACHEOPHYTE

R

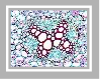
← **LEAF**

← **STEM**

**VASCULAR
TISSUE
THROUGHOUT
PLANT**



TYPICAL TRACHEOPHYTE

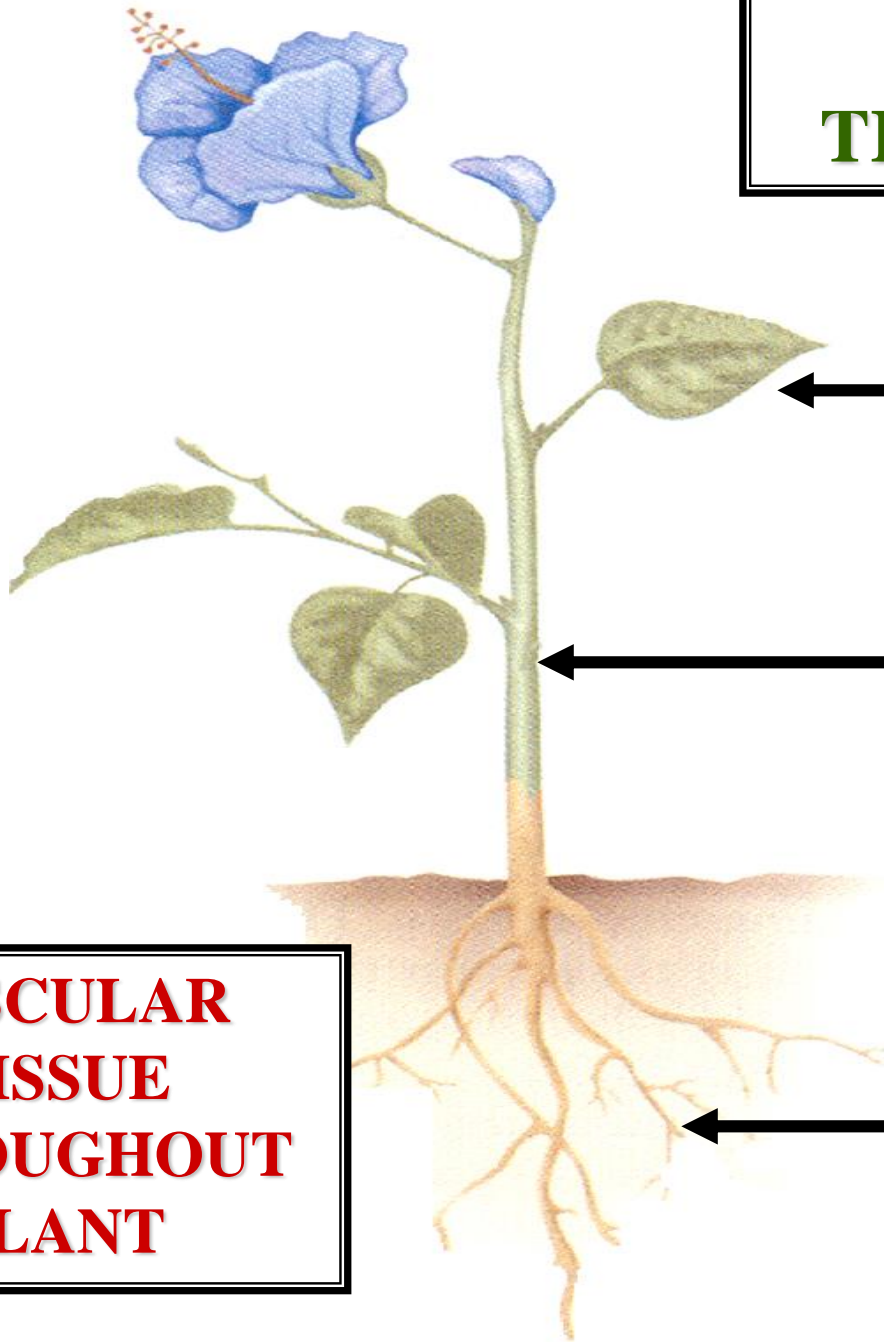


LEAF

STEM

ROOT

**VASCULAR
TISSUE
THROUGHOUT
PLANT**

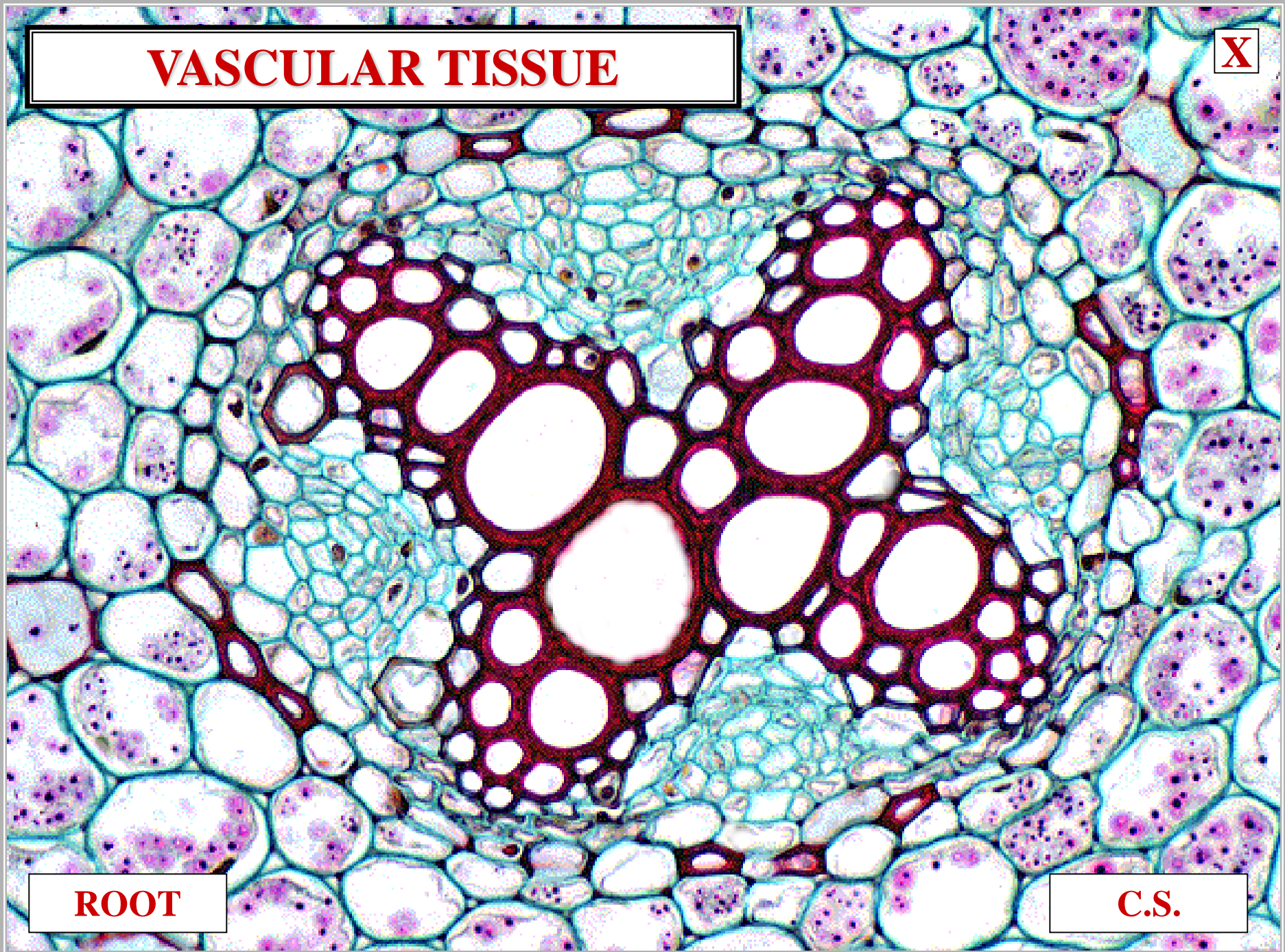


VASCULAR TISSUE

X

ROOT

C.S.



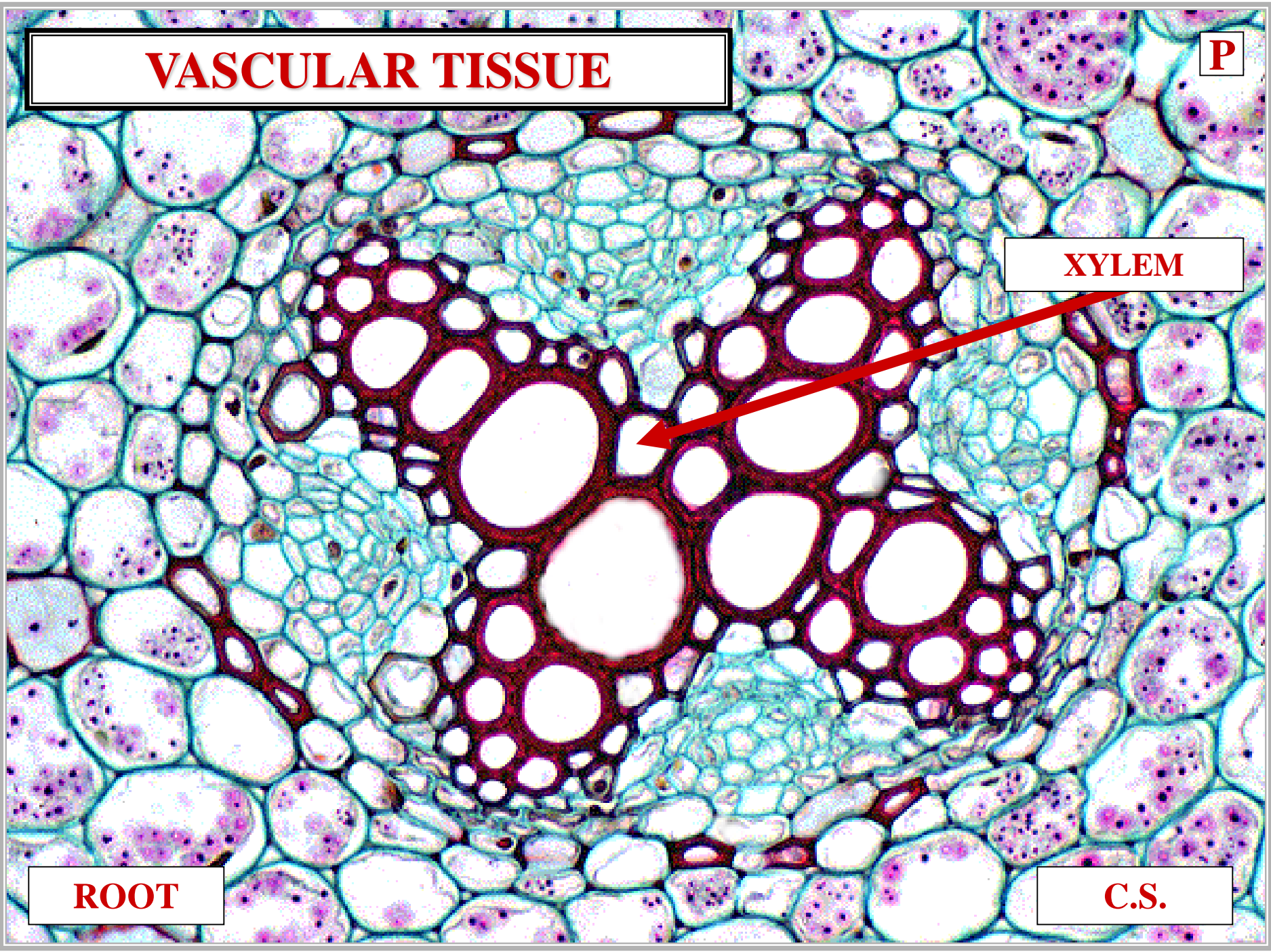
VASCULAR TISSUE

P

XYLEM

ROOT

C.S.



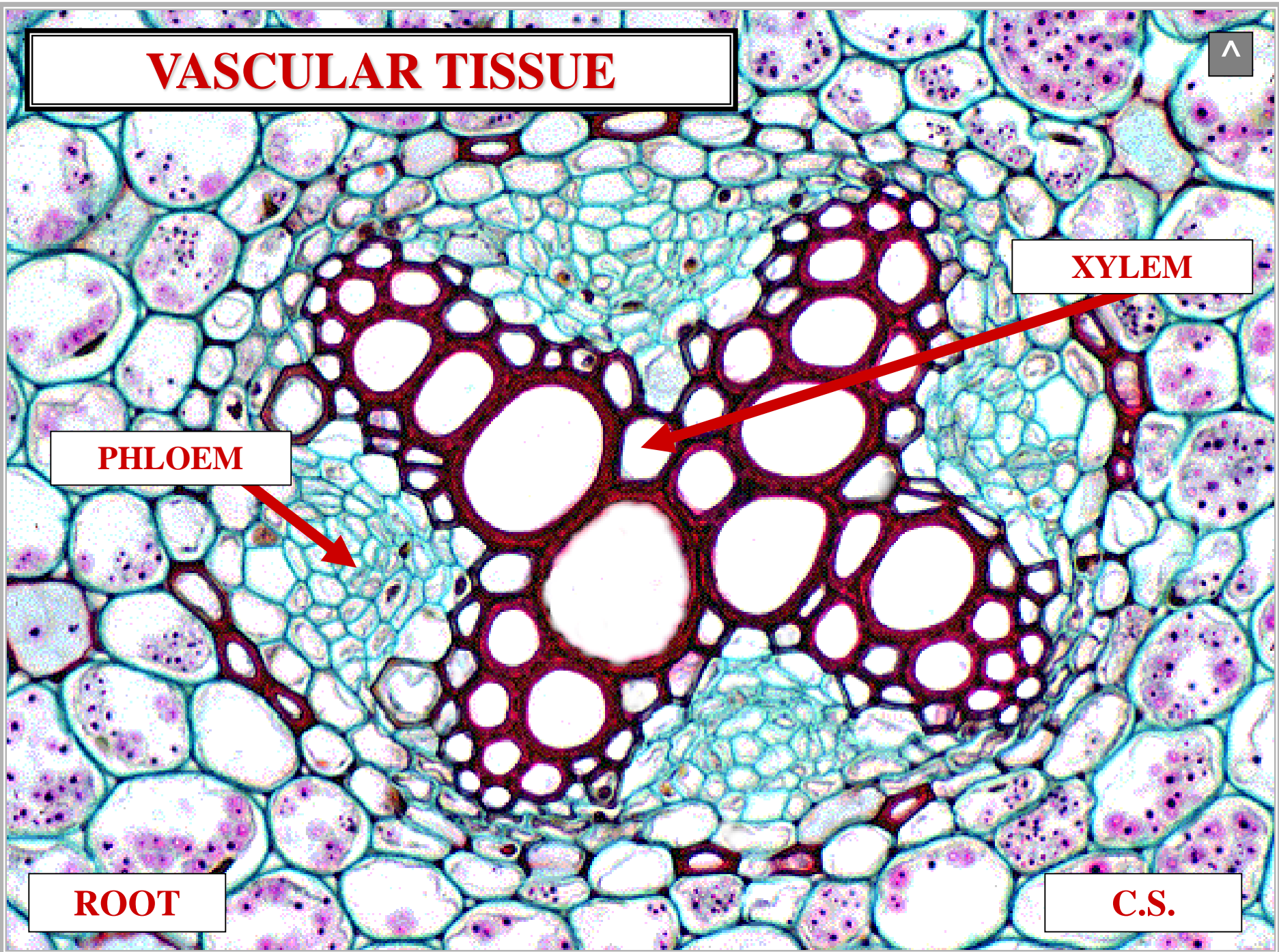
VASCULAR TISSUE

XYLEM

PHLOEM

ROOT

C.S.



XYLEM

VASCULAR TISSUE

XYLEM TISSUE

VASCULAR TISSUE

XYLEM



CONDUCTS WATER

VASCULAR TISSUE

XYLEM

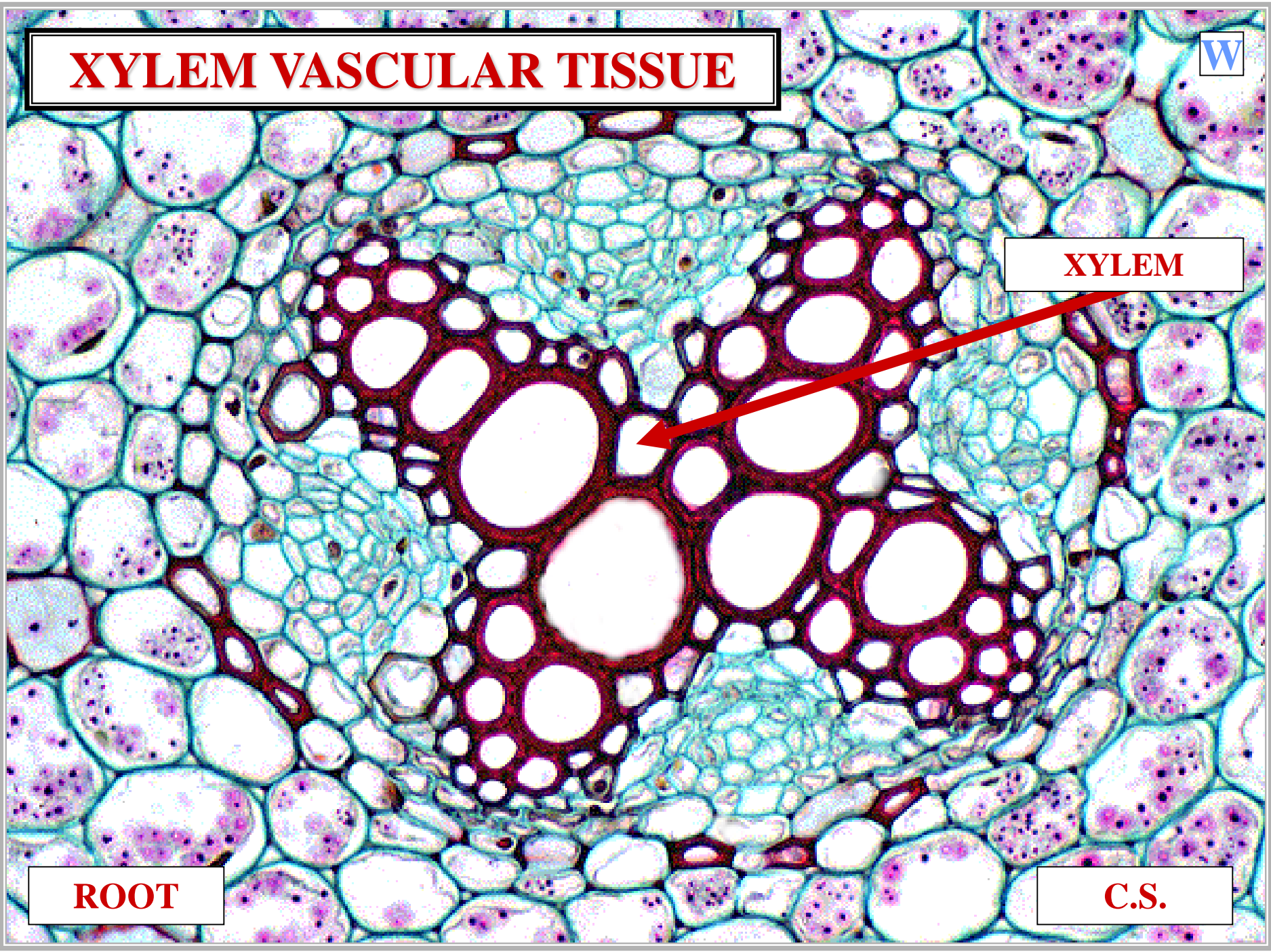
XYLEM VASCULAR TISSUE

W

XYLEM

ROOT

C.S.



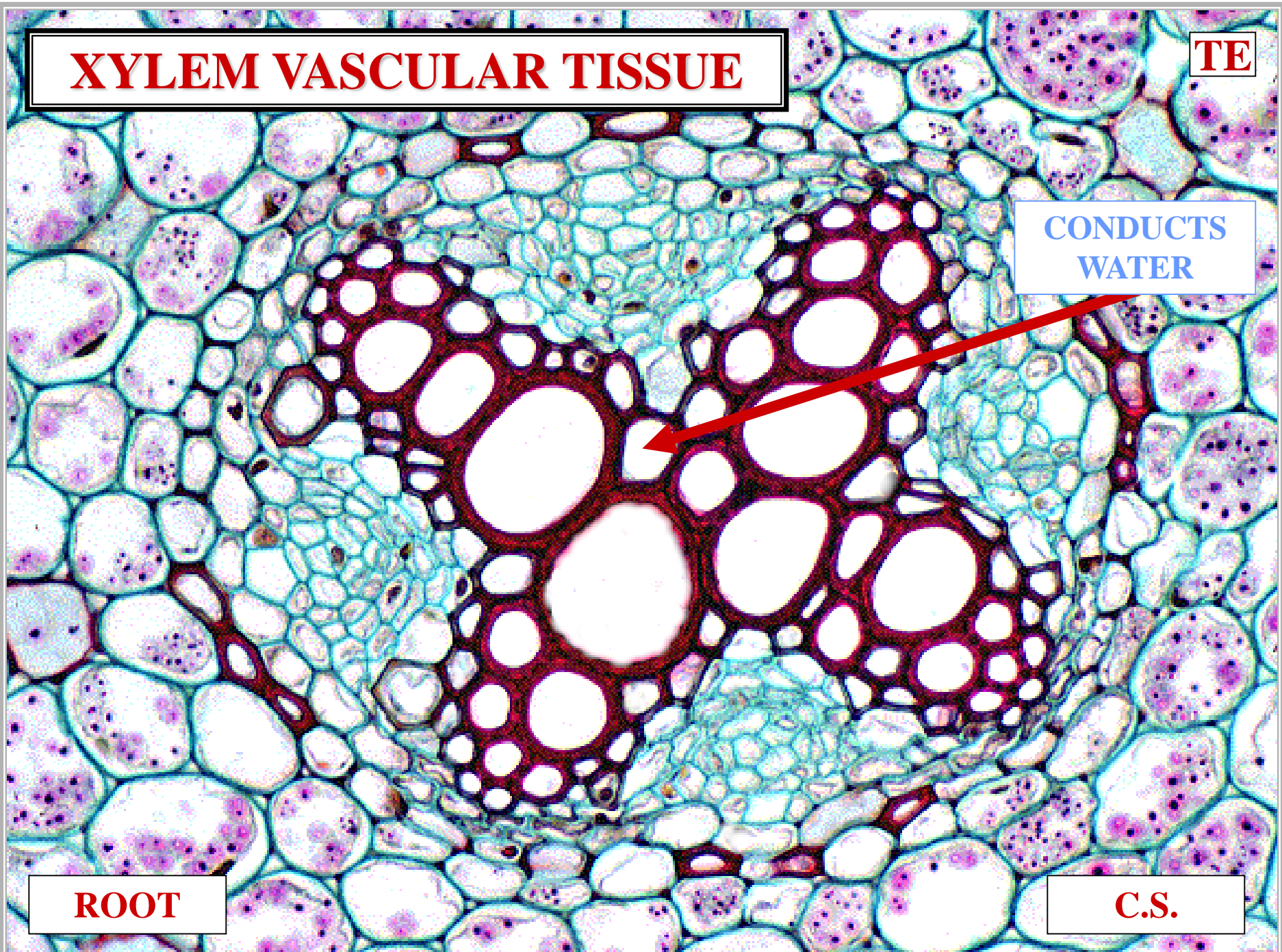
XYLEM VASCULAR TISSUE

TE

CONDUCTS
WATER

ROOT

C.S.

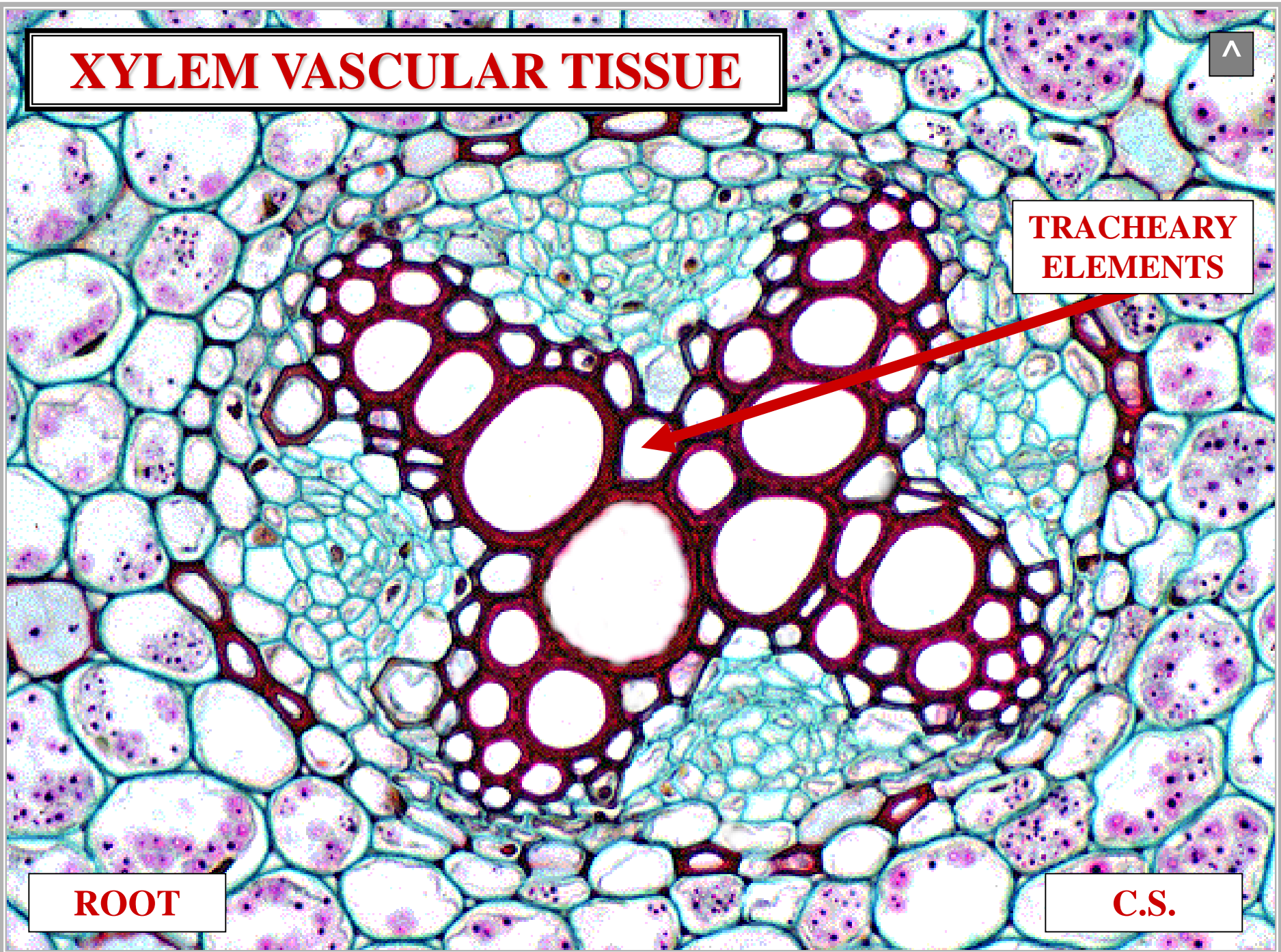


XYLEM VASCULAR TISSUE

TRACHEARY
ELEMENTS

ROOT

C.S.



TRACHEARY ELEMENTS

TRACHEARY ELEMENTS

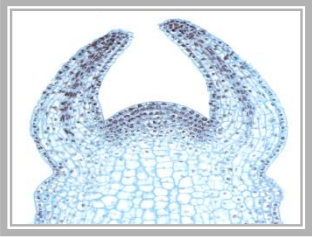


**XYLEM
TRACHEARY ELEMENTS**

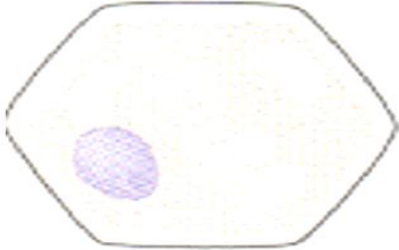
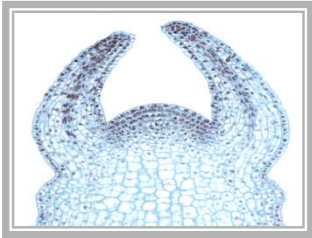
**WATER
CONDUCTING
CELLS**

**XYLEM
TRACHEARY ELEMENTS**

STEM MERISTEM



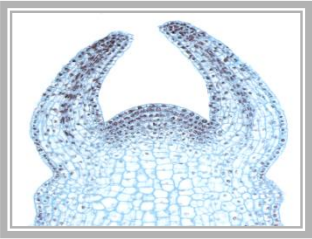
**STEM
MERISTEM**



CELL INITIAL

**PARENCHYMA
BASIC
PLANT CELL**

**STEM
MERISTEM**

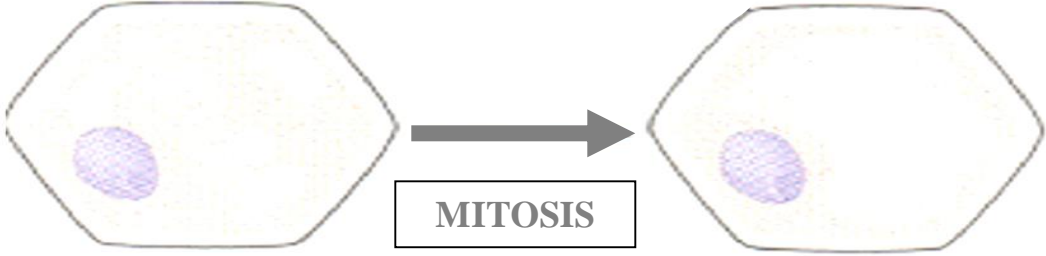
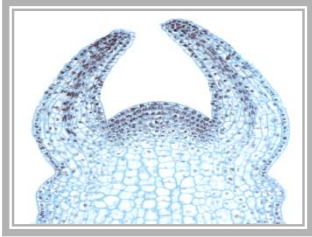


CELL INITIAL

PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

**STEM
MERISTEM**



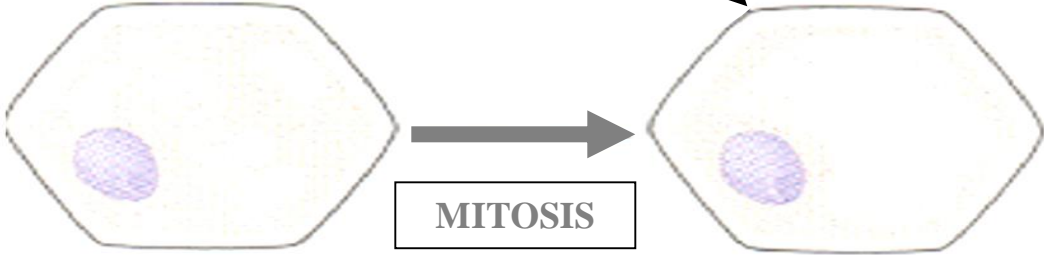
CELL INITIAL

PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

**STEM
MERISTEM**

DERIVATIVE CELL



CELL INITIAL

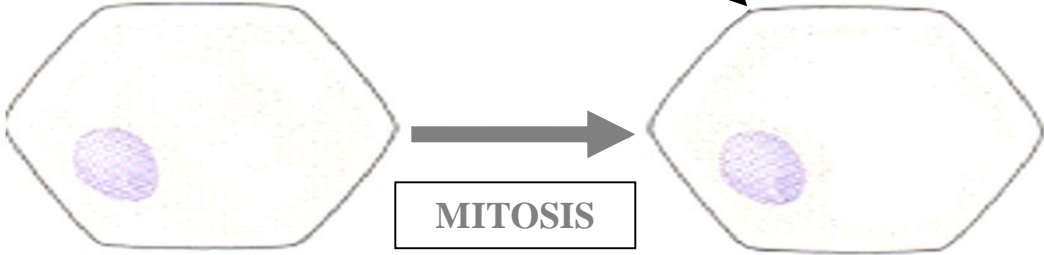
PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

**STEM
MERISTEM**

DERIVATIVE CELL

PARENCHYMA CELL



CELL INITIAL

PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

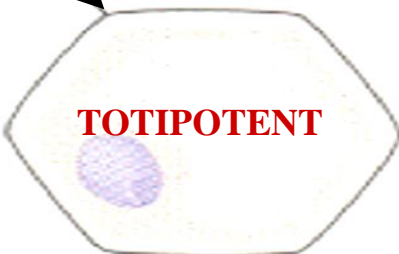
**STEM
MERISTEM**

DERIVATIVE CELL

PARENCHYMA CELL



MITOSIS



TOTIPOTENT

**MERISTEM DERIVATIVE
CAN POTENTIALLY
DIFFERENTIATE
INTO ANY PLANT CELL TYPE**

CELL INITIAL

PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

**STEM
MERISTEM**

DERIVATIVE CELL

PARENCHYMA CELL



MITOSIS



CELL INITIAL

PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

**STEM
MERISTEM**

DERIVATIVE CELL

PARENCHYMA CELL



MITOSIS



CELL INITIAL

PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**



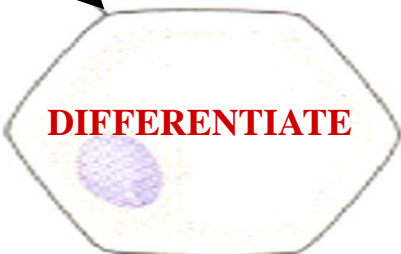
**STEM
MERISTEM**

DERIVATIVE CELL

PARENCHYMA CELL



MITOSIS



DIFFERENTIATE

CELL INITIAL

PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**



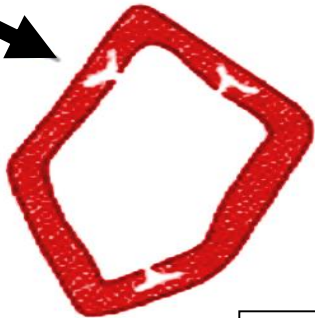
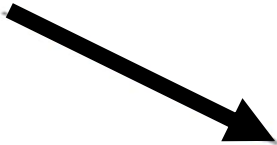
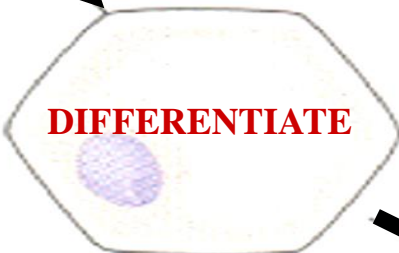
**STEM
MERISTEM**

DERIVATIVE CELL

PARENCHYMA CELL



MITOSIS



**TRACHEARY
ELEMENT**

CELL INITIAL

PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**



TE



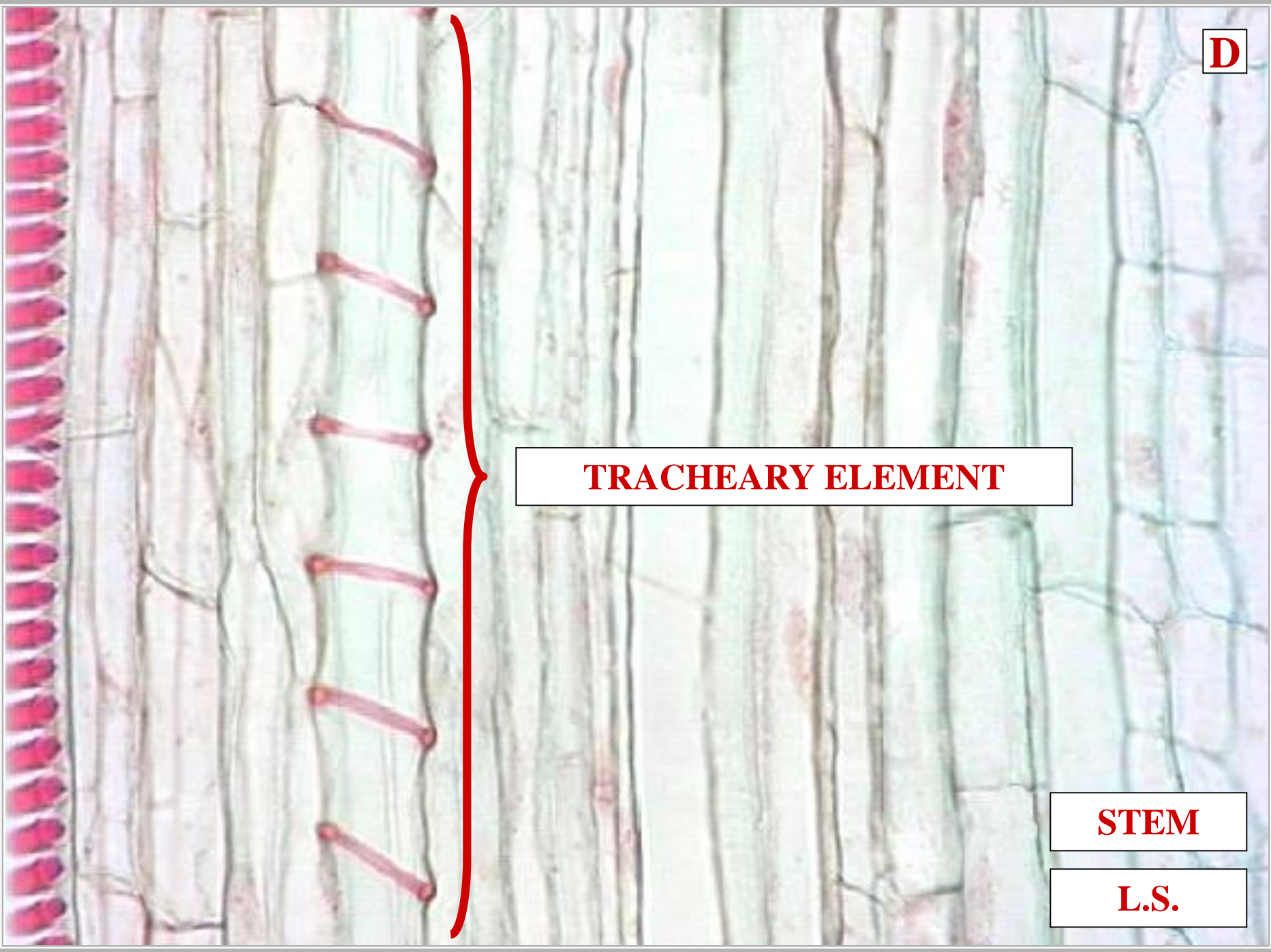
TRACHEARY ELEMENT CHARACTERS

D

TRACHEARY ELEMENT

STEM

L.S.



1&2



**TRACHEARY ELEMENT
DEAD FUNCTIONAL CELL**

STEM

L.S.

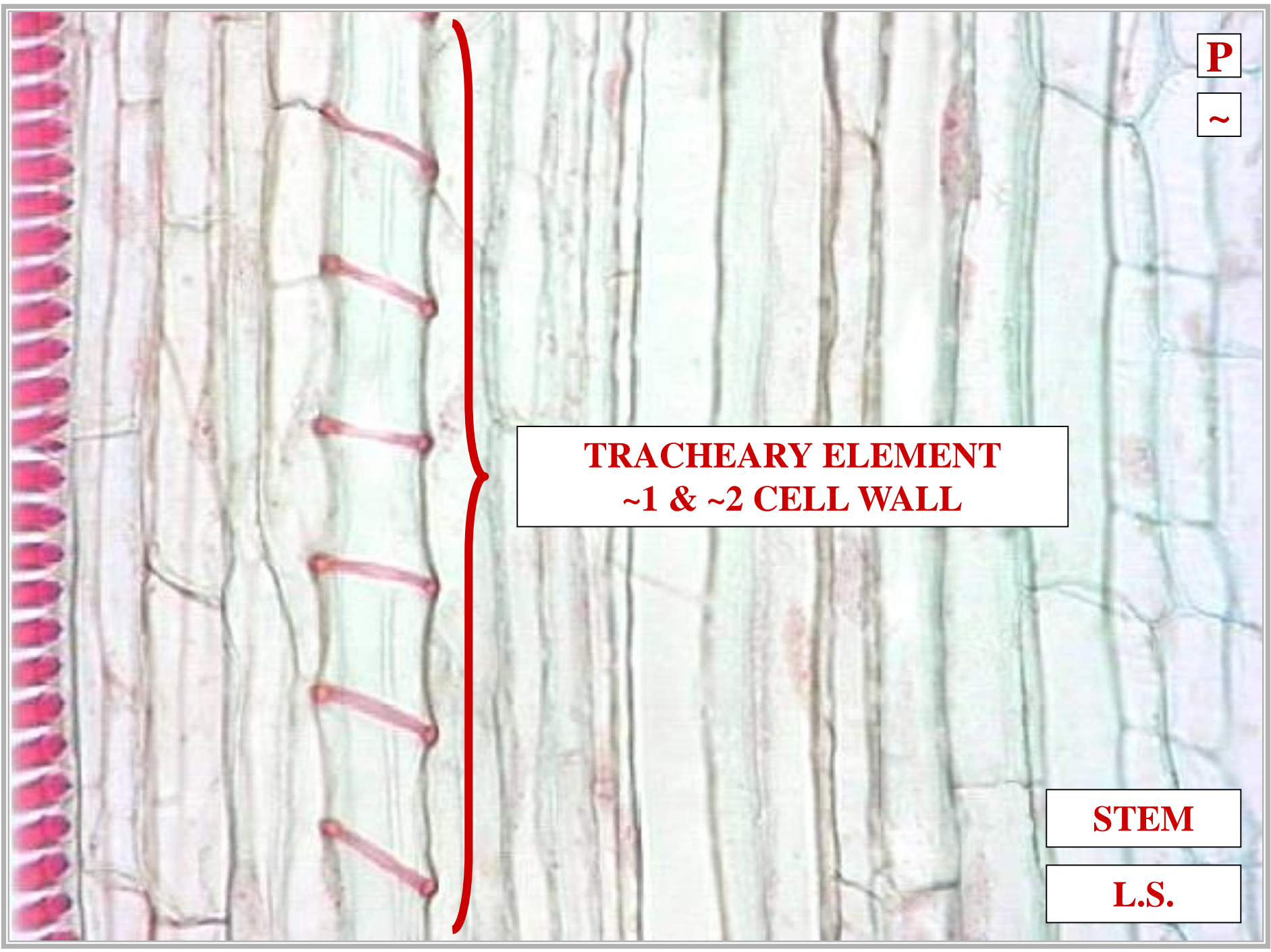
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**TRACHEARY ELEMENT
~1 & ~2 CELL WALL**

STEM

L.S.



S

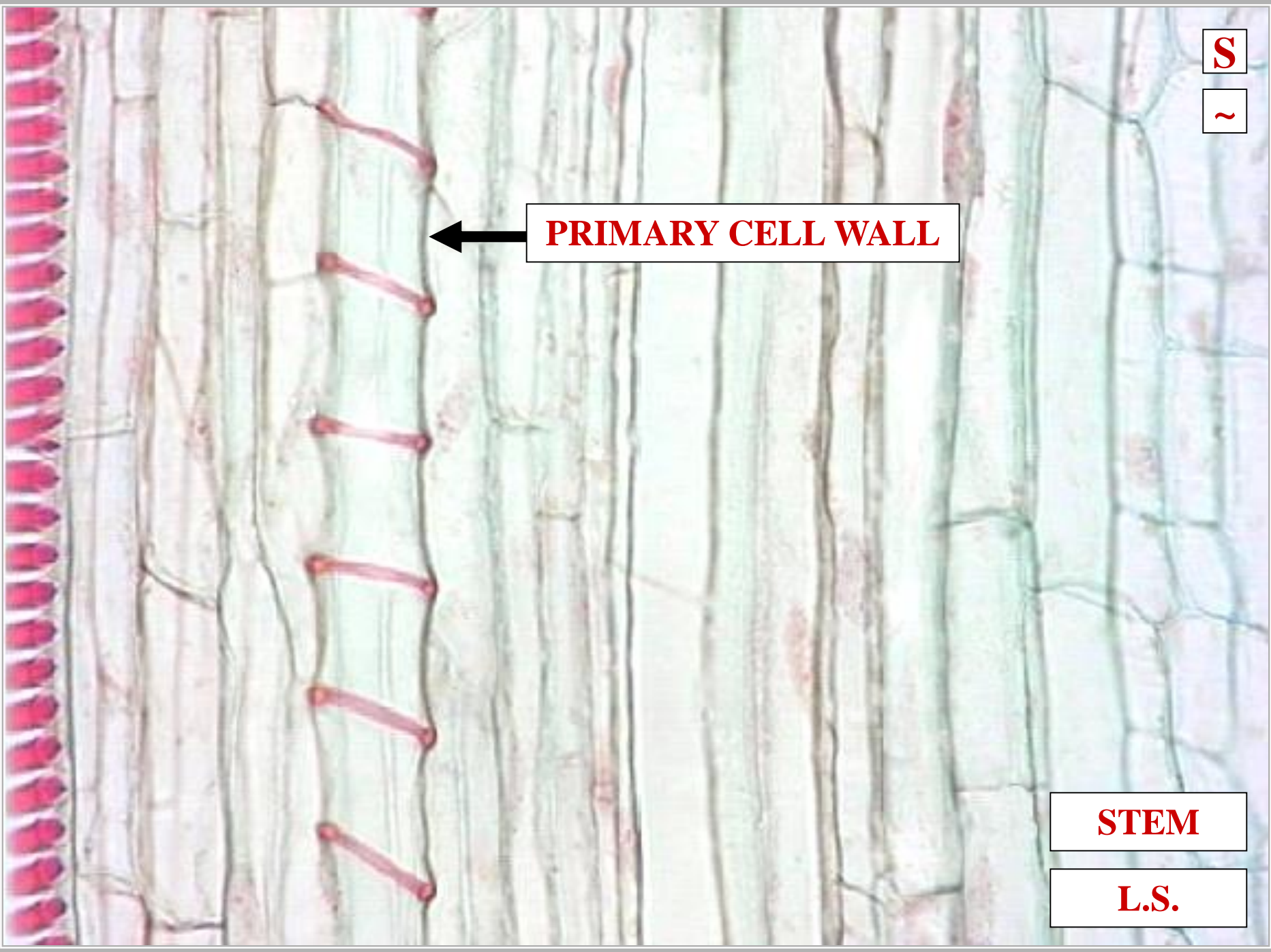
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PRIMARY CELL WALL



STEM

L.S.



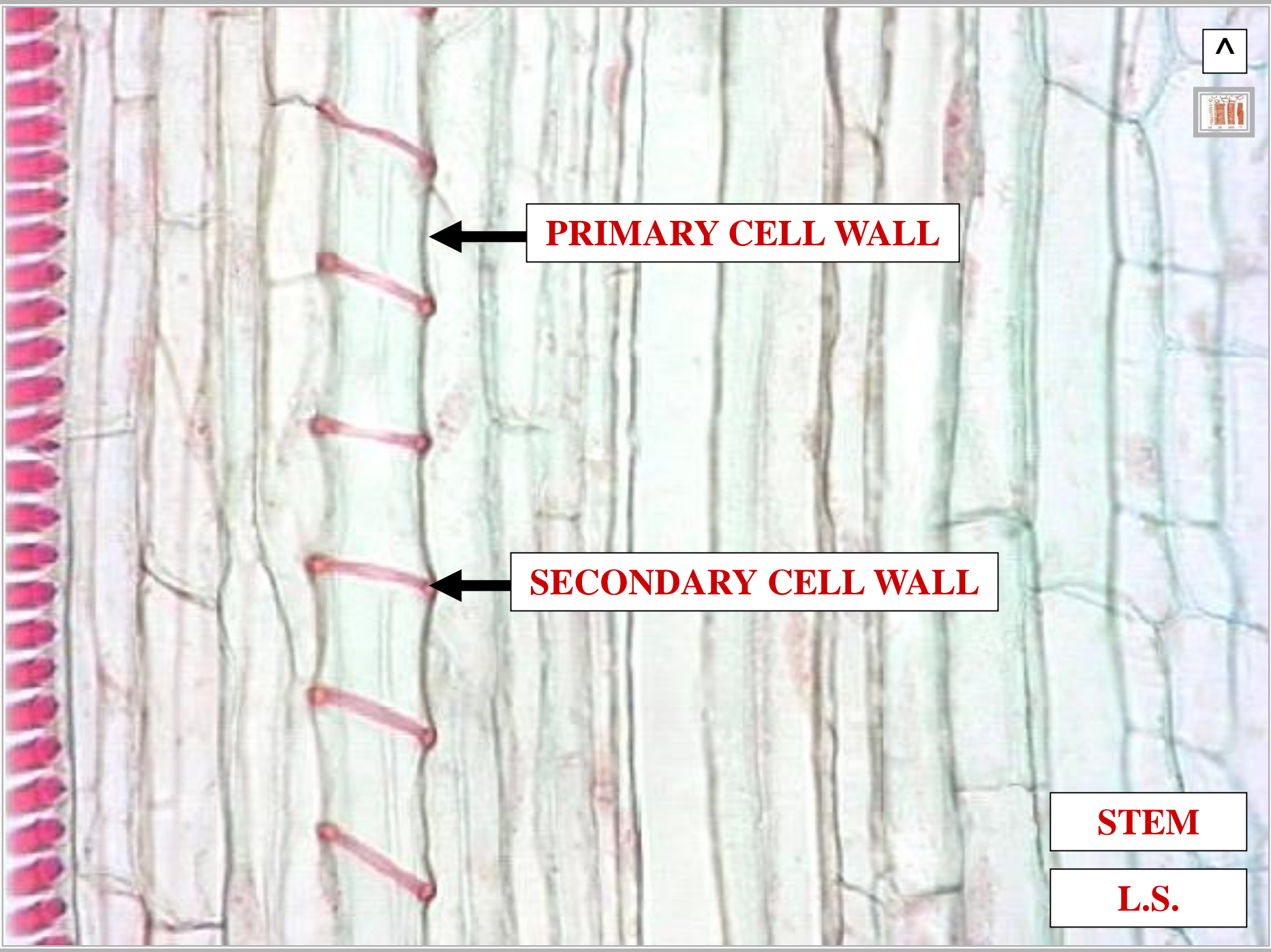


PRIMARY CELL WALL

SECONDARY CELL WALL

STEM

L.S.





PRIMARY XYLEM

SECONDARY

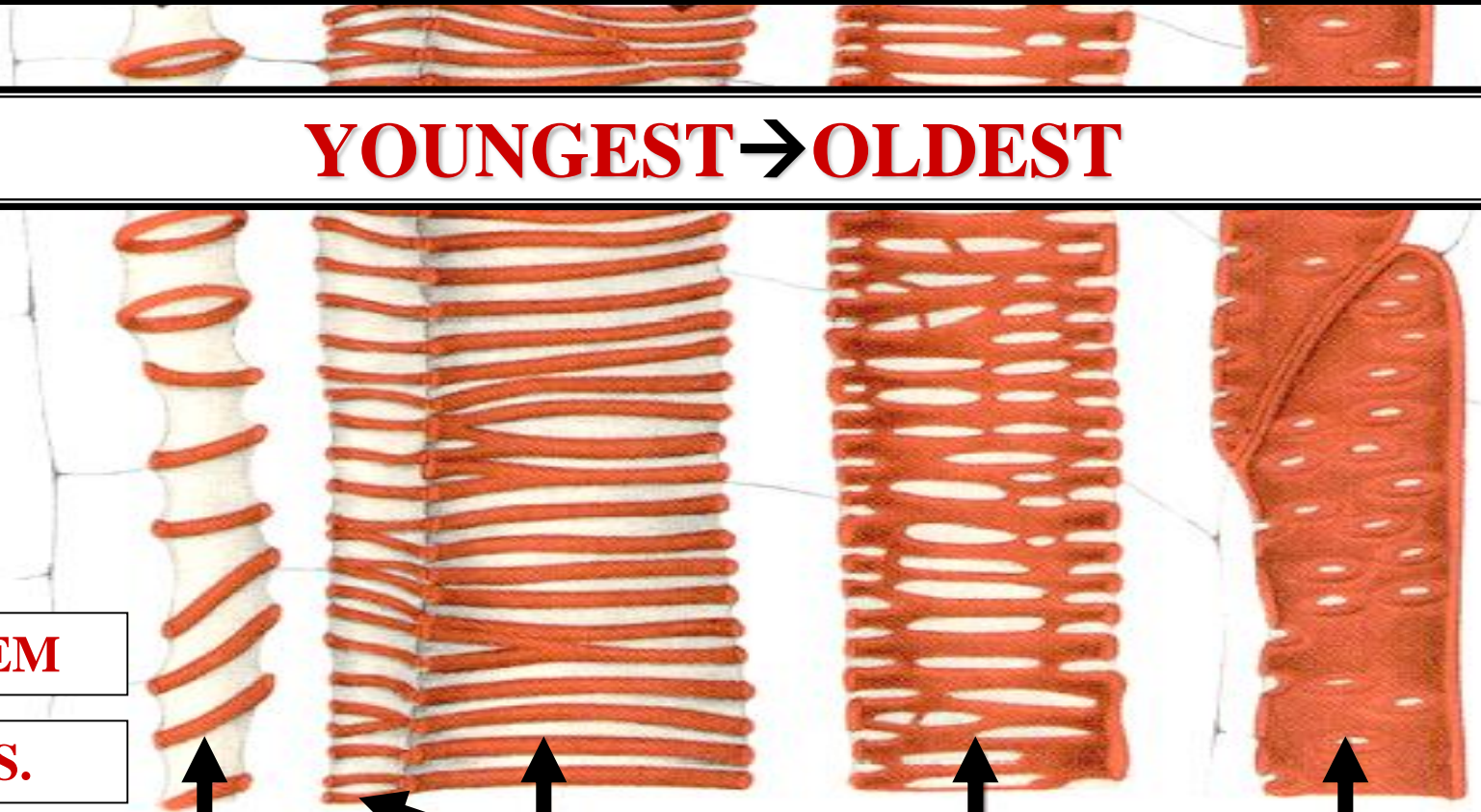
CELL WALL

MATURATION

PATTERN

PRIMARY XYLEM SECONDARY CELL WALL MATURATION PATTERN

YOUNGEST → OLDEST



STEM

L.S.



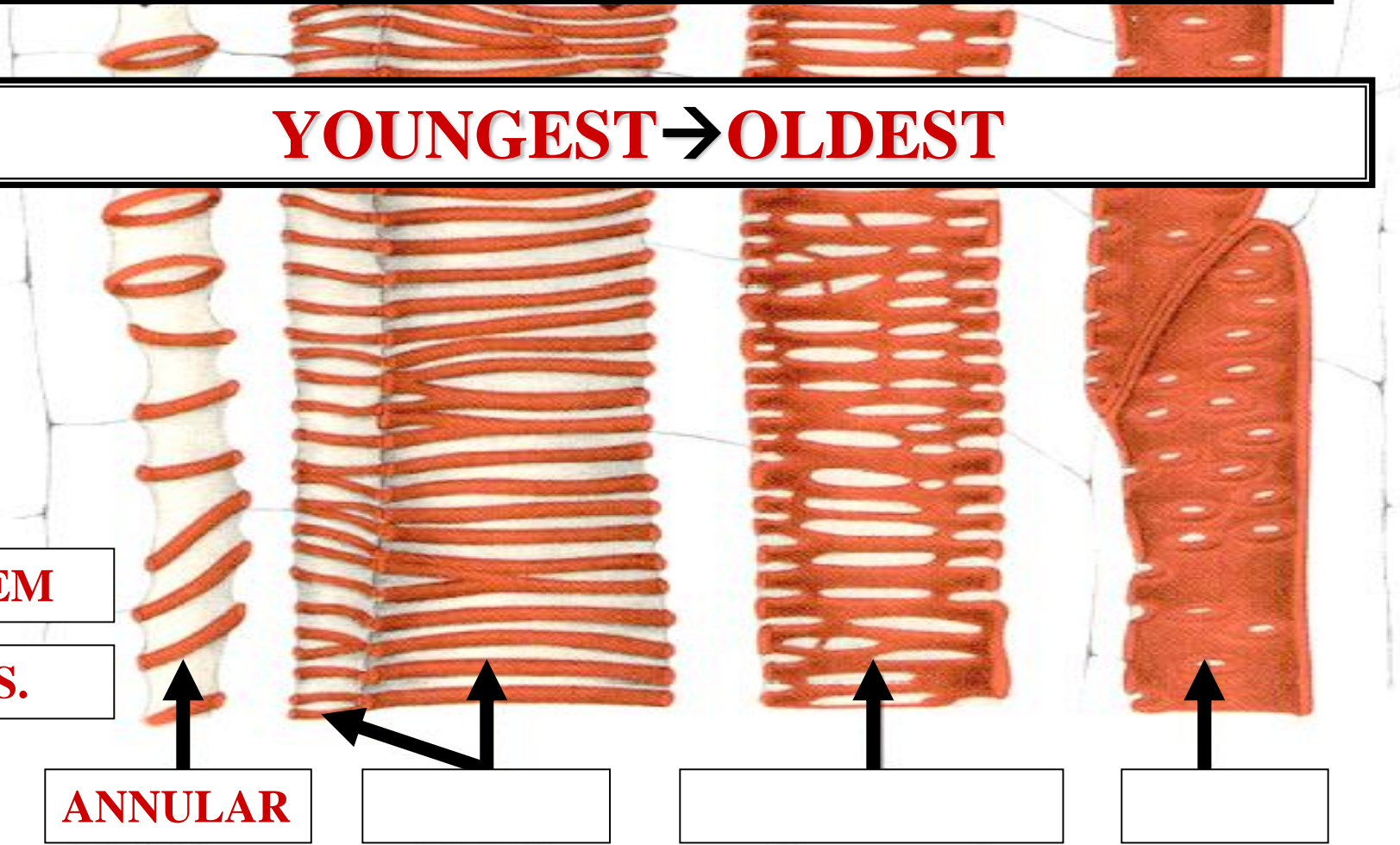
PRIMARY XYLEM SECONDARY CELL WALL MATURATION PATTERN

YOUNGEST → OLDEST

STEM

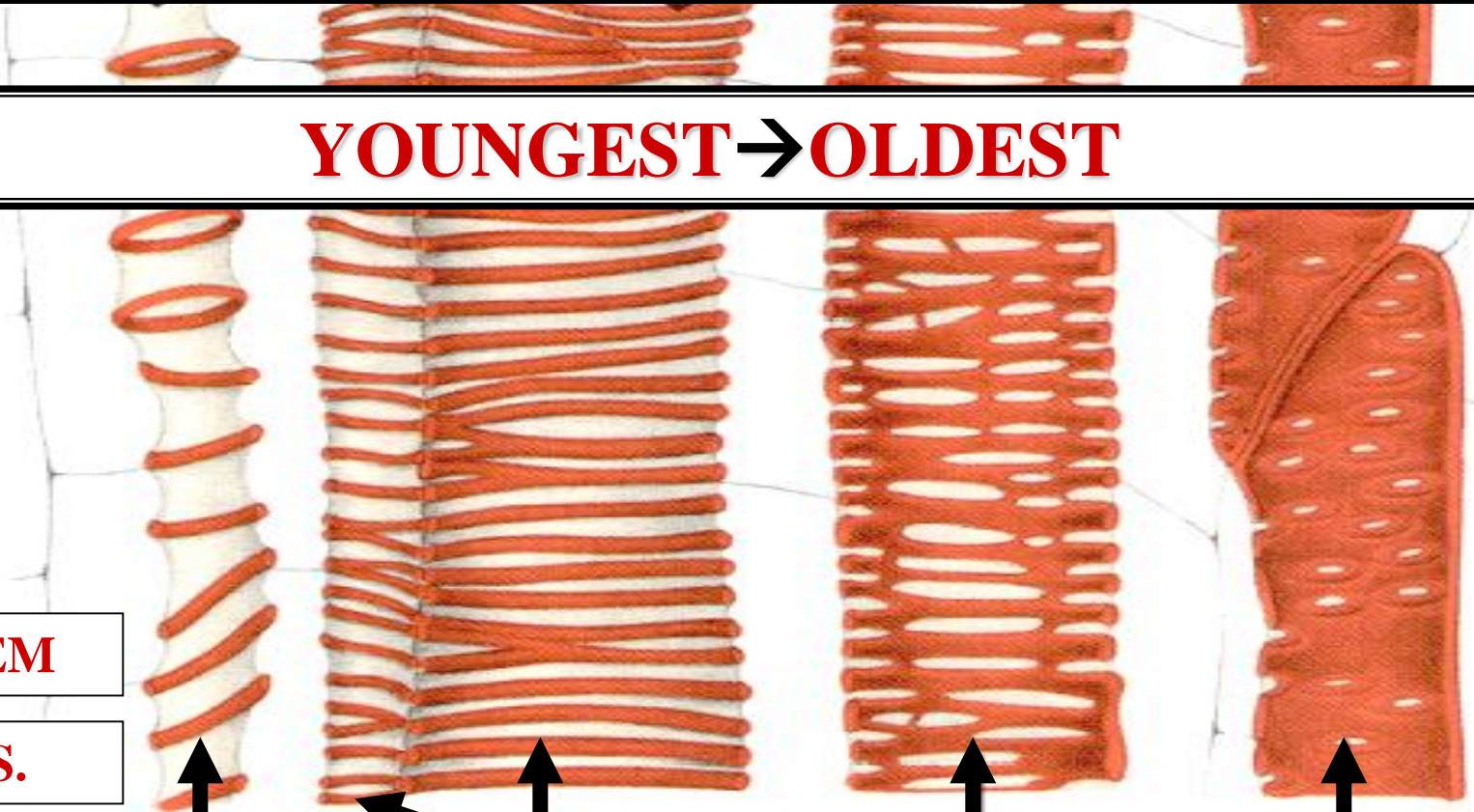
L.S.

ANNULAR



PRIMARY XYLEM SECONDARY CELL WALL MATURATION PATTERN

YOUNGEST → OLDEST



STEM

L.S.

ANNULAR

HELICAL

PRIMARY XYLEM SECONDARY CELL WALL MATURATION PATTERN

YOUNGEST → OLDEST

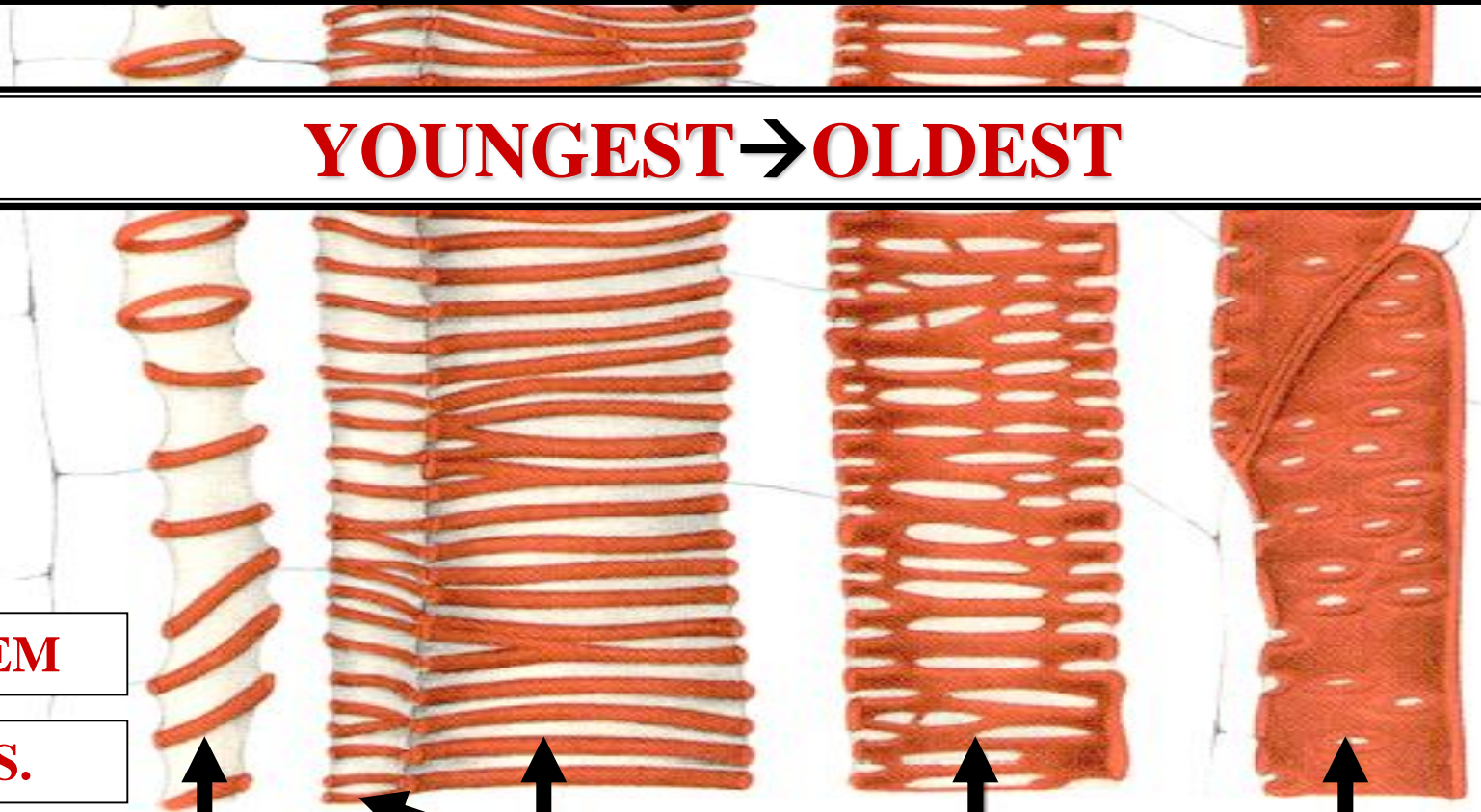
STEM

L.S.

ANNULAR

HELICAL

SCALARIFORM





PRIMARY XYLEM SECONDARY CELL WALL MATURATION PATTERN

YOUNGEST → OLDEST

STEM

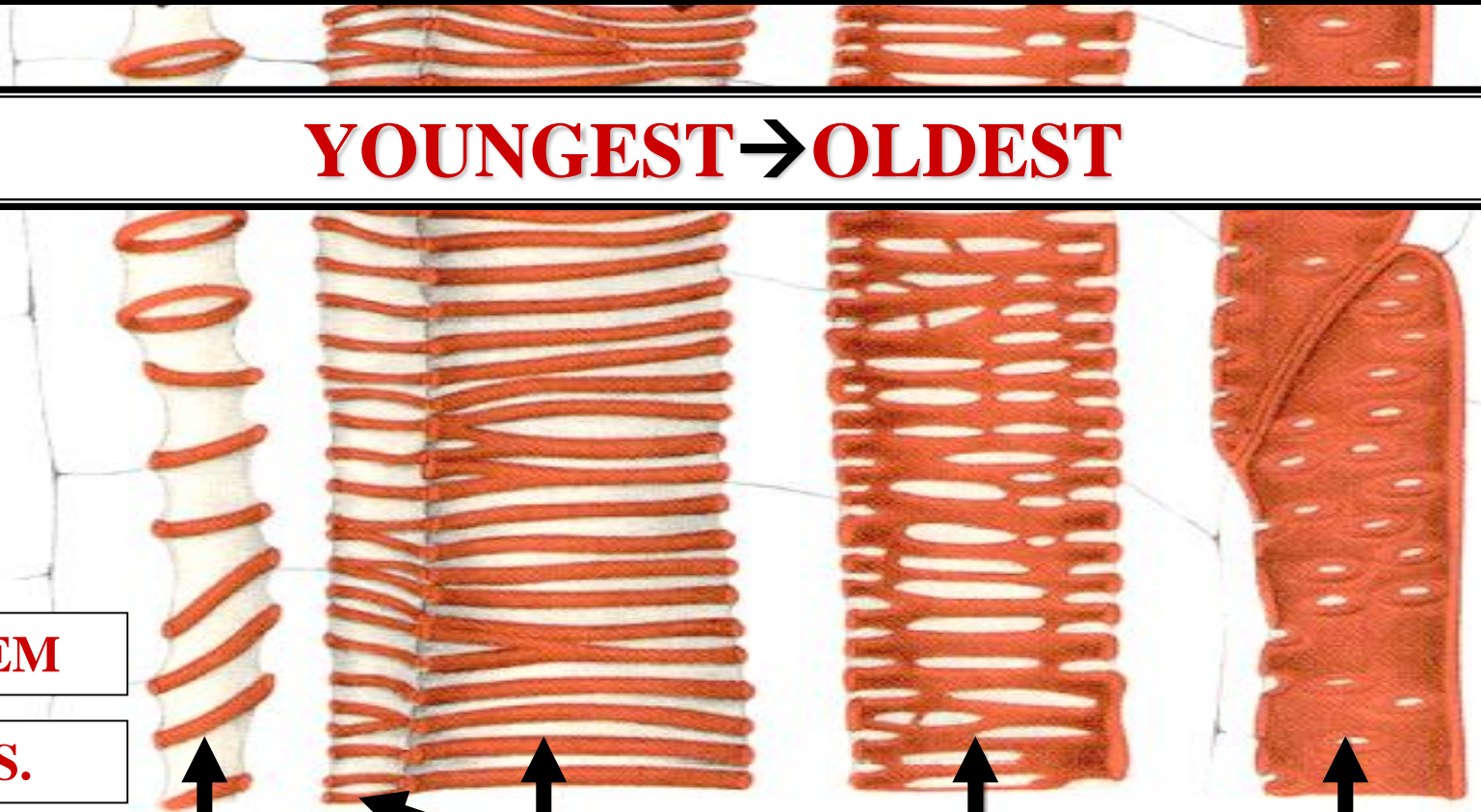
L.S.

ANNULAR

HELICAL

SCALARIFORM

PITTED



TRACHEARY ELEMENT TYPES

TRACHEARY ELEMENT TYPES

TRACHEIDS

TRACHEARY ELEMENT TYPES

TRACHEARY ELEMENT TYPES

T

TRACHEIDS
VESSEL MEMBERS

TRACHEARY ELEMENT
TYPES

TRACHEID

TRACHEARY ELEMENT

TRACHEID



KNOWN MOST VASCULAR PLANTS

TRACHEARY ELEMENT

TRACHEID

TRACHEARY ELEMENT
TRACHEID



KNOWN MOST VASCULAR PLANTS

END WALL HIGHLY TAPPED

TRACHEARY ELEMENT
TRACHEID

TRACHEARY ELEMENT TRACHEID

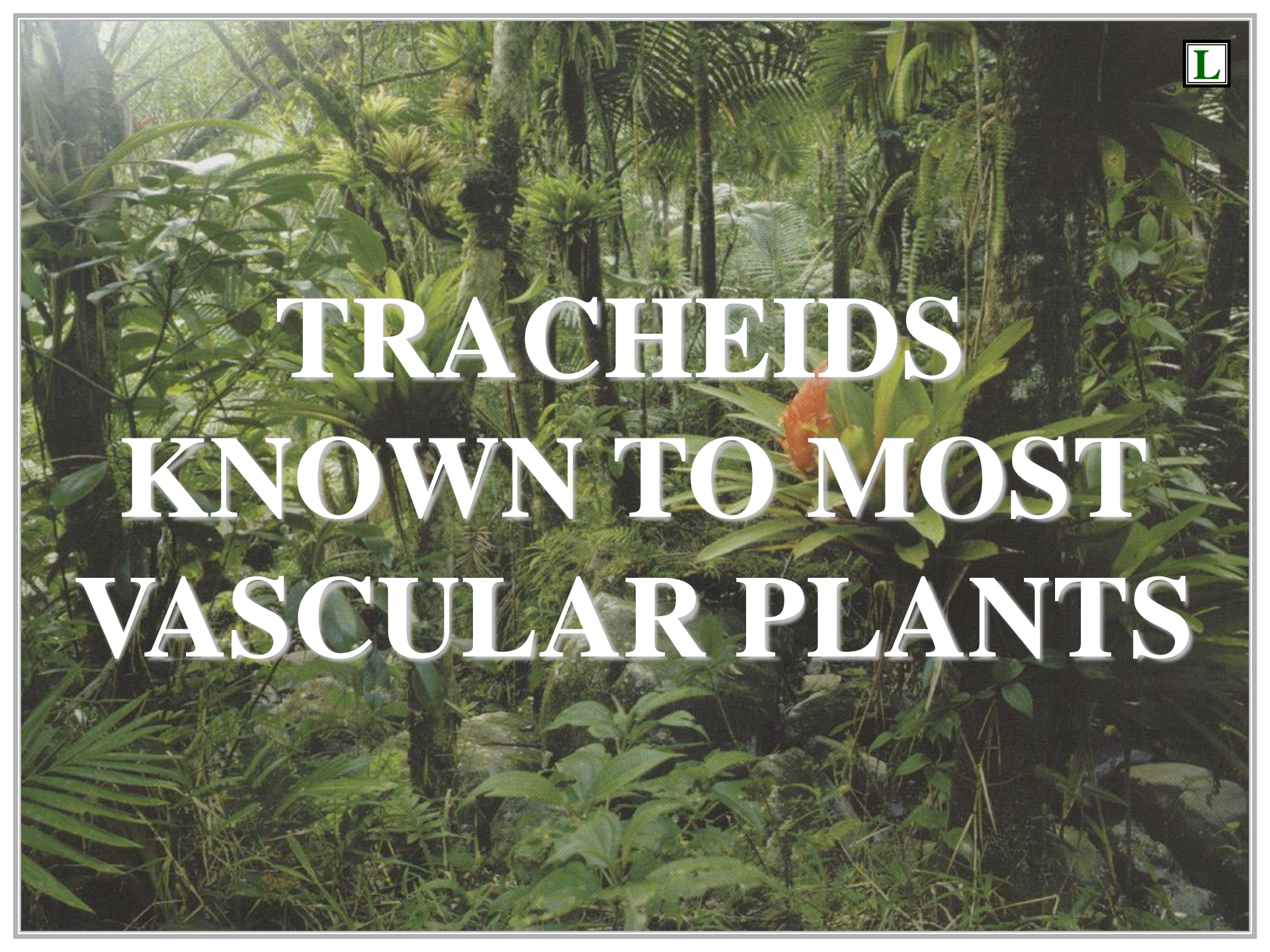


KNOWN MOST VASCULAR PLANTS

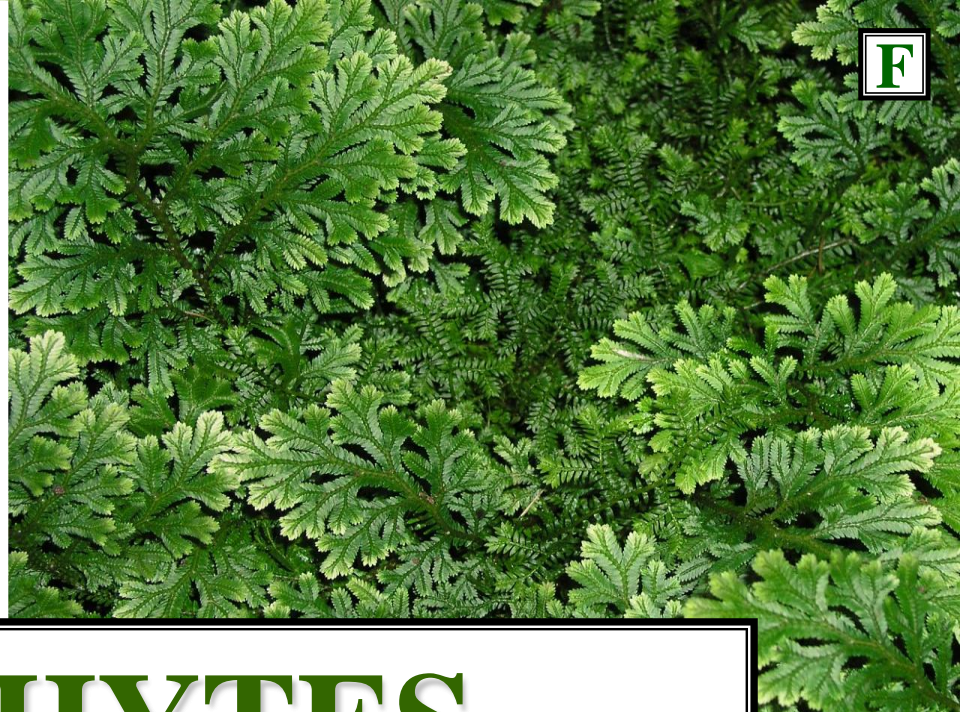
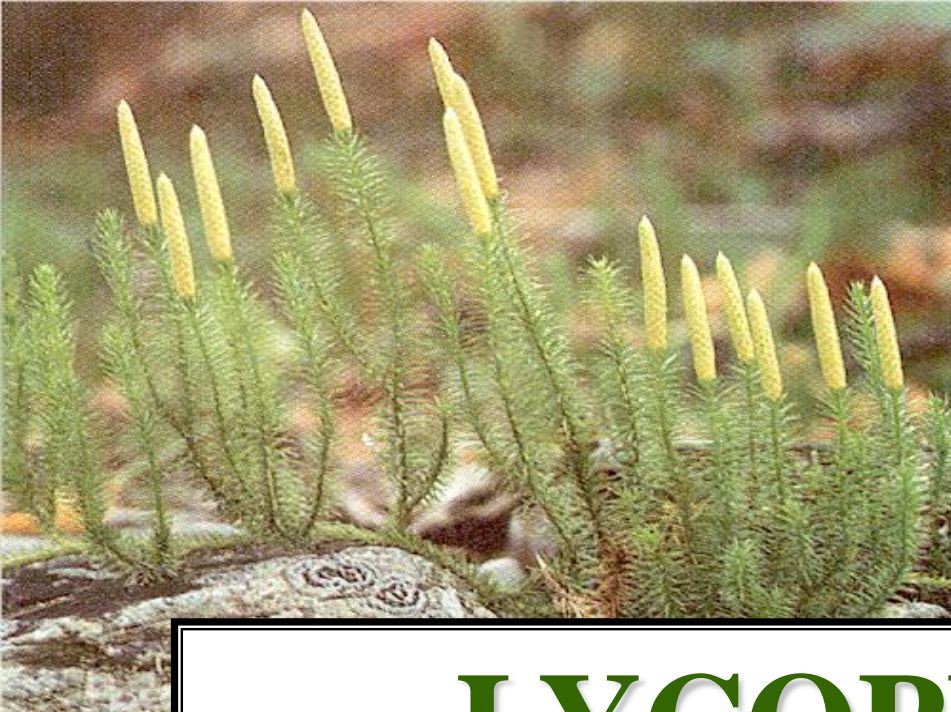
END WALL HIGHLY TAPPED

END WALL WITH PITS

TRACHEARY ELEMENT
TRACHEID

A lush tropical forest scene with dense green foliage and a single orange flower. The text is overlaid in the center.

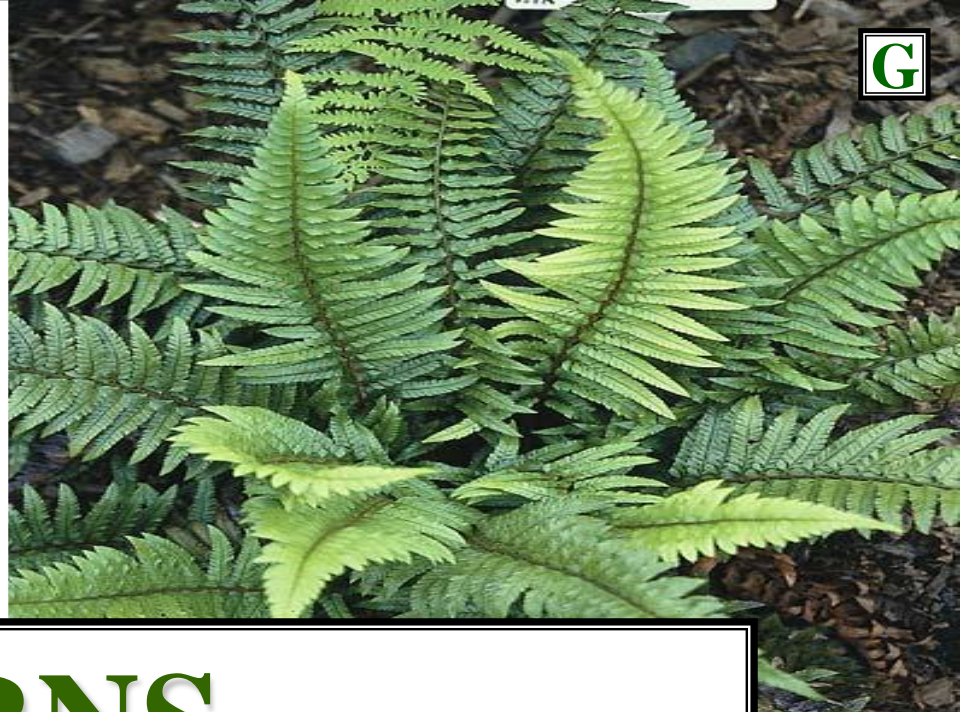
**TRACHEIDS
KNOWN TO MOST
VASCULAR PLANTS**



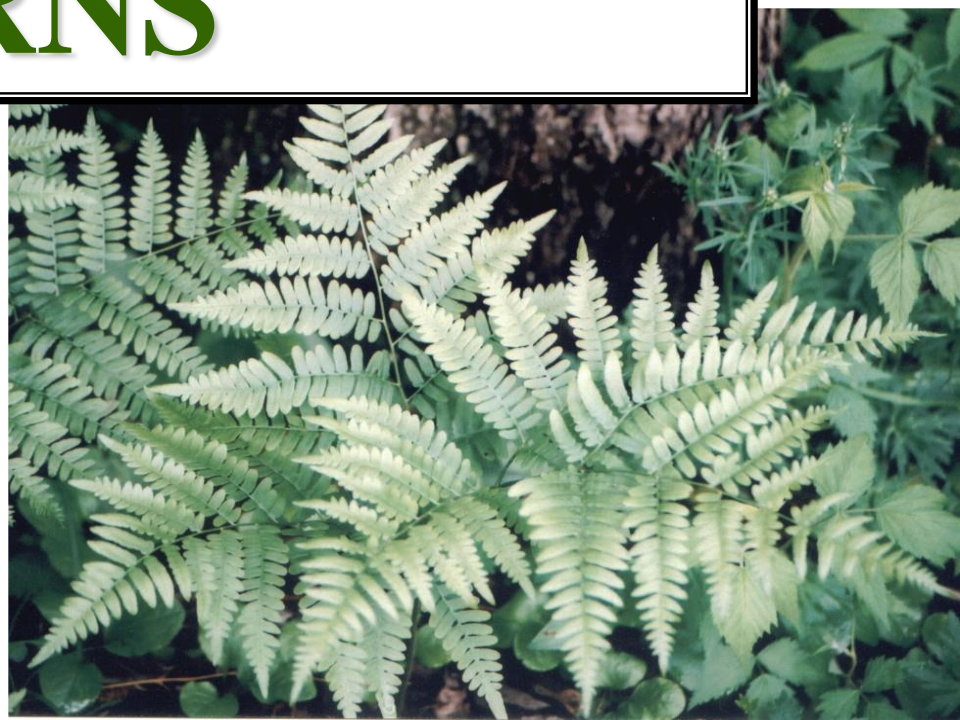
F

LYCOPHYTES





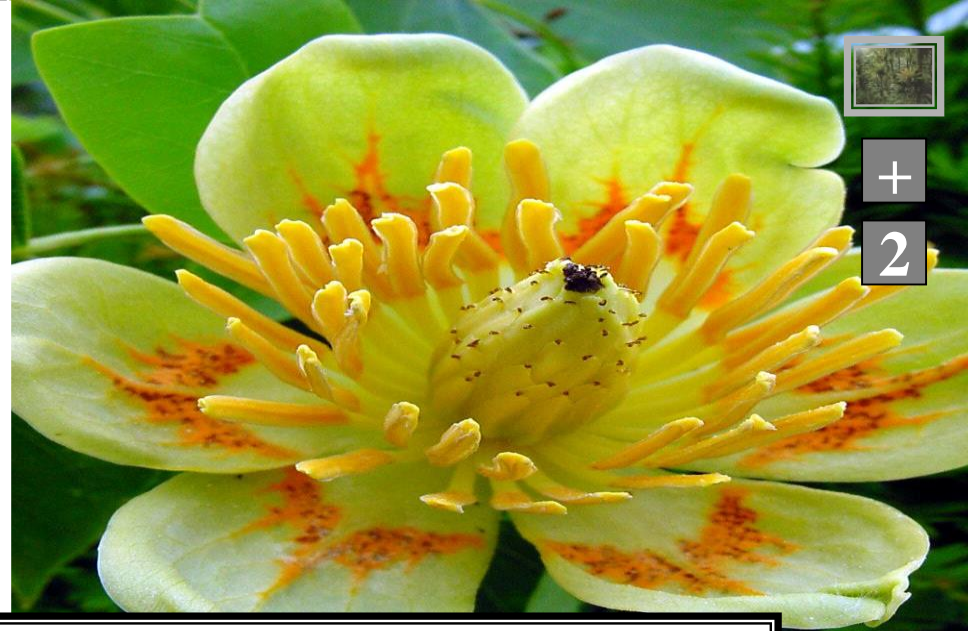
FERNS





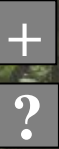
GYMNOSPERMS





ANGIOSPERMS





TRACHEIDS
KNOWN TO MOST
VASCULAR PLANTS

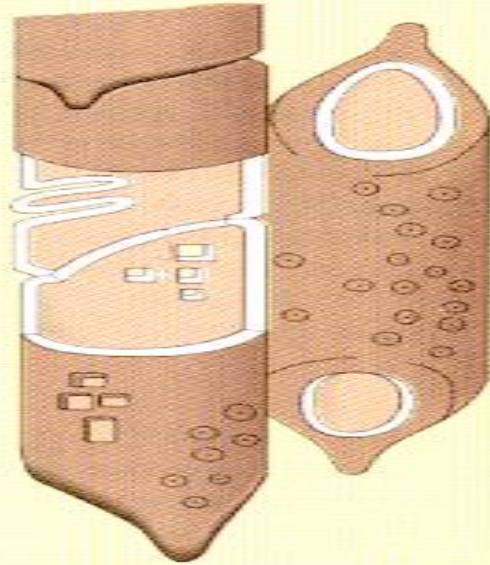
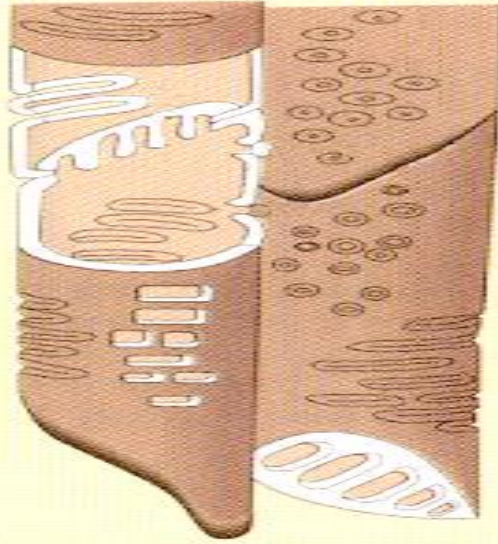
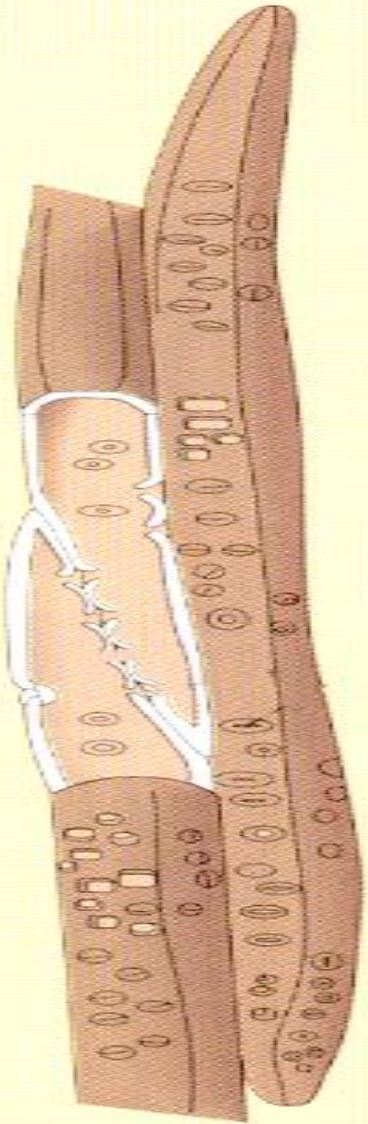


VASCULAR PLANTS

?

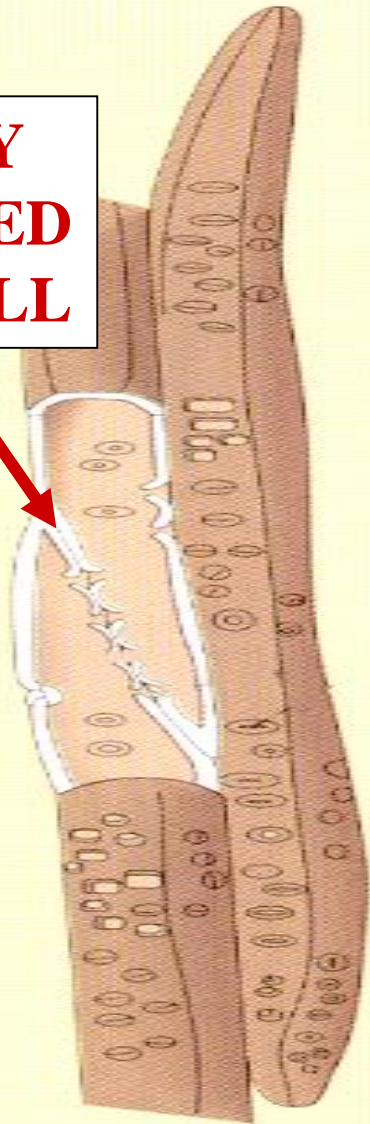


VASCULAR PLANTS TRACHEOPHYTES

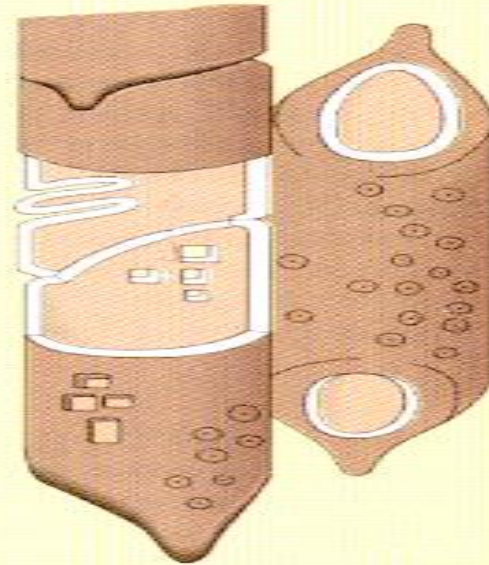
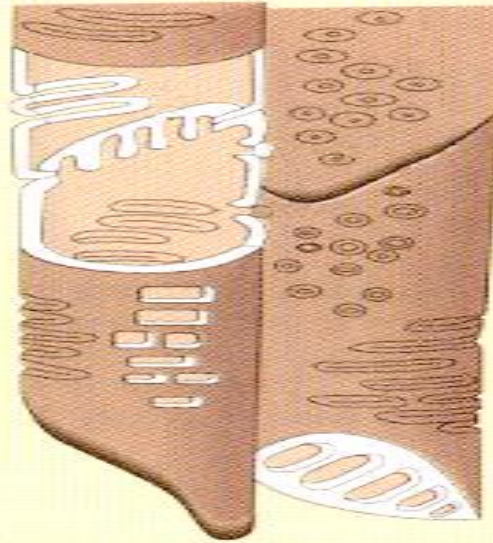


TRACHEID

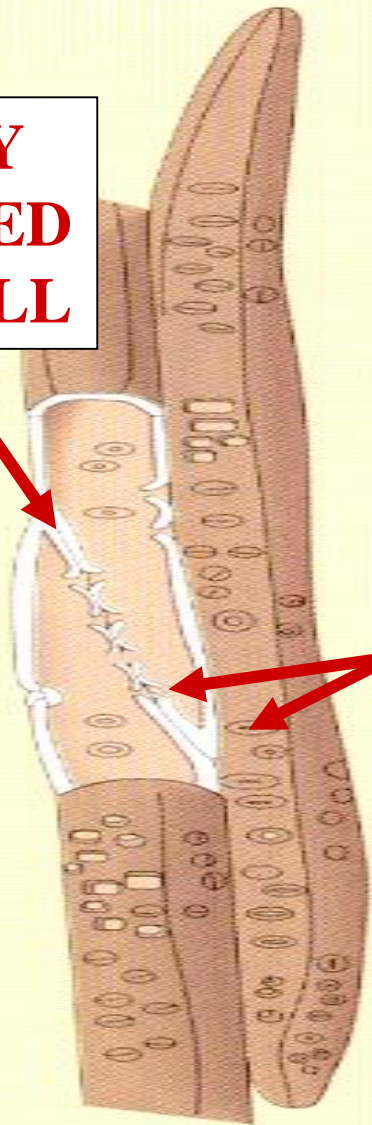
**HIGHLY
TAPPED
END WALL**



TRACHEID



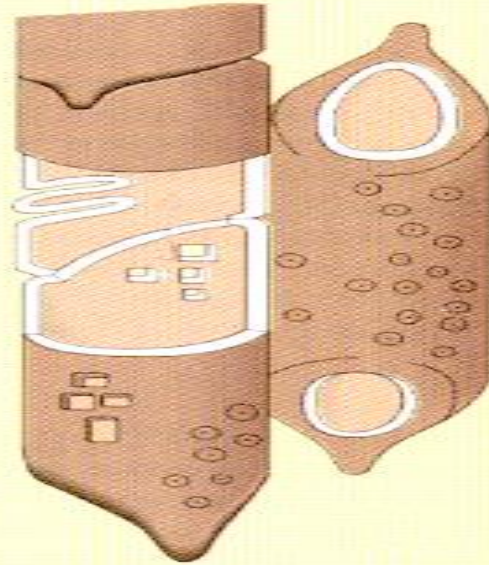
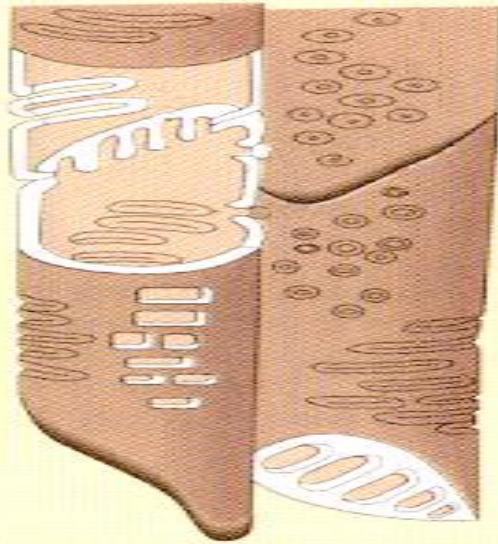
**HIGHLY
TAPPED
END WALL**



PITS



TRACHEID

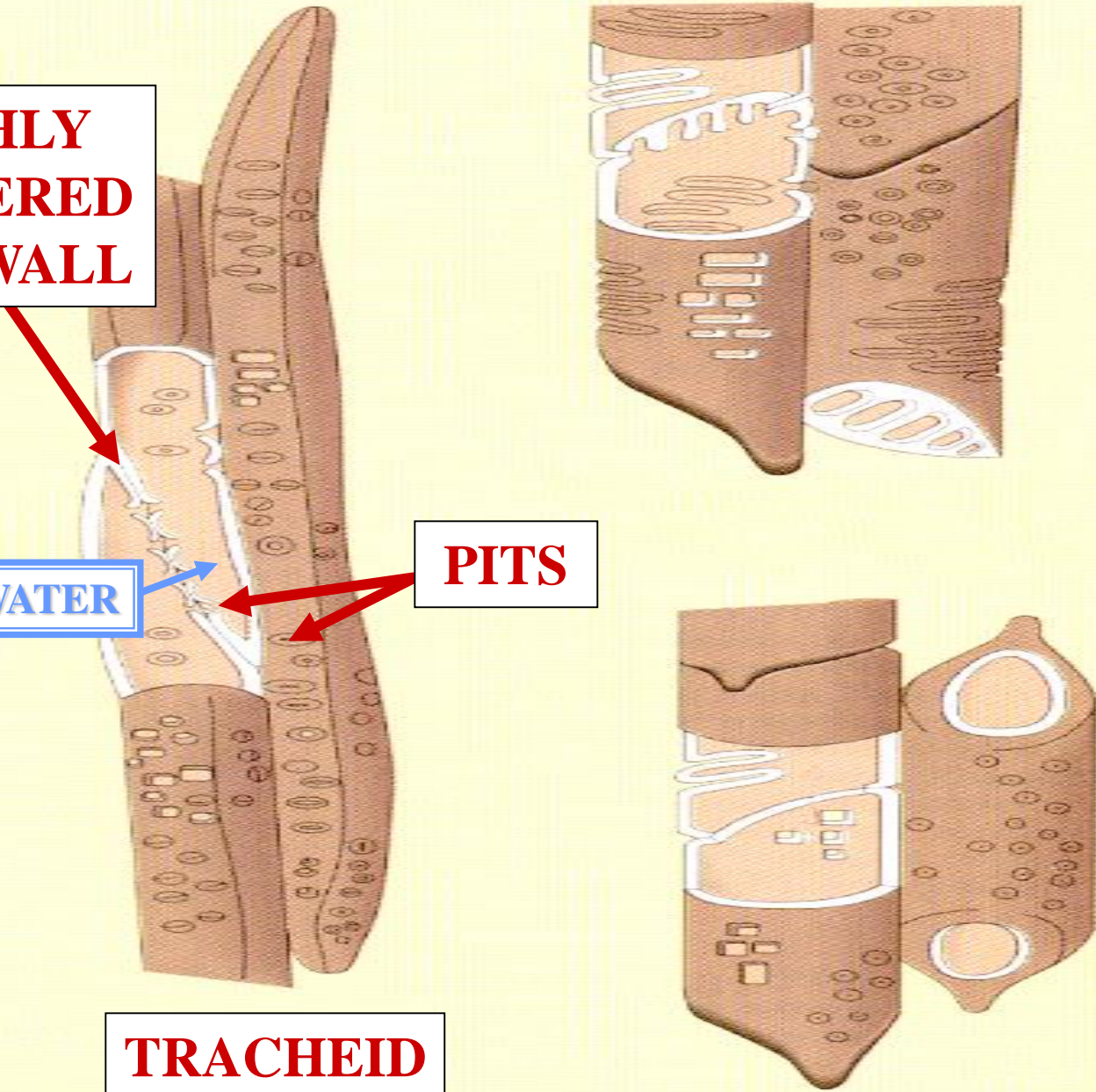


**HIGHLY
TAPPED
END WALL**

WATER

PITS

TRACHEID



VESSEL MEMBER

TRACHEARY ELEMENT VESSEL MEMBER



KNOWN VARIOUS VASCULAR PLANTS

**TRACHEARY ELEMENT
VESSEL MEMBER**

TRACHEARY ELEMENT VESSEL MEMBER



KNOWN VARIOUS VASCULAR PLANTS

END WALL LESS TAPERED

TRACHEARY ELEMENT VESSEL MEMBER

TRACHEARY ELEMENT VESSEL MEMBER



KNOWN VARIOUS VASCULAR PLANTS

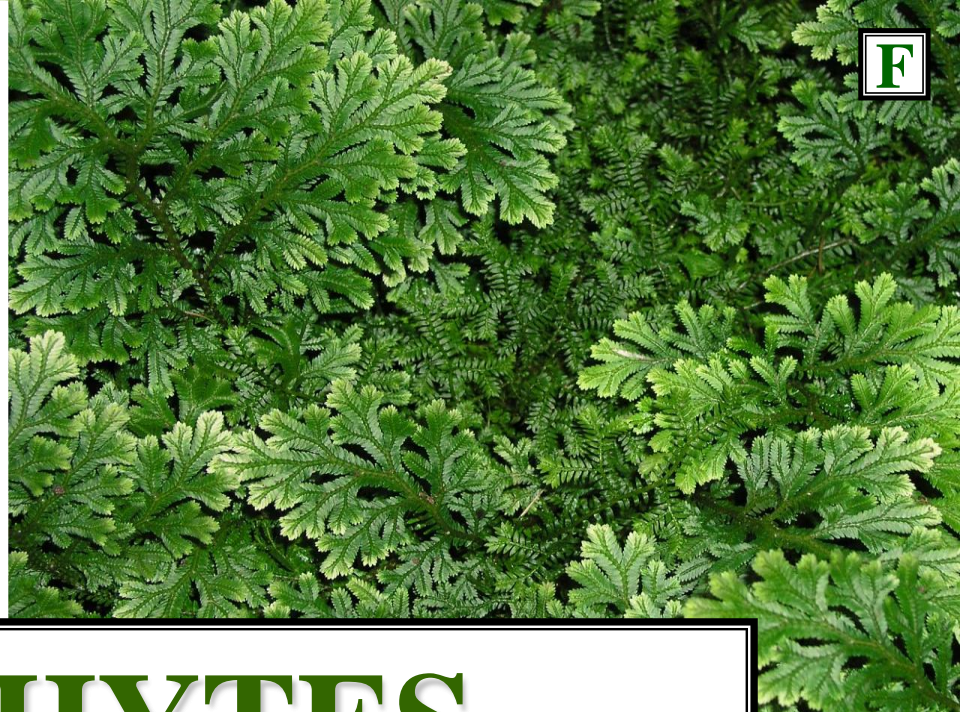
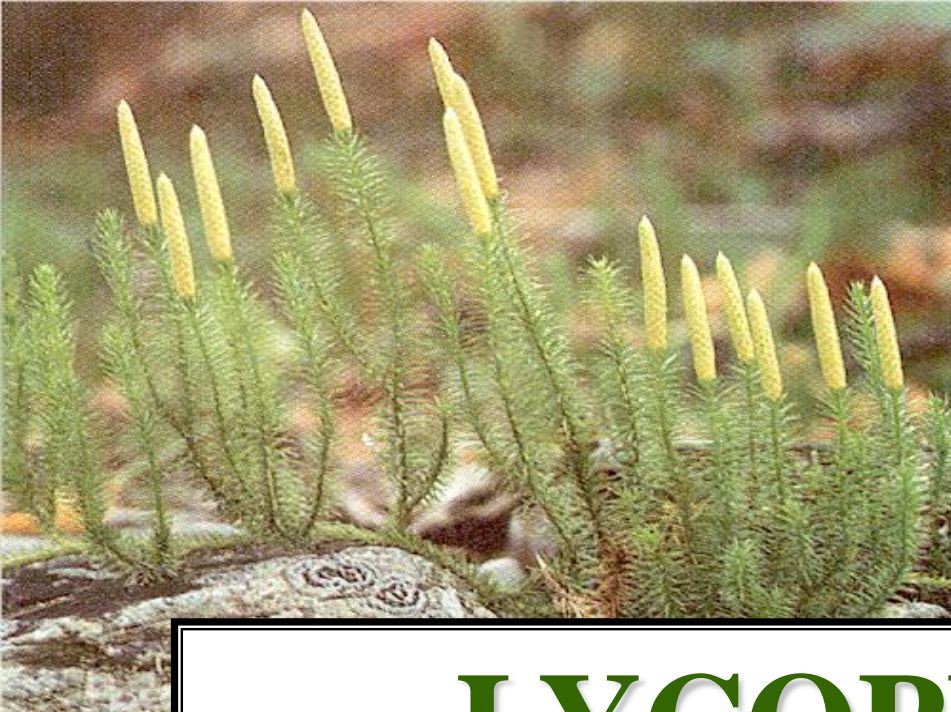
END WALL LESS TAPPERED

END WALL WITH PERFORATED PLATE

TRACHEARY ELEMENT VESSEL MEMBER

A dense tropical forest scene with various green plants, including ferns and broad-leafed species. A single bright orange flower is visible in the middle ground. The text is overlaid in the center.

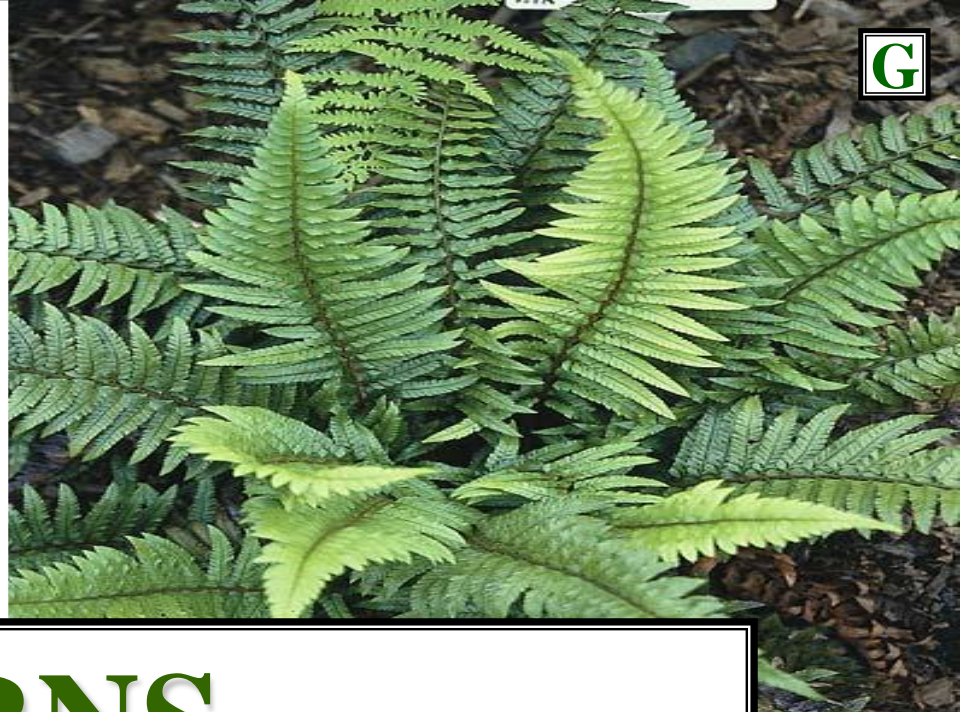
**VESSEL MEMBERS
KNOWN TO VARIOUS
VASCULAR PLANTS**



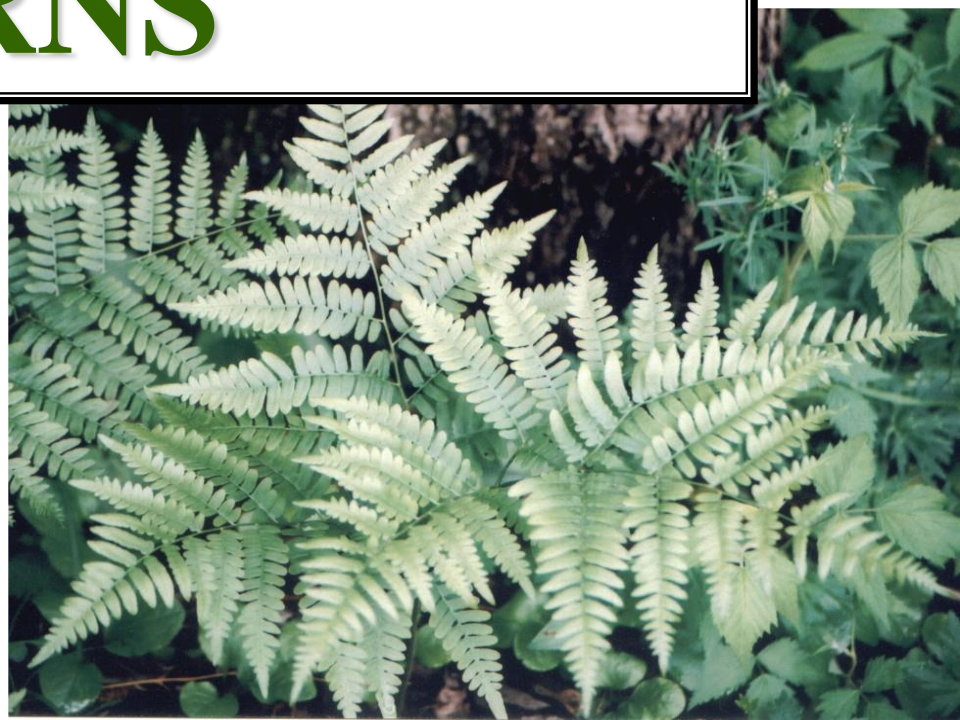
F

LYCOPHYTES





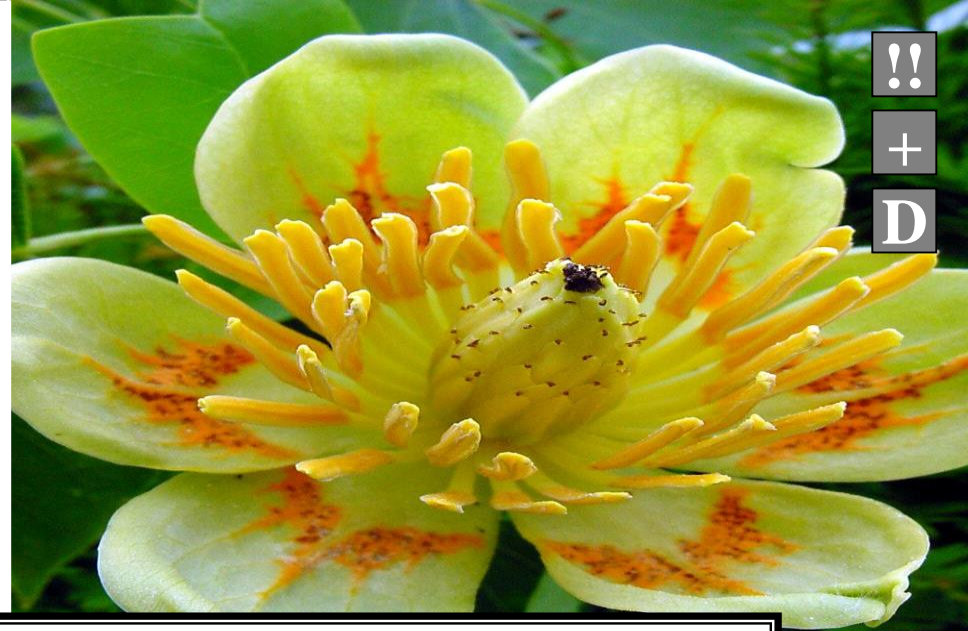
FERNS





GYMNOSPERMS





ANGIOSPERMS





**VESSEL MEMBERS
DOMINATE WITH
ANGIOSPERMS**

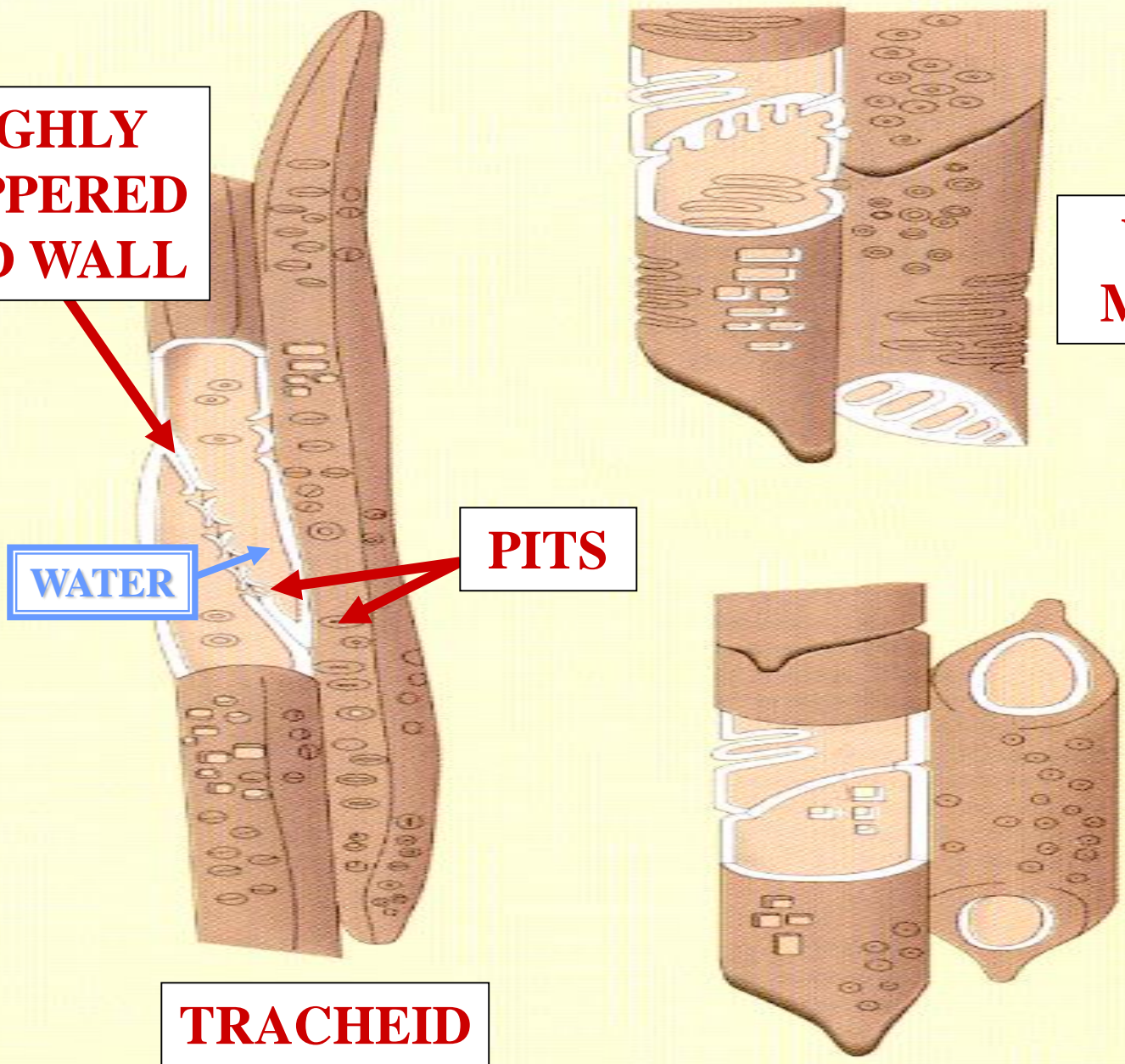
**HIGHLY
TAPPED
END WALL**

WATER

PITS

TRACHEID

**VESSEL
MEMBER**



**HIGHLY
TAPPERED
END WALL**

**LESS
TAPPERED
END WALL**

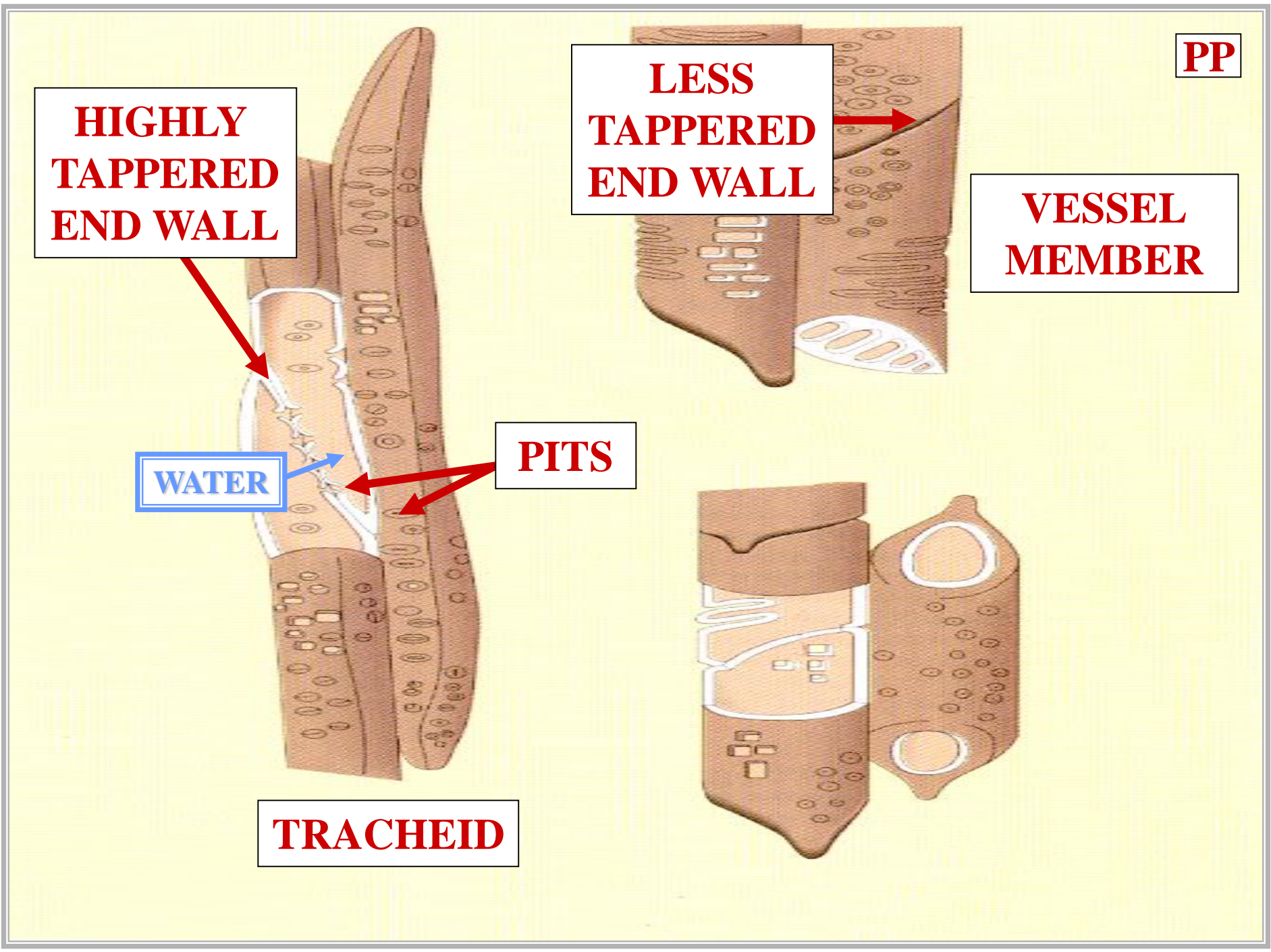
PP

**VESSEL
MEMBER**

WATER

PITS

TRACHEID





**HIGHLY
TAPPERED
END WALL**

**LESS
TAPPERED
END WALL**

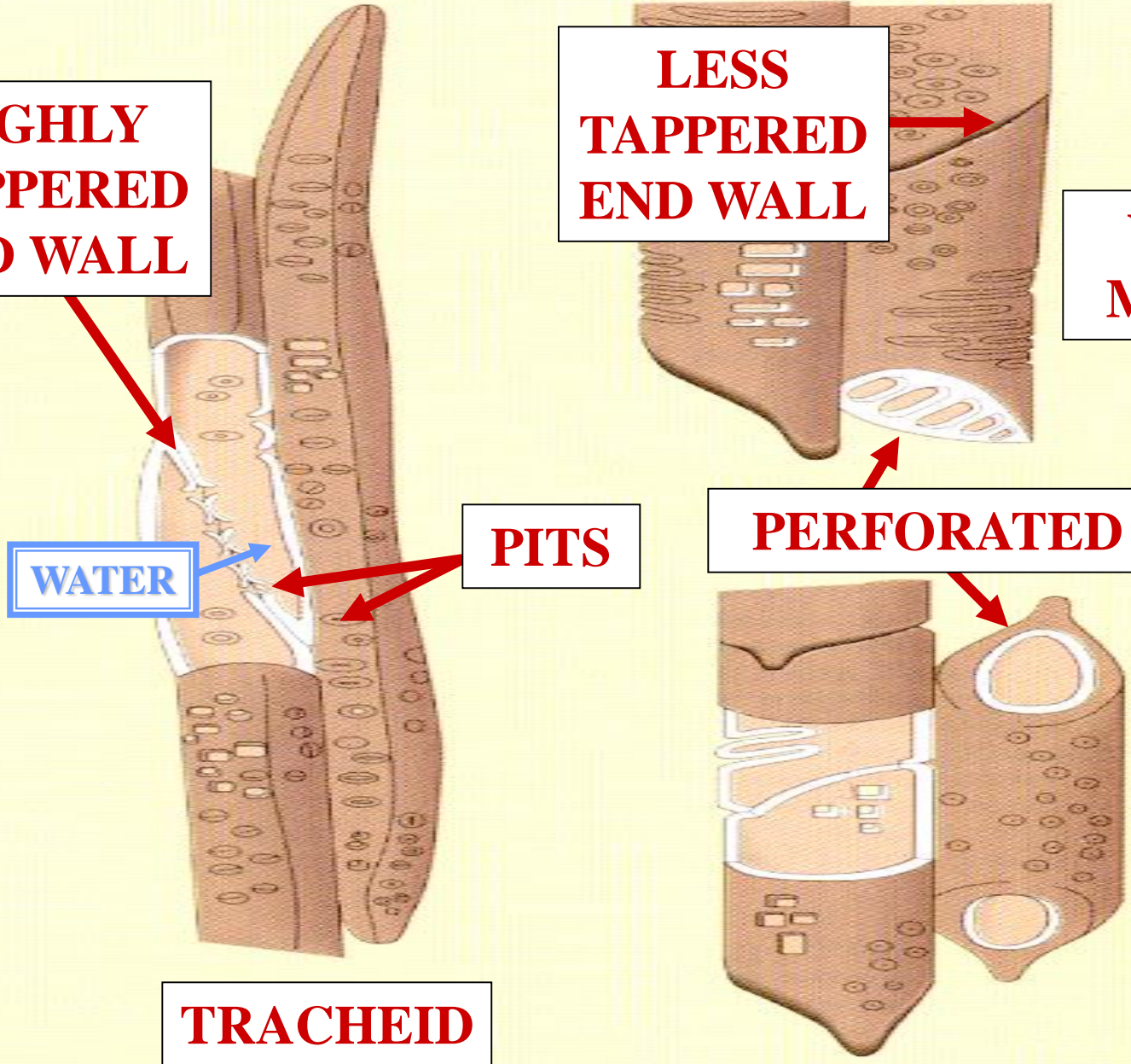
**VESSEL
MEMBER**

WATER

PITS

PERFORATED PLATE

TRACHEID



PERFORATED PLATE TYPES

PERFORATED PLATE TYPES



SCALARIFORM PERFORATED PLATE

PERFORATED PLATE TYPES

PERFORATED PLATE TYPES



SCALARIFORM PERFORATED PLATE
SIMPLE PERFORATED PLATE

PERFORATED PLATE TYPES

**SCALARIFORM
PERFORATED
PLATE**

**SCALARIFORM
PERFORATED PLATE**



LADDER-LIKE

**SCALARIFORM
PERFORATED PLATE**



**HIGHLY
TAPPED
END WALL**

**LESS
TAPPED
END WALL**

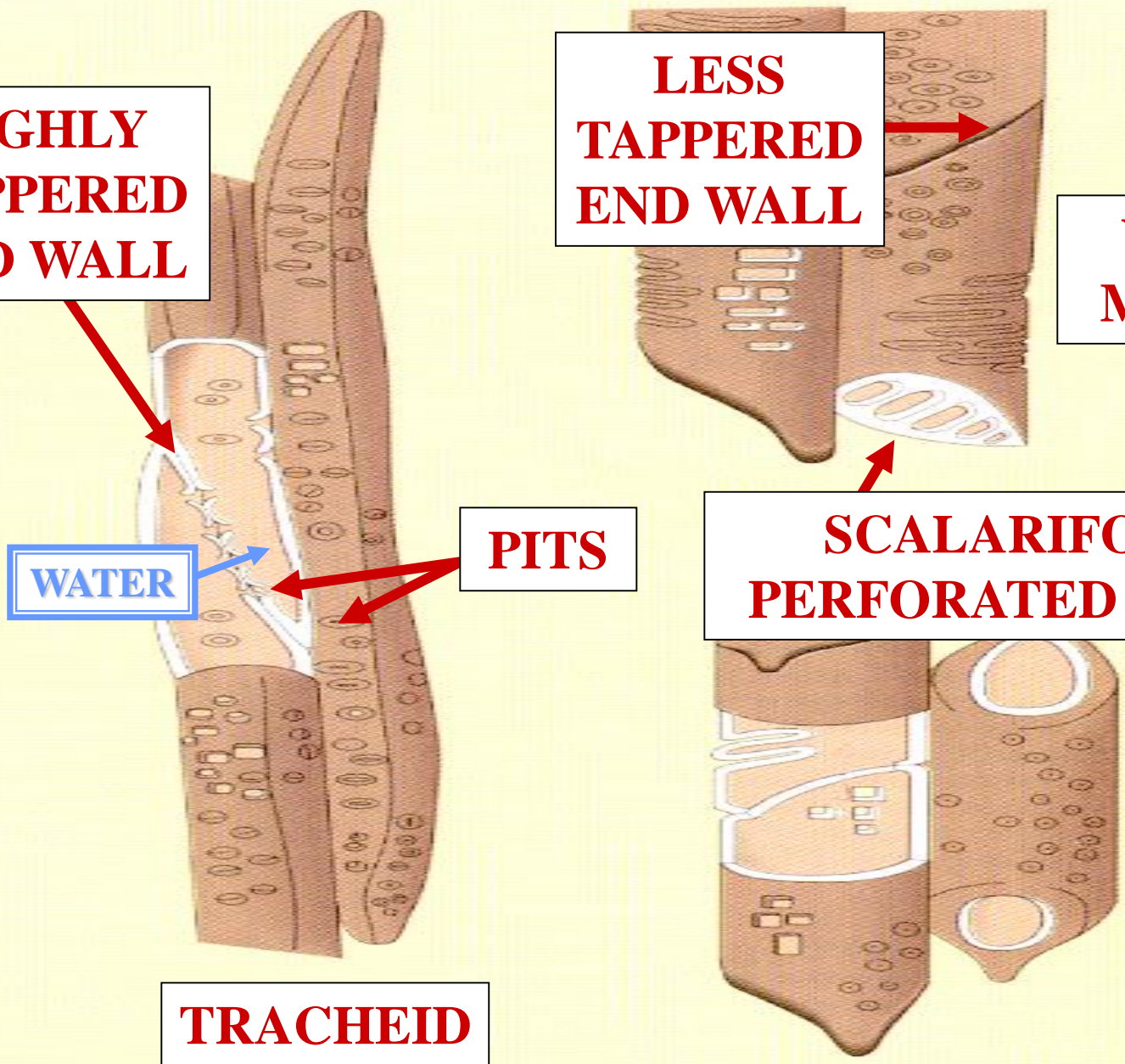
**VESSEL
MEMBER**

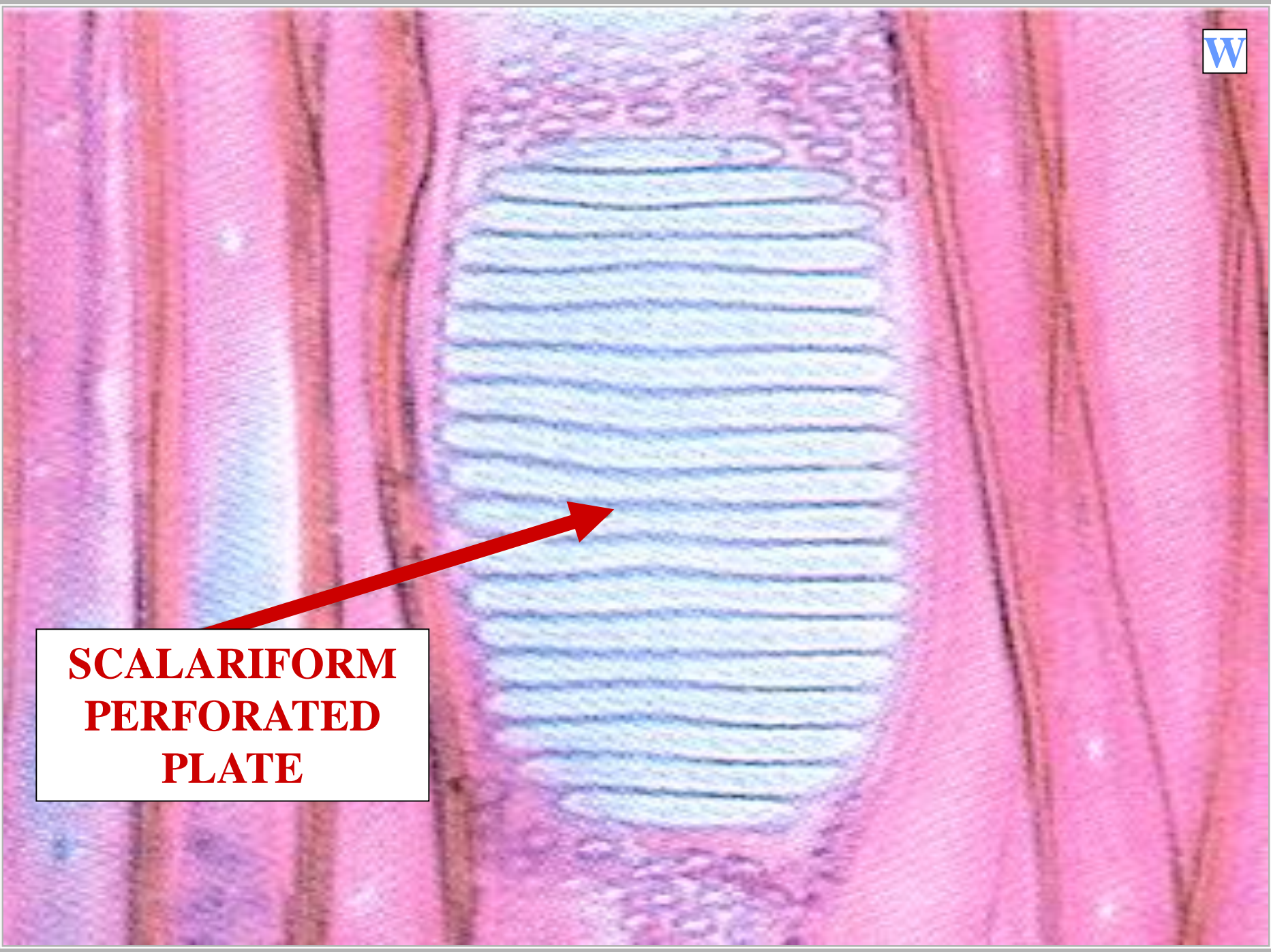
WATER

PITS

**SCALARIFORM
PERFORATED PLATE**

TRACHEID





**SCALARIFORM
PERFORATED
PLATE**

**HIGHLY
TAPPED
END WALL**

**LESS
TAPPED
END WALL**

**VESSEL
MEMBER**

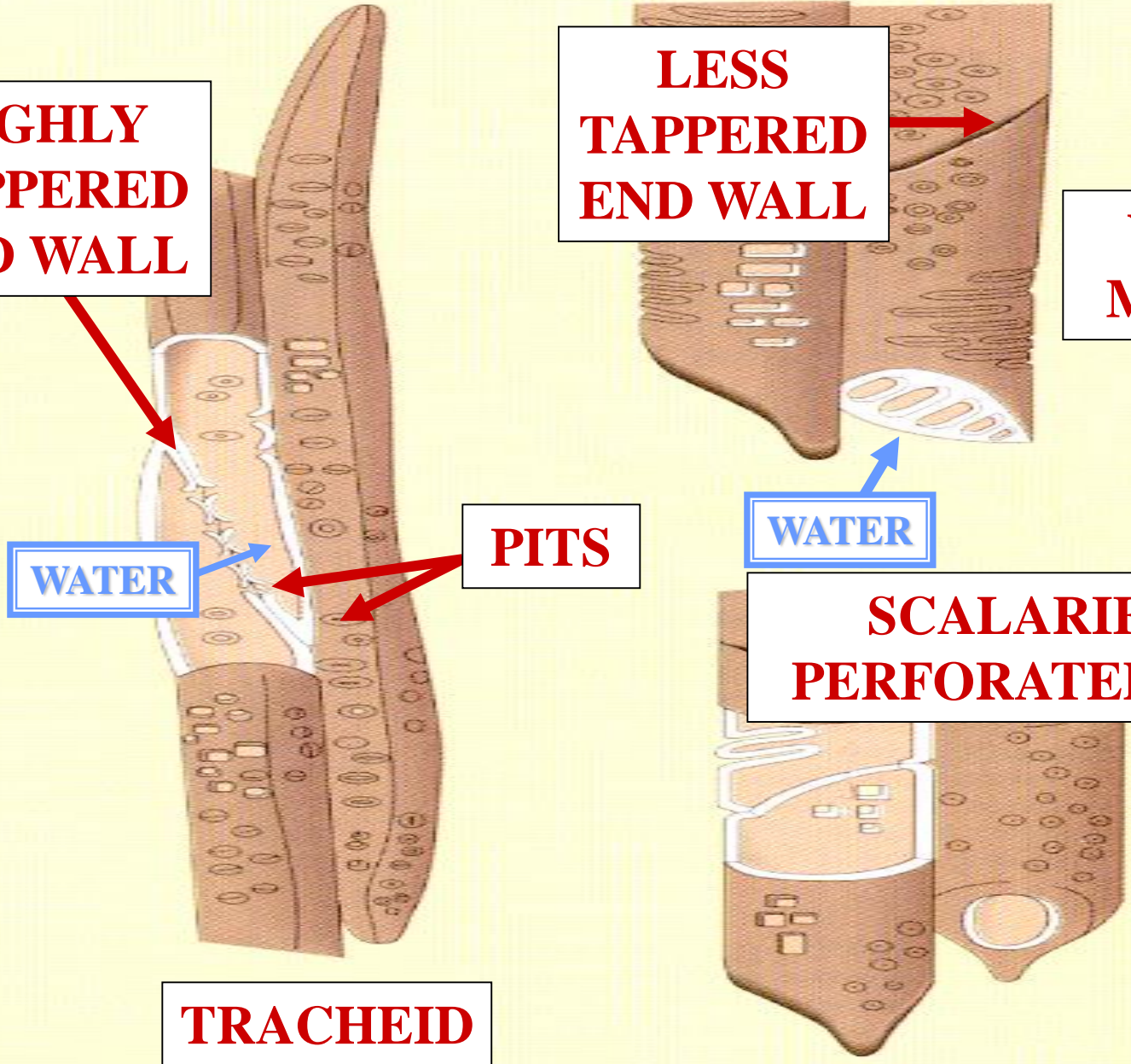
WATER

PITS

WATER

**SCALARIFORM
PERFORATED PLATE**

TRACHEID



**SIMPLE
PERFORATED
PLATE**



**SIMPLE
PERFORATED PLATE**

LARGE PERFORATION

**SIMPLE
PERFORATED PLATE**



**HIGHLY
TAPPED
END WALL**

**LESS
TAPPED
END WALL**

**VESSEL
MEMBER**

WATER

PITS

**SIMPLE
PERFORATED PLATE**

TRACHEID

