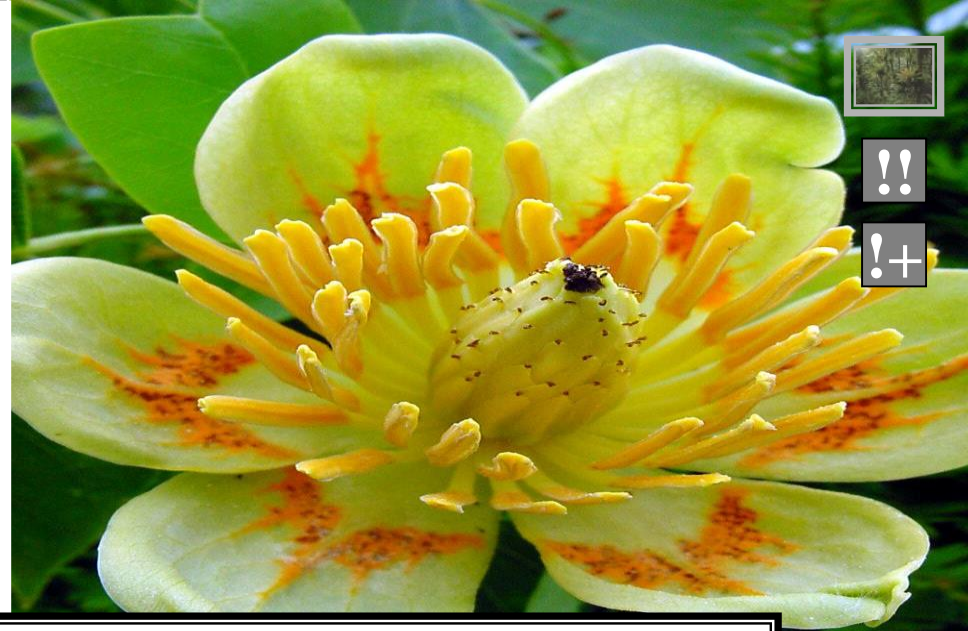




GYMNOSPERMS





ANGIOSPERMS





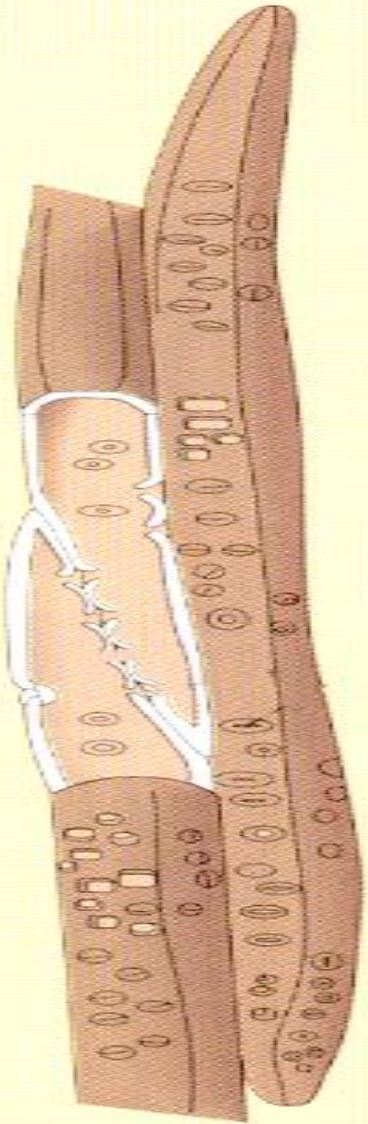
TRACHEIDS KNOWN TO MOST VASCULAR PLANTS

VASCULAR PLANTS

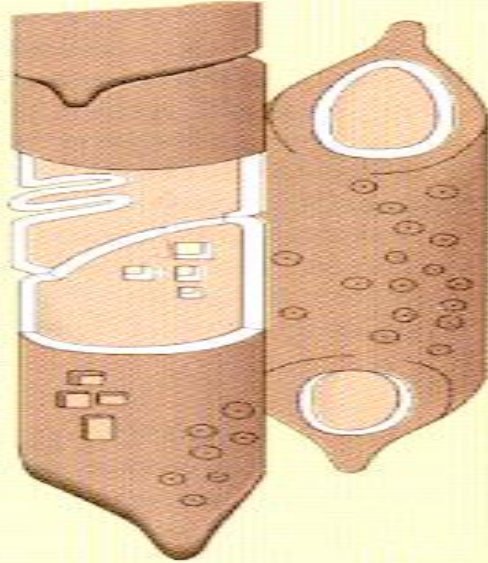
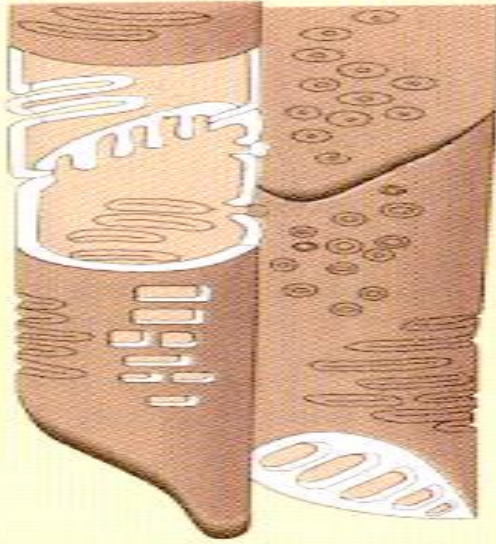
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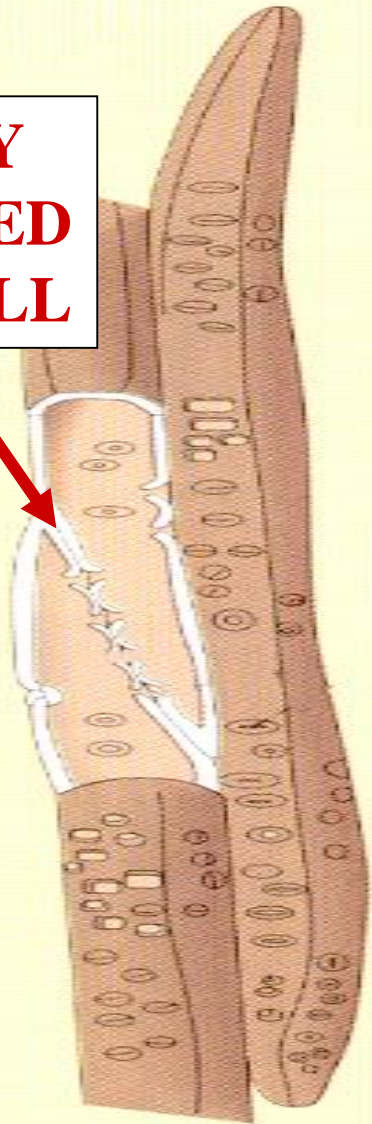
VASCULAR PLANTS TRACHEOPHYTES



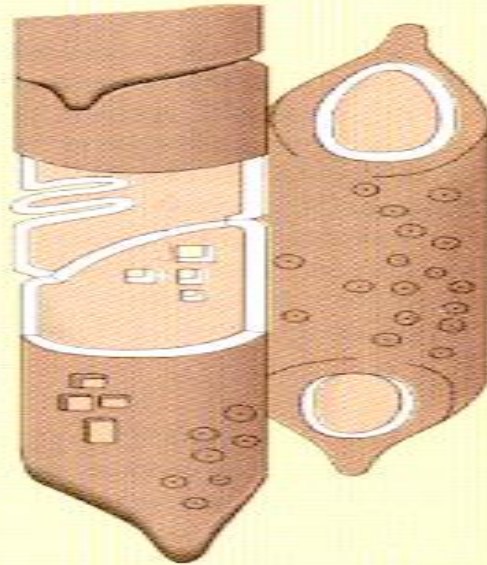
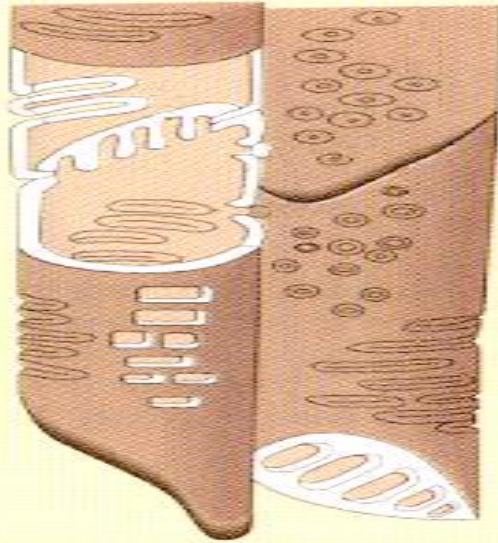
TRACHEID



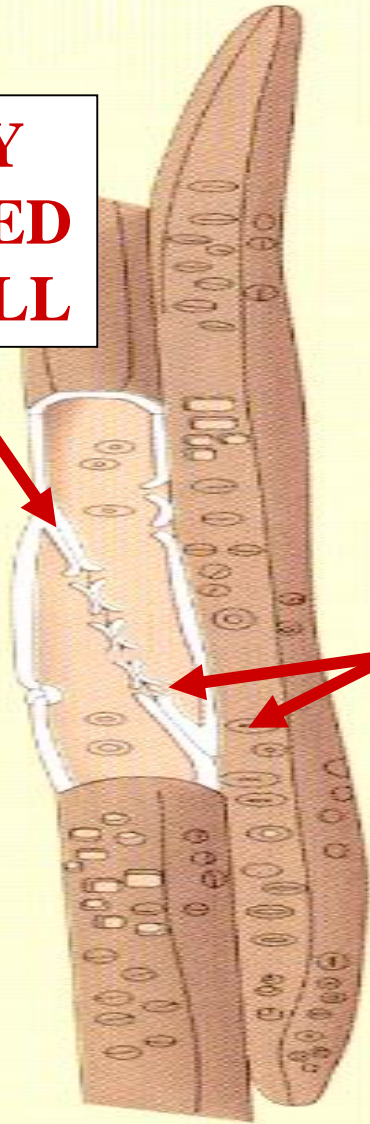
**HIGHLY
TAPPED
END WALL**



TRACHEID



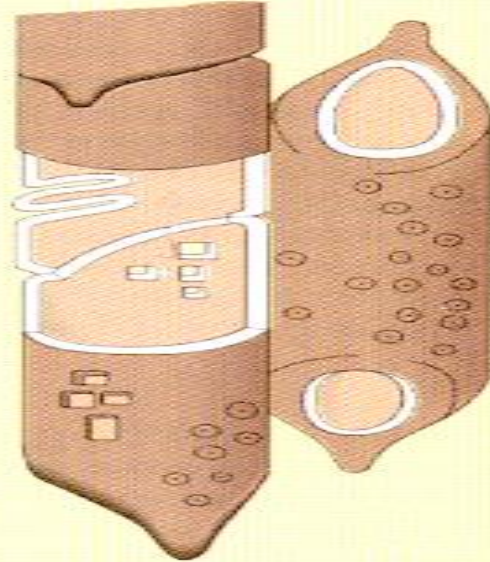
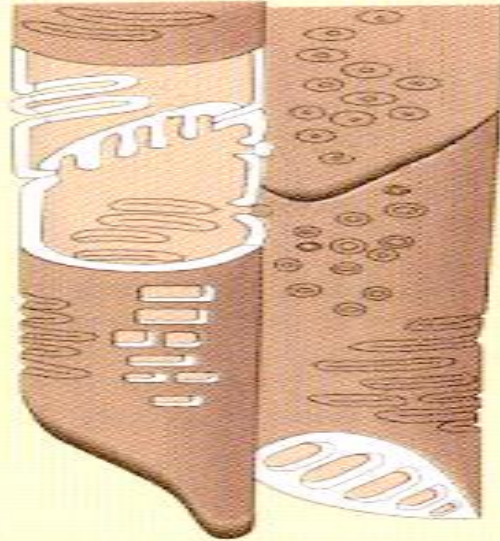
**HIGHLY
TAPPED
END WALL**



PITS



TRACHEID

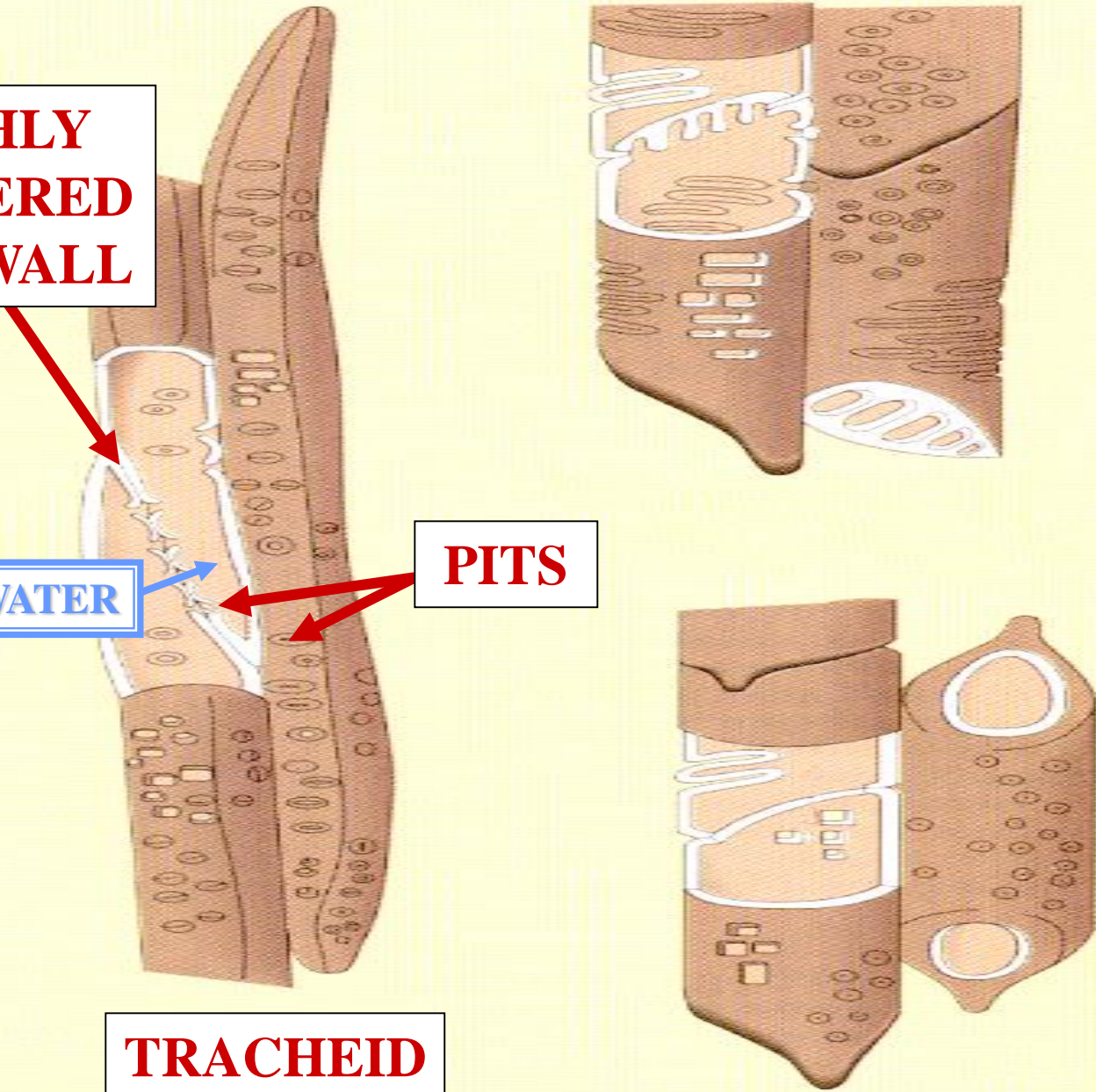


**HIGHLY
TAPPED
END WALL**

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
DOMINATE WITH ANGIOSPERMS**

**TRACHEARY ELEMENT
VESSEL MEMBER**

TRACHEARY ELEMENT VESSEL MEMBER



**KNOWN VARIOUS VASCULAR PLANTS
DOMINATE WITH ANGIOSPERMS**

END WALL LESS TAPPED

**TRACHEARY ELEMENT
VESSEL MEMBER**

TRACHEARY ELEMENT VESSEL MEMBER



KNOWN VARIOUS VASCULAR PLANTS
DOMINATE WITH ANGIOSPERMS

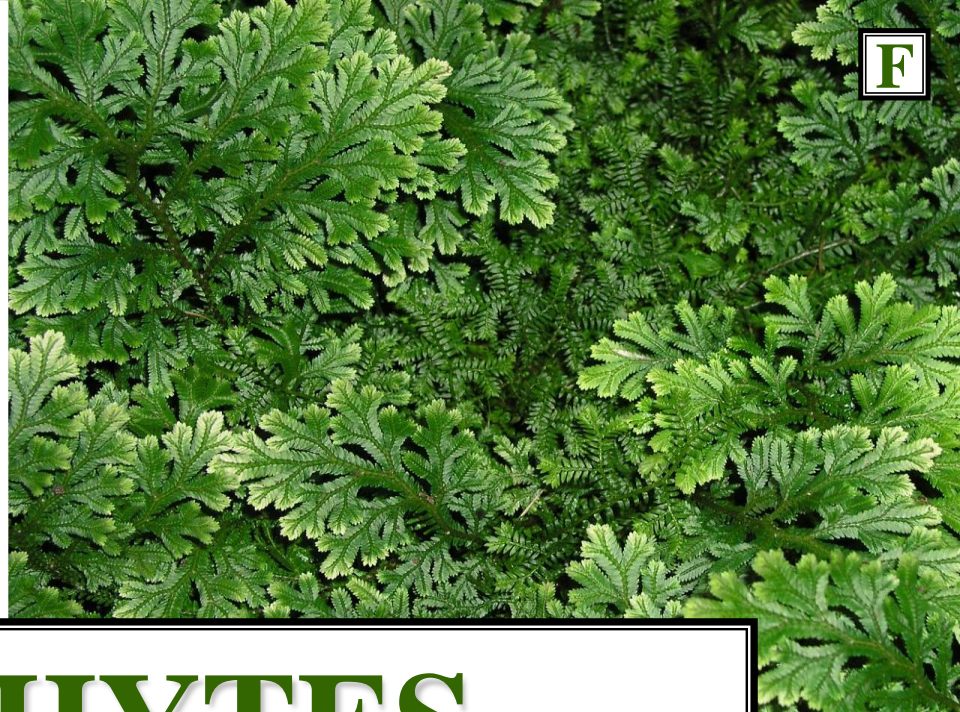
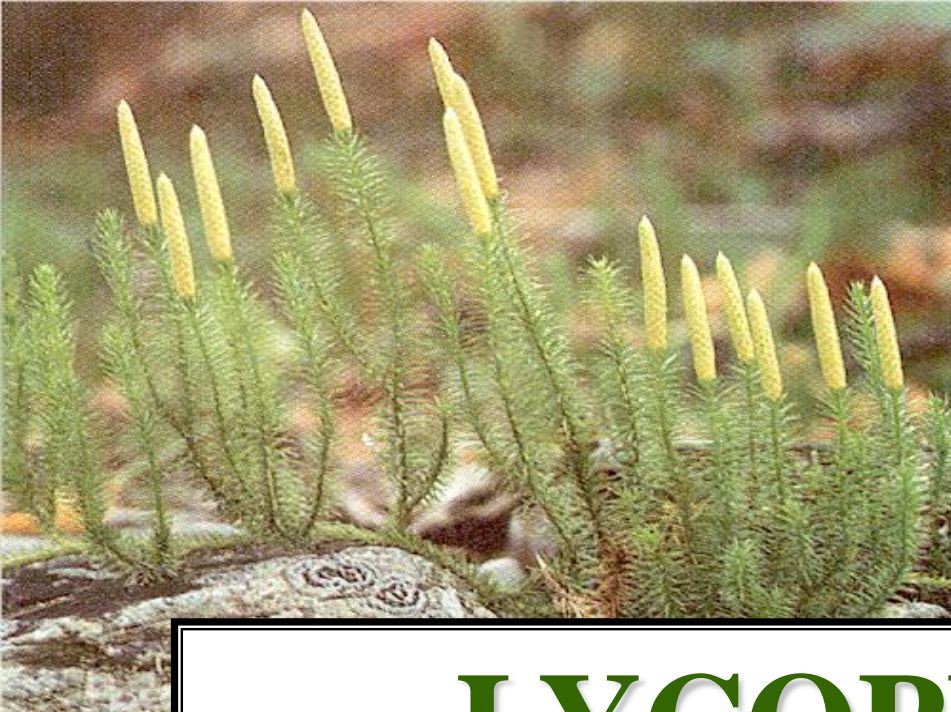
END WALL LESS TAPPED

END WALL WITH PERFORATED PLATE

TRACHEARY ELEMENT VESSEL MEMBER

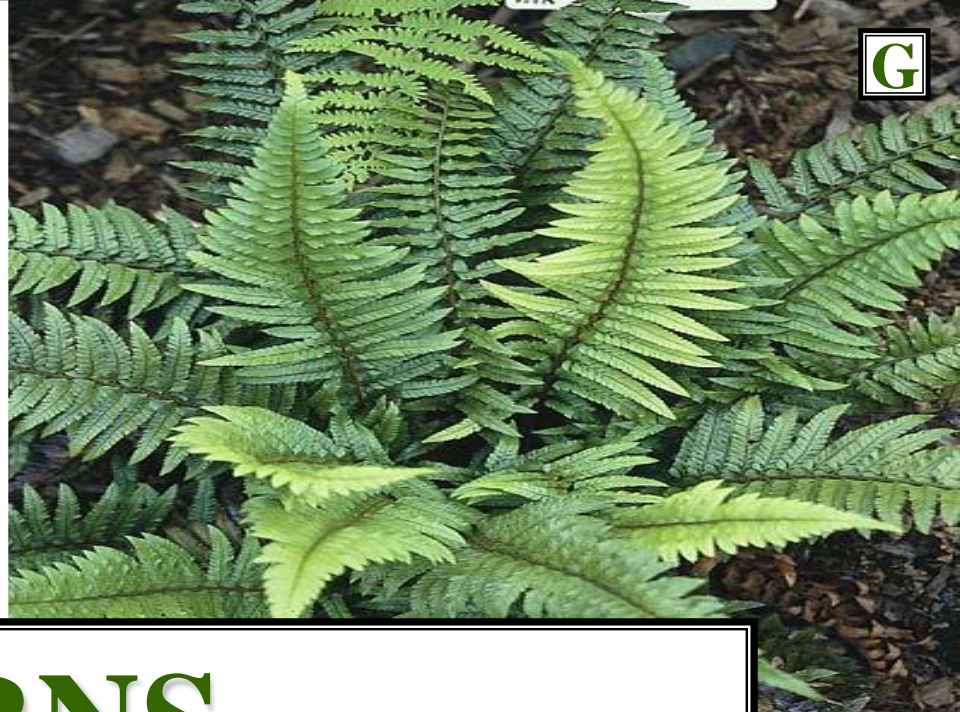
A dense tropical forest scene with various green plants, including ferns and broad-leaved species. A single bright orange flower is visible in the middle ground. The text is overlaid in the center of the image.

**VESSEL MEMBERS
KNOWN TO VARIOUS
VASCULAR PLANTS**

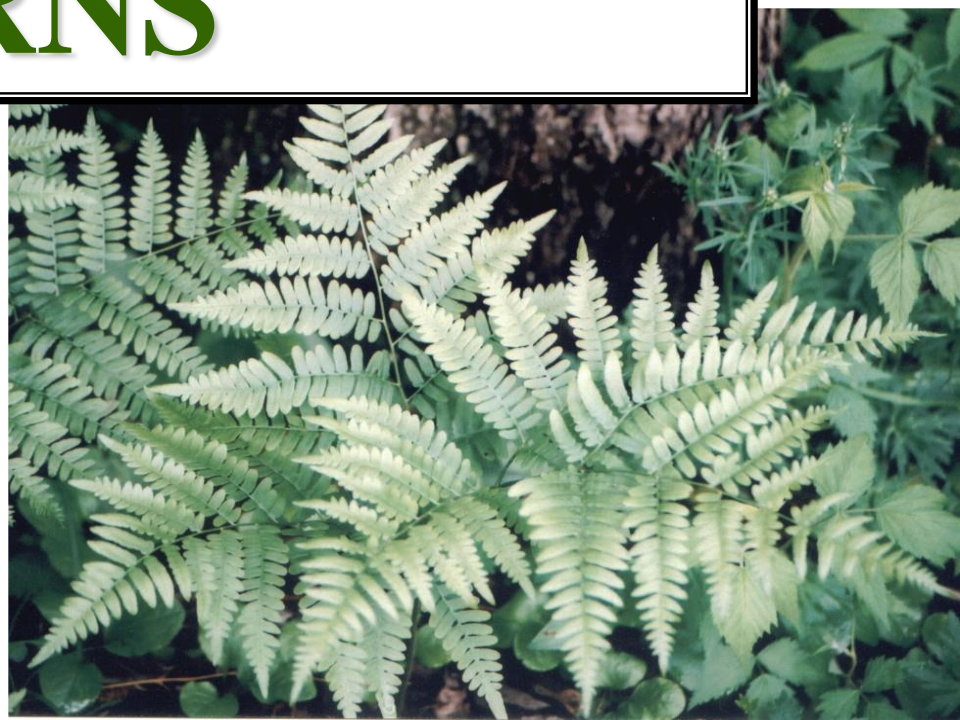


LYCOPHYTES





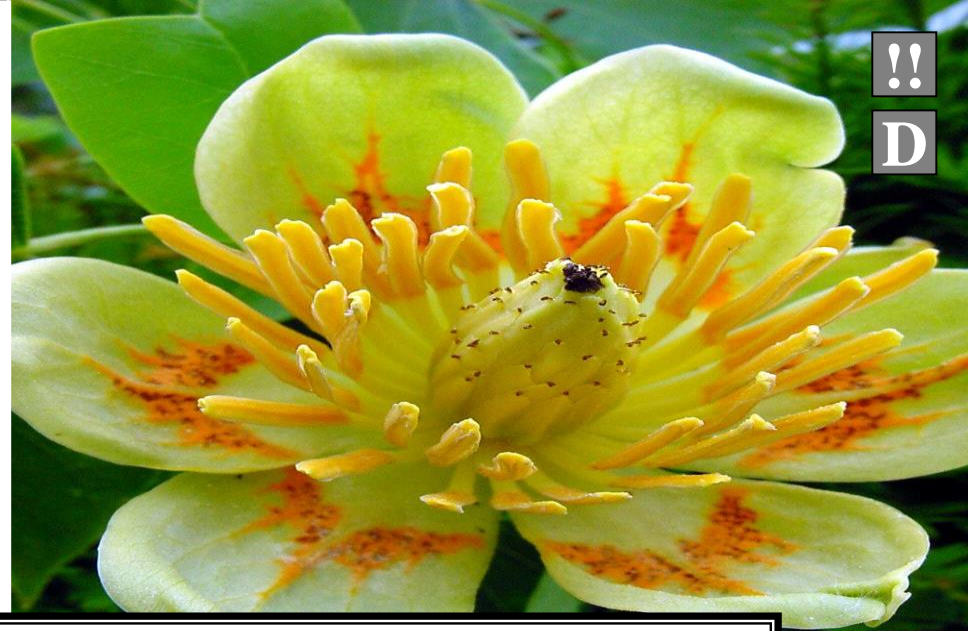
FERNS





GYMNOSPERMS





!!
D

ANGIOSPERMS





**VESSEL MEMBERS
DOMINATE WITH
ANGIOSPERMS**

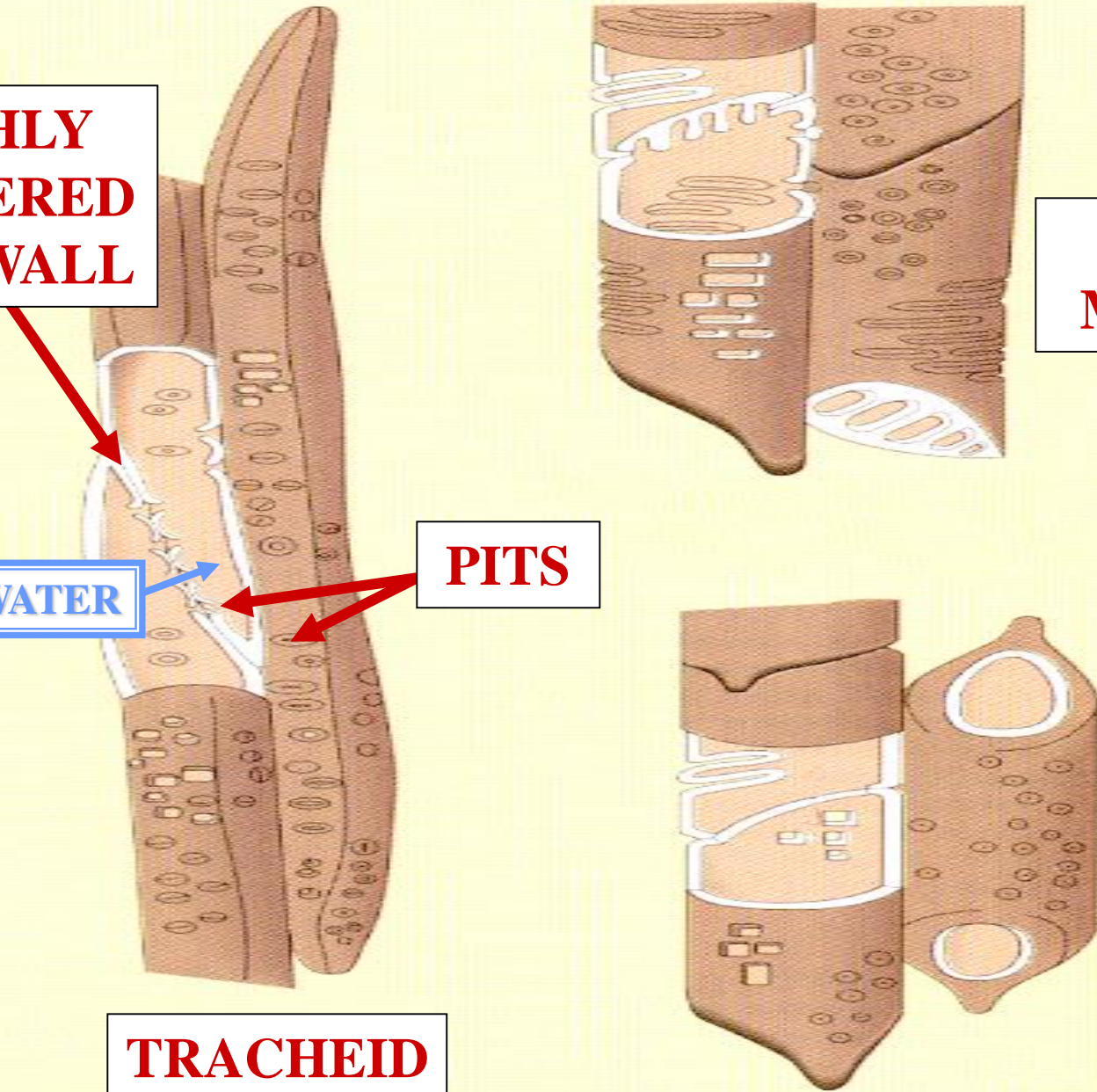
**HIGHLY
TAPPED
END WALL**

WATER

PITS

TRACHEID

**VESSEL
MEMBER**



**HIGHLY
TAPPERED
END WALL**

WATER

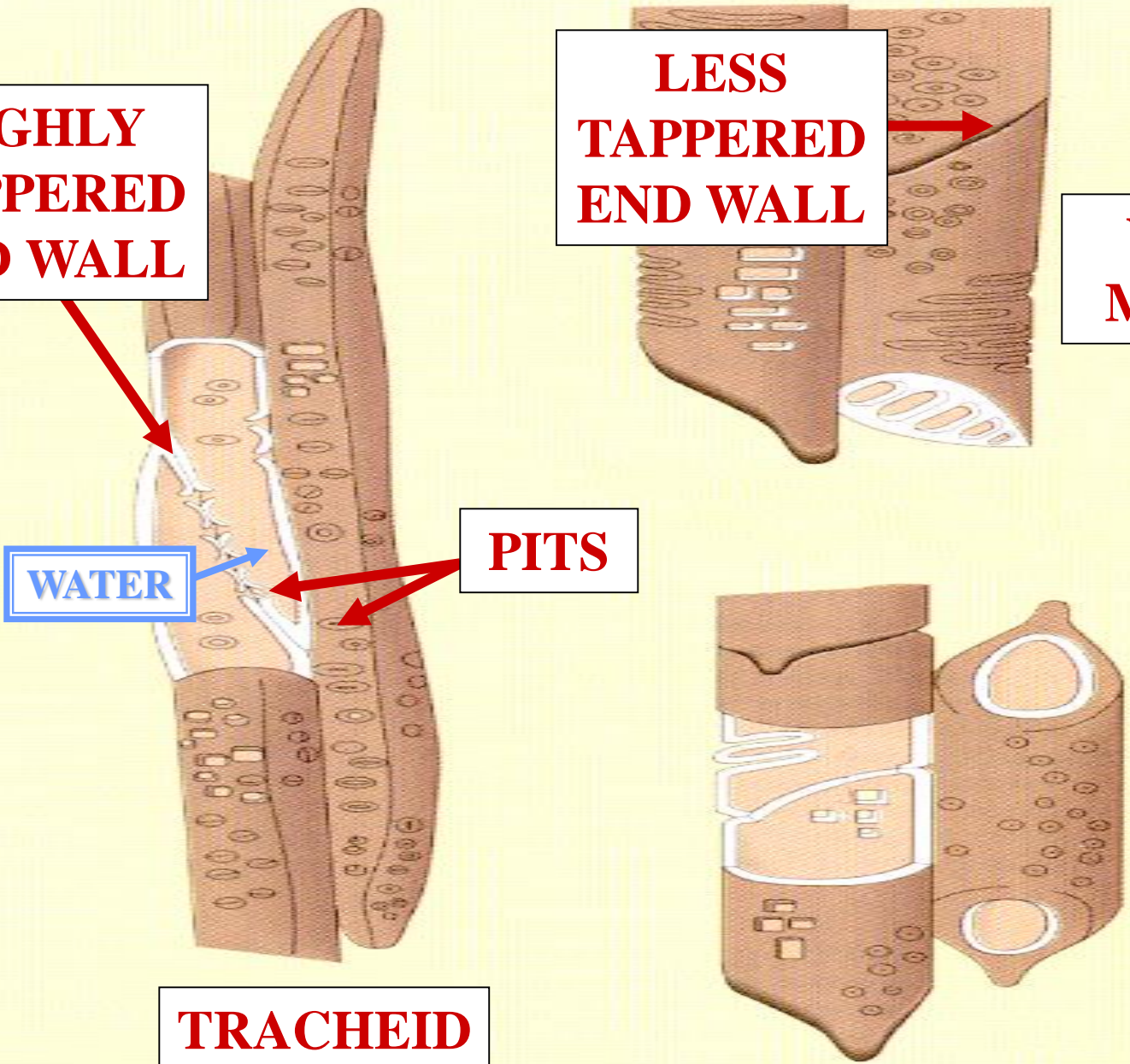
PITS

TRACHEID

**LESS
TAPPERED
END WALL**

**VESSEL
MEMBER**

PP





**HIGHLY
TAPPED
END WALL**

**LESS
TAPPED
END WALL**

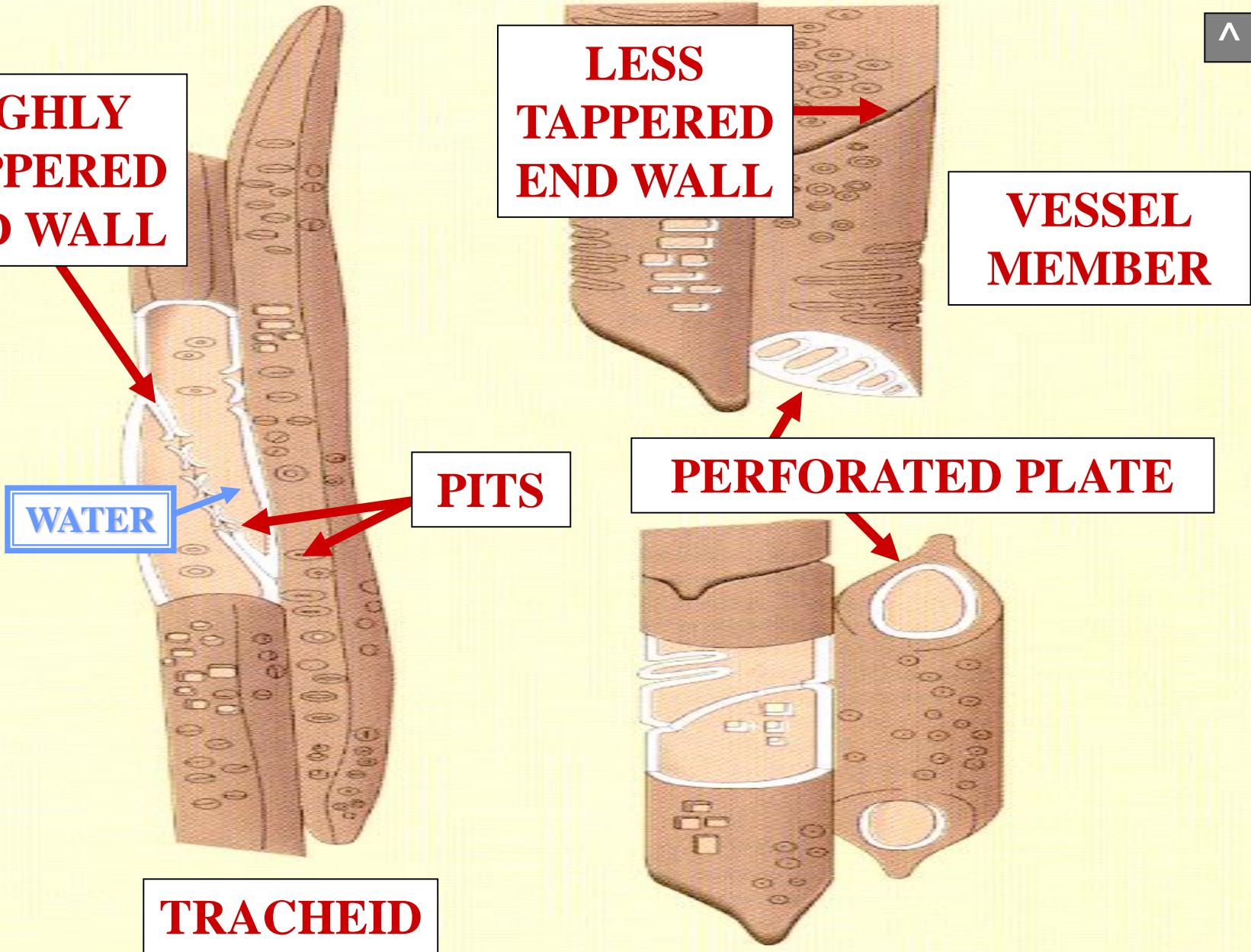
**VESSEL
MEMBER**

WATER

PITS

PERFORATED PLATE

TRACHEID



PERFORATED PLATE TYPES

PERFORATED PLATE TYPES

SCALARIFORM PERFORATED PLATE

PERFORATED PLATE TYPES

PERFORATED PLATE TYPES

S

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**

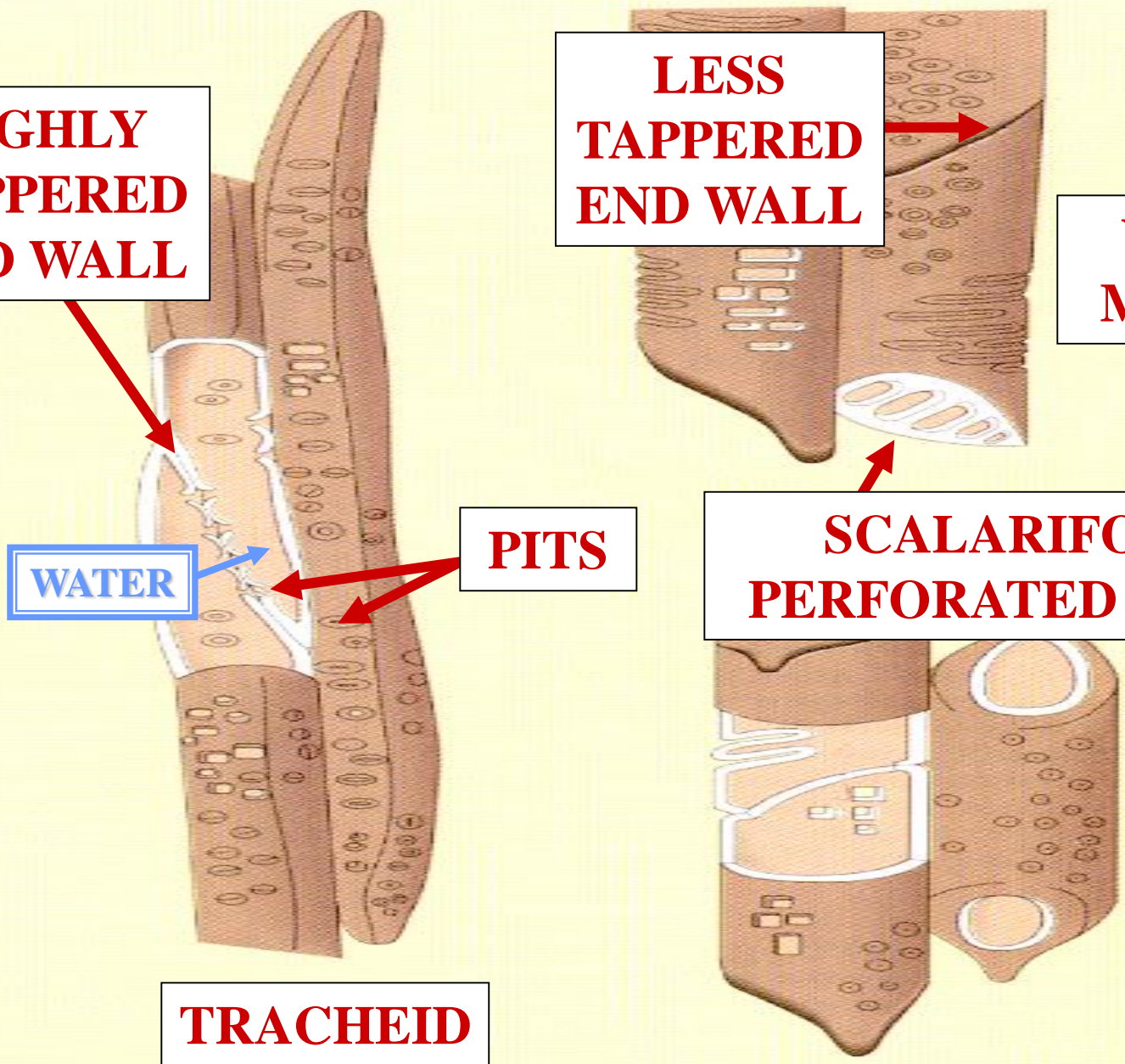
**VESSEL
MEMBER**

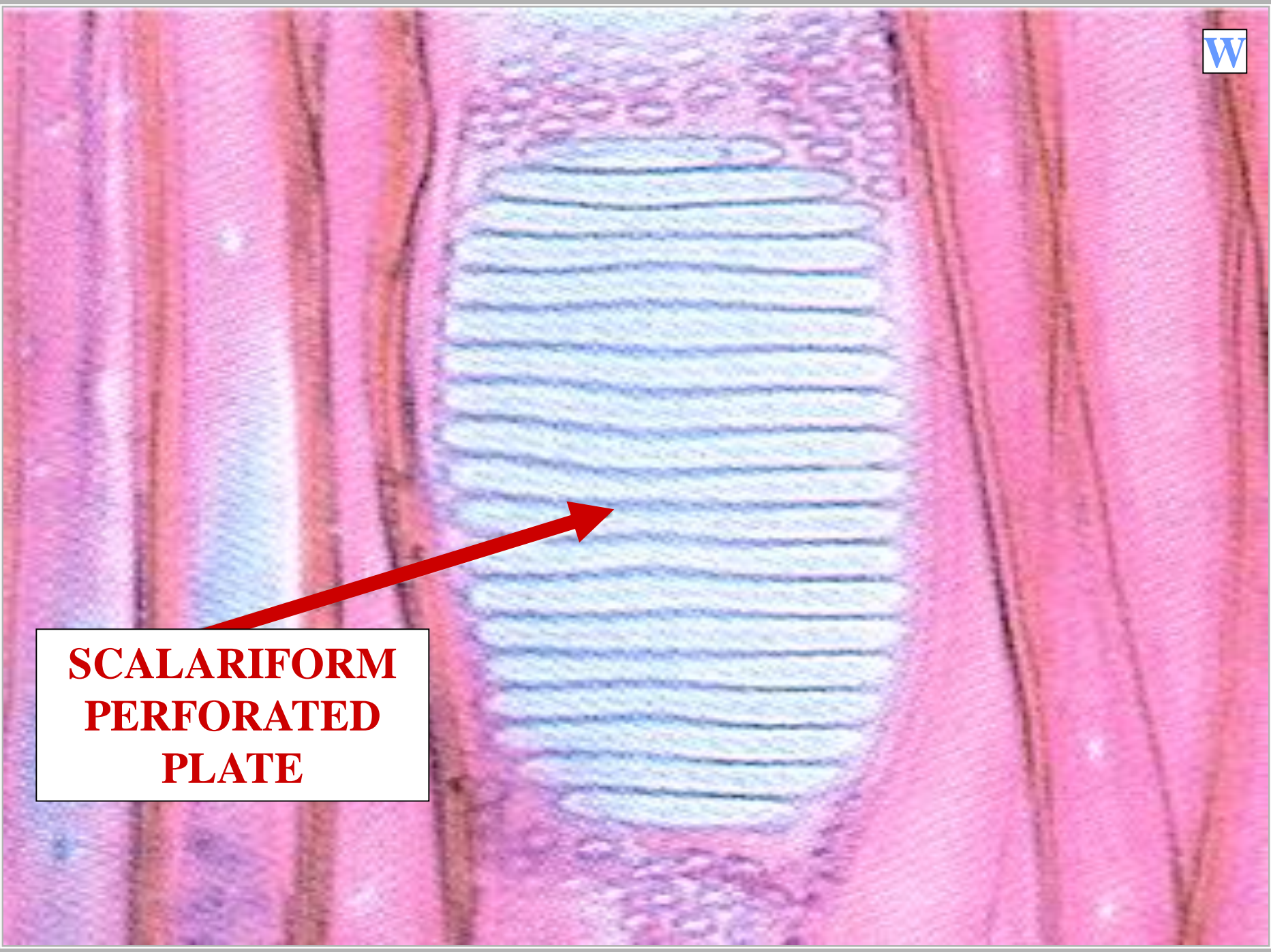
WATER

PITS

**SCALARIFORM
PERFORATED PLATE**

TRACHEID





**SCALARIFORM
PERFORATED
PLATE**

^

S

**HIGHLY
TAPPED
END WALL**

**LESS
TAPPED
END WALL**

**VESSEL
MEMBER**

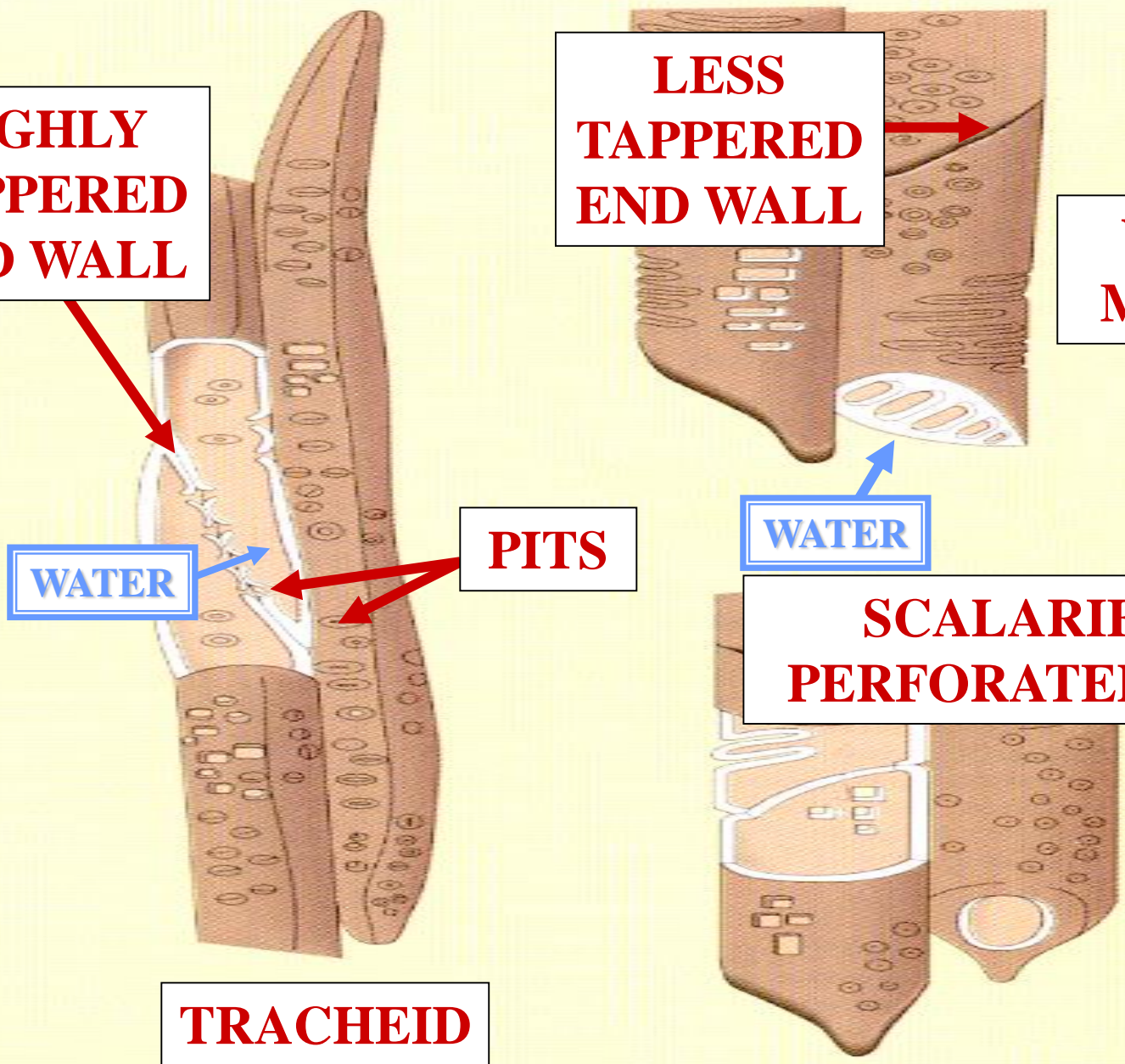
WATER

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**

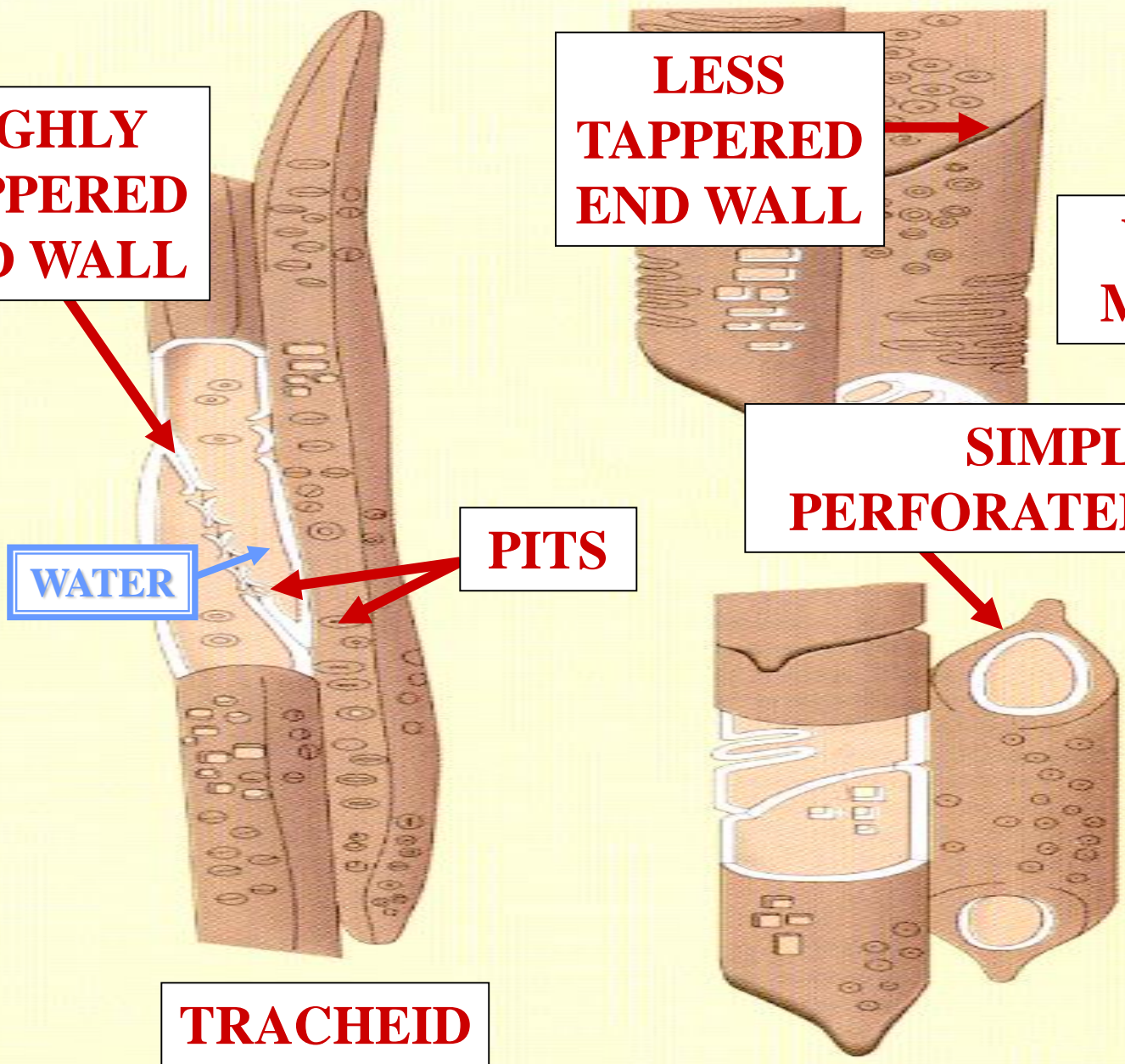
**VESSEL
MEMBER**

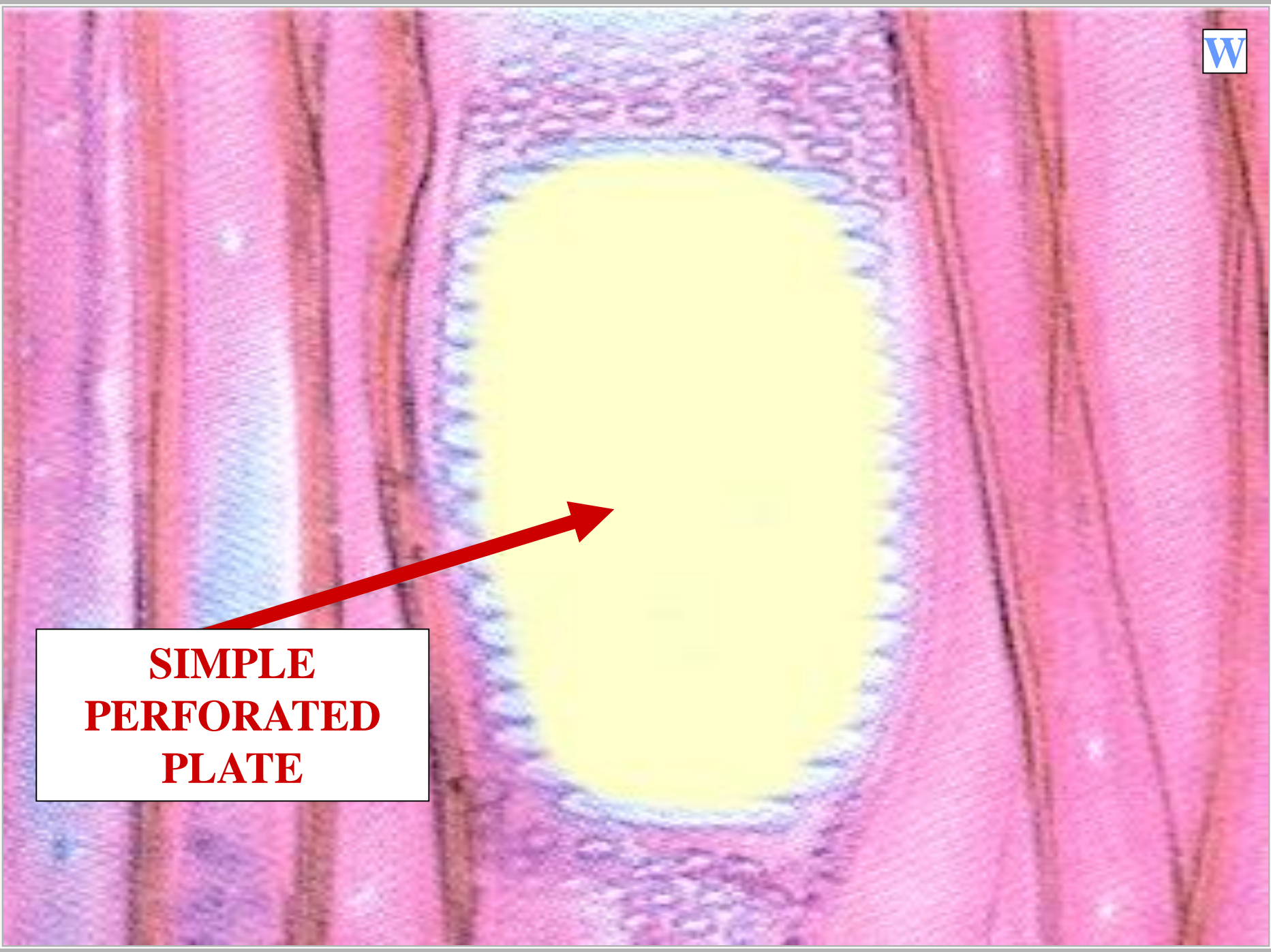
WATER

PITS

**SIMPLE
PERFORATED PLATE**

TRACHEID





**SIMPLE
PERFORATED
PLATE**

**HIGHLY
TAPPED
END WALL**

**LESS
TAPPED
END WALL**

**VESSEL
MEMBER**

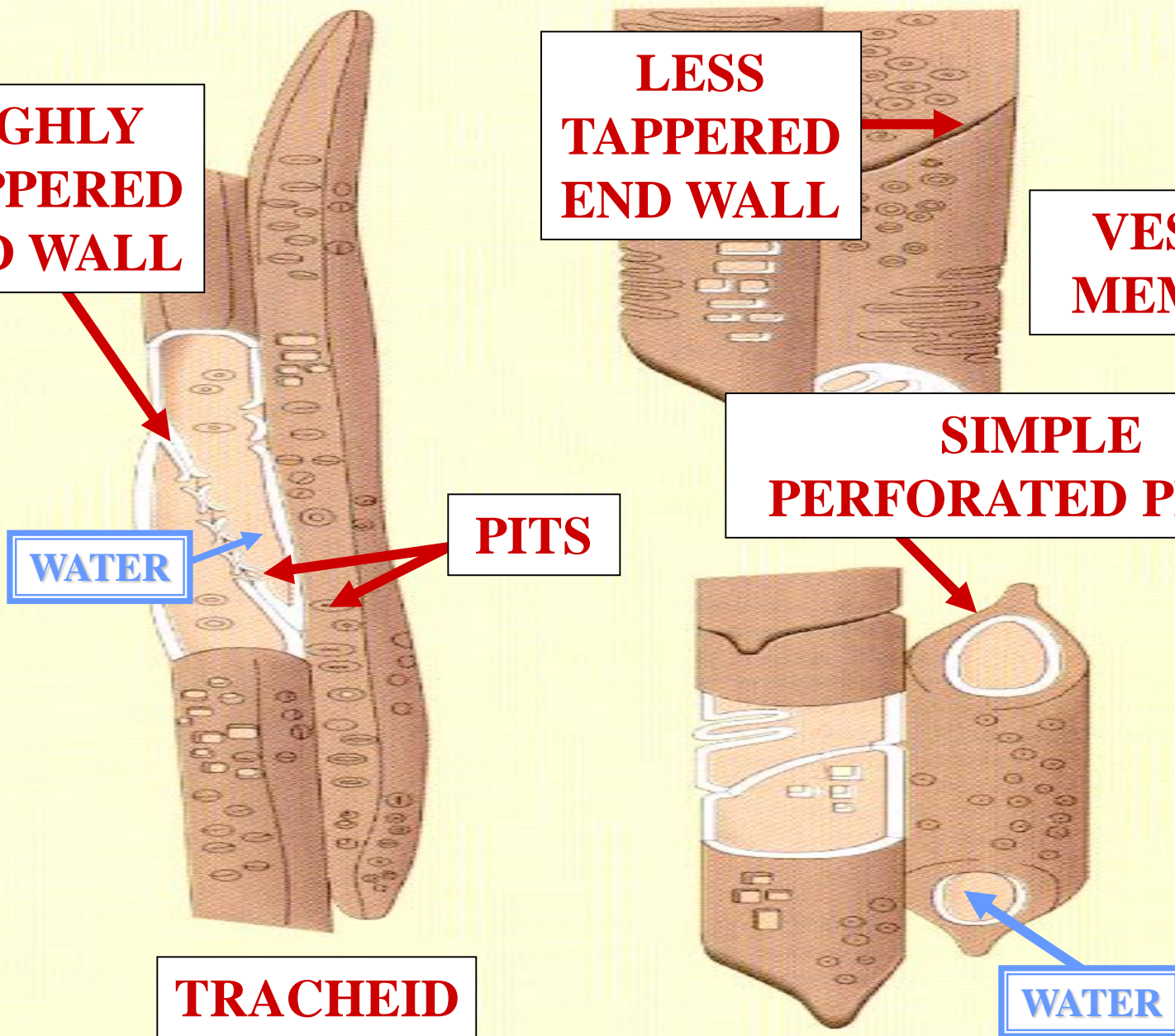
**SIMPLE
PERFORATED PLATE**

WATER

PITS

TRACHEID

WATER





XYLEM TISSUE SUMMARY

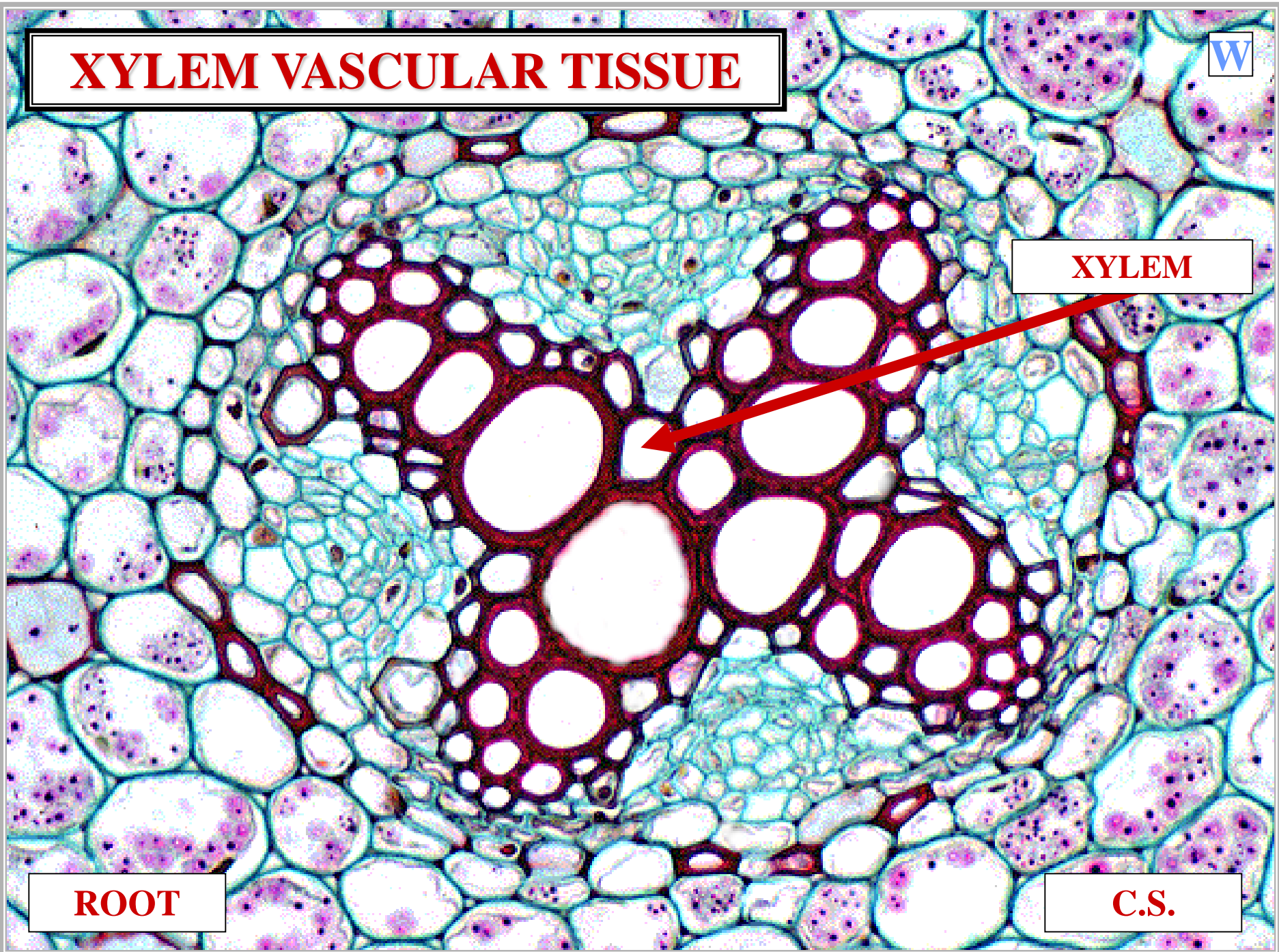
XYLEM VASCULAR TISSUE

W

XYLEM

ROOT

C.S.



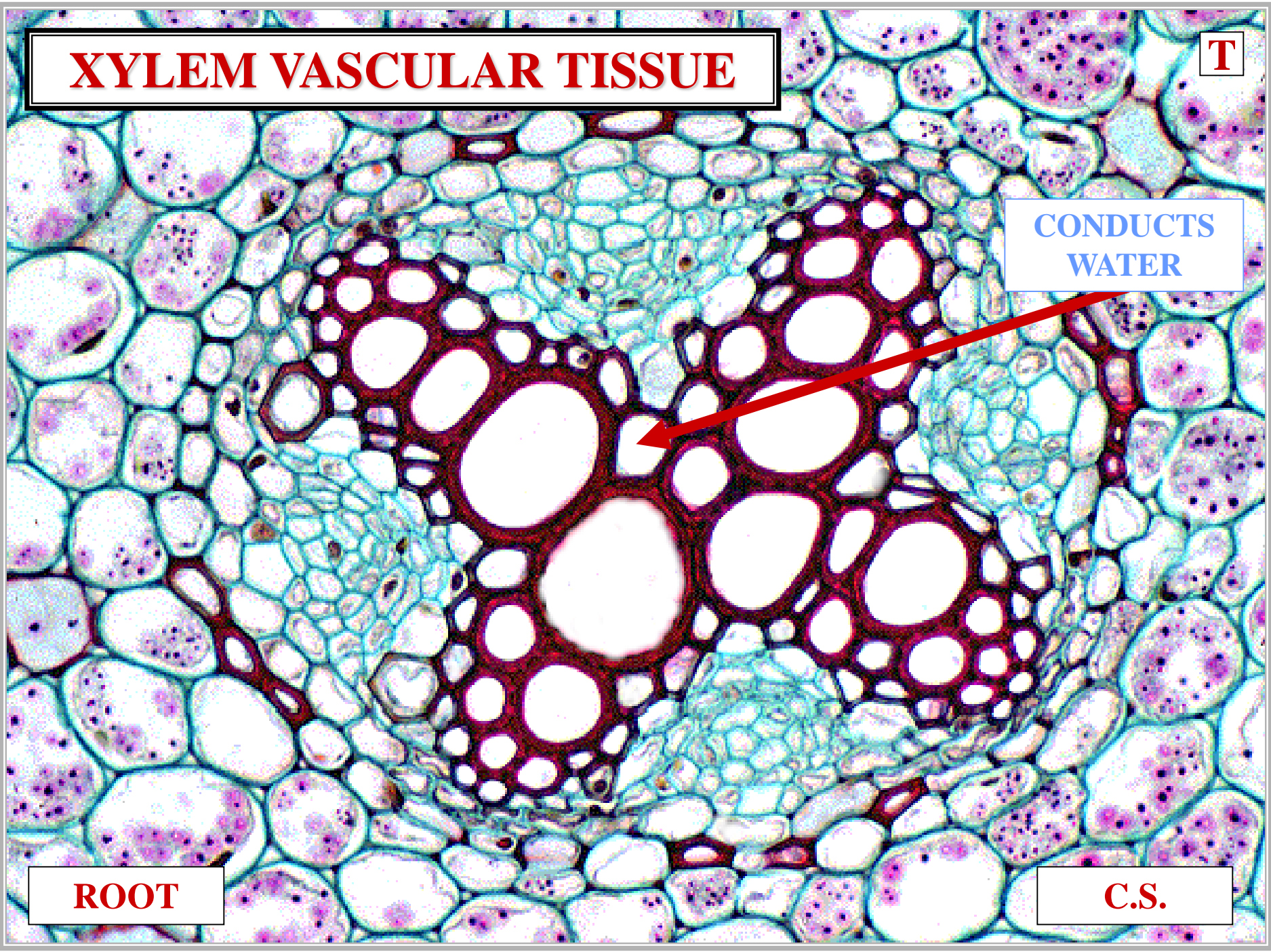
XYLEM VASCULAR TISSUE

T

CONDUCTS
WATER

ROOT

C.S.



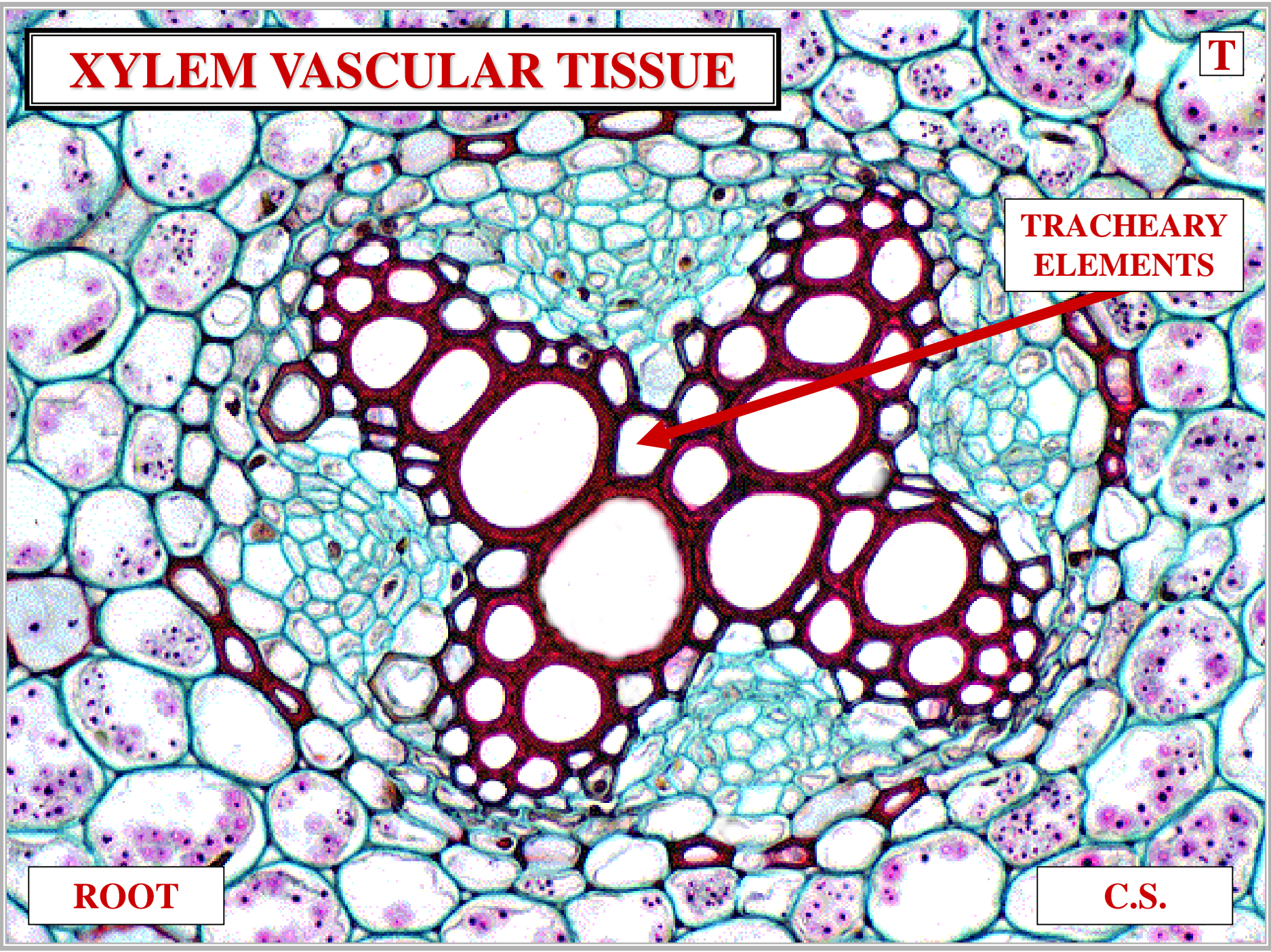
XYLEM VASCULAR TISSUE

T

TRACHEARY
ELEMENTS

ROOT

C.S.



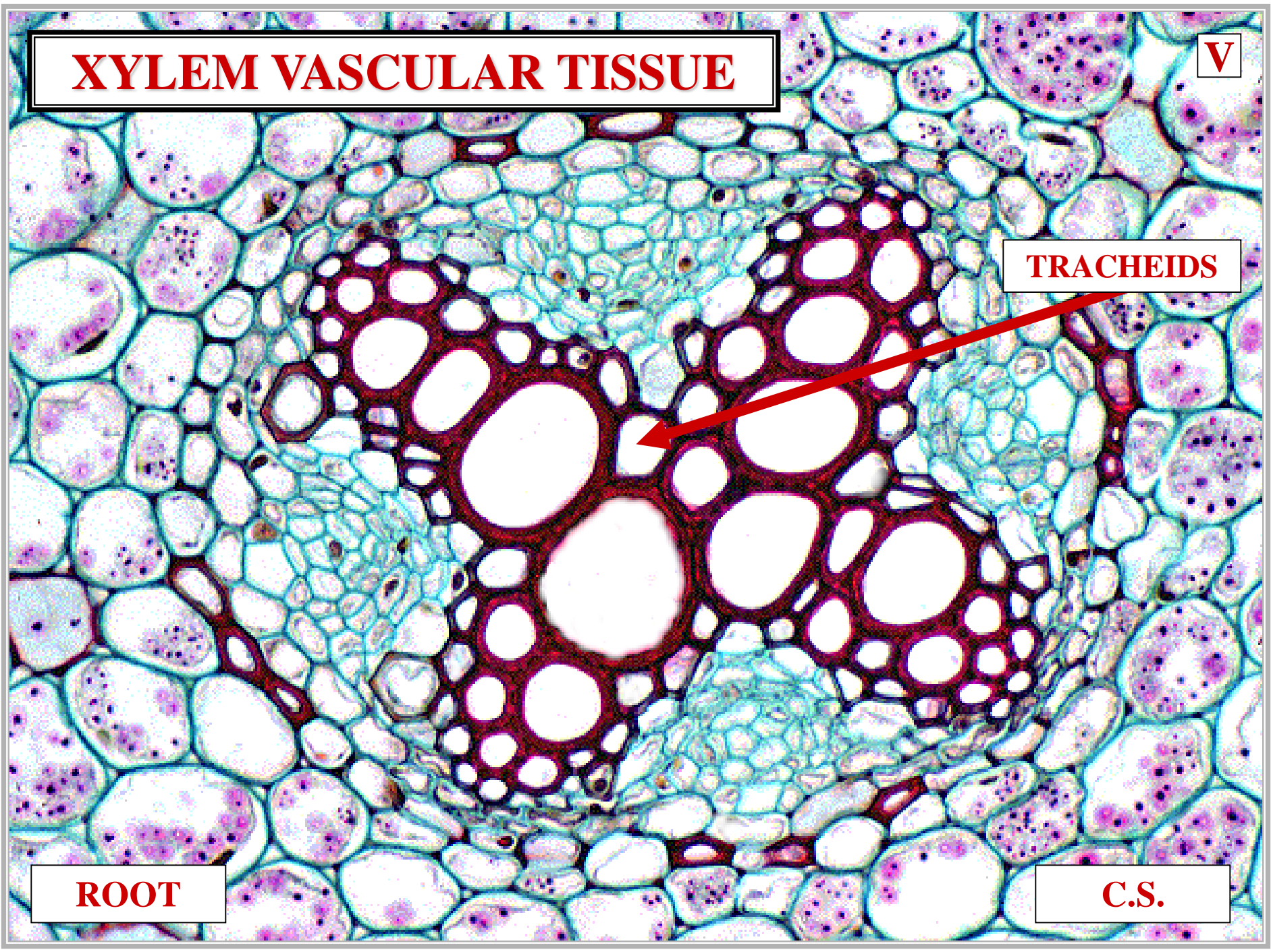
XYLEM VASCULAR TISSUE

V

TRACHEIDS

ROOT

C.S.

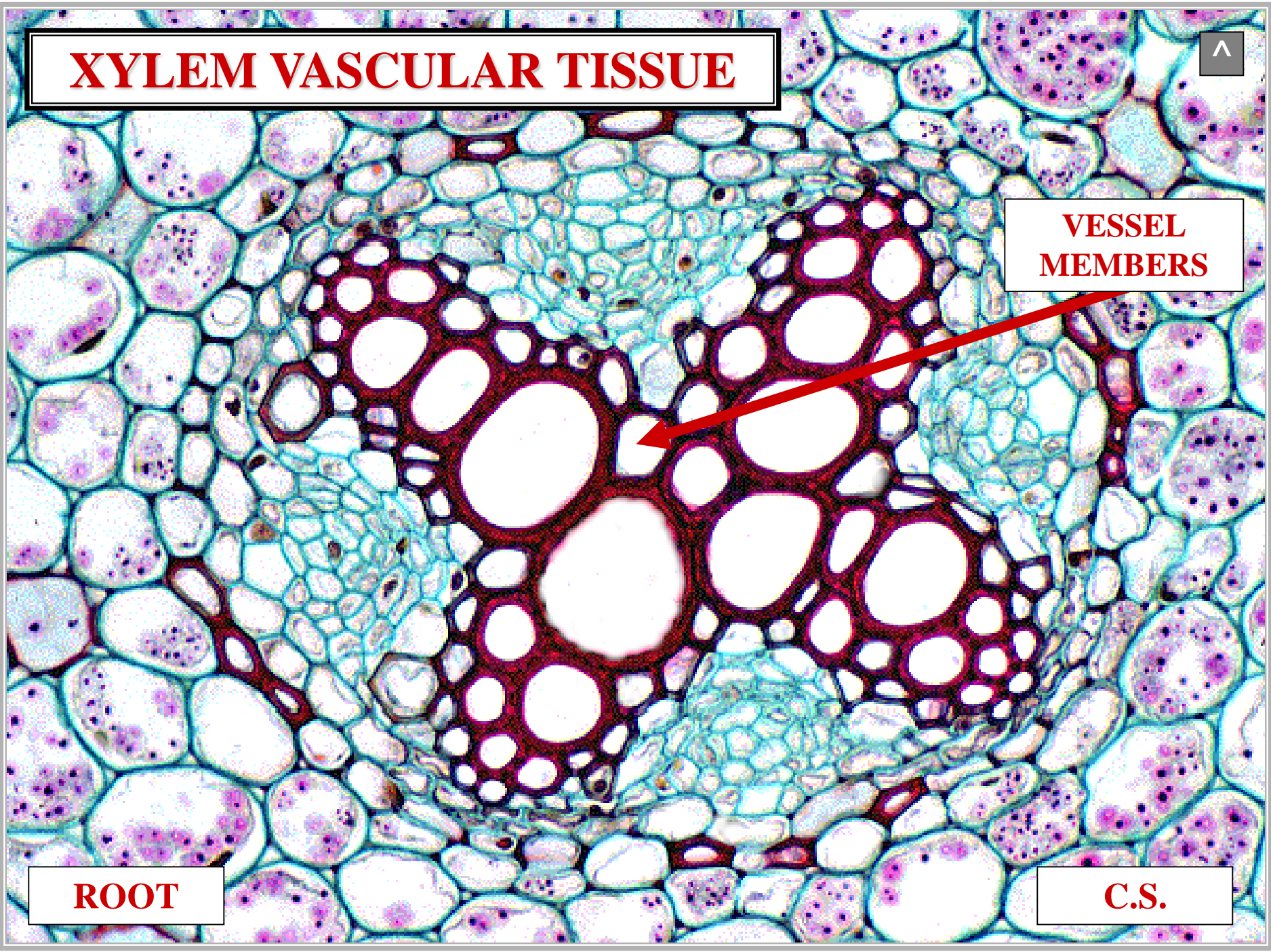


XYLEM VASCULAR TISSUE

**VESSEL
MEMBERS**

ROOT

C.S.



PHLOEM

VASCULAR TISSUE

PHLOEM TISSUE

VASCULAR TISSUE PHLOEM



CONDUCTS SUGAR

VASCULAR TISSUE PHLOEM

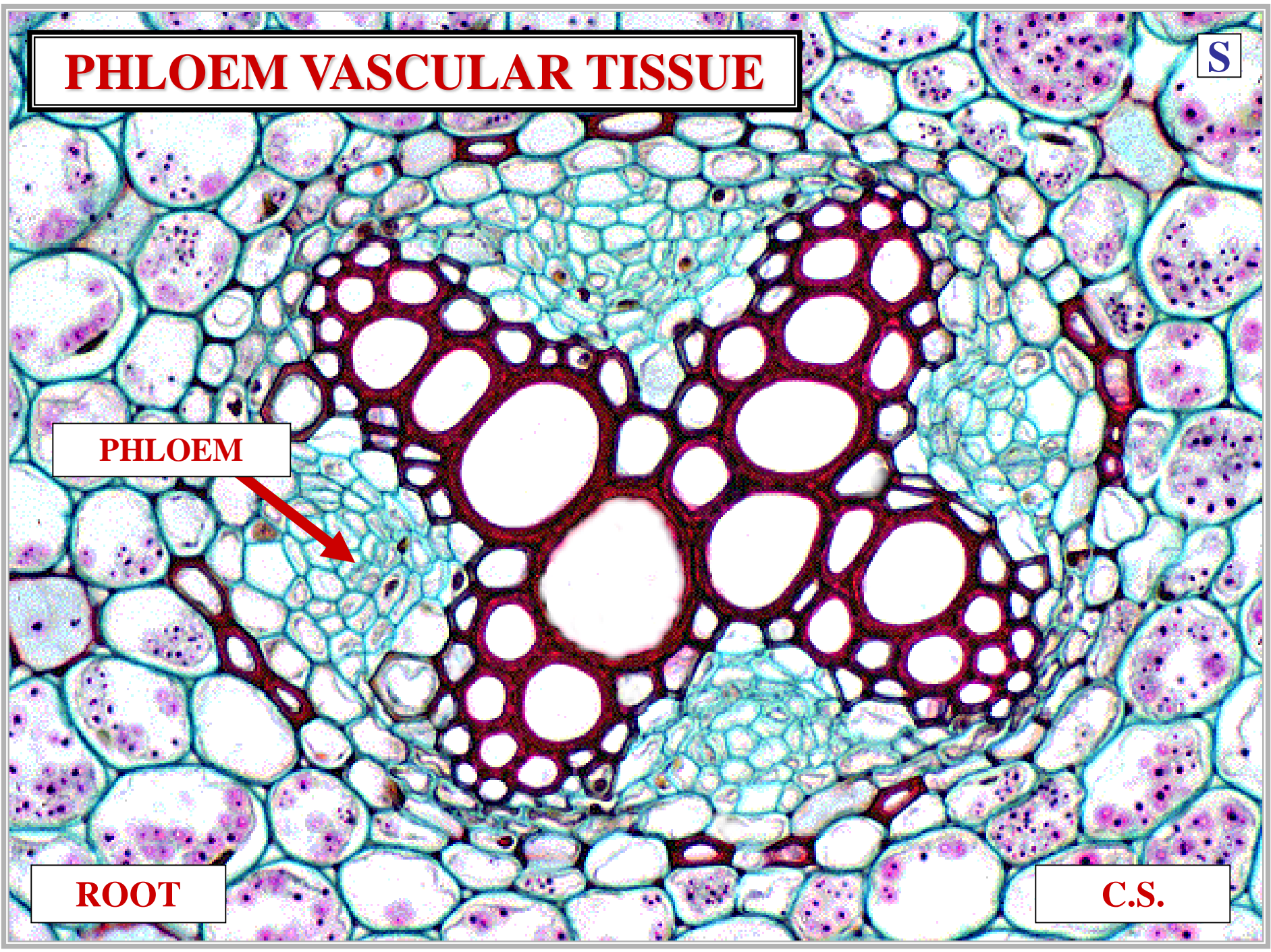
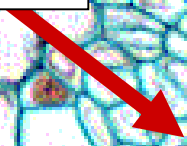
PHLOEM VASCULAR TISSUE

S

PHLOEM

ROOT

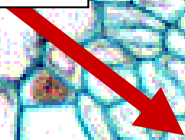
C.S.



PHLOEM VASCULAR TISSUE

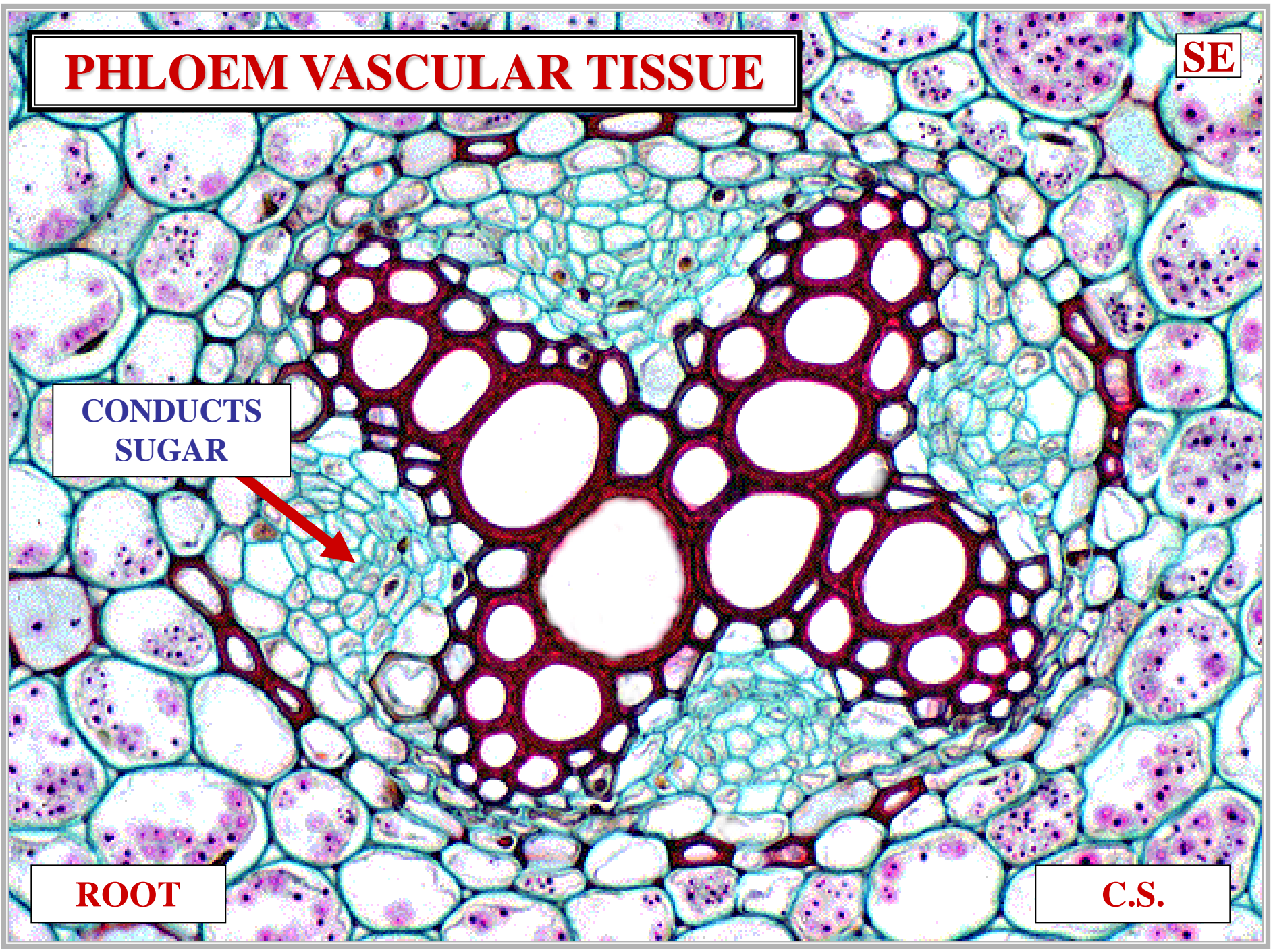
SE

CONDUCTS
SUGAR



ROOT

C.S.

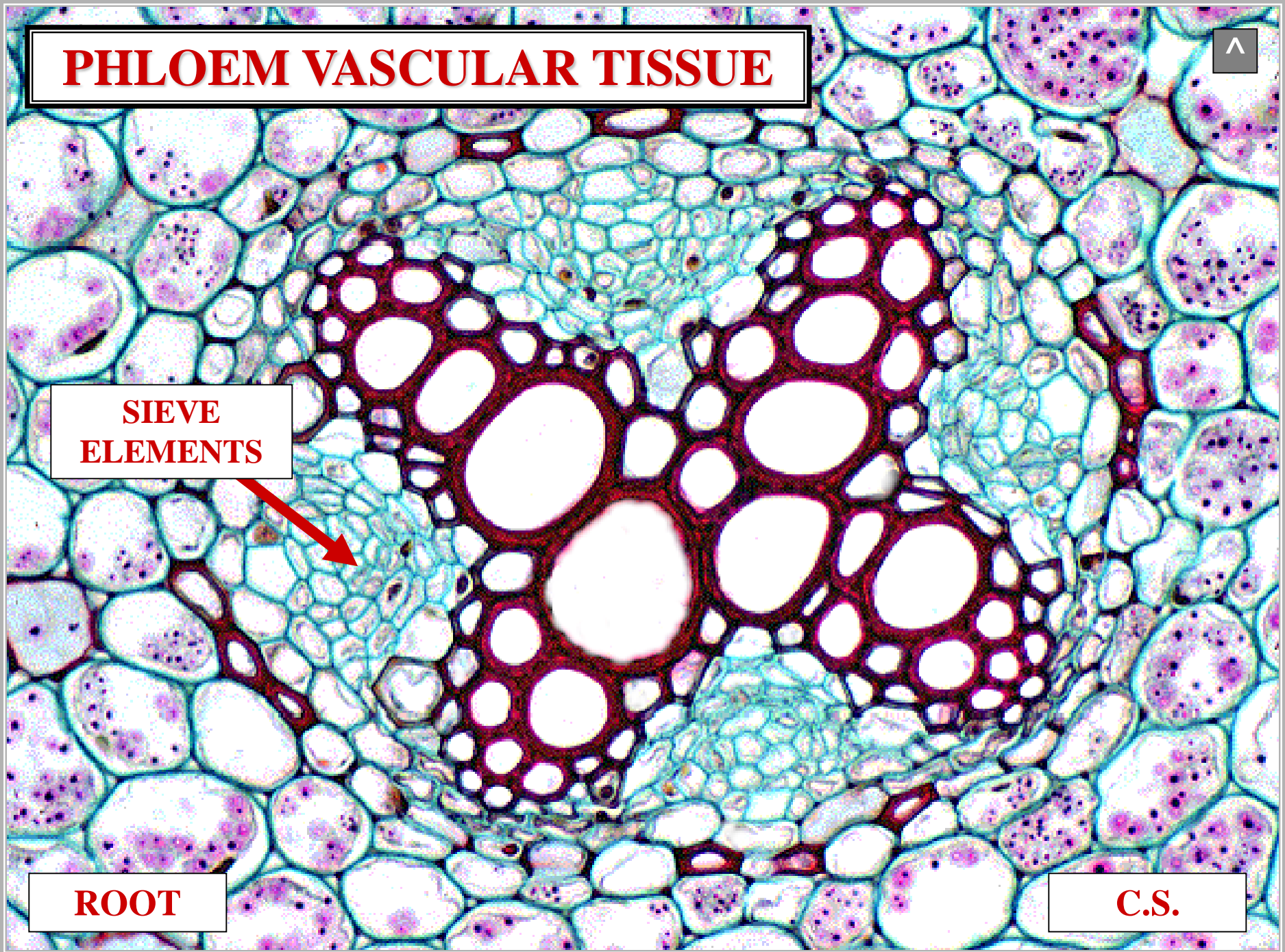


PHLOEM VASCULAR TISSUE

SIEVE
ELEMENTS

ROOT

C.S.



SIEVE ELEMENTS

SIEVE ELEMENTS



**PHLOEM
SIEVE ELEMENTS**

**SUGAR
CONDUCTING
CELLS**

**PHLOEM
SIEVE ELEMENTS**



SE

SIEVE ELEMENT CHARACTERS

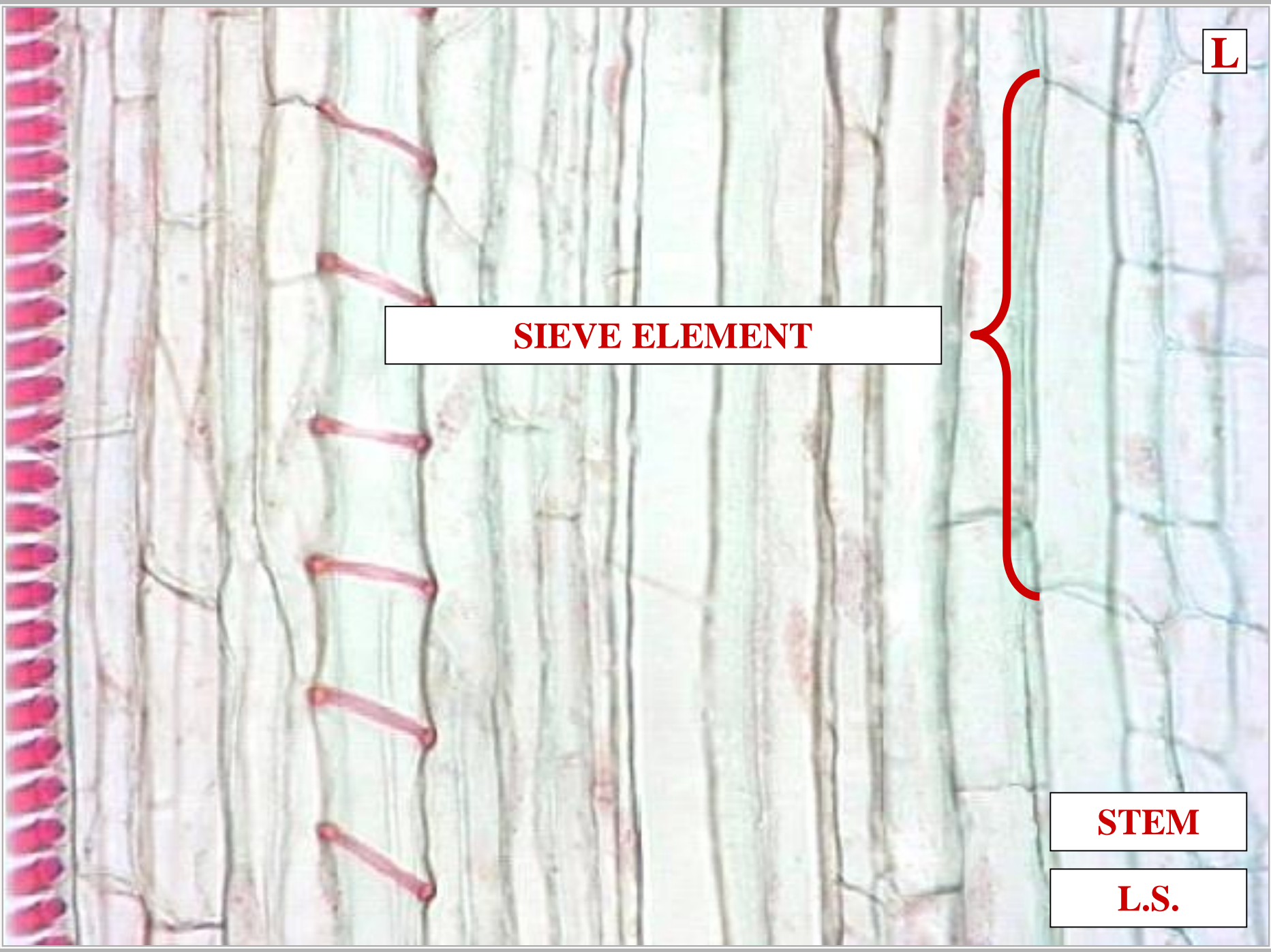
L

SIEVE ELEMENT



STEM

L.S.

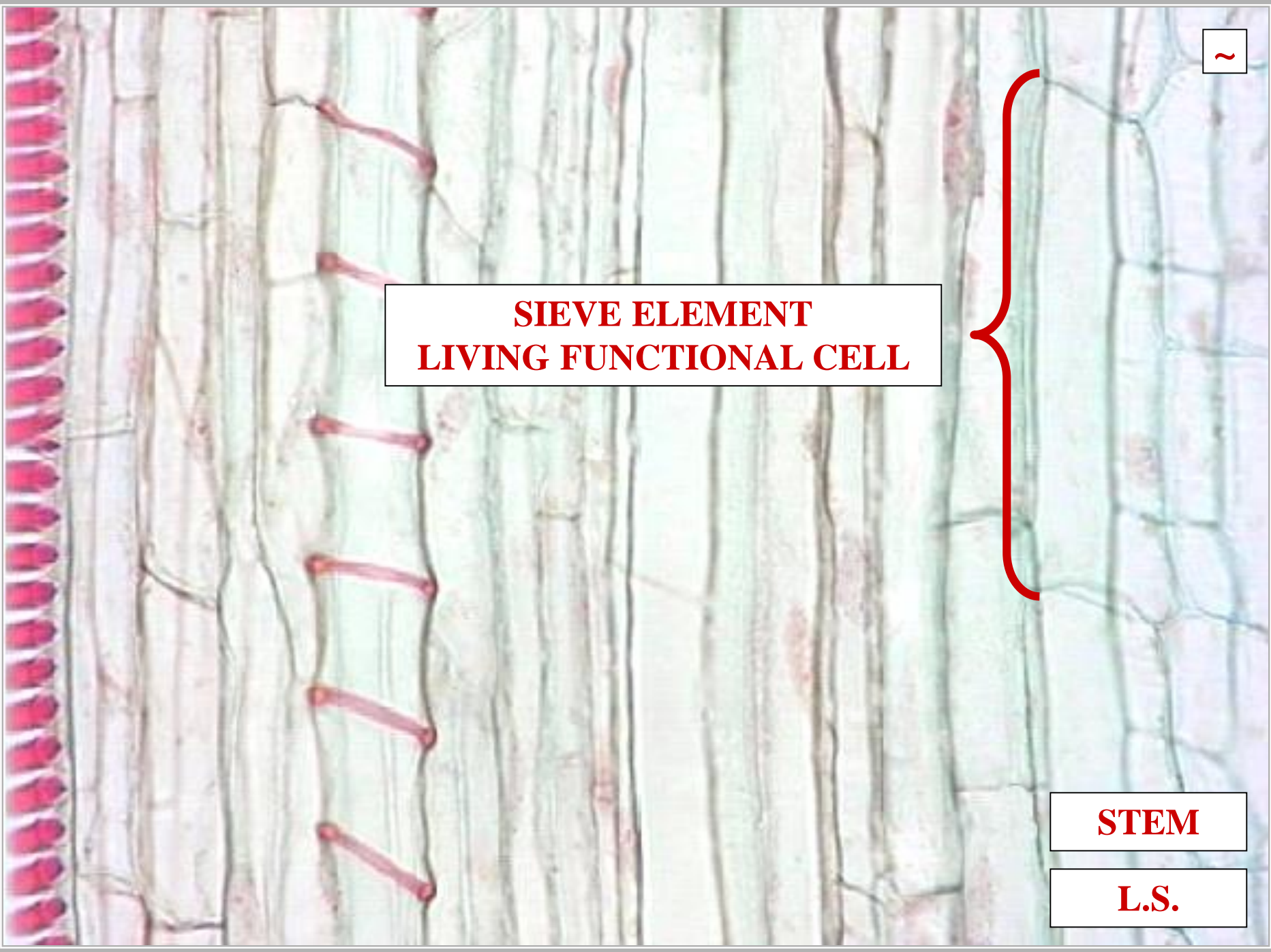


**SIEVE ELEMENT
LIVING FUNCTIONAL CELL**



STEM

L.S.



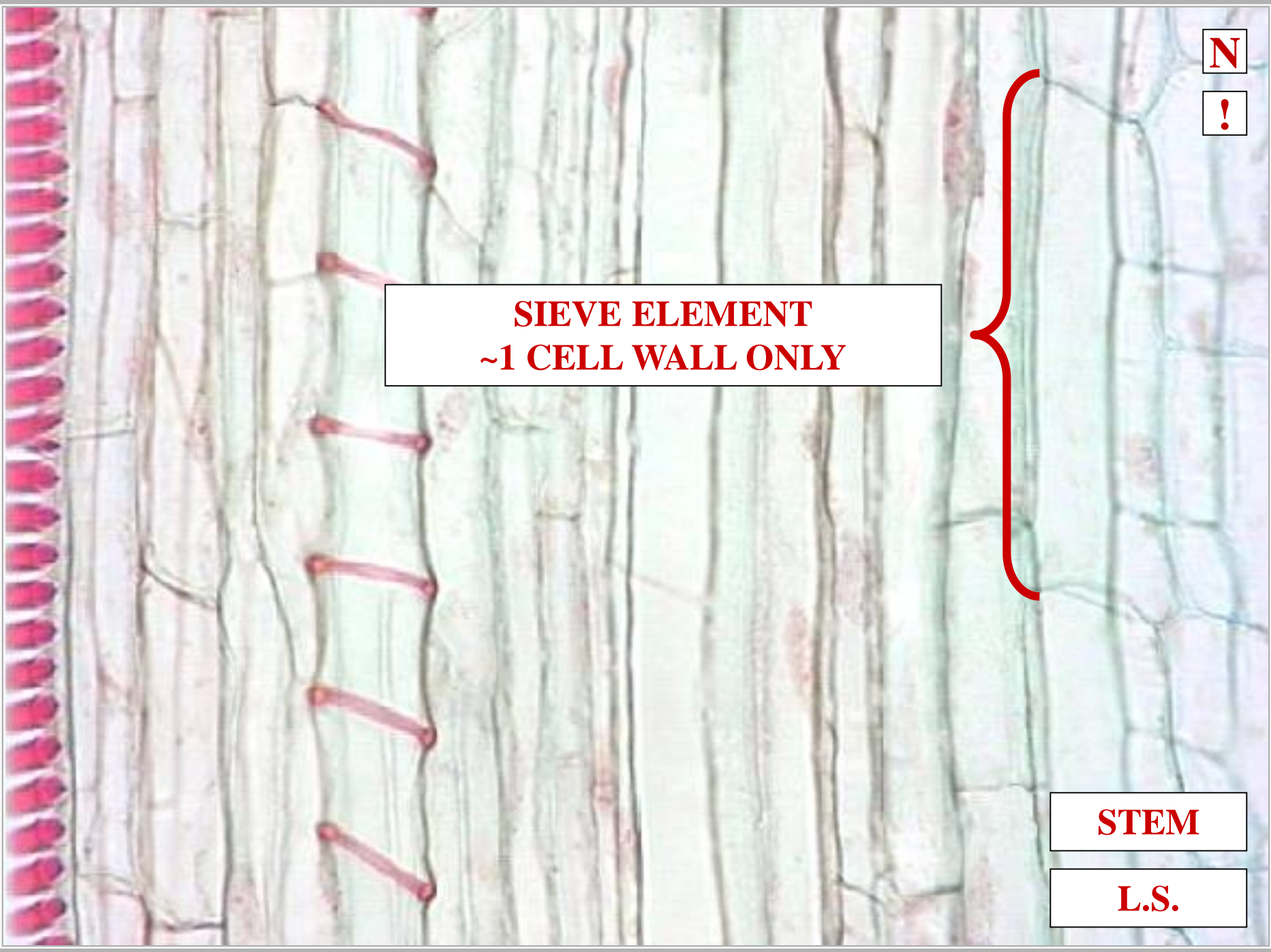
N

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**SIEVE ELEMENT
~1 CELL WALL ONLY**

STEM

L.S.





**SIEVE ELEMENT
NON-NUCLEATED**



STEM

L.S.



SIEVE ELEMENT TYPES

SIEVE ELEMENT TYPES

SIEVE CELLS

**SIEVE ELEMENT
TYPES**

SIEVE ELEMENT TYPES

SIEVE CELLS

SIEVE MEMBERS

**SIEVE ELEMENT
TYPES**

SIEVE CELL

SIEVE ELEMENT
SIEVE CELL



KNOWN
PTERIDOPHYTES & GYMNOSPERMS

SIEVE ELEMENT
SIEVE CELL

SIEVE ELEMENT



SIEVE CELL

KNOWN

PTERIDOPHYTES & GYMNOSPERMS

END WALL WITH SIEVE AREA

SMALL PORES

SIEVE ELEMENT

SIEVE CELL

SIEVE ELEMENT

SIEVE CELL

KNOWN

PTERIDOPHYTES & GYMNOSPERMS

END WALL WITH SIEVE AREA

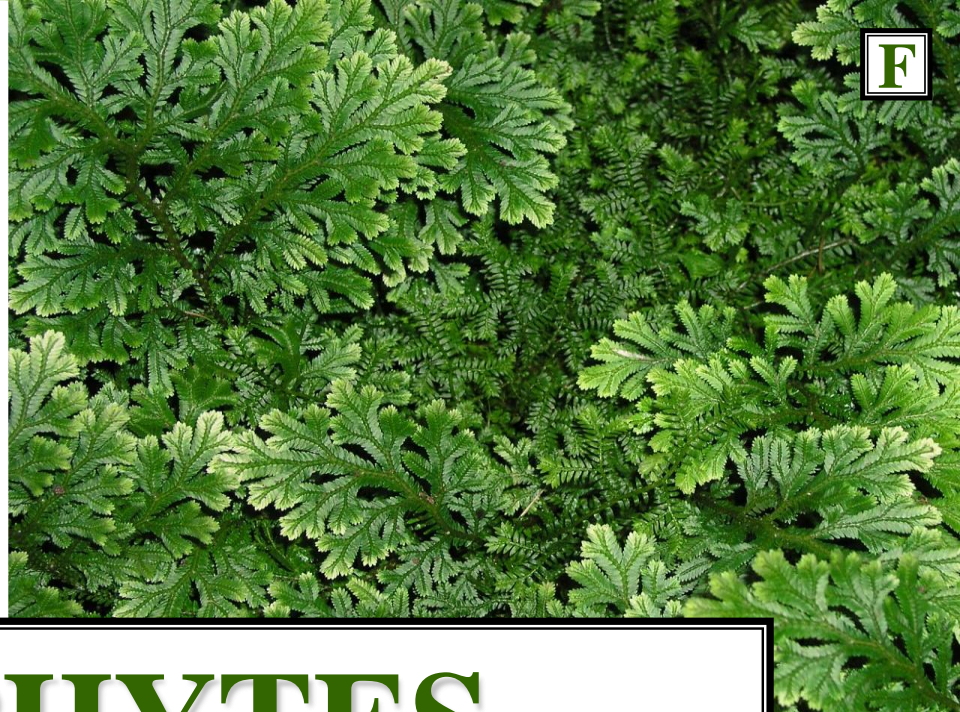
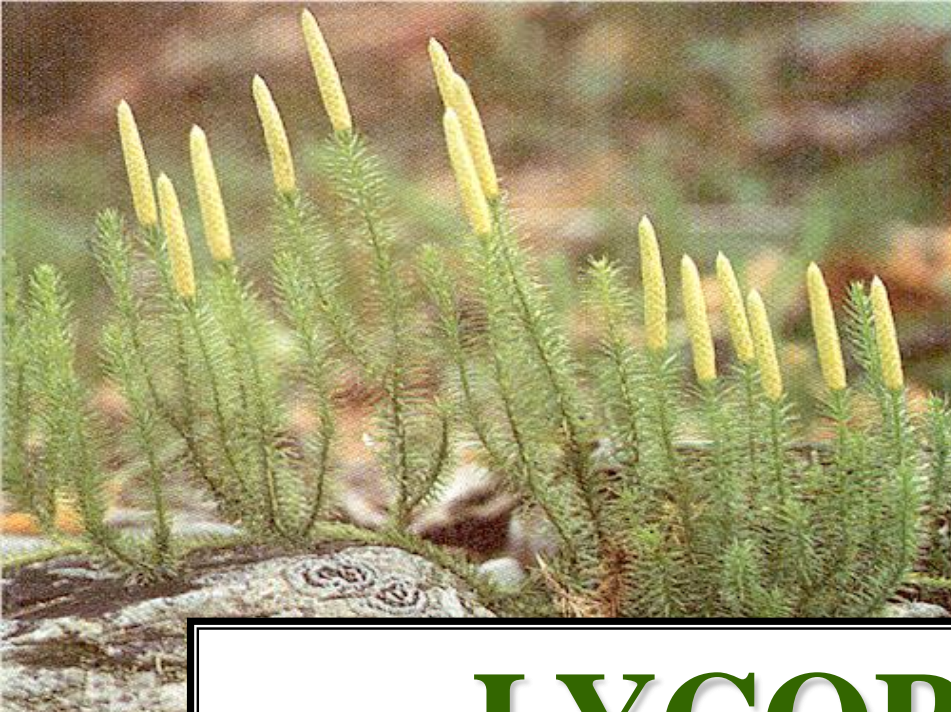
SMALL PORES

SIEVE ELEMENT

SIEVE CELL



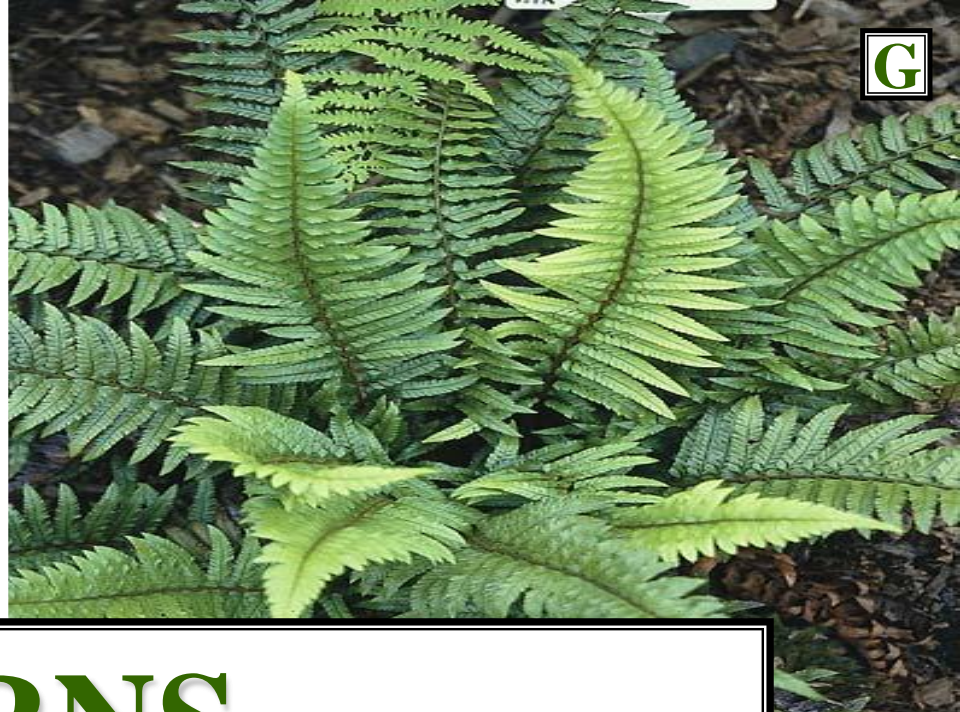
**SIEVE CELLS
KNOWN
PTERIDOPHYTES
&
GYMNOSPERMS**



F

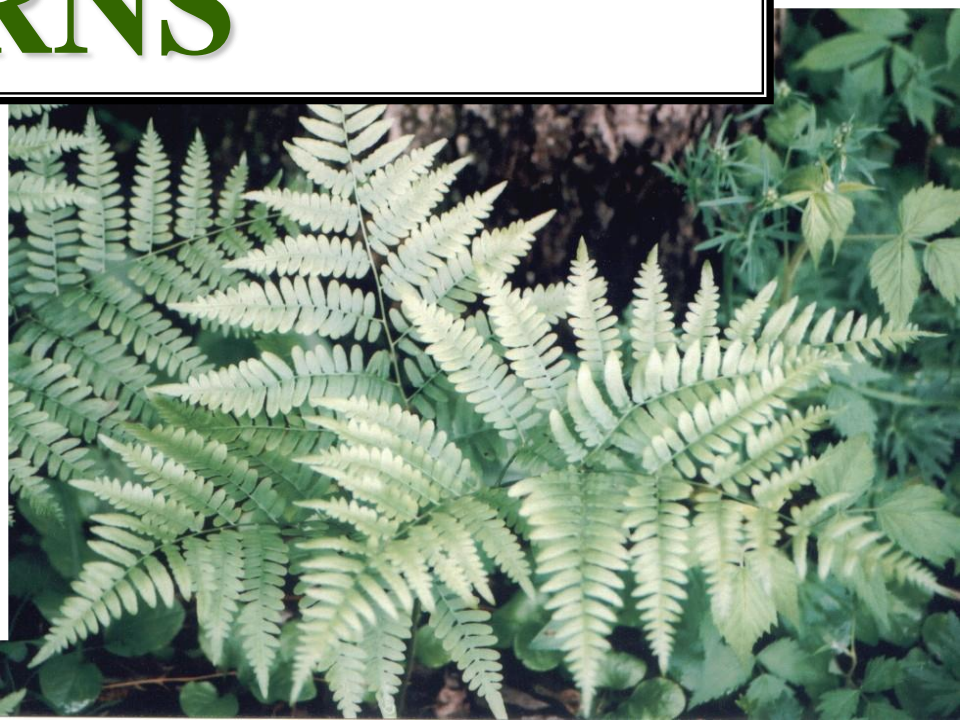
LYCOPHYTES





G

FERNS





GYMNOSPERMS



SA

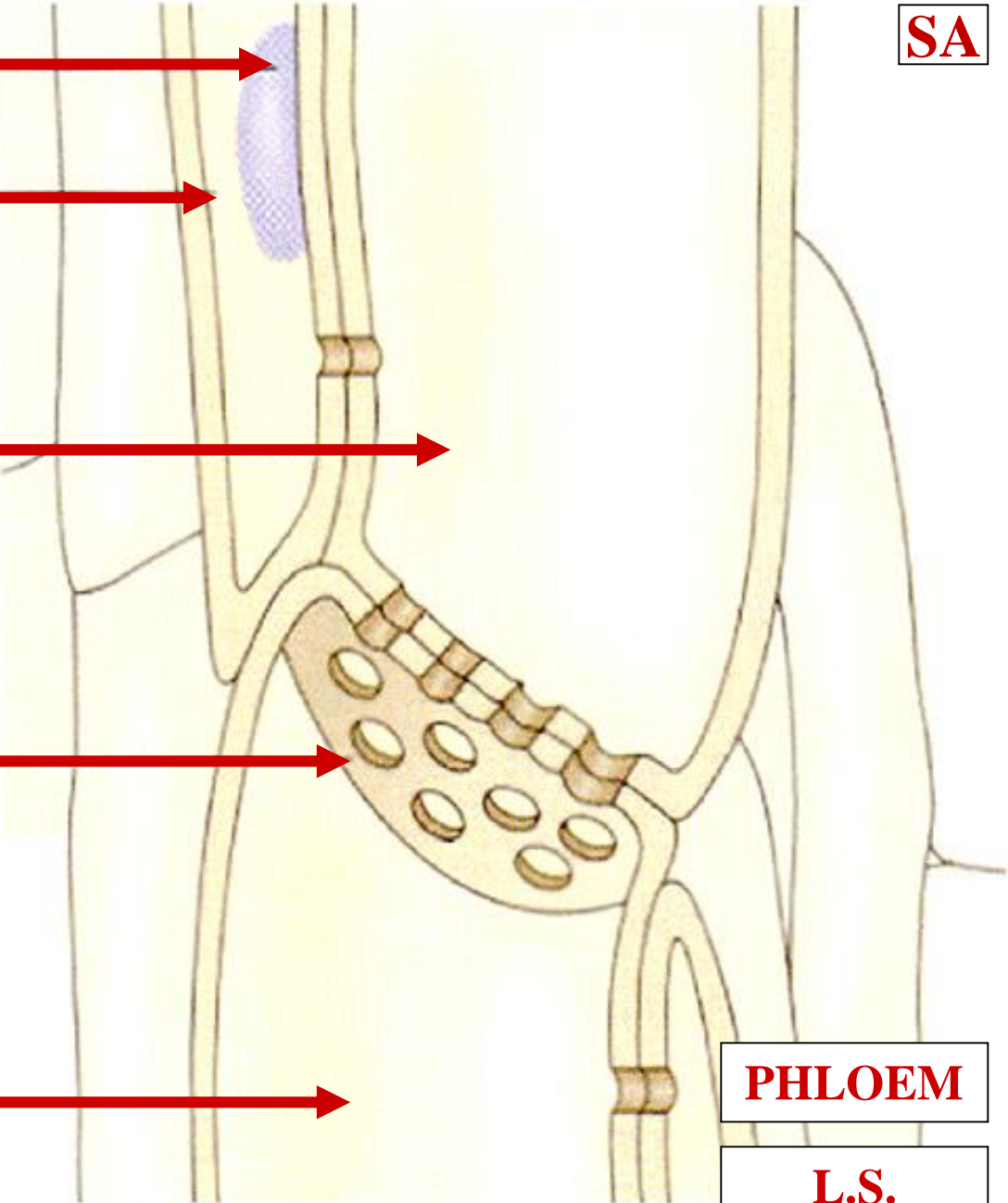
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SIEVE CELL

END WALL

SIEVE CELL



PHLOEM

L.S.

SA

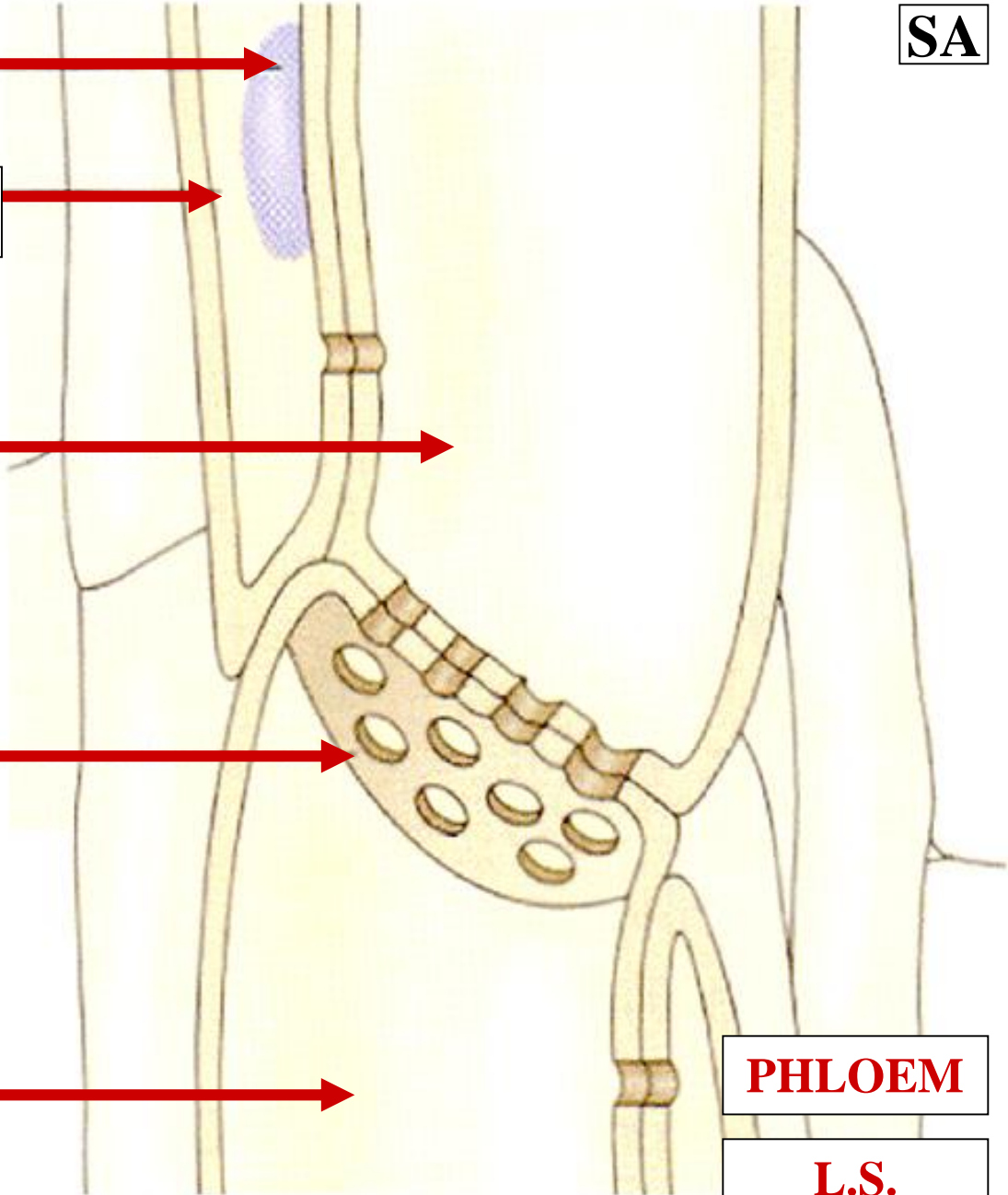
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SIEVE CELL

SIEVE AREA

SIEVE CELL



PHLOEM

L.S.

SIEVE AREA

SIEVE CELL
SIEVE AREA



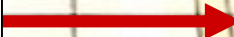
SMALL PORES

SIEVE CELL
SIEVE AREA

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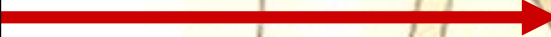
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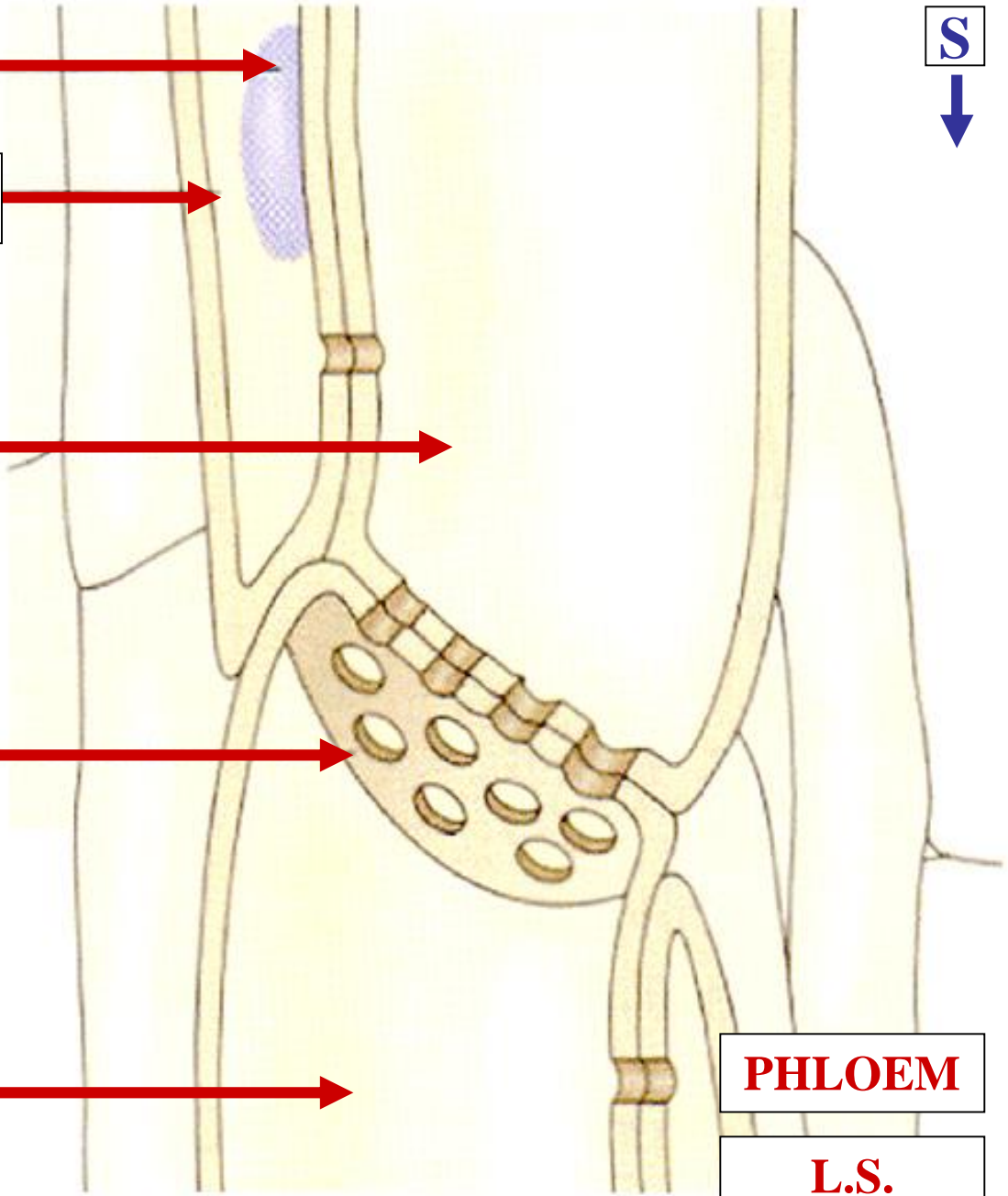
SIEVE CELL



**SIEVE AREA
SMALL PORES**



SIEVE CELL



S
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PHLOEM

L.S.

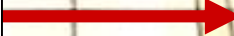
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SUGAR



SIEVE CELL



**SIEVE AREA
SMALL PORES**

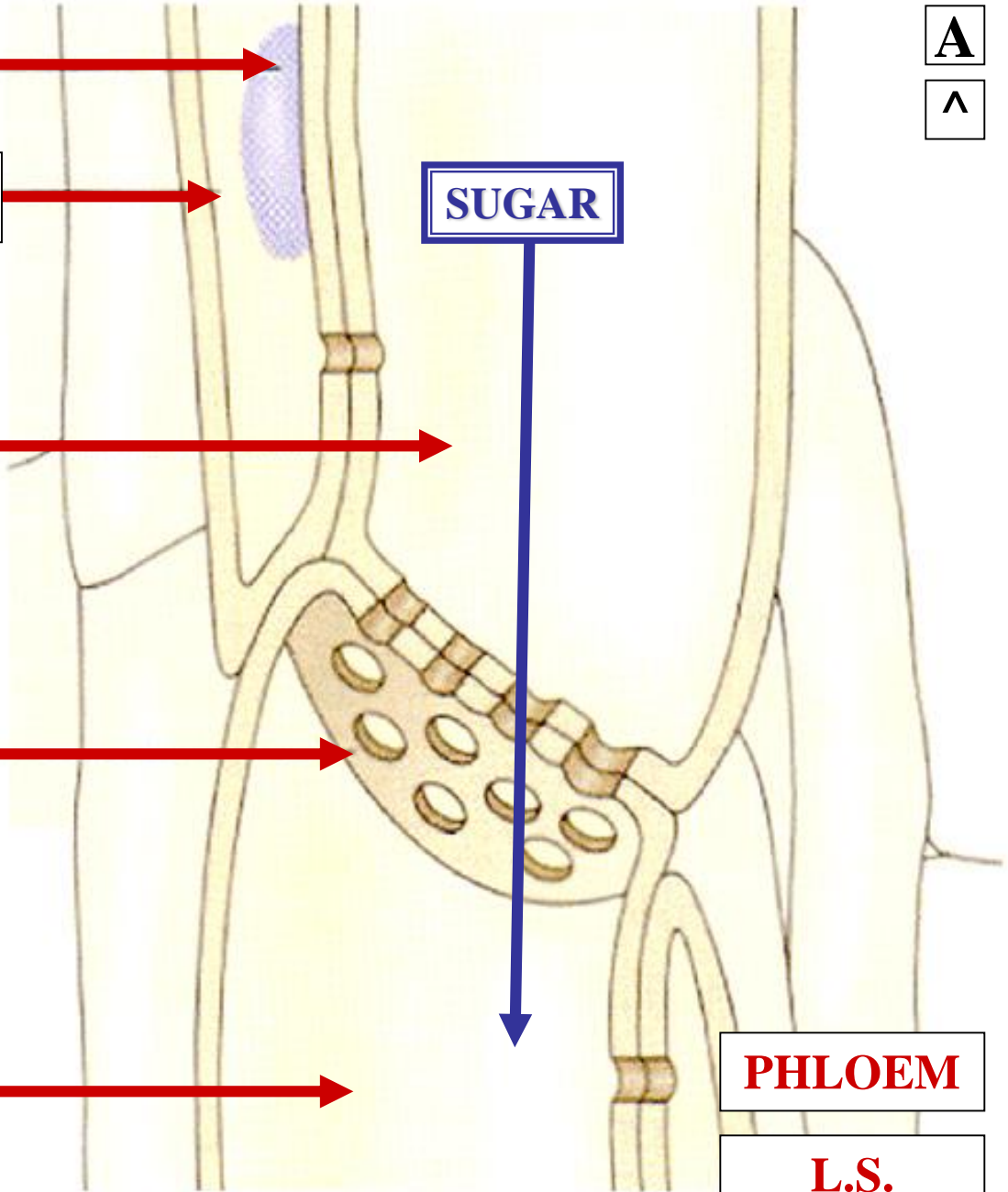


SIEVE CELL



PHLOEM

L.S.



ALBUMINOUS CELL



SIEVE CELL
ALBUMINOUS CELL

ASSOCIATED WITH SIEVE CELL

SIEVE CELL
ALBUMINOUS CELL



**SIEVE CELL
ALBUMINOUS CELL**

ASSOCIATED WITH SIEVE CELL

NUCLEATED

**SIEVE CELL
ALBUMINOUS CELL**



SIEVE CELL

ALBUMINOUS CELL

ASSOCIATED WITH SIEVE CELL

NUCLEATED

METABOLICALLY CONTROLS

SIEVE CELL

SIEVE CELL

ALBUMINOUS CELL

AL

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[]



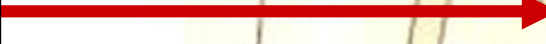
SUGAR



SIEVE CELL



SIEVE AREA
SMALL PORES

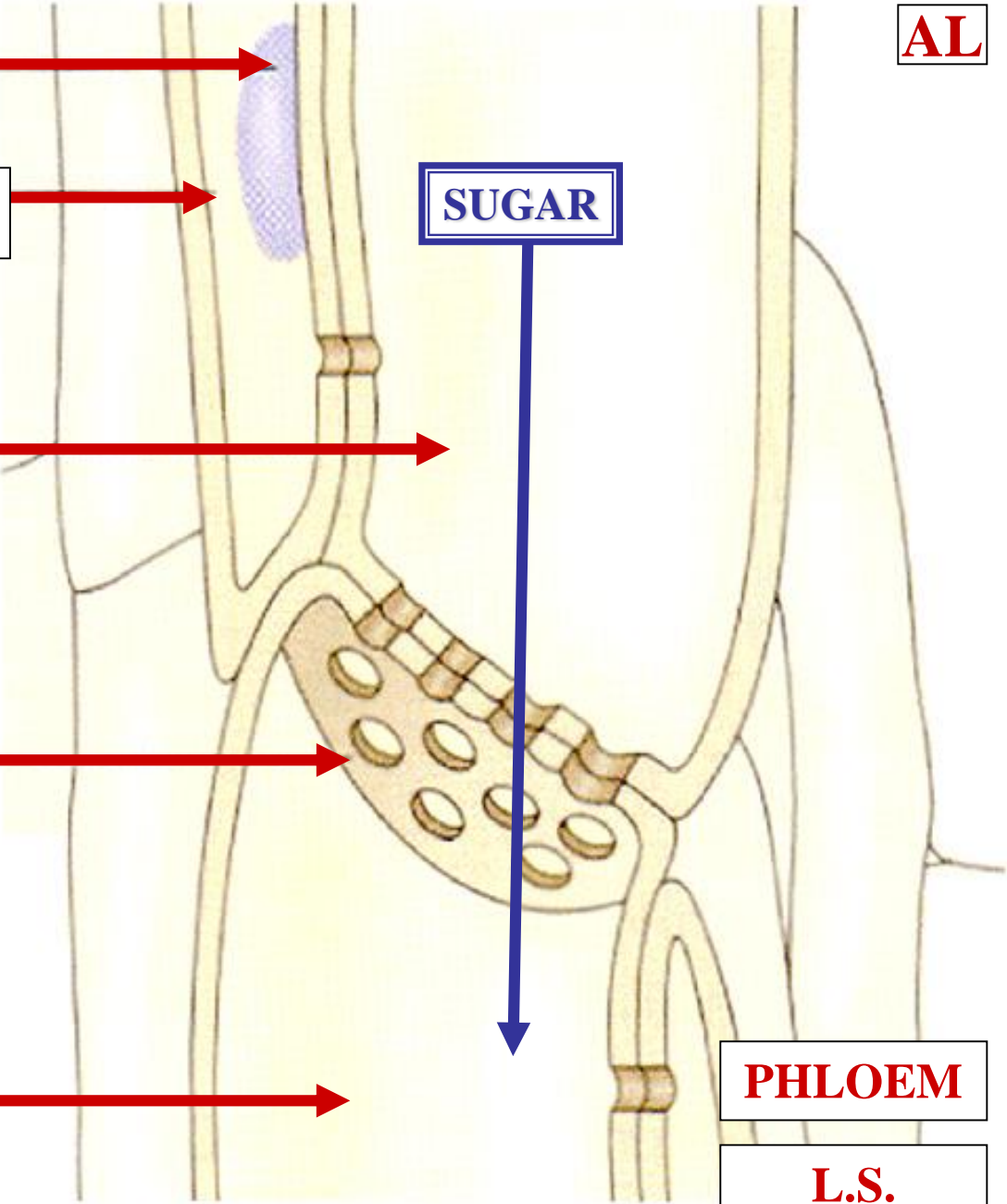


SIEVE CELL



PHLOEM

L.S.

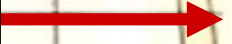


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ALBUMINOUS CELL



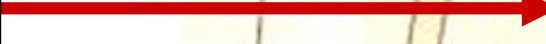
SUGAR



SIEVE CELL



**SIEVE AREA
SMALL PORES**

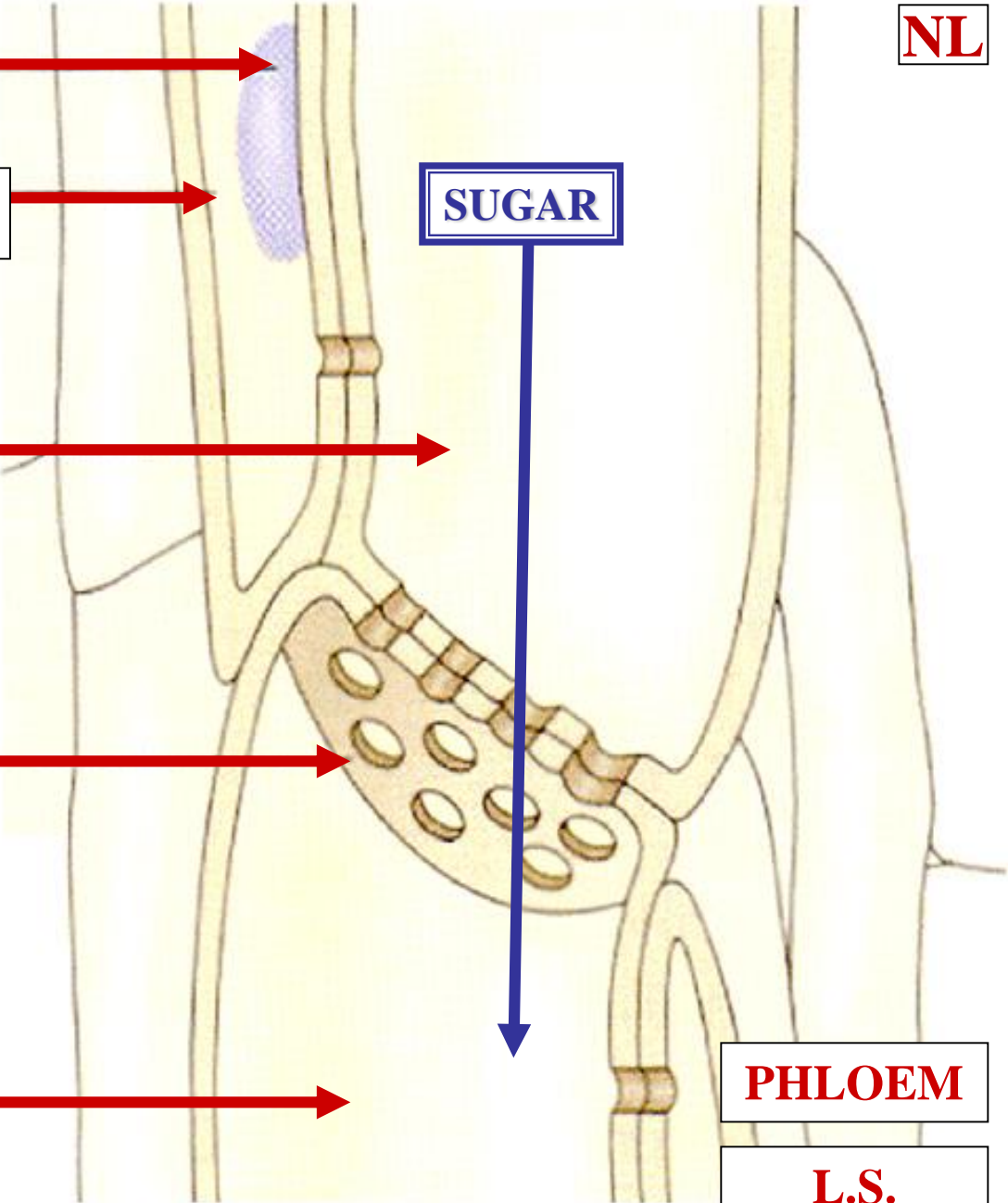


SIEVE CELL



PHLOEM

L.S.



NUCLEUS



ALBUMINOUS CELL



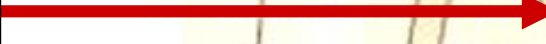
SUGAR



SIEVE CELL



**SIEVE AREA
SMALL PORES**

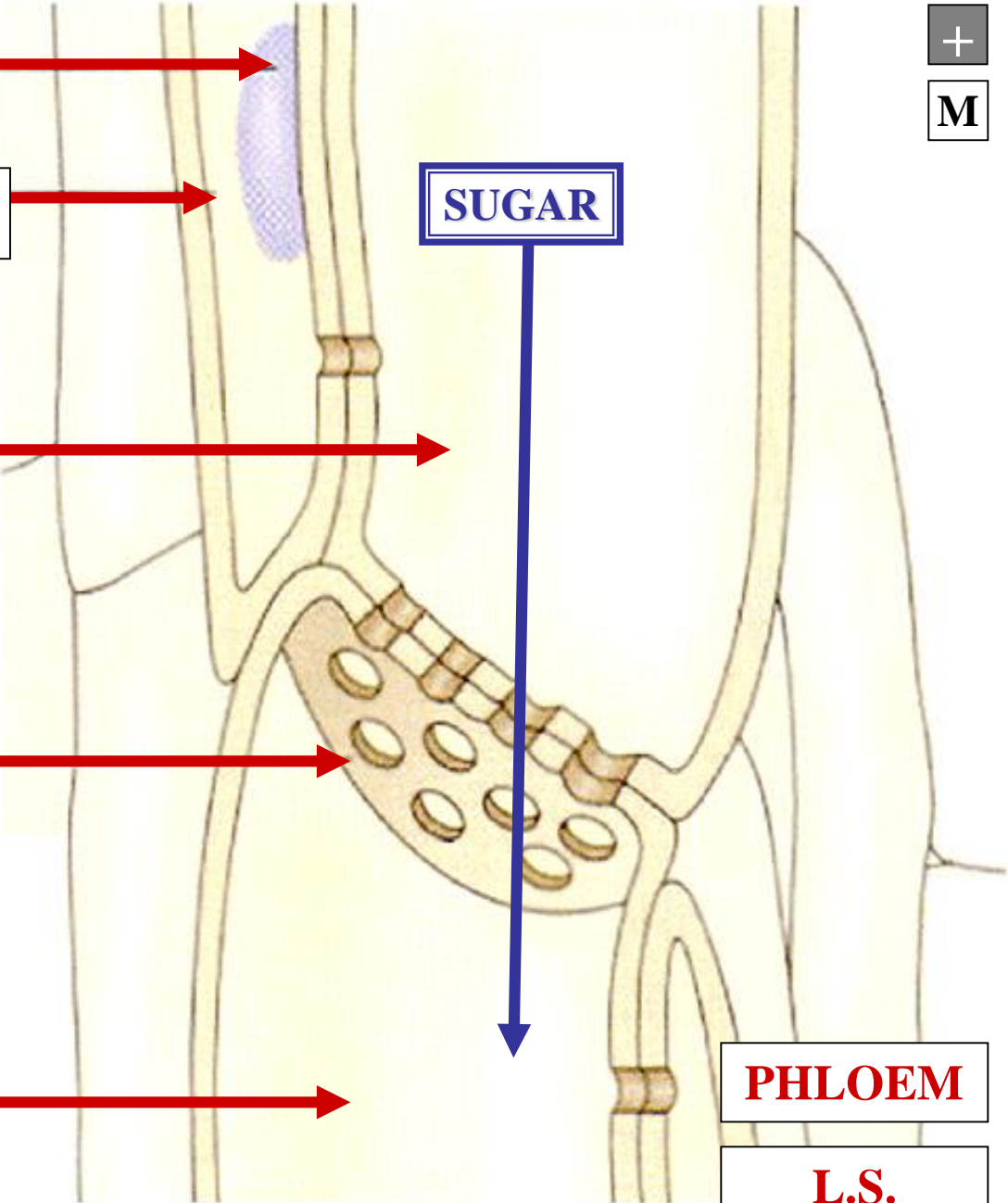


SIEVE CELL



PHLOEM

L.S.





NUCLEUS



ALBUMINOUS CELL
METABOLICALLY
CONTROLS SIEVE CELL



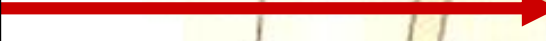
SUGAR



SIEVE CELL



SIEVE AREA
SMALL PORES

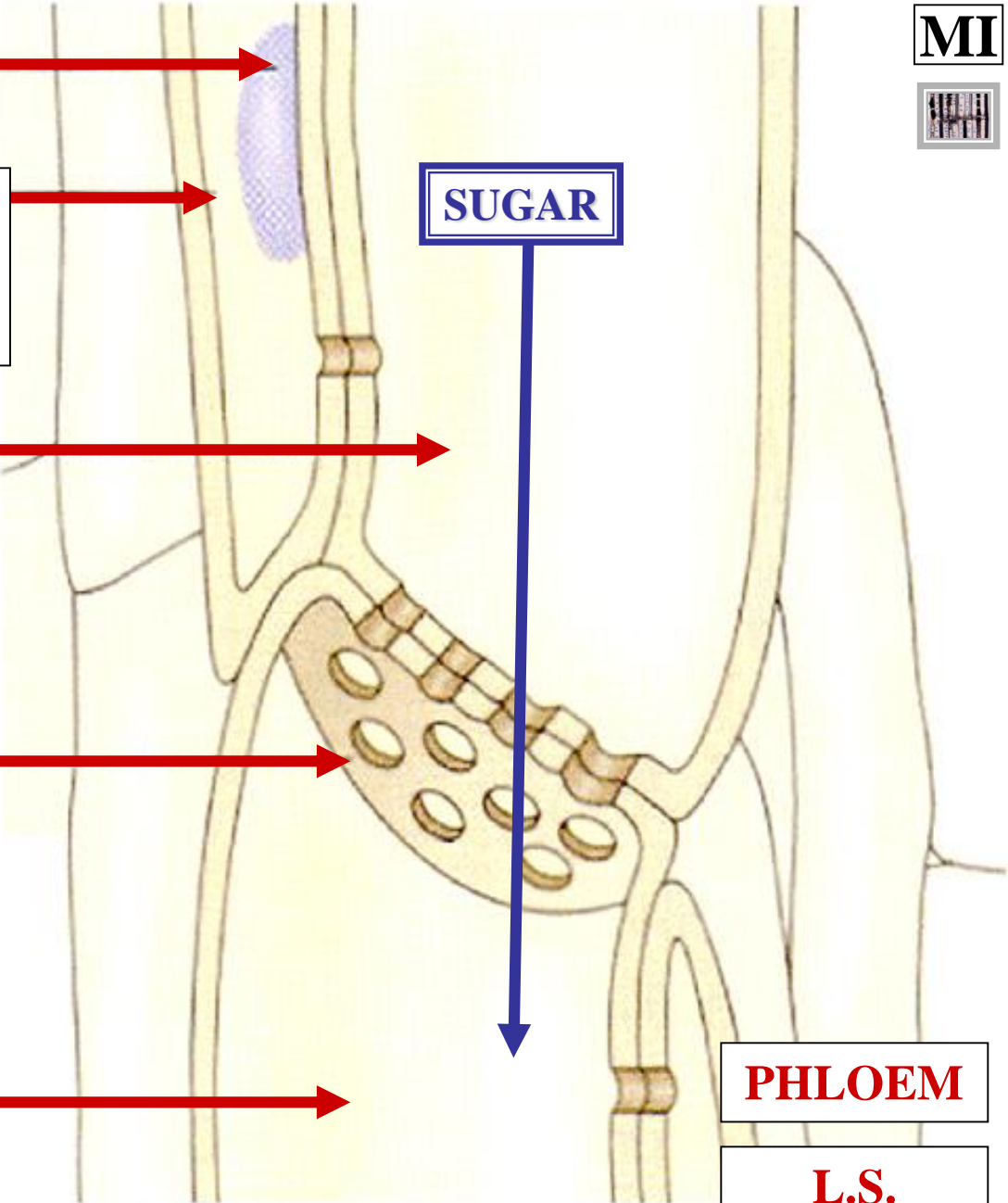


SIEVE CELL



PHLOEM

L.S.





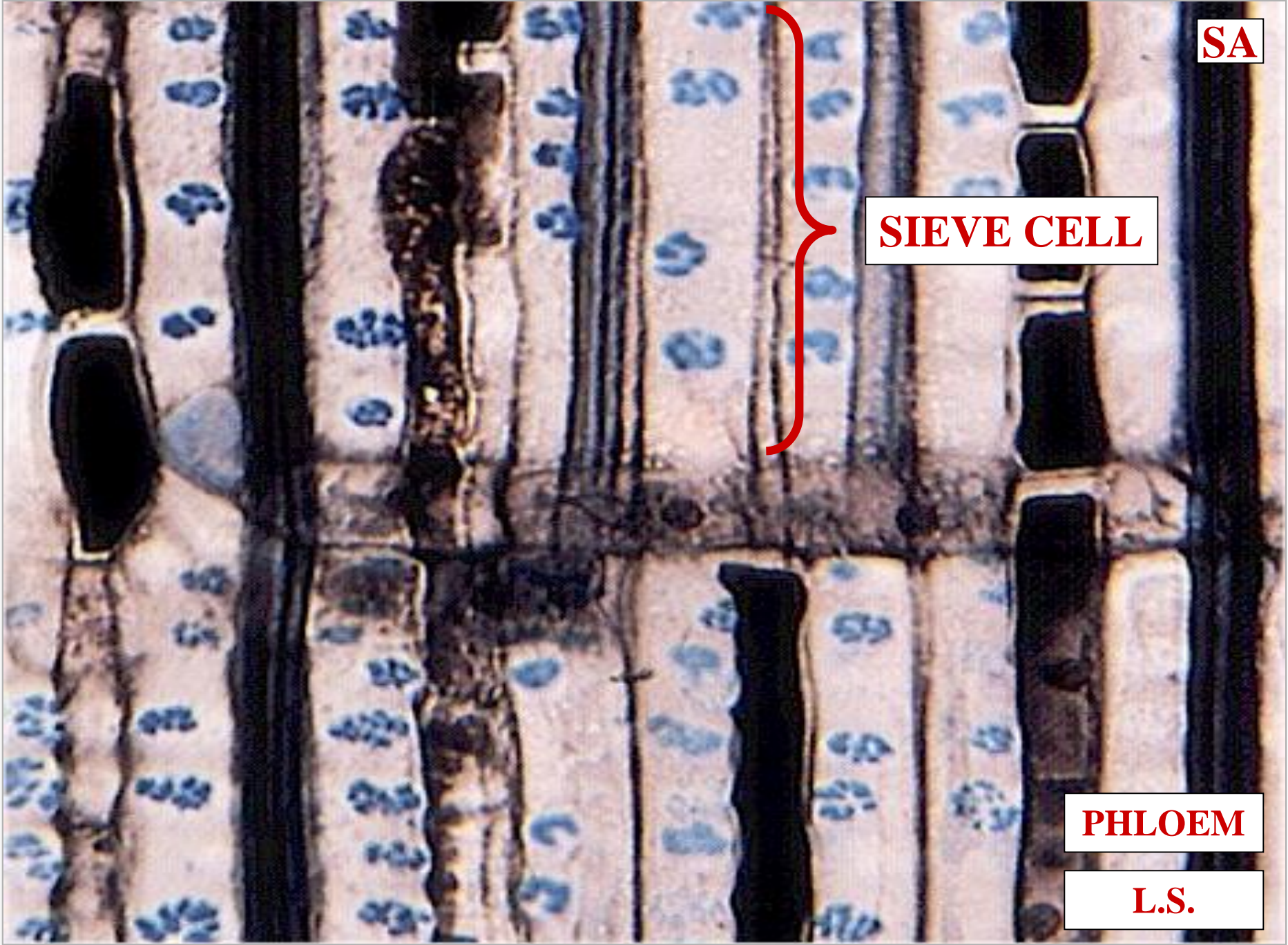
**SIEVE CELL
ALBUMINOUS CELL
MICROGRAPHS
L.S.**

SA

SIEVE CELL

PHLOEM

L.S.



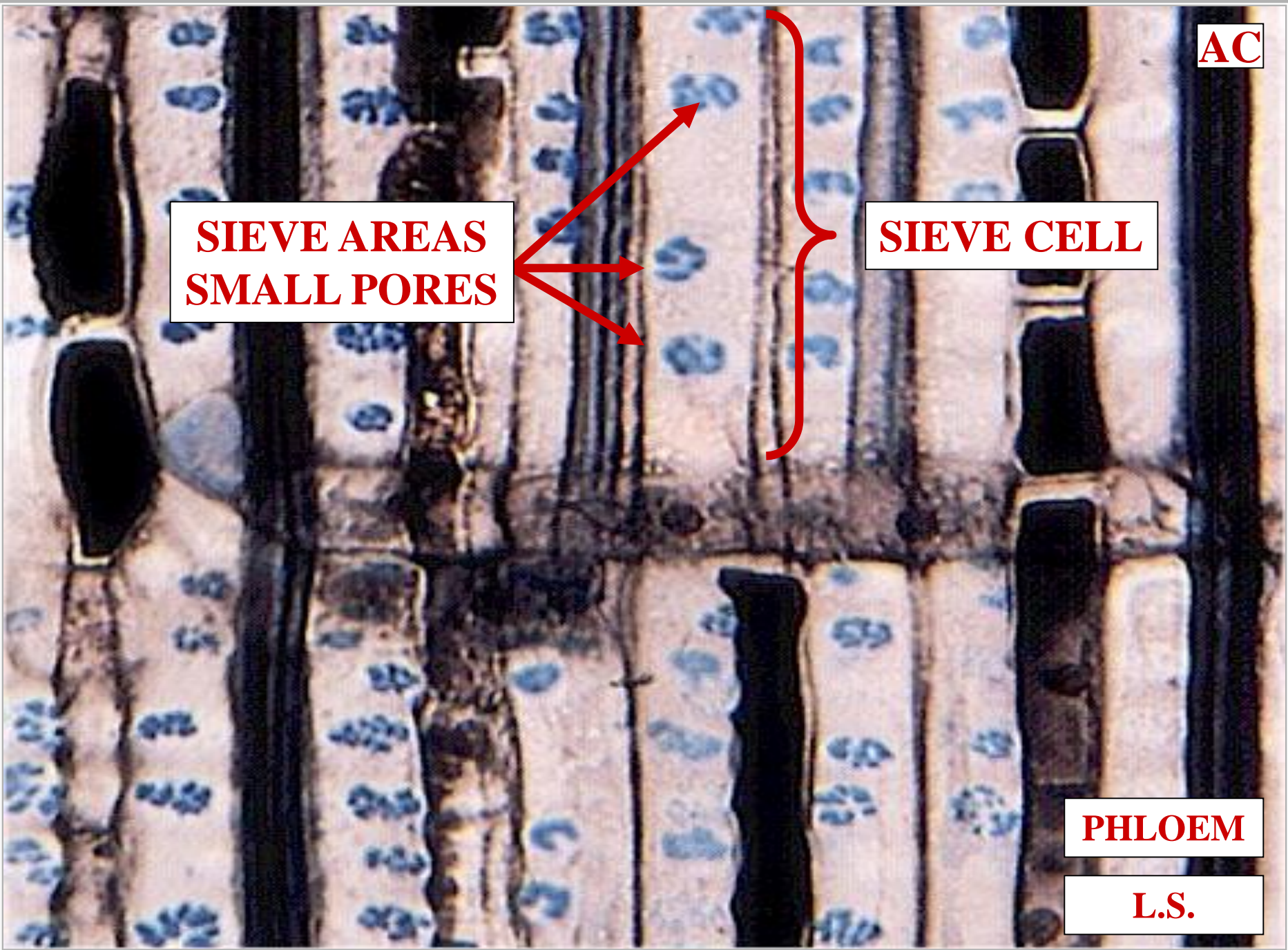
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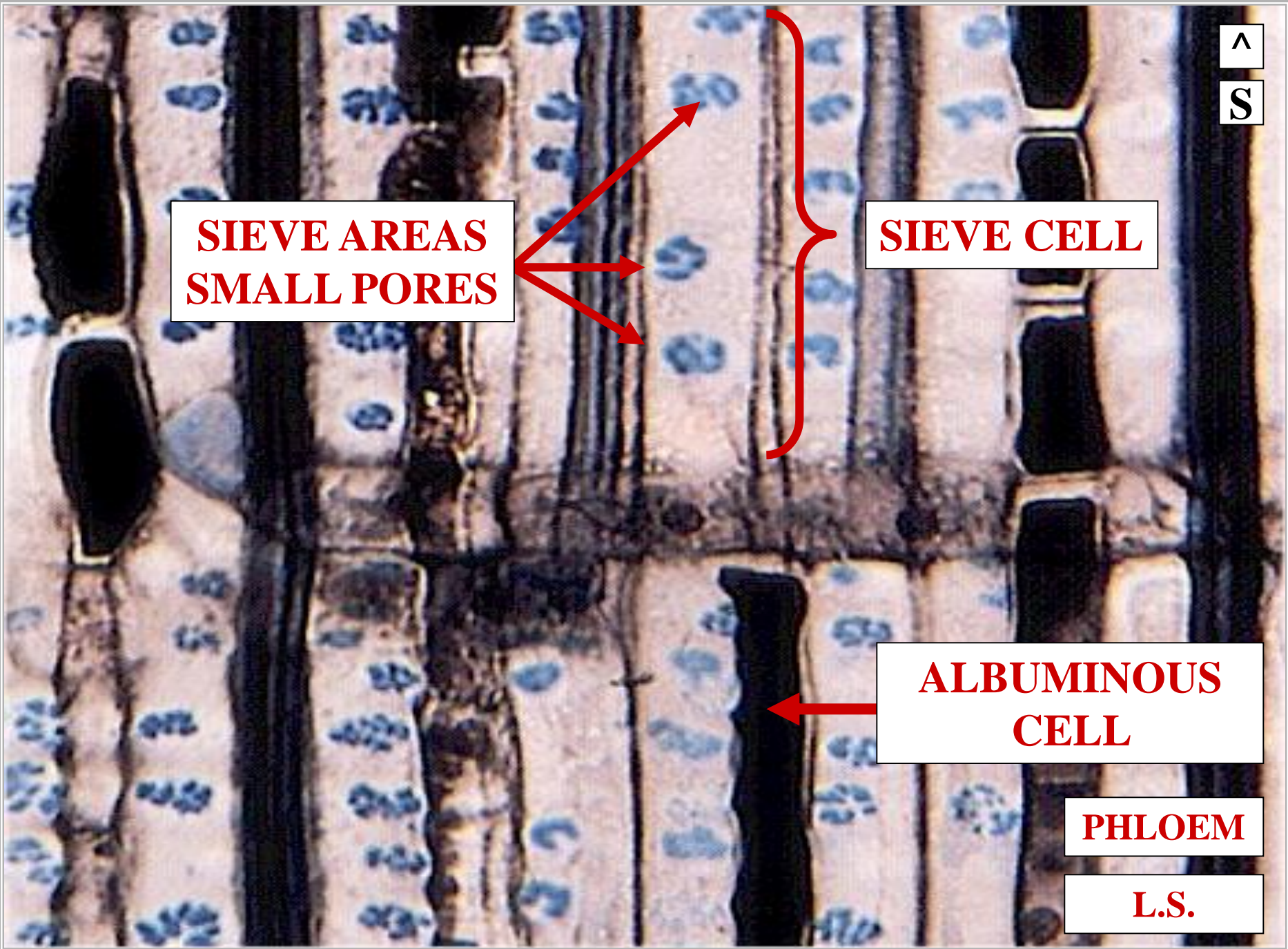
**SIEVE AREAS
SMALL PORES**

SIEVE CELL

PHLOEM

L.S.





**SIEVE AREAS
SMALL PORES**

SIEVE CELL

**ALBUMINOUS
CELL**

PHLOEM

L.S.

**^
S**

SIEVE MEMBER

SIEVE ELEMENT
SIEVE MEMBER



KNOWN ANGIOSPERMS ONLY

SIEVE ELEMENT
SIEVE CELL

SIEVE ELEMENT
SIEVE MEMBER



KNOWN ANGIOSPERMS

END WALL WITH SIEVE PLATE

SIEVE ELEMENT
SIEVE CELL

SIEVE ELEMENT
SIEVE MEMBER



KNOWN ANGIOSPERMS

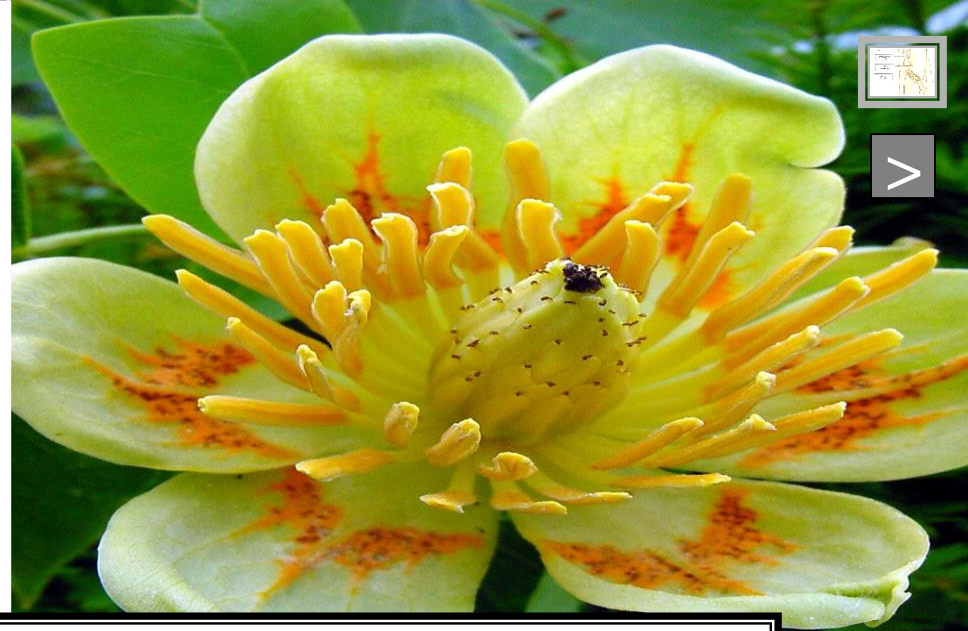
END WALL WITH SIEVE PLATE

LARGE PORES

SIEVE ELEMENT
SIEVE CELL



**SIEVE MEMBERS
KNOWN
ANGIOSPERMS
ONLY**



ANGIOSPERMS

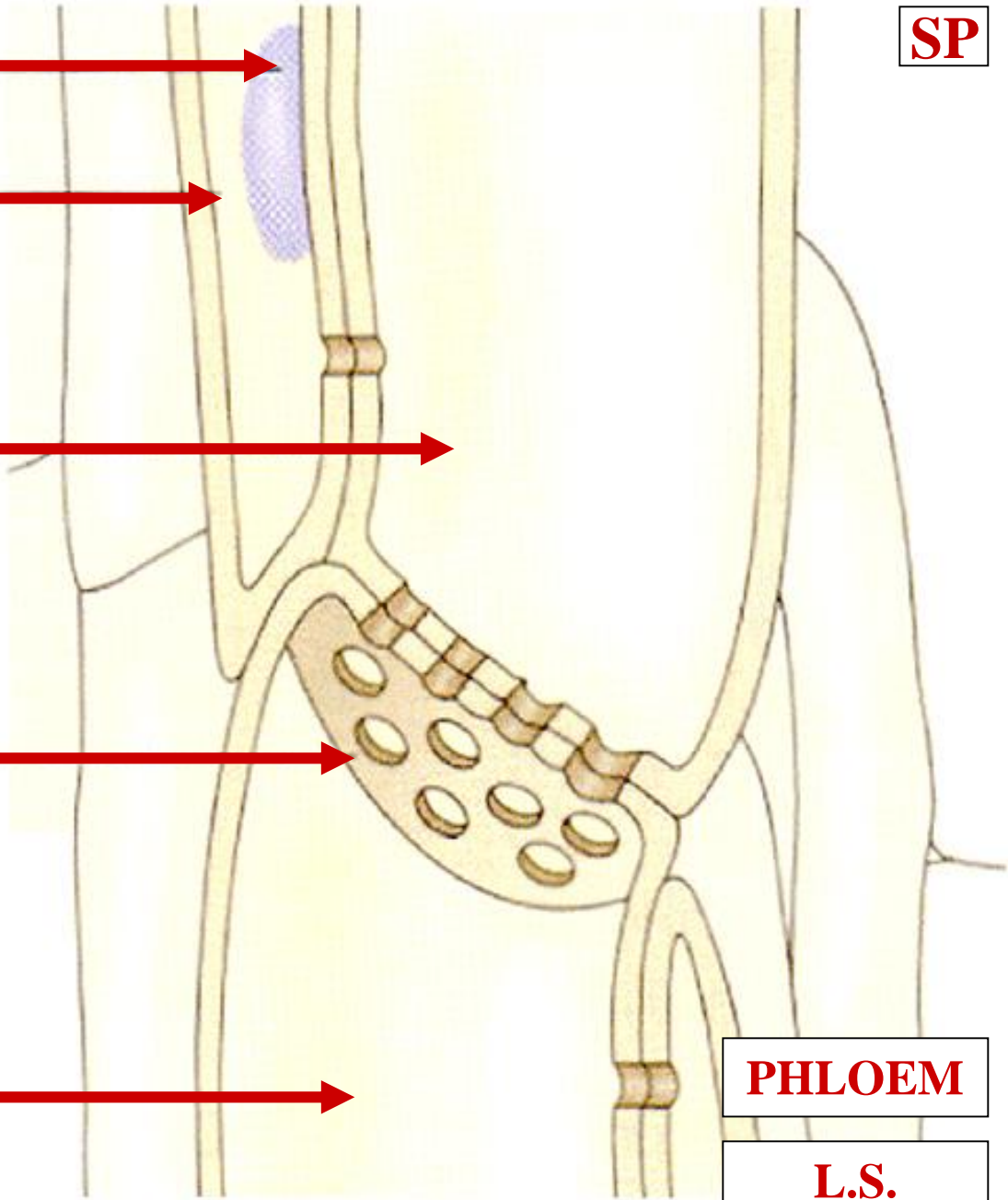


SP

SIEVE MEMBER

END WALL

SIEVE MEMBER



PHLOEM

L.S.

SP

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[]

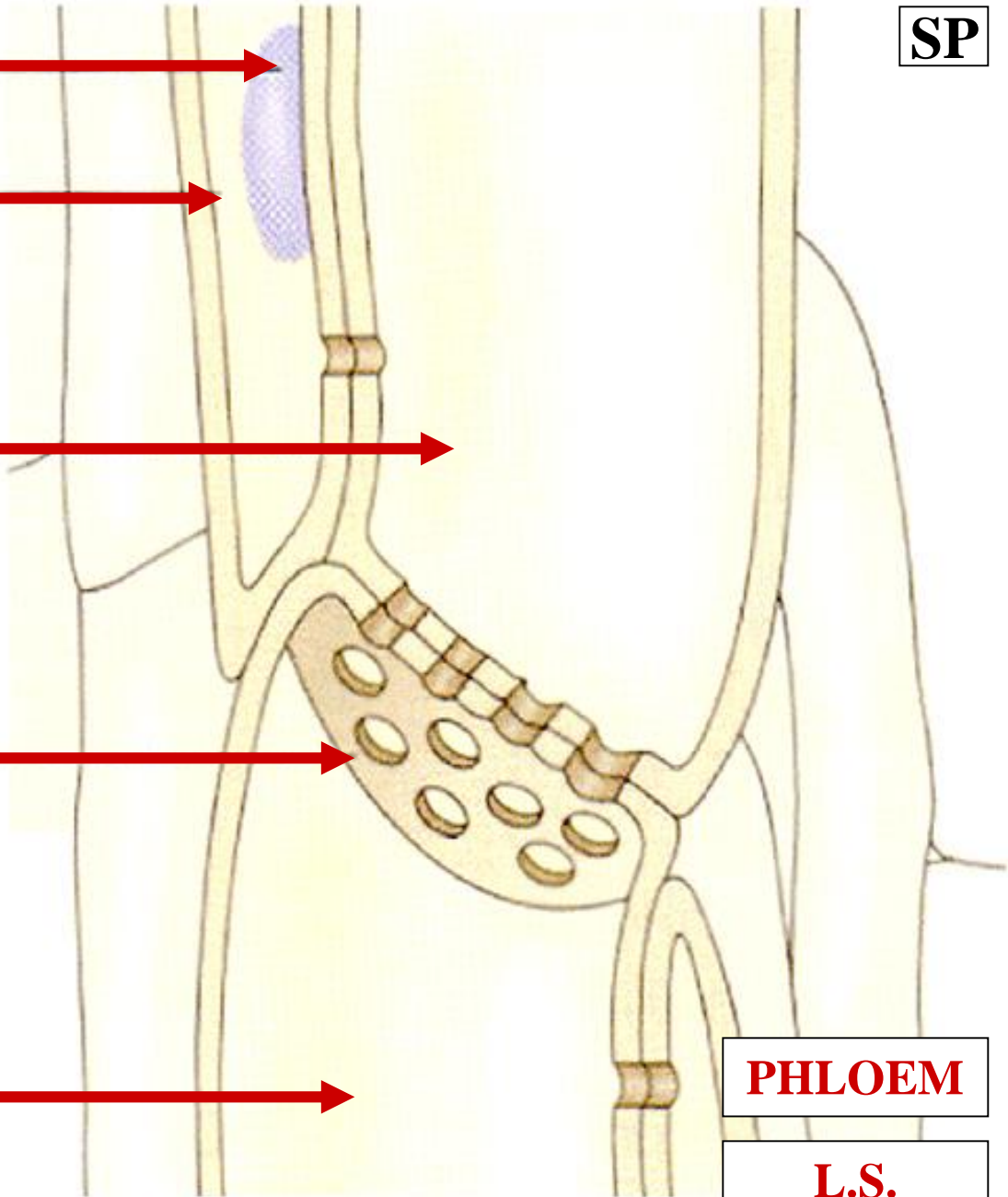
SIEVE MEMBER

SIEVE PLATE

SIEVE MEMBER

PHLOEM

L.S.



SIEVE PLATE

**SIEVE MEMBER
SIEVE PLATE**



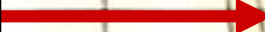
LARGE PORES

**SIEVE MEMBER
SIEVE PLATE**

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SIEVE MEMBER



**SIEVE PLATE
LARGE PORES**



SIEVE MEMBER

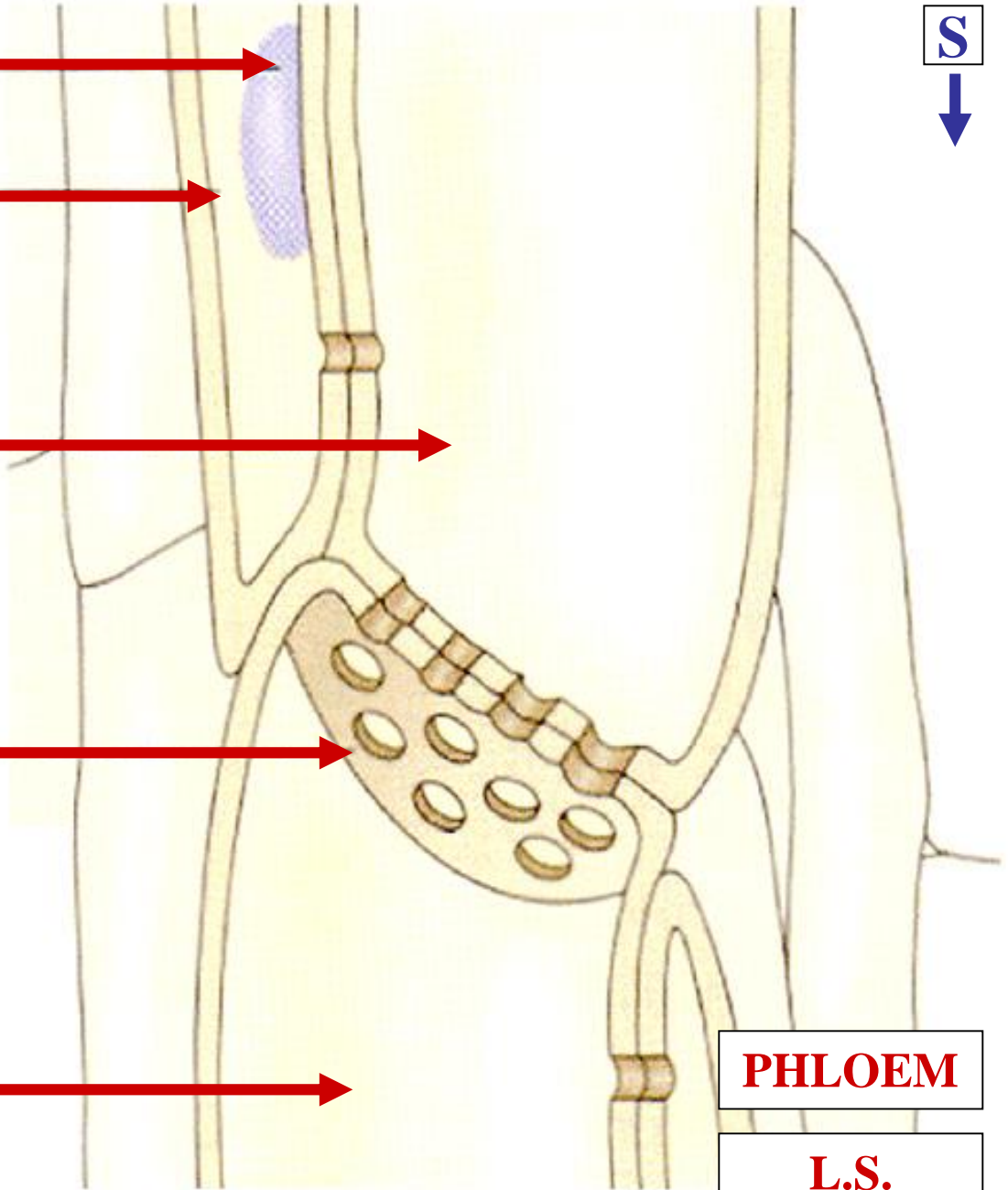


S



PHLOEM

L.S.



C

[]



[]



SUGAR



SIEVE MEMBER



SIEVE PLATE
LARGE PORES

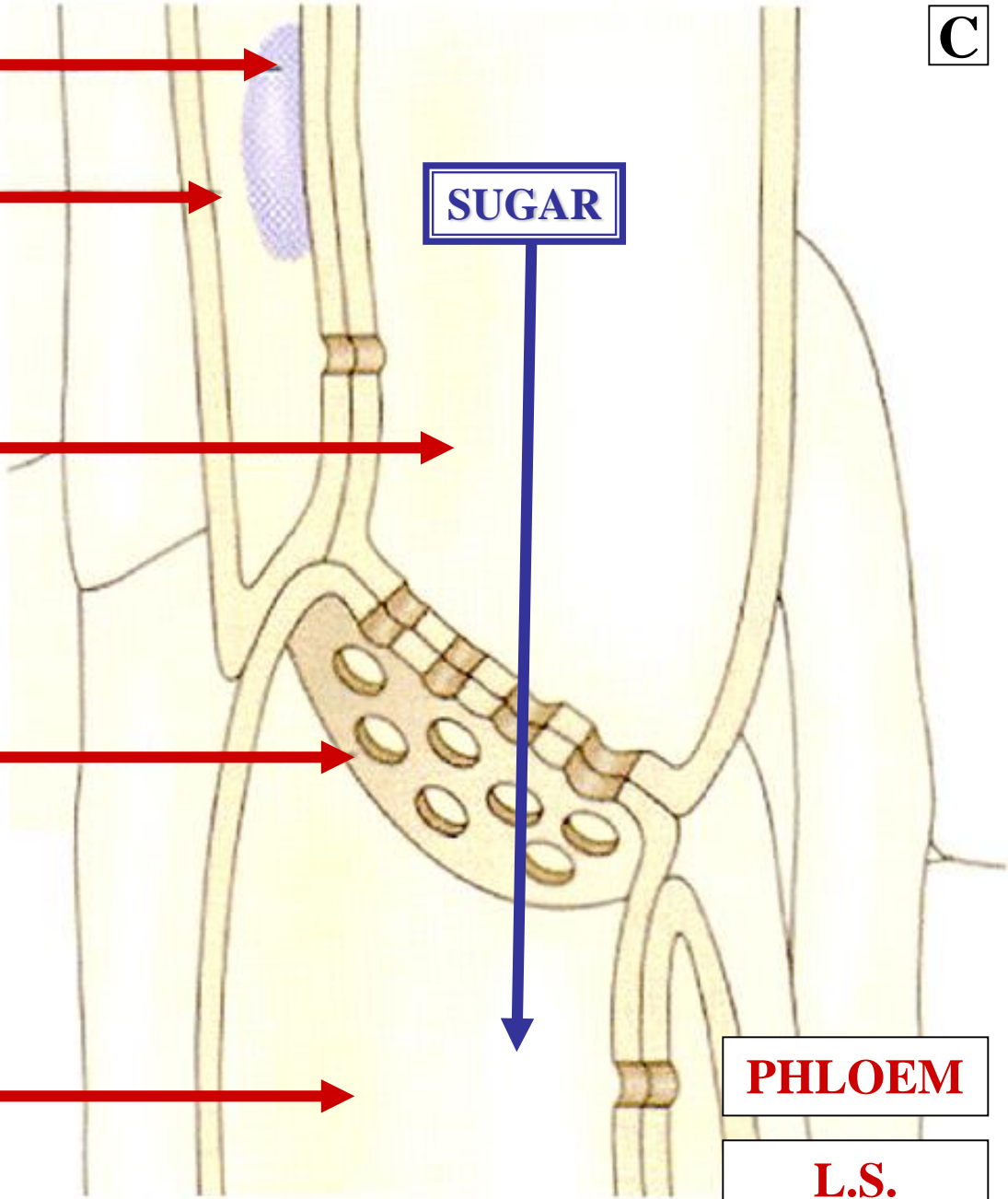


SIEVE MEMBER



PHLOEM

L.S.



COMPANION CELL



SIEVE MEMBER COMPANION CELL

ASSOCIATED WITH SIEVE MEMBER

SIEVE MEMBER COMPANION CELL



**SIEVE MEMBER
COMPANION CELL**

ASSOCIATED WITH SIEVE MEMBER

NUCLEATED

**SIEVE MEMBER
COMPANION CELL**