

**TRACHEARY ELEMENT
VESSEL MEMBER**



KNOWN VARIOUS VASCULAR PLANTS

END WALL LESS TAPPED

**TRACHEARY ELEMENT
VESSEL MEMBER**

TRACHEARY ELEMENT VESSEL MEMBER



KNOWN VARIOUS VASCULAR PLANTS

END WALL LESS TAPPED

END WALL WITH PERFORATED PLATE

TRACHEARY ELEMENT VESSEL MEMBER



VESSEL MEMBERS KNOWN TO VARIOUS VASCULAR PLANTS



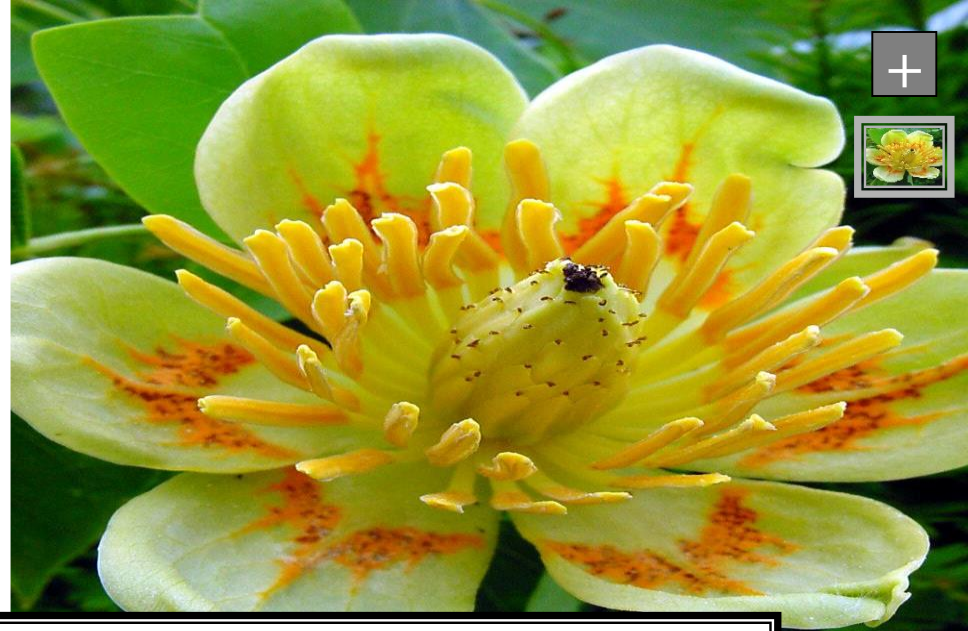
PTERIDOPHYTES





GYMNOSPERMS





ANGIOSPERMS





**VESSEL MEMBERS
DOMINATE WITH
ANGIOSPERMS**

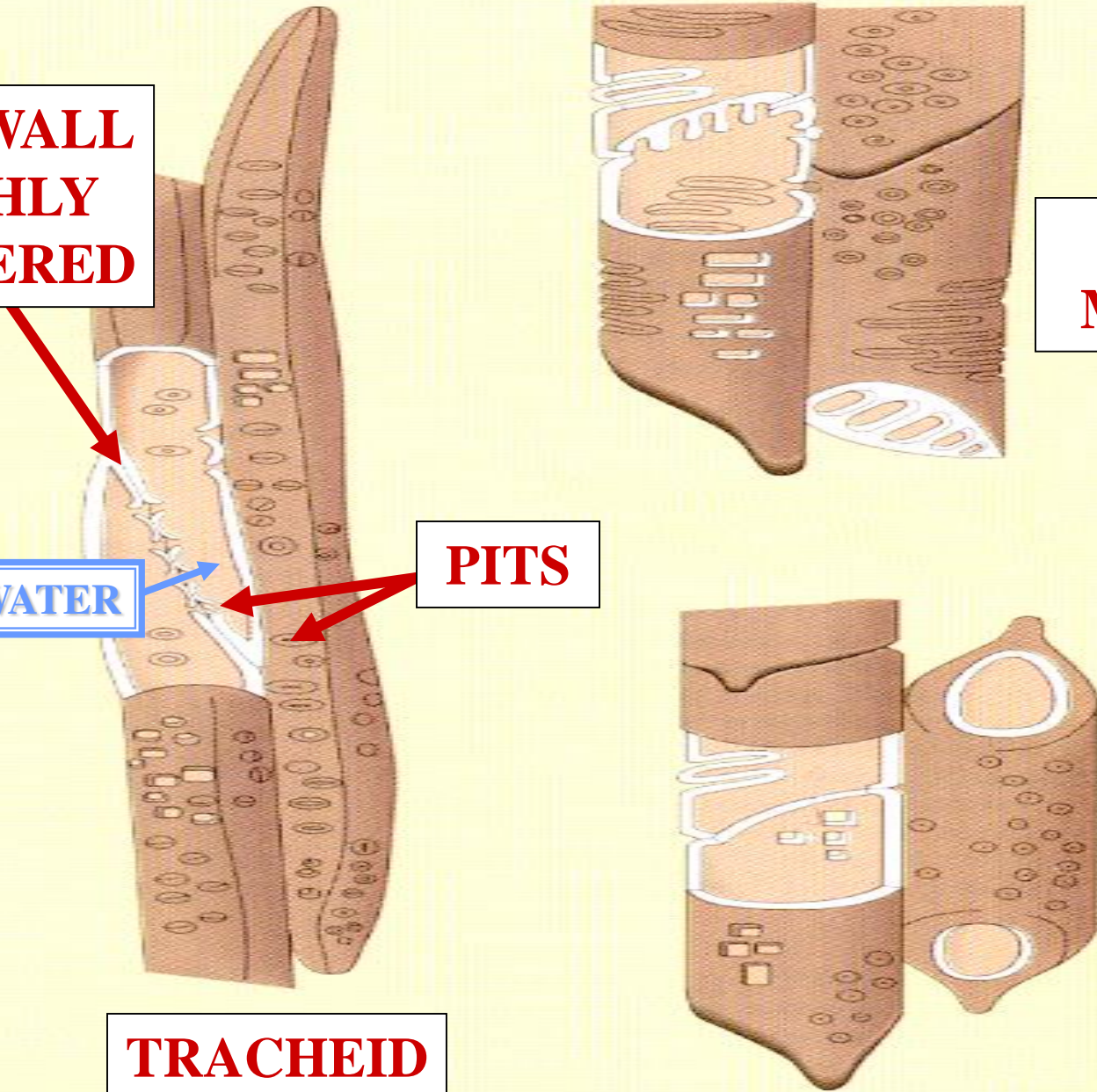
**END WALL
HIGHLY
TAPPERED**

WATER

PITS

TRACHEID

**VESSEL
MEMBER**



**END WALL
HIGHLY
TAPPERED**

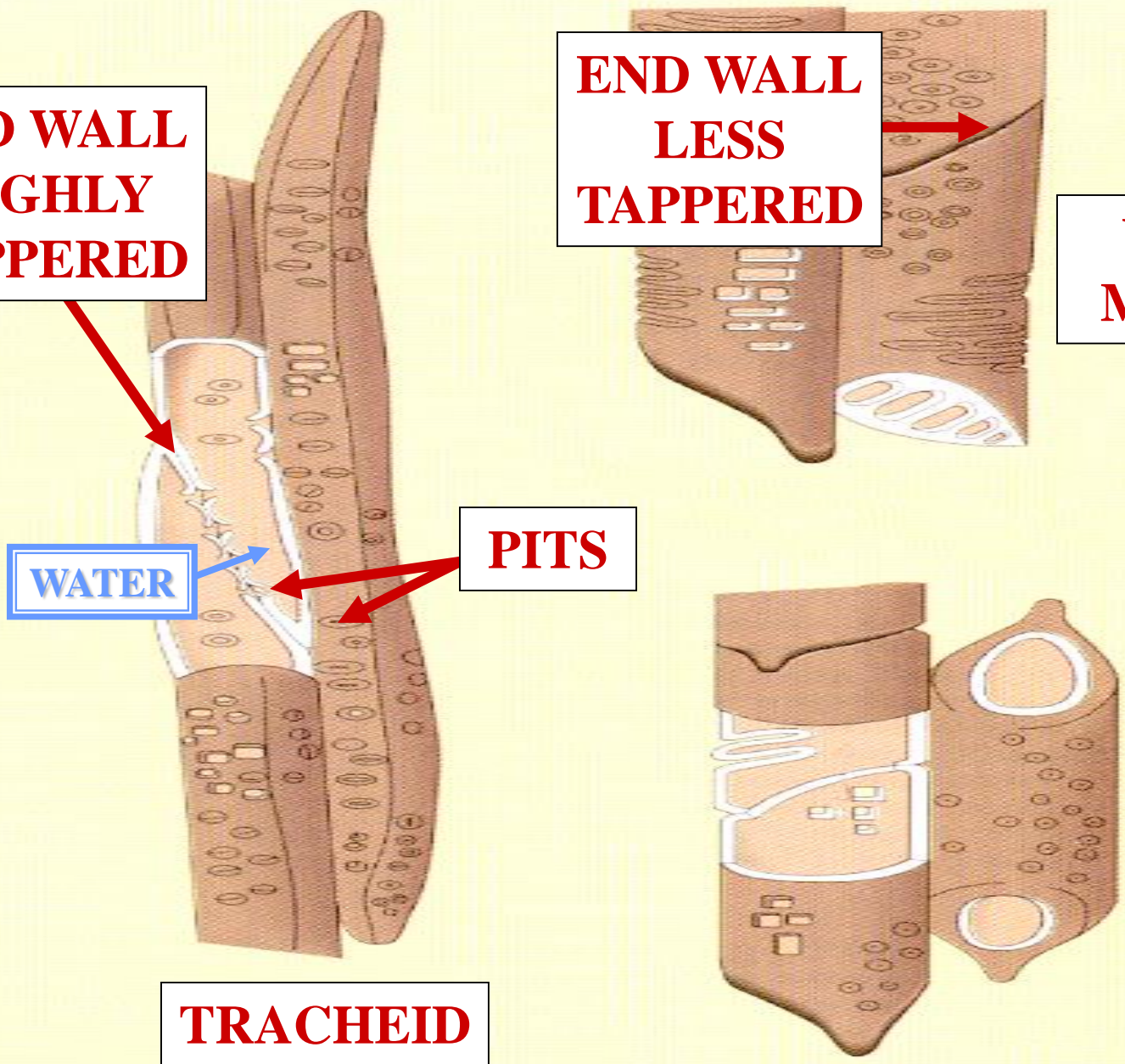
**END WALL
LESS
TAPPERED**

**VESSEL
MEMBER**

WATER

PITS

TRACHEID





**END WALL
HIGHLY
TAPPERED**

**END WALL
LESS
TAPPERED**

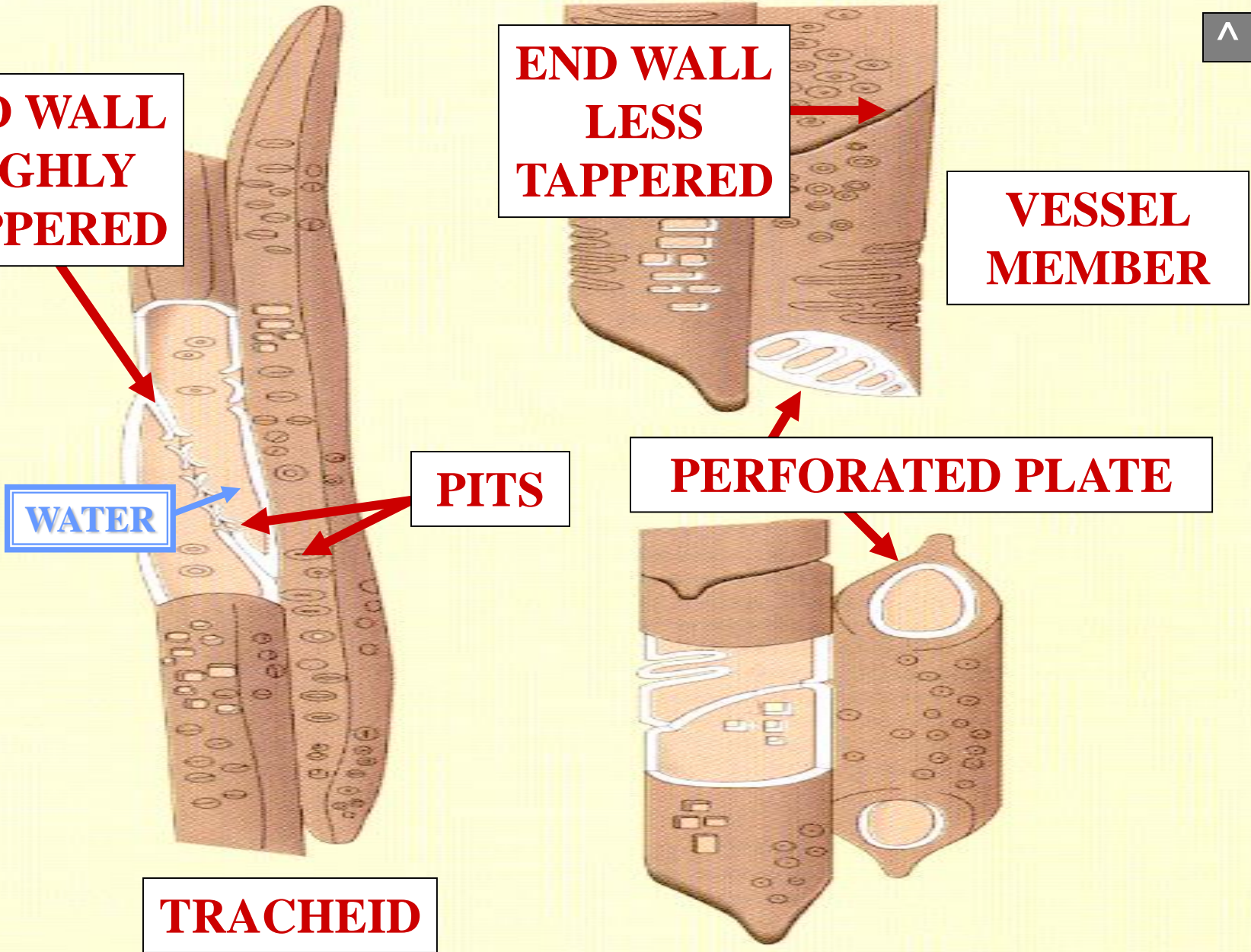
**VESSEL
MEMBER**

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**

PERFORATED PLATE SCALARIFORM



LADDER-LIKE

PERFORATED PLATE SCALARIFORM



**HIGHLY
TAPPED
END WALL**

**LESS
TAPPED
END WALL**

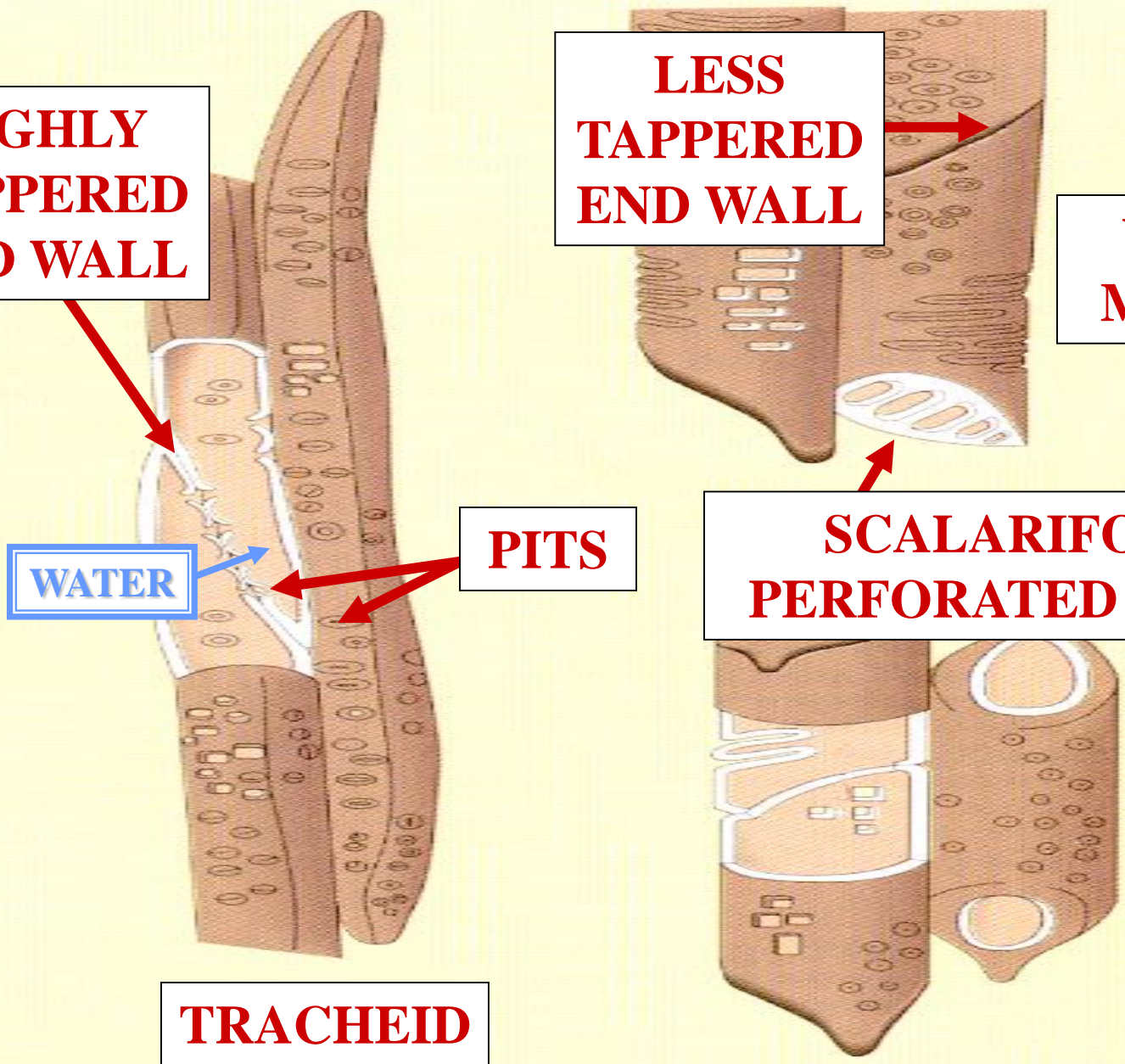
**VESSEL
MEMBER**

WATER

PITS

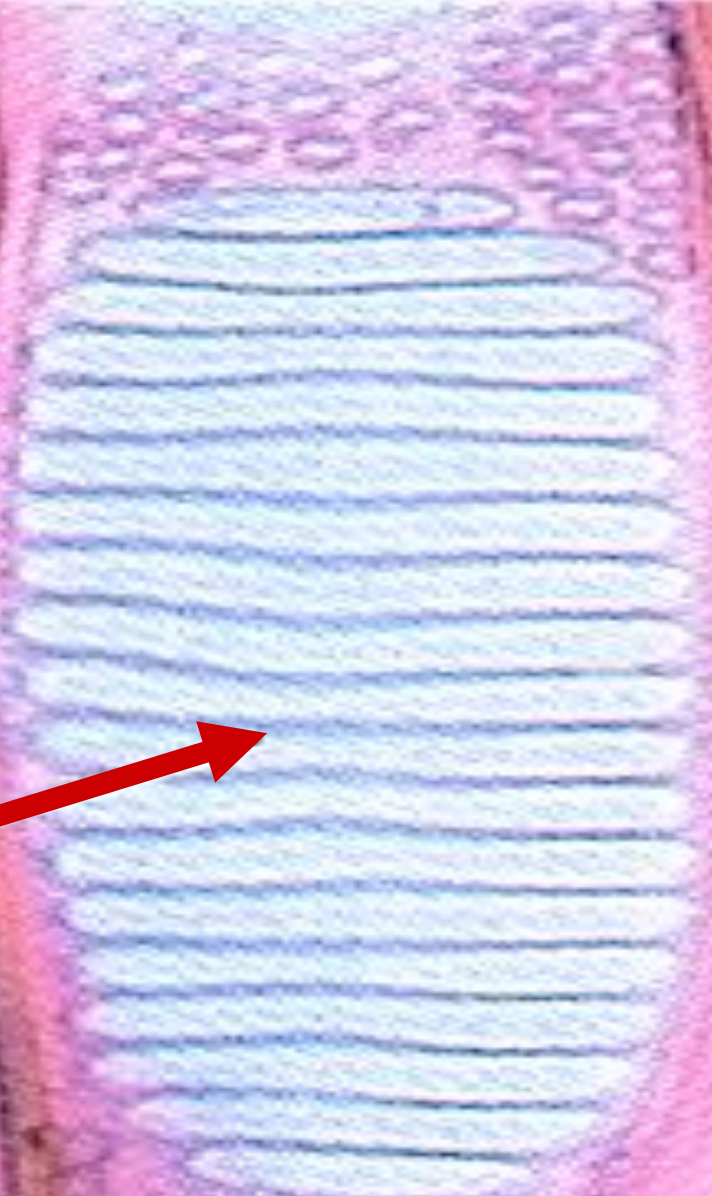
**SCALARIFORM
PERFORATED PLATE**

TRACHEID





**SCALARIFORM
PERFORATED
PLATE**



**HIGHLY
TAPPERED
END WALL**

**LESS
TAPPERED
END WALL**

**VESSEL
MEMBER**

WATER

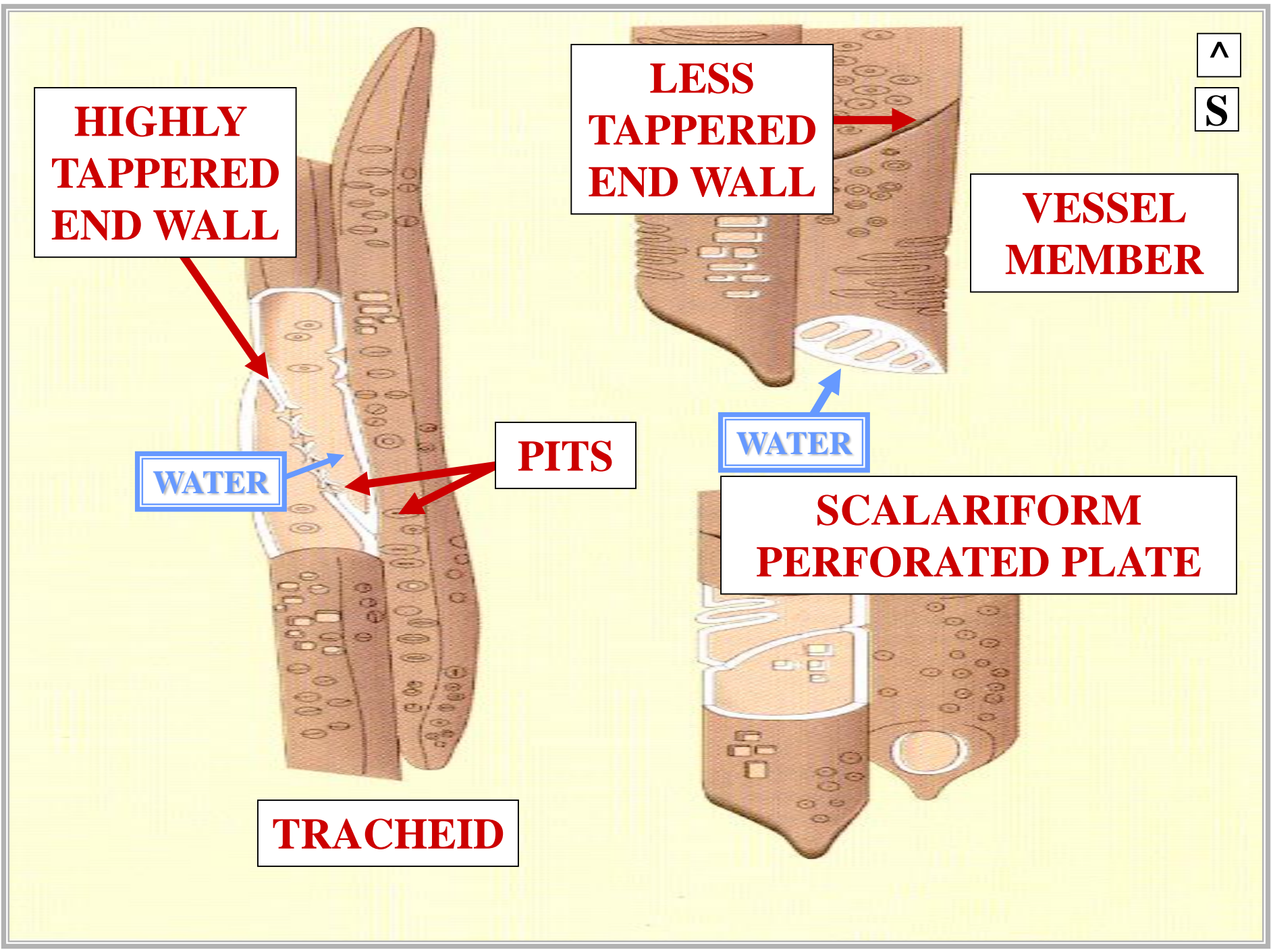
PITS

WATER

**SCALARIFORM
PERFORATED PLATE**

TRACHEID

**^
S**



**SIMPLE
PERFORATED
PLATE**

PERFORATED PLATE SIMPLE



LARGE PERFORATION

PERFORATED PLATE SIMPLE



**HIGHLY
TAPPED
END WALL**

**LESS
TAPPED
END WALL**

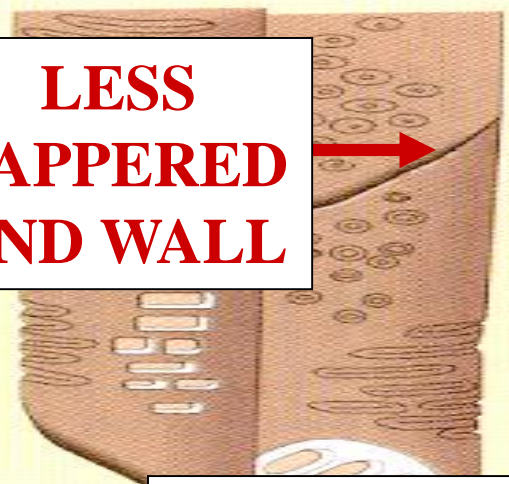
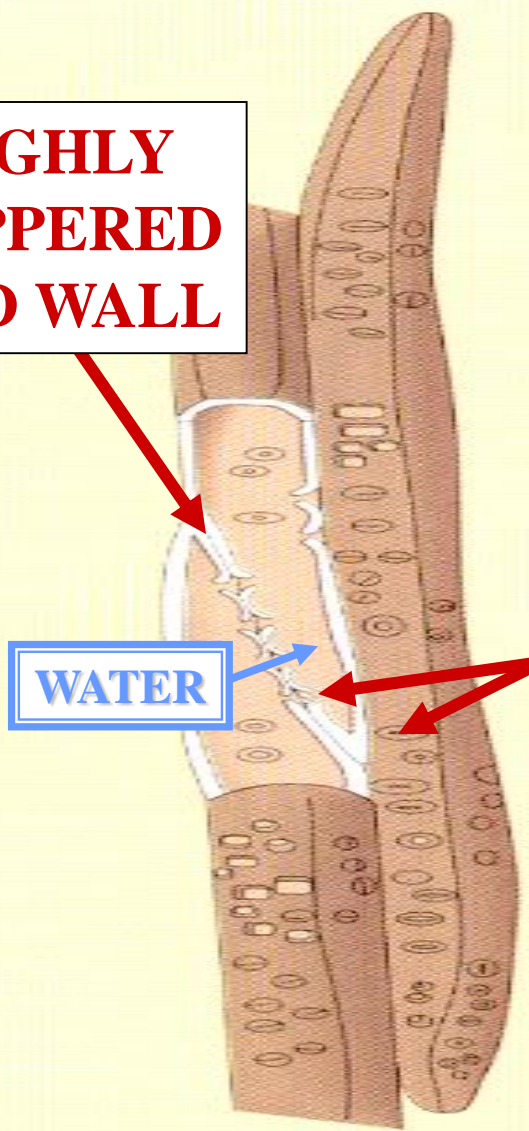
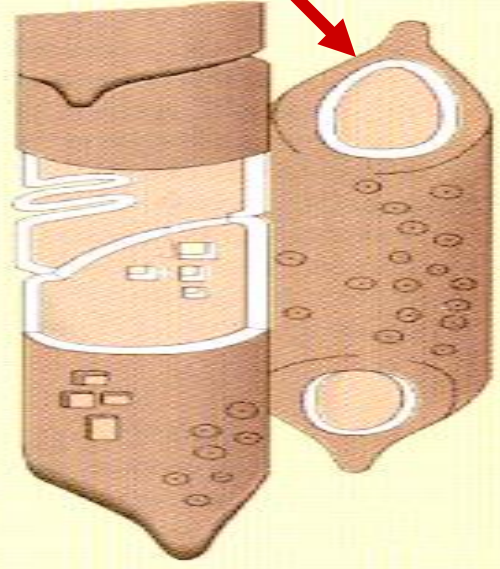
**VESSEL
MEMBER**

WATER

PITS

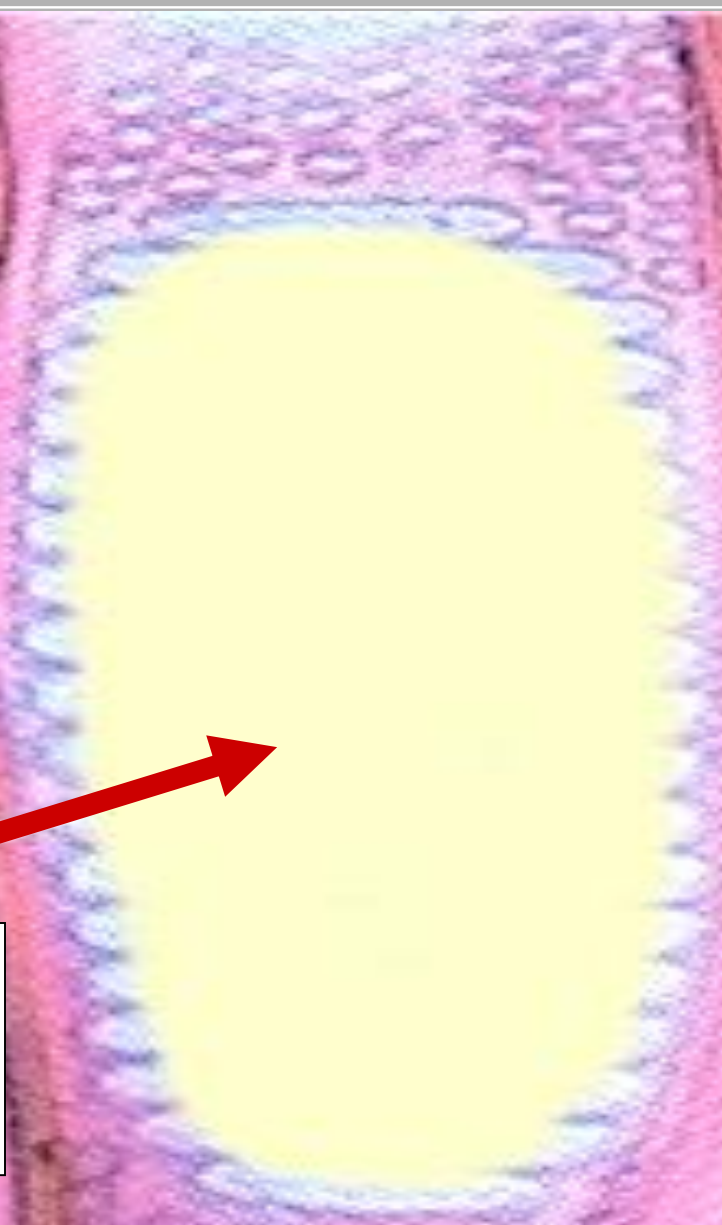
**SIMPLE
PERFORATED
PLATE**

TRACHEID





**SIMPLE
PERFORATED
PLATE**



**HIGHLY
TAPPERED
END WALL**

**LESS
TAPPERED
END WALL**

**VESSEL
MEMBER**

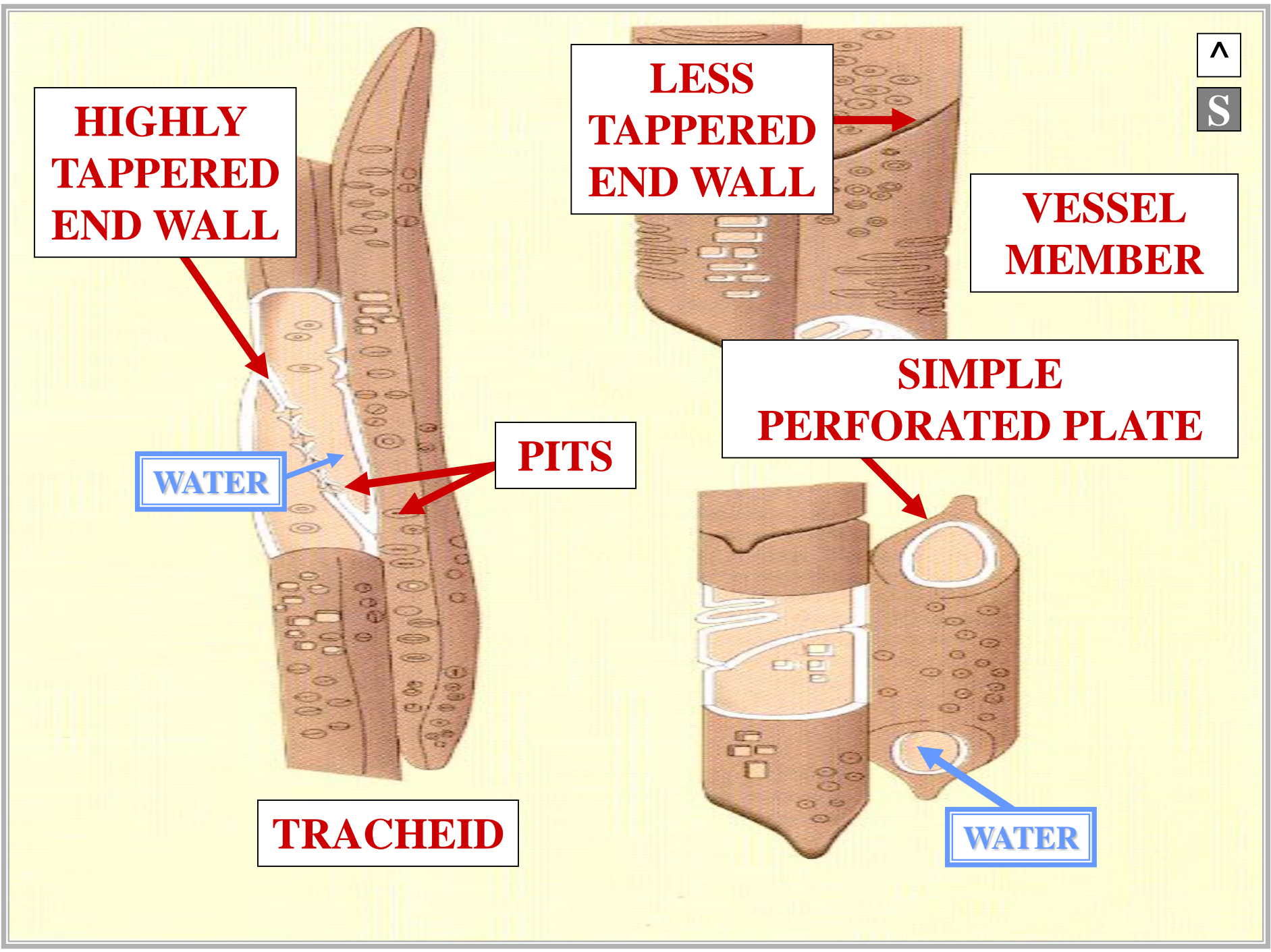
**SIMPLE
PERFORATED PLATE**

WATER

PITS

TRACHEID

WATER





XYLEM TISSUE SUMMARY

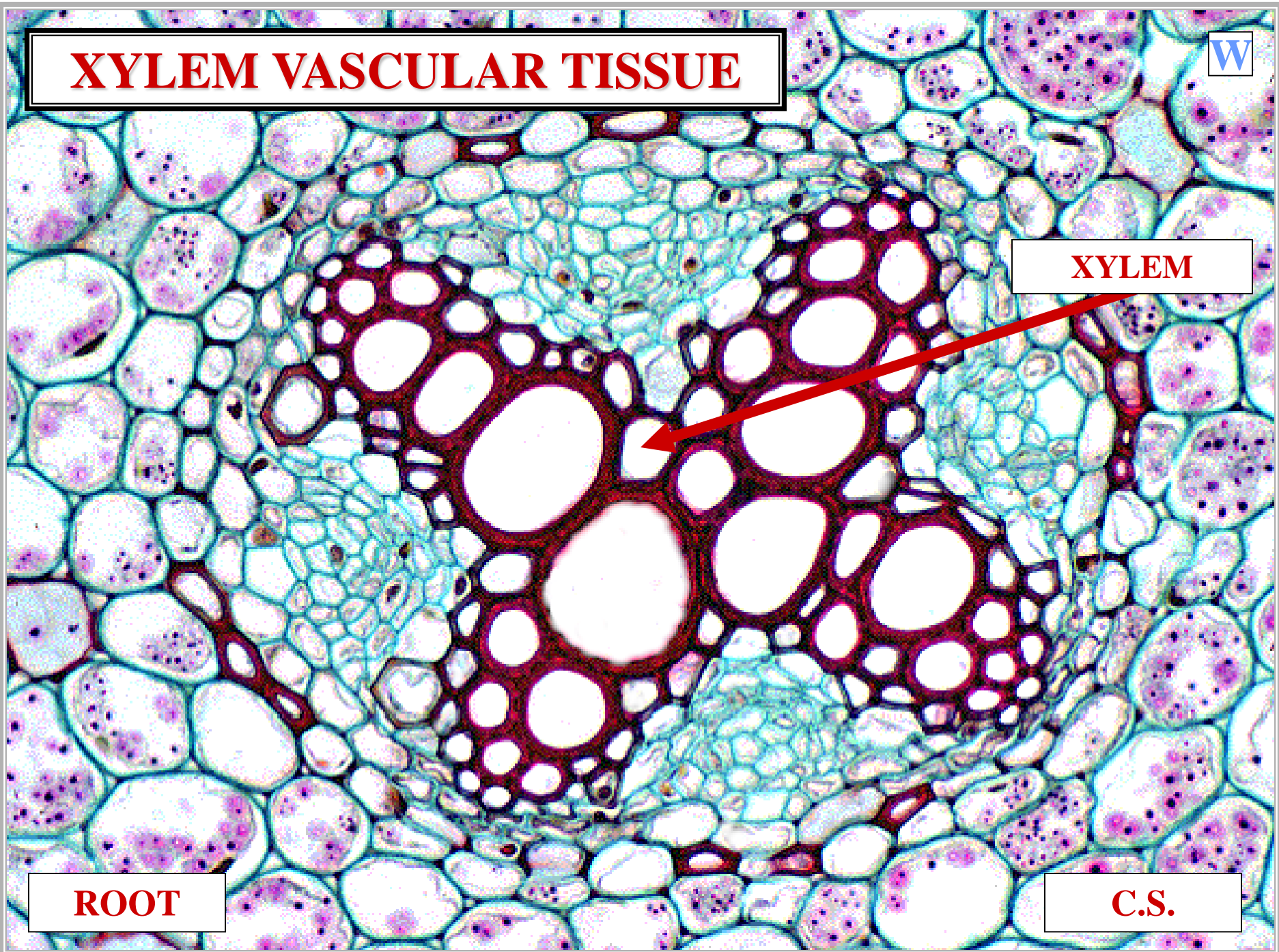
XYLEM VASCULAR TISSUE

W

XYLEM

ROOT

C.S.



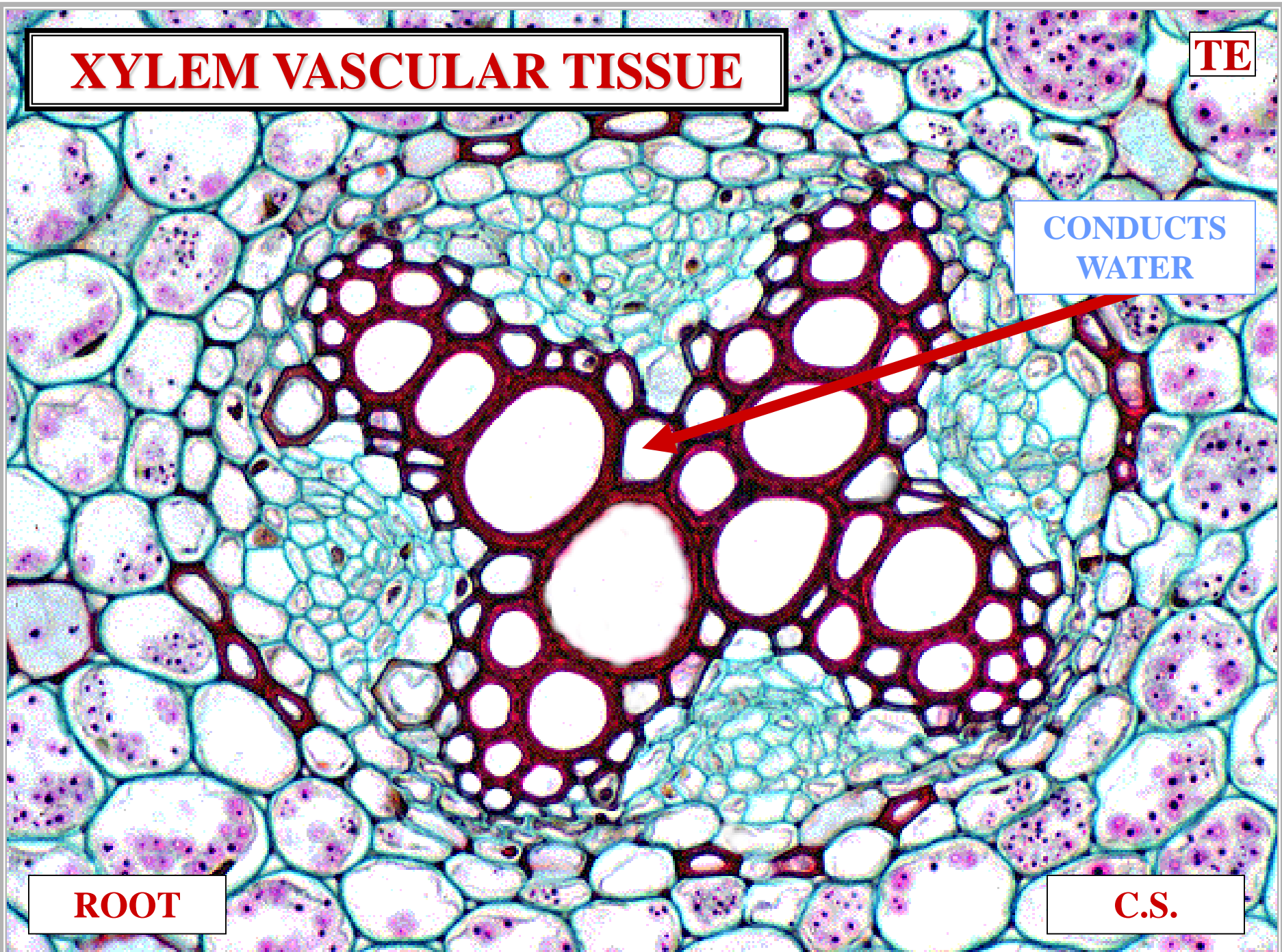
XYLEM VASCULAR TISSUE

TE

**CONDUCTS
WATER**

ROOT

C.S.



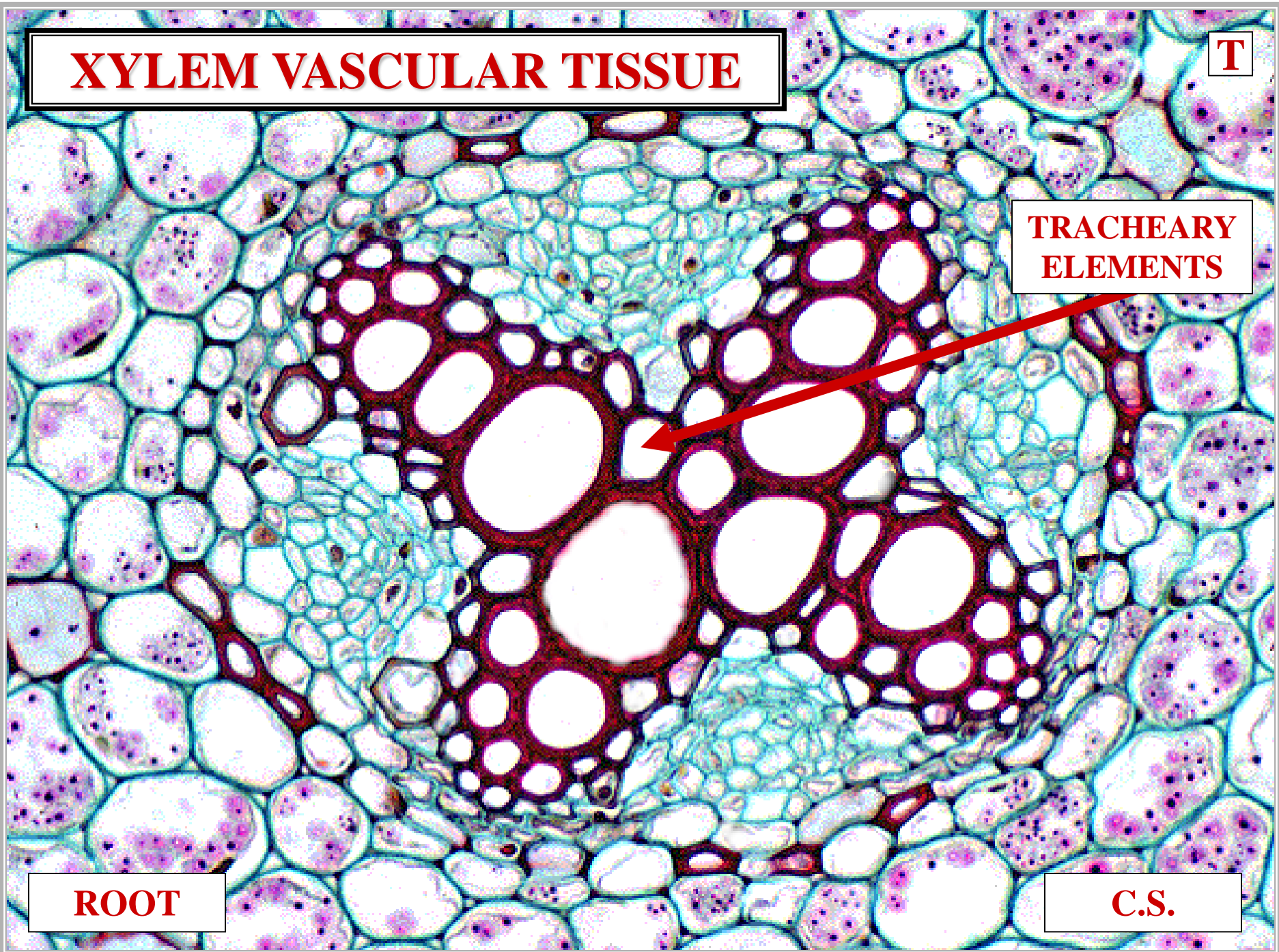
XYLEM VASCULAR TISSUE

T

TRACHEARY
ELEMENTS

ROOT

C.S.



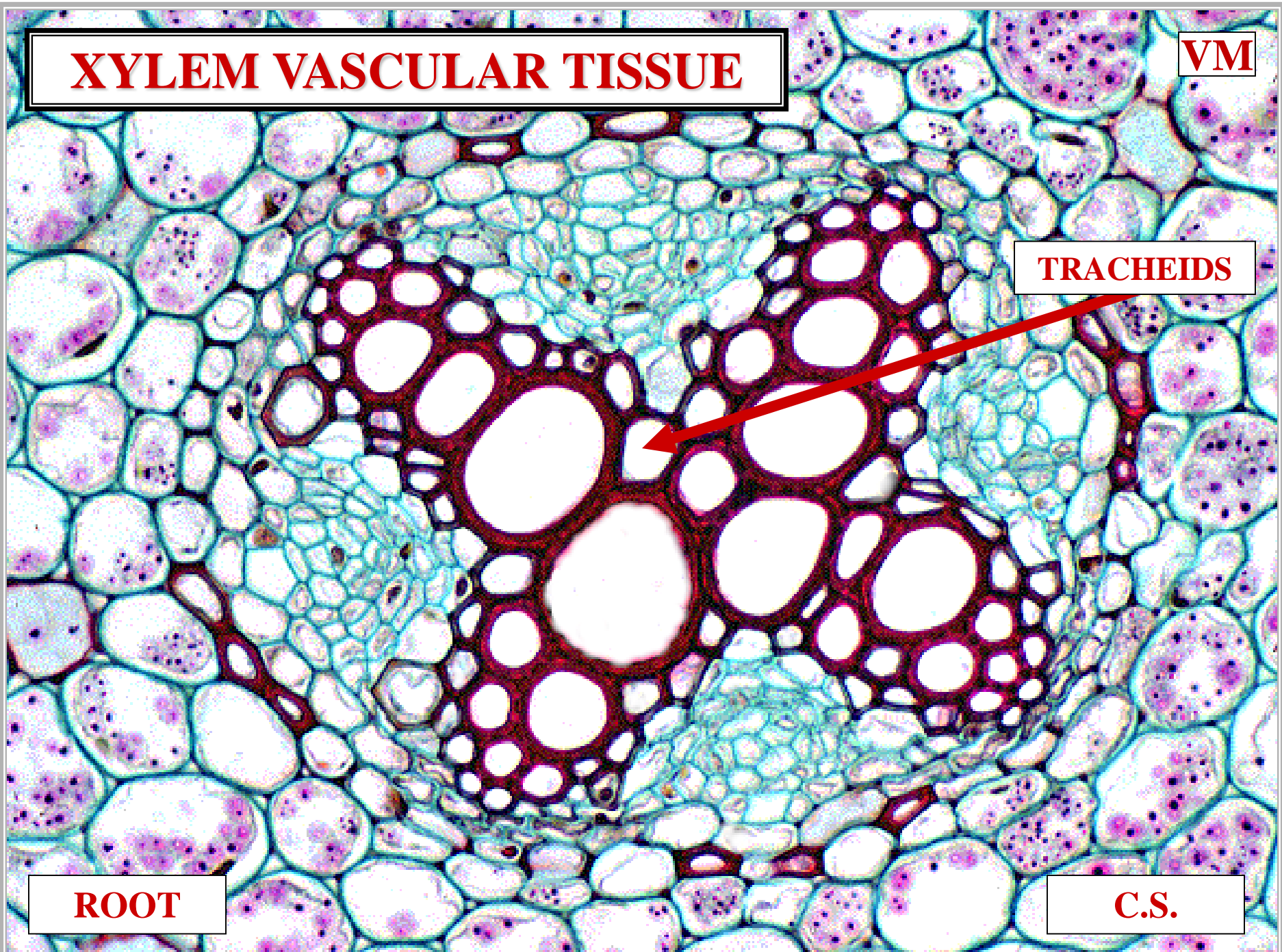
XYLEM VASCULAR TISSUE

VM

TRACHEIDS

ROOT

C.S.

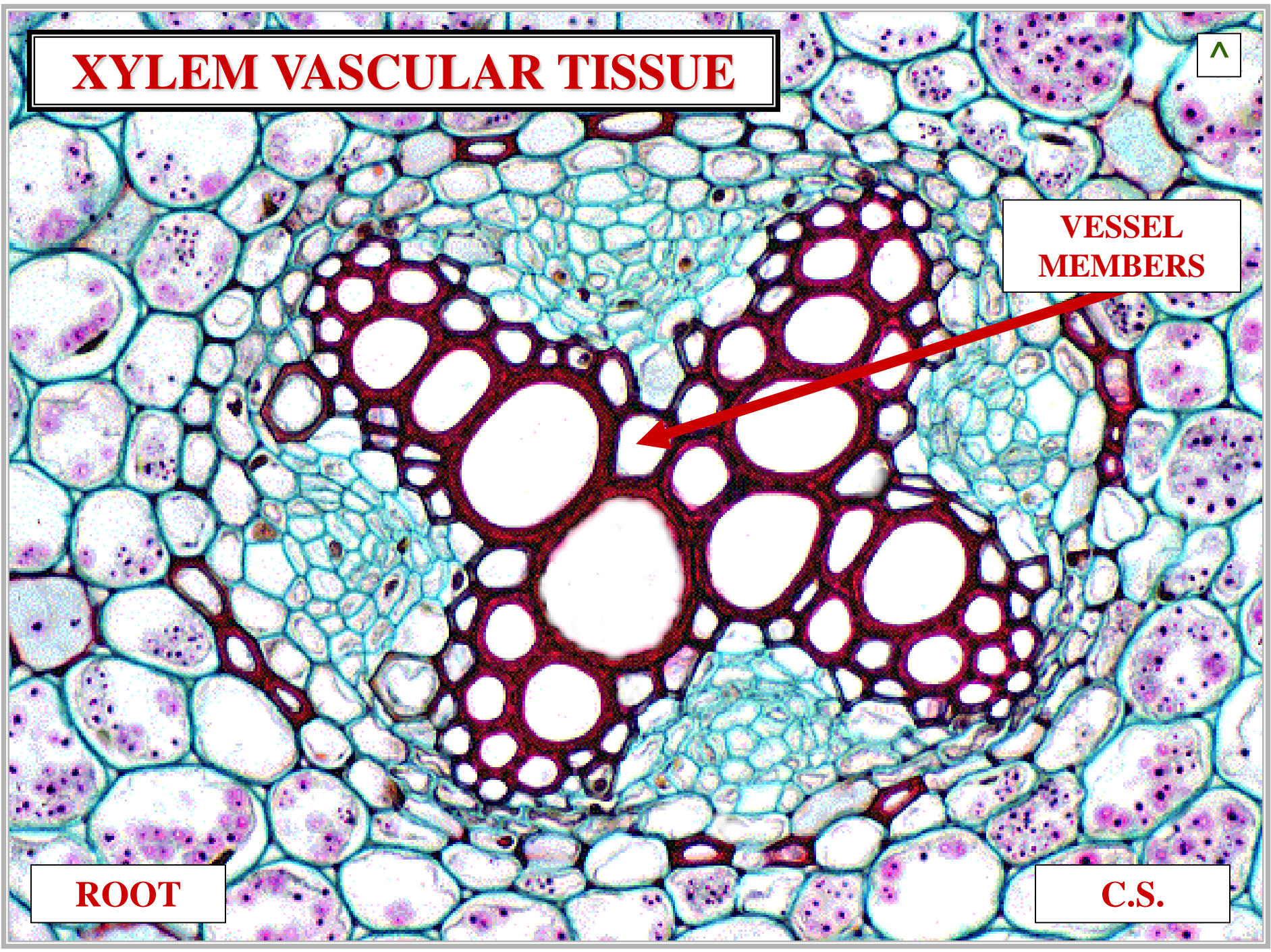


XYLEM VASCULAR TISSUE

**VESSEL
MEMBERS**

ROOT

C.S.



PHILOEM VASCULAR TISSUE

PHLOEM TISSUE



PHLOEM TISSUE

CONDUCTS SUGAR

PHLOEM TISSUE

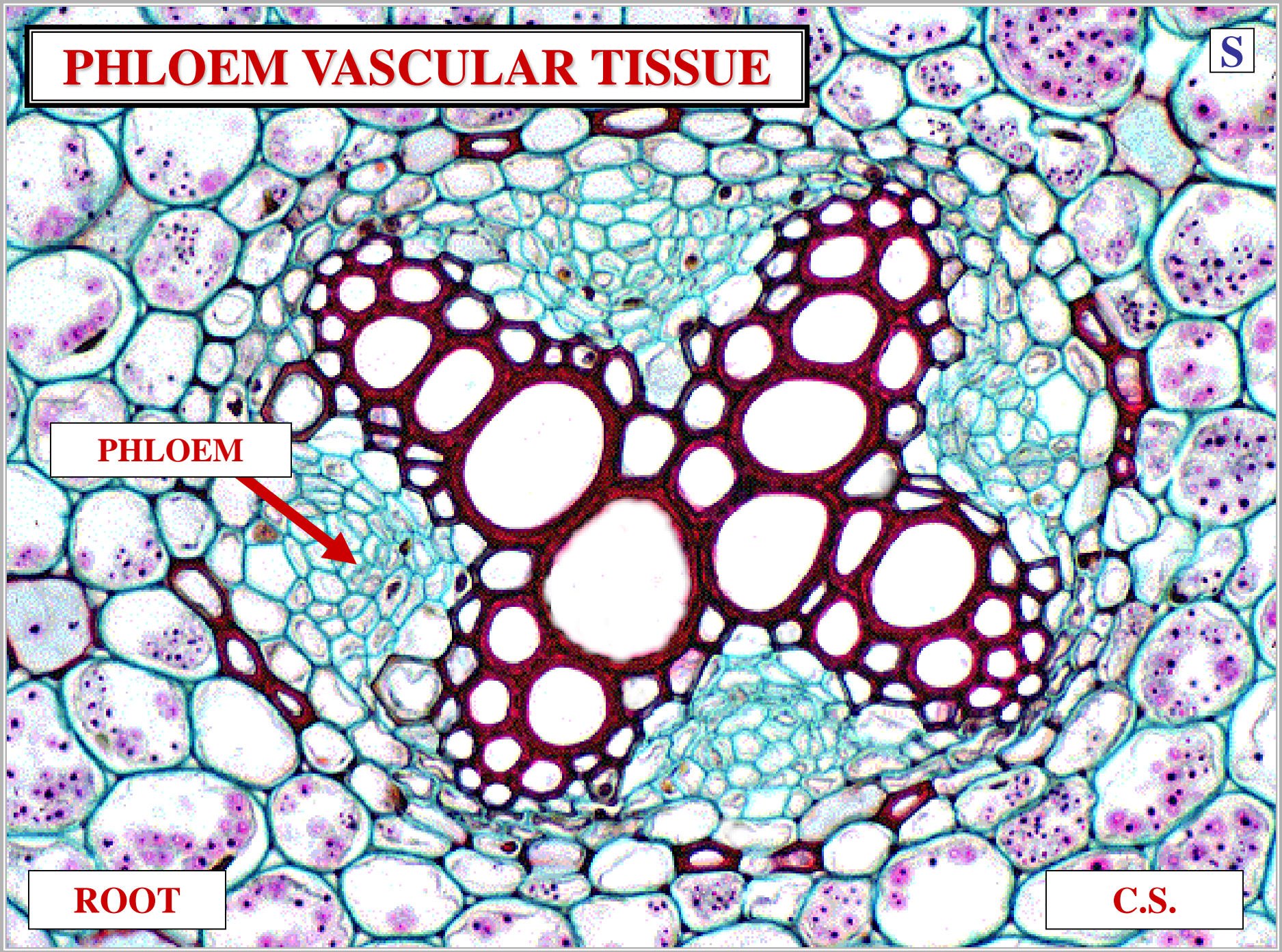
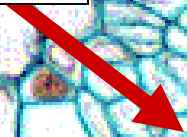
PHLOEM VASCULAR TISSUE

S

PHLOEM

ROOT

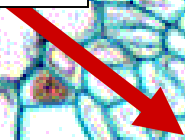
C.S.



PHLOEM VASCULAR TISSUE

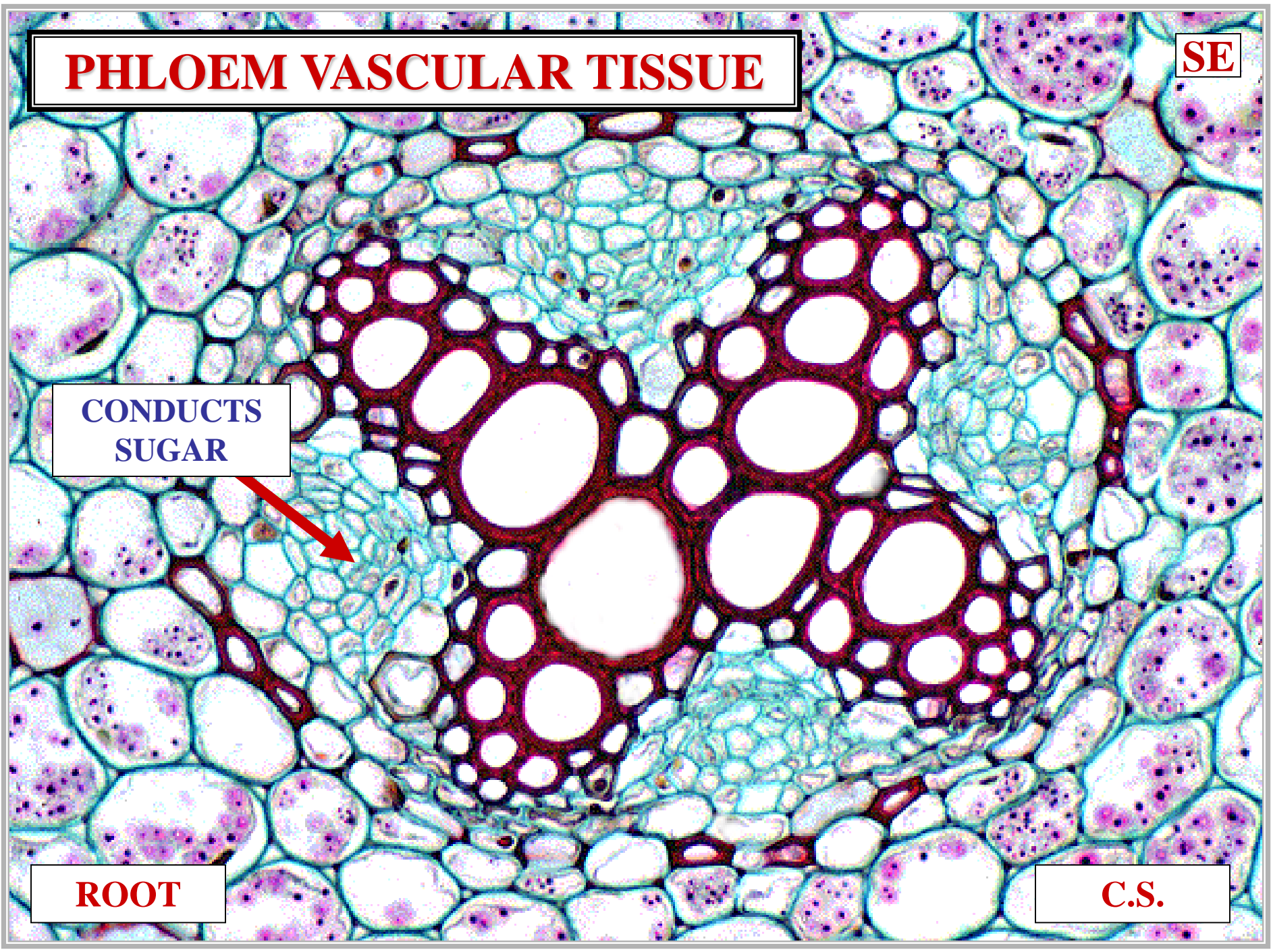
SE

CONDUCTS
SUGAR



ROOT

C.S.

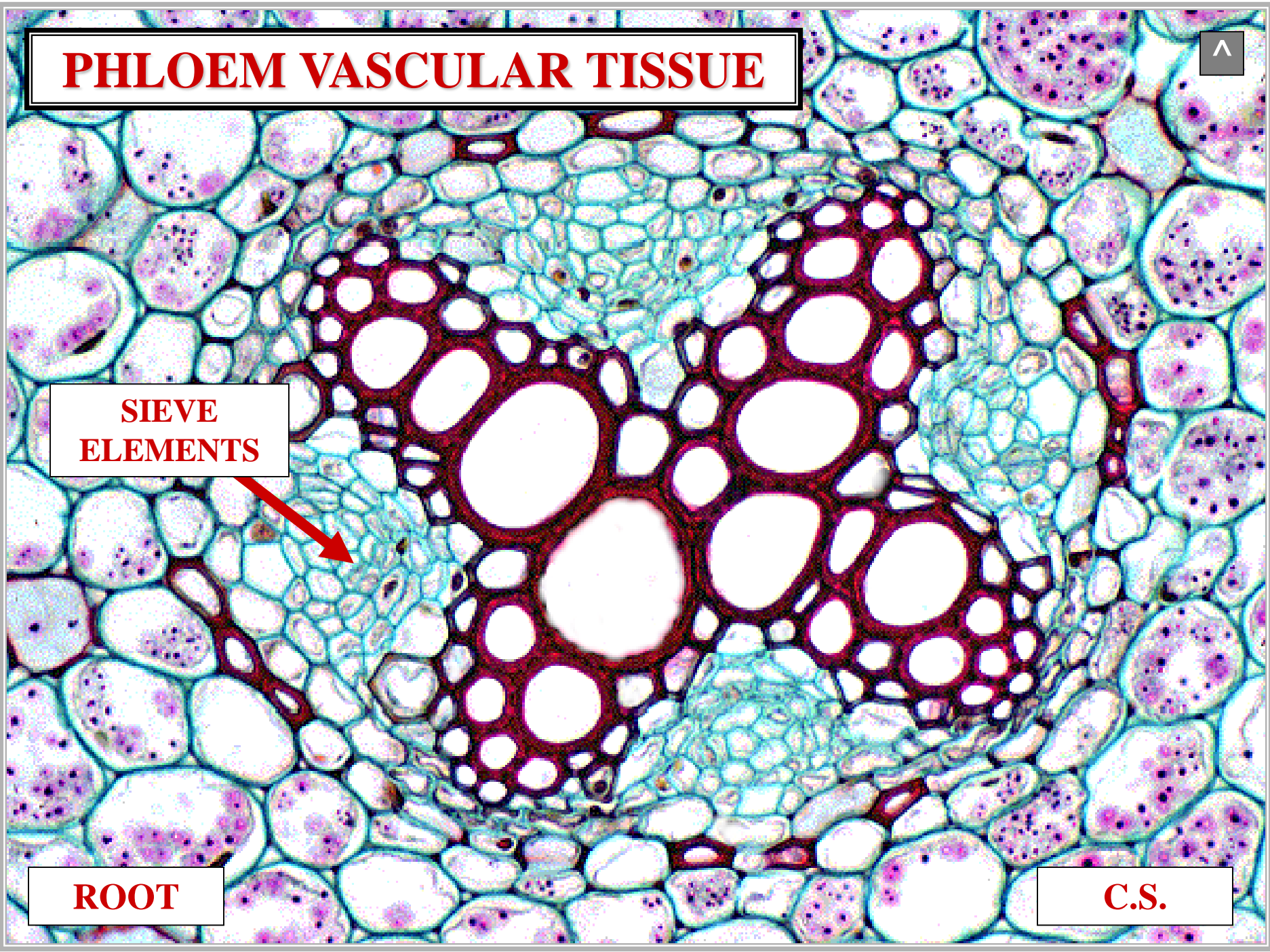
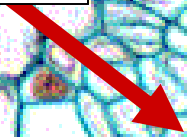


PHLOEM VASCULAR TISSUE

SIEVE
ELEMENTS

ROOT

C.S.



SIEVE ELEMENTS

SIEVE ELEMENTS

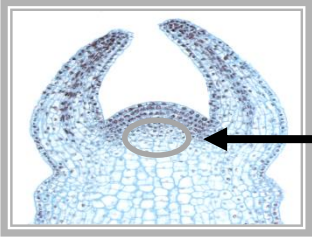


SIEVE ELEMENTS

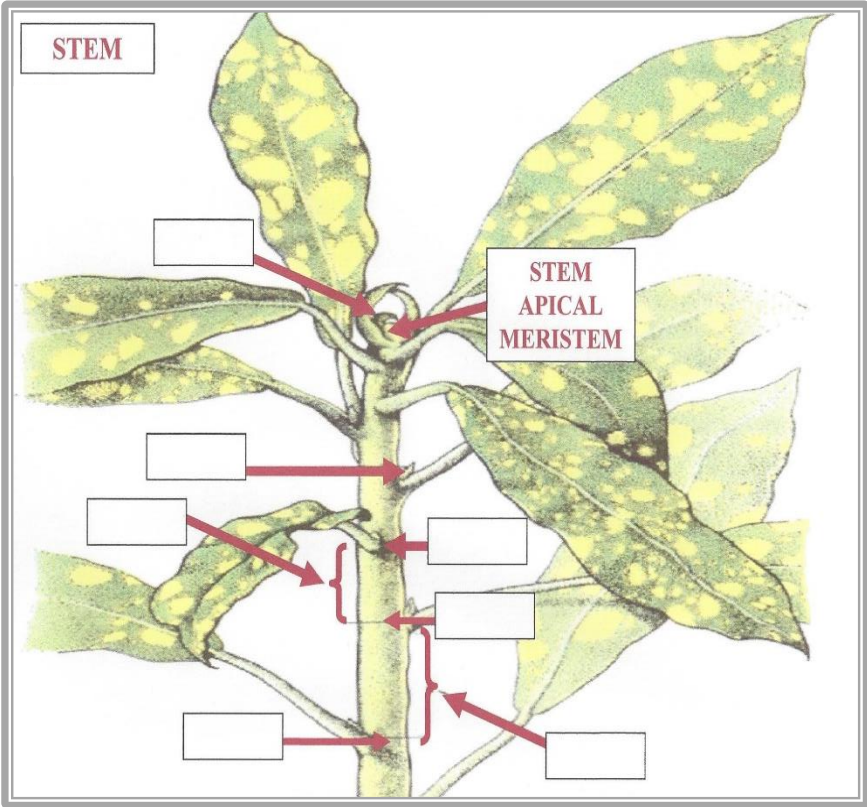
**PHLOEM SUGAR
CONDUCTING CELLS**

SIEVE ELEMENTS

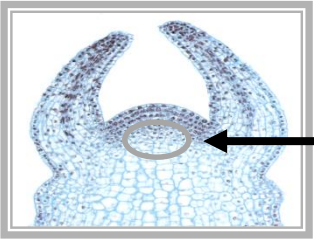
STEM APICAL MERISTEM



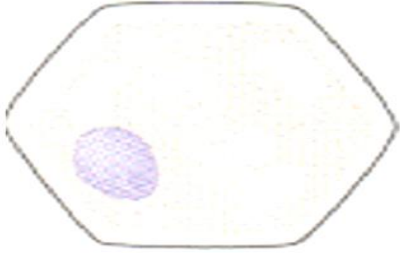
STEM APICAL MERISTEM



STEM APICAL MERISTEM

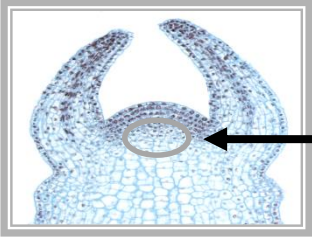


STEM APICAL MERISTEM

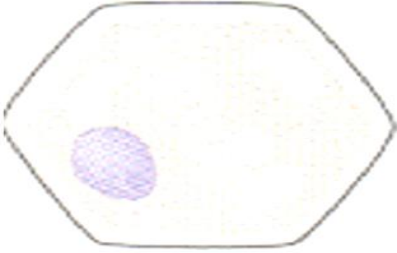


MERISTEM CELL INITIAL

**STEM APICAL
MERISTEM**



STEM APICAL MERISTEM

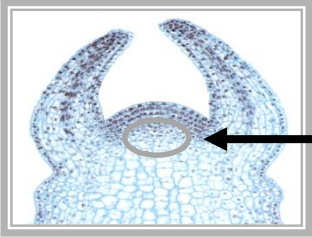


MERISTEM CELL INITIAL

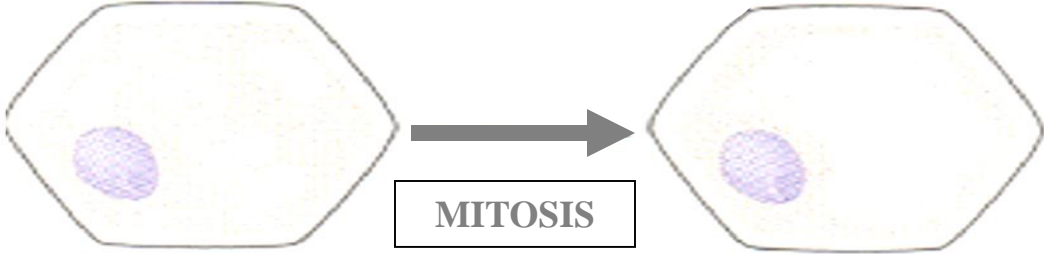
PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

**STEM APICAL
MERISTEM**



STEM APICAL MERISTEM



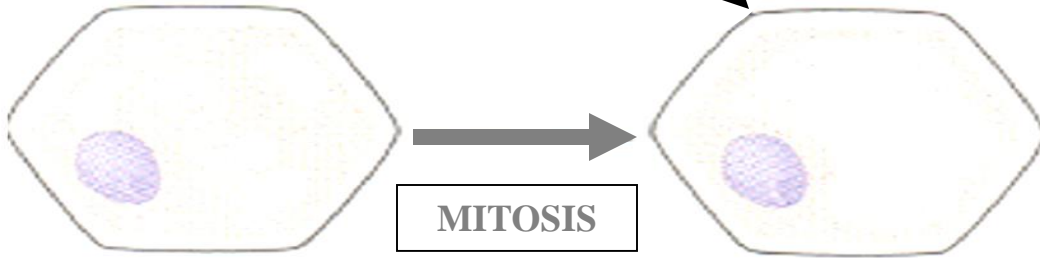
MERISTEM CELL INITIAL

PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

**STEM APICAL
MERISTEM**

DERIVATIVE CELL



MERISTEM CELL INITIAL

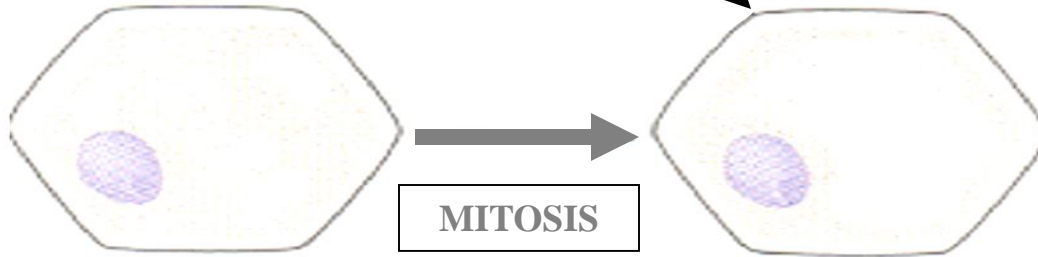
PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

**STEM APICAL
MERISTEM**

DERIVATIVE CELL

PARENCHYMA CELL



MITOSIS

MERISTEM CELL INITIAL

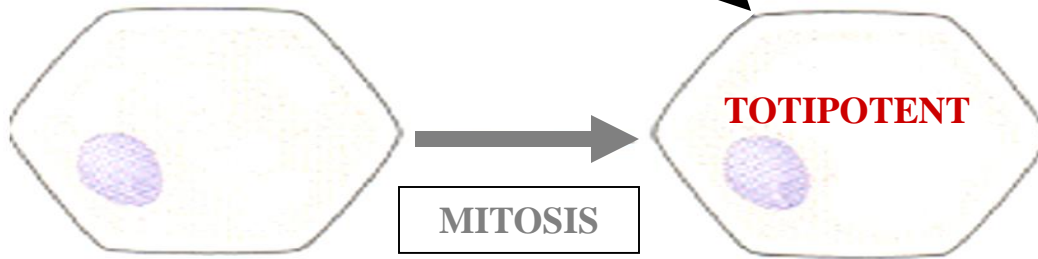
PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

**STEM APICAL
MERISTEM**

DERIVATIVE CELL

PARENCHYMA CELL



MERISTEM CELL INITIAL

PARENCHYMA CELL

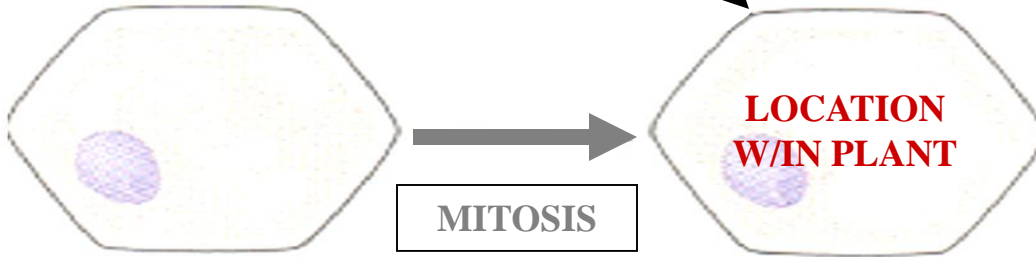
**PARENCHYMA
BASIC
PLANT CELL**

**PARENCHYMA CELL
CAN POTENTIALLY
DIFFERENTIATE
INTO ANY PLANT CELL TYPE**

**STEM APICAL
MERISTEM**

DERIVATIVE CELL

PARENCHYMA CELL



**PARENCHYMA CELL
CAN POTENTIALLY
DIFFERENTIATE
INTO ANY PLANT CELL TYPE**

MERISTEM CELL INITIAL

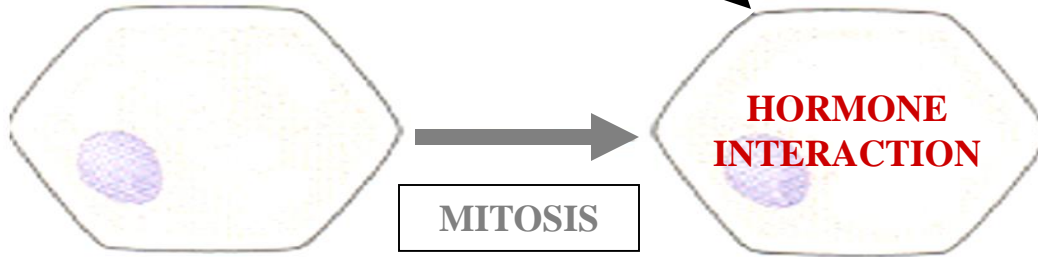
PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

**STEM APICAL
MERISTEM**

DERIVATIVE CELL

PARENCHYMA CELL



**PARENCHYMA CELL
CAN POTENTIALLY
DIFFERENTIATE
INTO ANY PLANT CELL TYPE**

MERISTEM CELL INITIAL

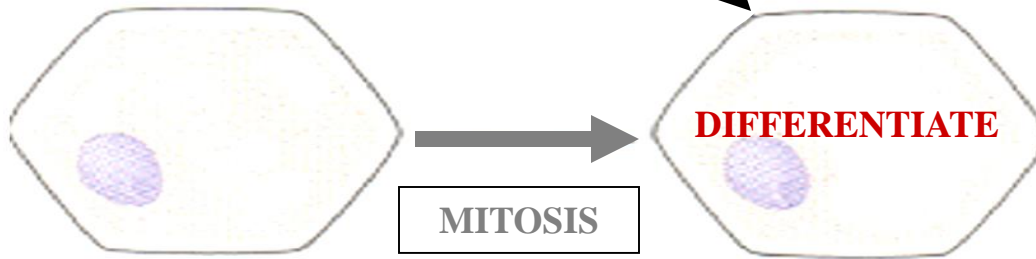
PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

**STEM APICAL
MERISTEM**

DERIVATIVE CELL

PARENCHYMA CELL



MITOSIS

DIFFERENTIATE

MERISTEM CELL INITIAL

PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

PARENCHYMA CELL
CAN POTENTIALLY
DIFFERENTIATE
INTO ANY PLANT CELL TYPE

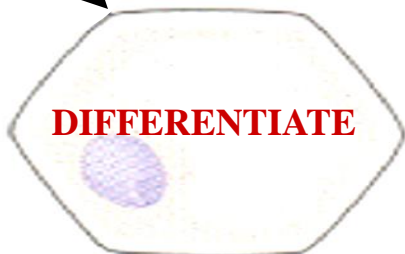
**STEM APICAL
MERISTEM**

DERIVATIVE CELL

PARENCHYMA CELL



MITOSIS

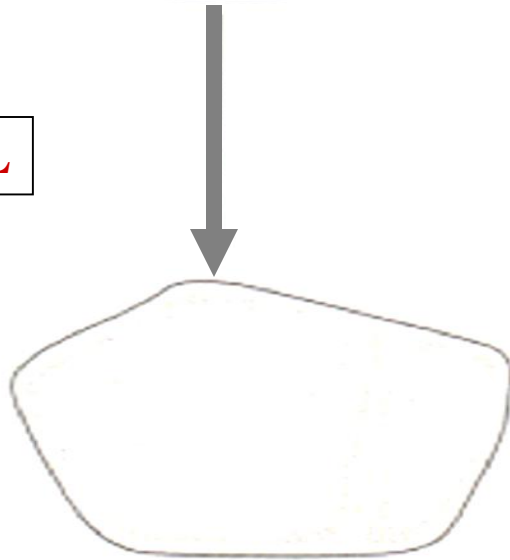


MERISTEM CELL INITIAL

PARENCHYMA CELL

**PARENCHYMA
BASIC
PLANT CELL**

**PARENCHYMA CELL
CAN POTENTIALLY
DIFFERENTIATE
INTO ANY PLANT CELL TYPE**



SIEVE ELEMENT



SIEVE ELEMENT CHARACTERS

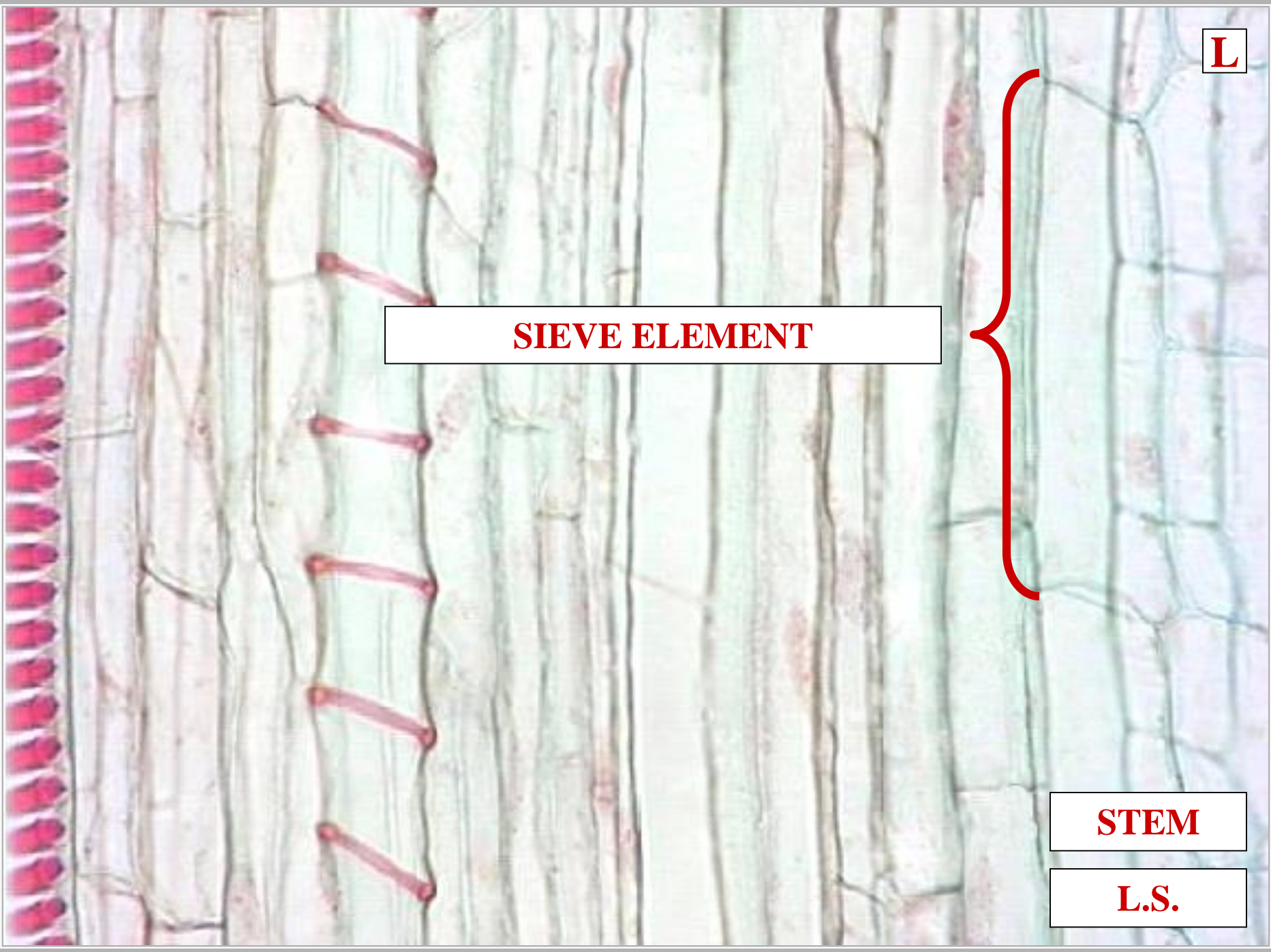
L

SIEVE ELEMENT



STEM

L.S.

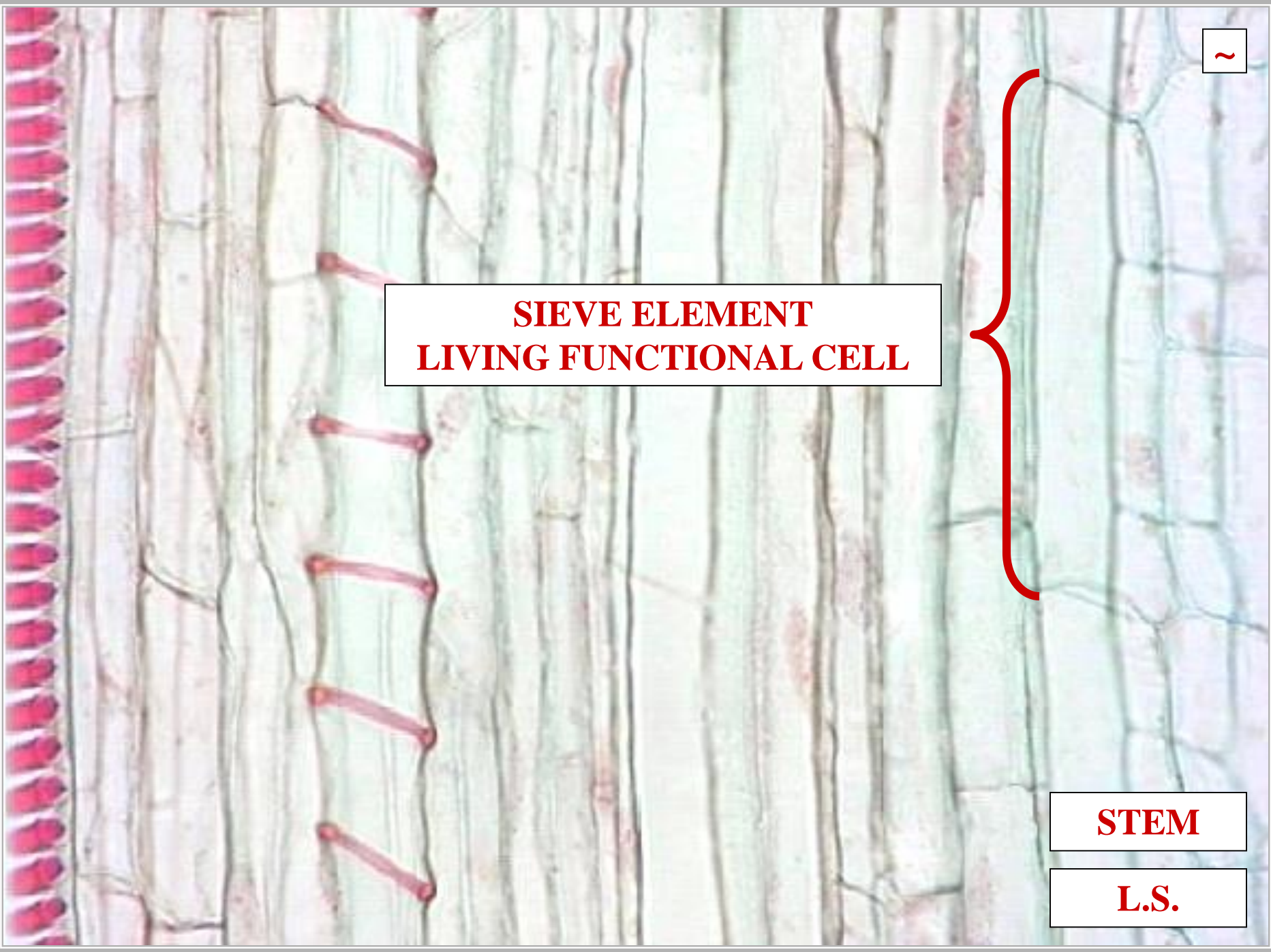


**SIEVE ELEMENT
LIVING FUNCTIONAL CELL**



STEM

L.S.

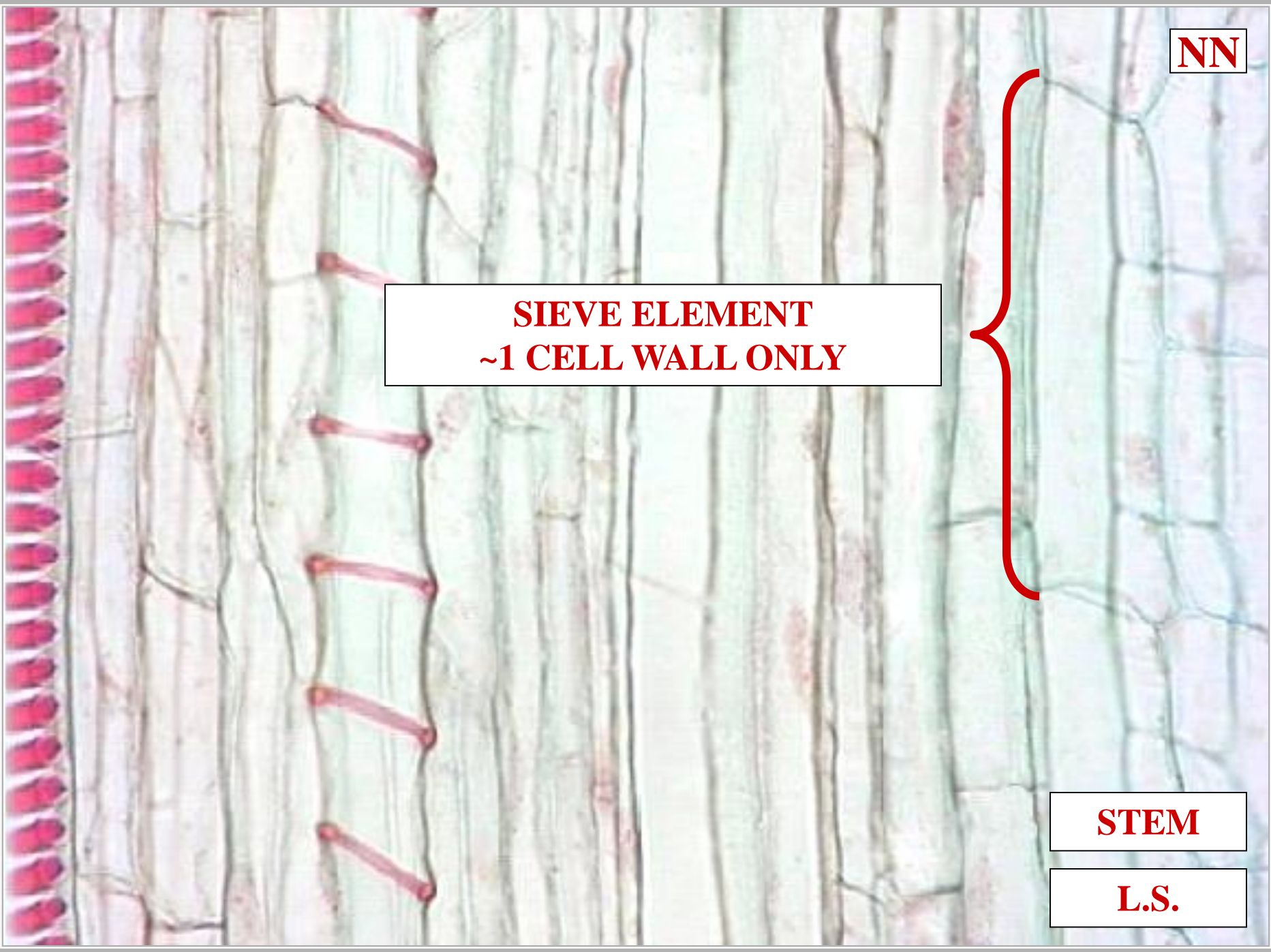


NN

**SIEVE ELEMENT
~1 CELL WALL ONLY**

STEM

L.S.





**SIEVE ELEMENT
NON-NUCLEATE**

STEM

L.S.

SIEVE ELEMENT TYPES

SIEVE ELEMENT TYPES

SIEVE CELL

SIEVE ELEMENT TYPES

SIEVE ELEMENT TYPES

SC

SIEVE CELL
SIEVE MEMBER

**SIEVE ELEMENT
TYPES**

SIEVE CELL



SIEVE ELEMENTS
SIEVE CELL

KNOWN
PTERIDOPHYTES & GYMNOSPERMS

SIEVE ELEMENTS
SIEVE CELL

SIEVE ELEMENTS SIEVE CELL



KNOWN
PTERIDOPHYTES & GYMNOSPERMS

END WALL WITH SIEVE AREA

SIEVE ELEMENTS SIEVE CELL



PTERIDOPHYTES





SC

GYMNOSPERMS



SA

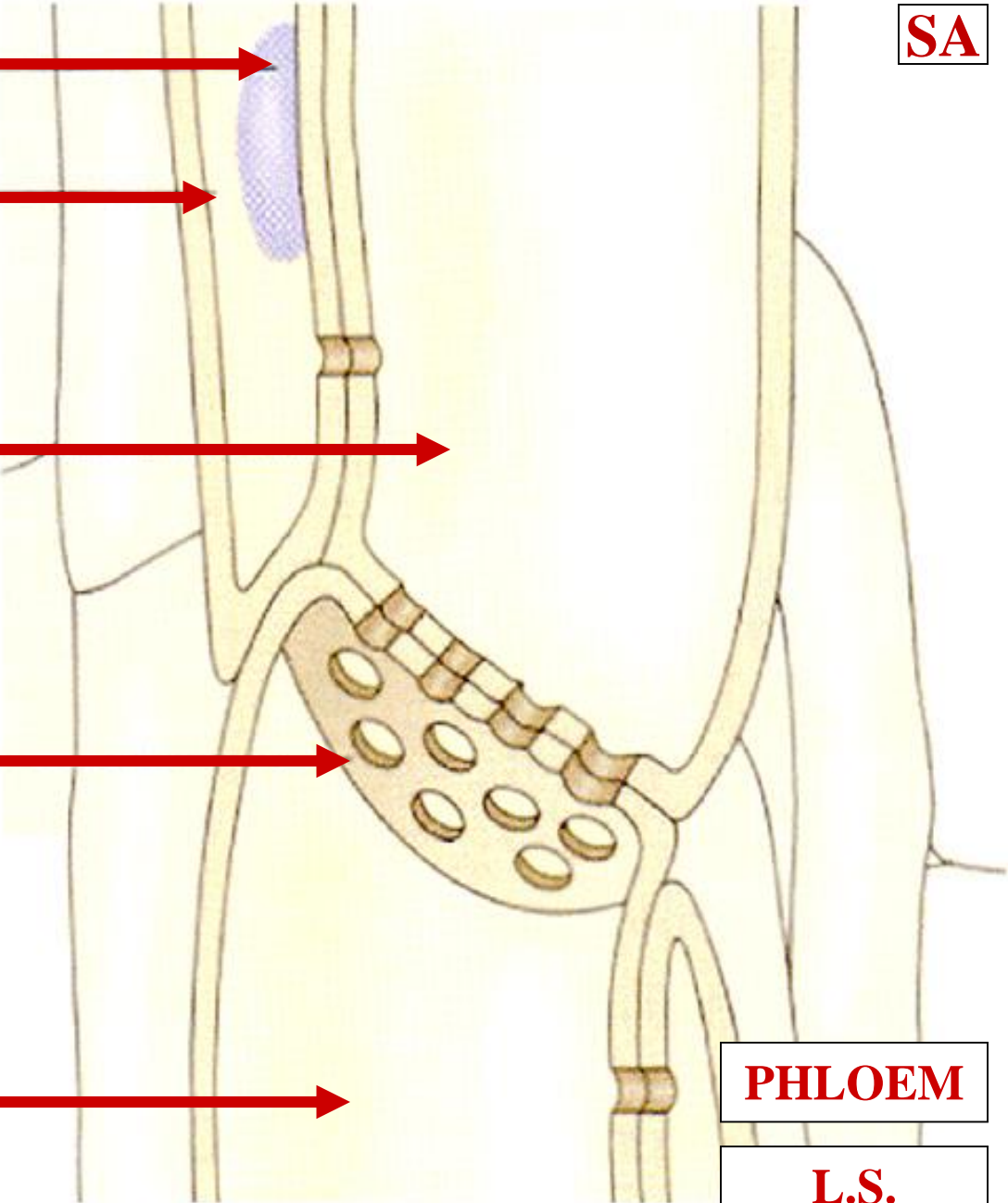
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SIEVE CELL

END WALL

SIEVE CELL



PHLOEM

L.S.

SA

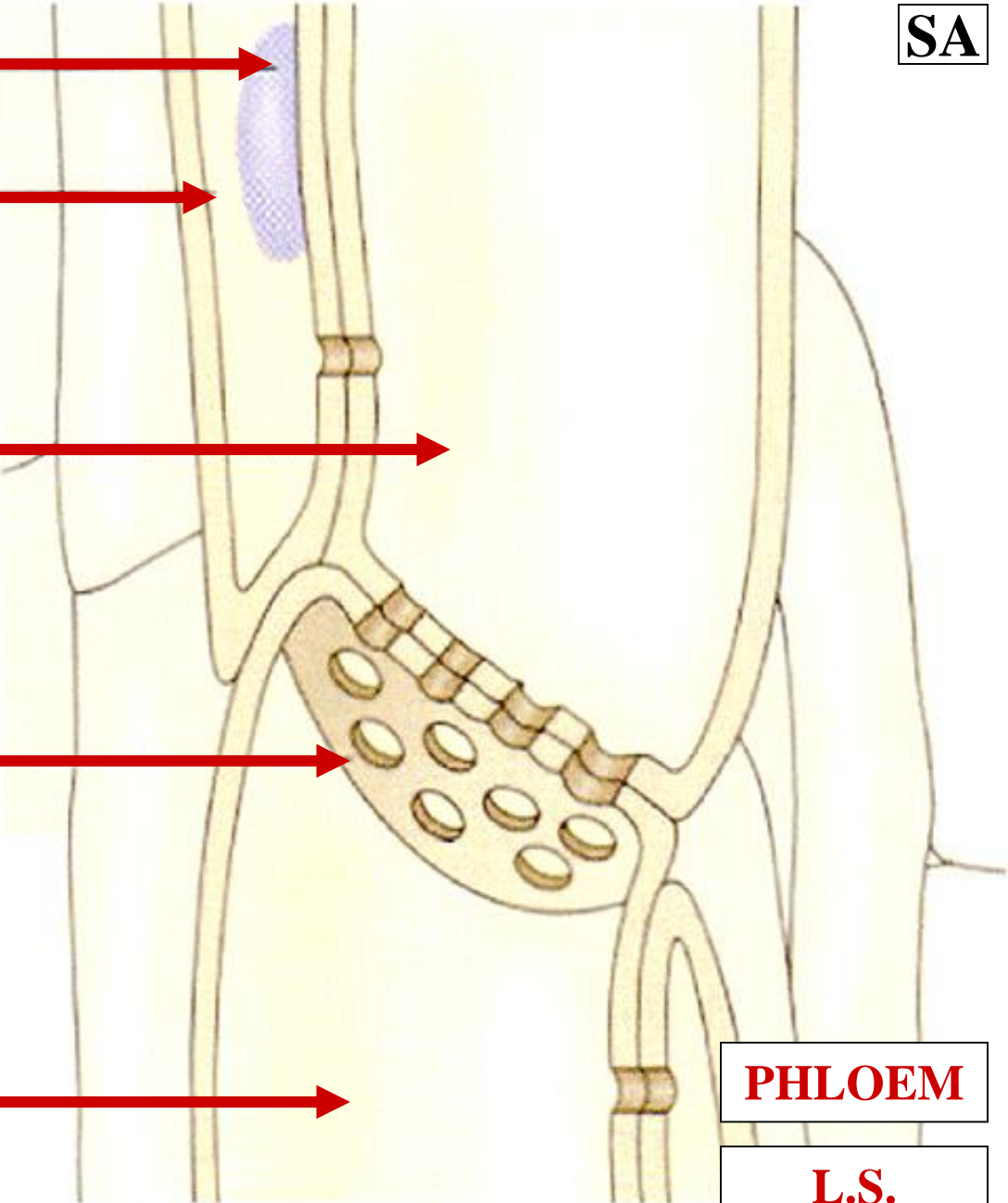
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SIEVE CELL

SIEVE AREA

SIEVE CELL



PHLOEM

L.S.

SIEVE AREA



SIEVE ELEMENTS
SIEVE CELL / SIEVE AREA

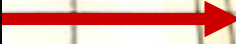
SMALL PORES

SIEVE ELEMENTS
SIEVE CELL / SIEVE AREA

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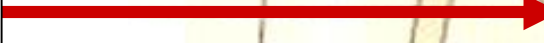
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SIEVE CELL



**SIEVE AREA
SMALL PORES**

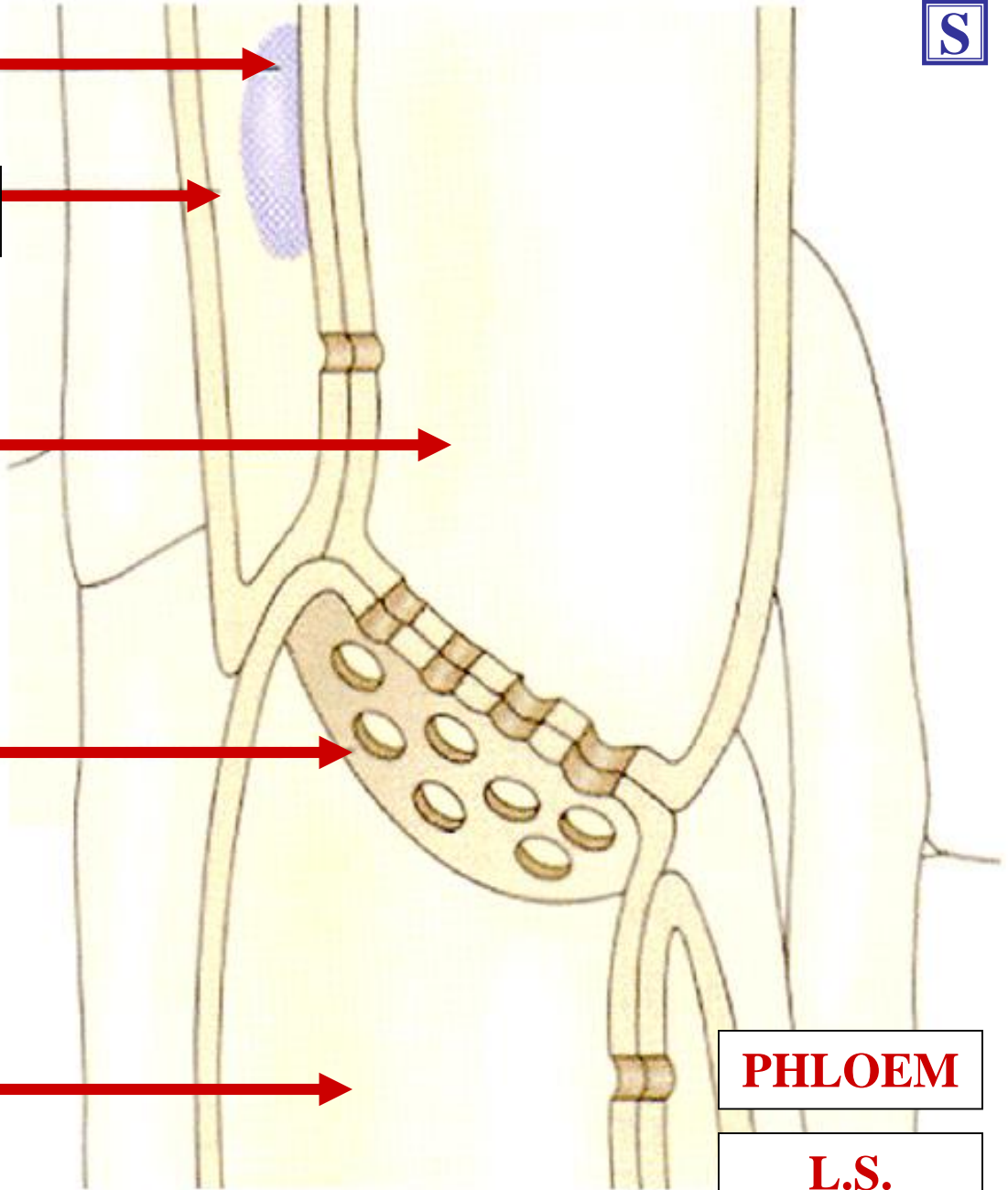


SIEVE CELL



PHLOEM

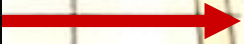
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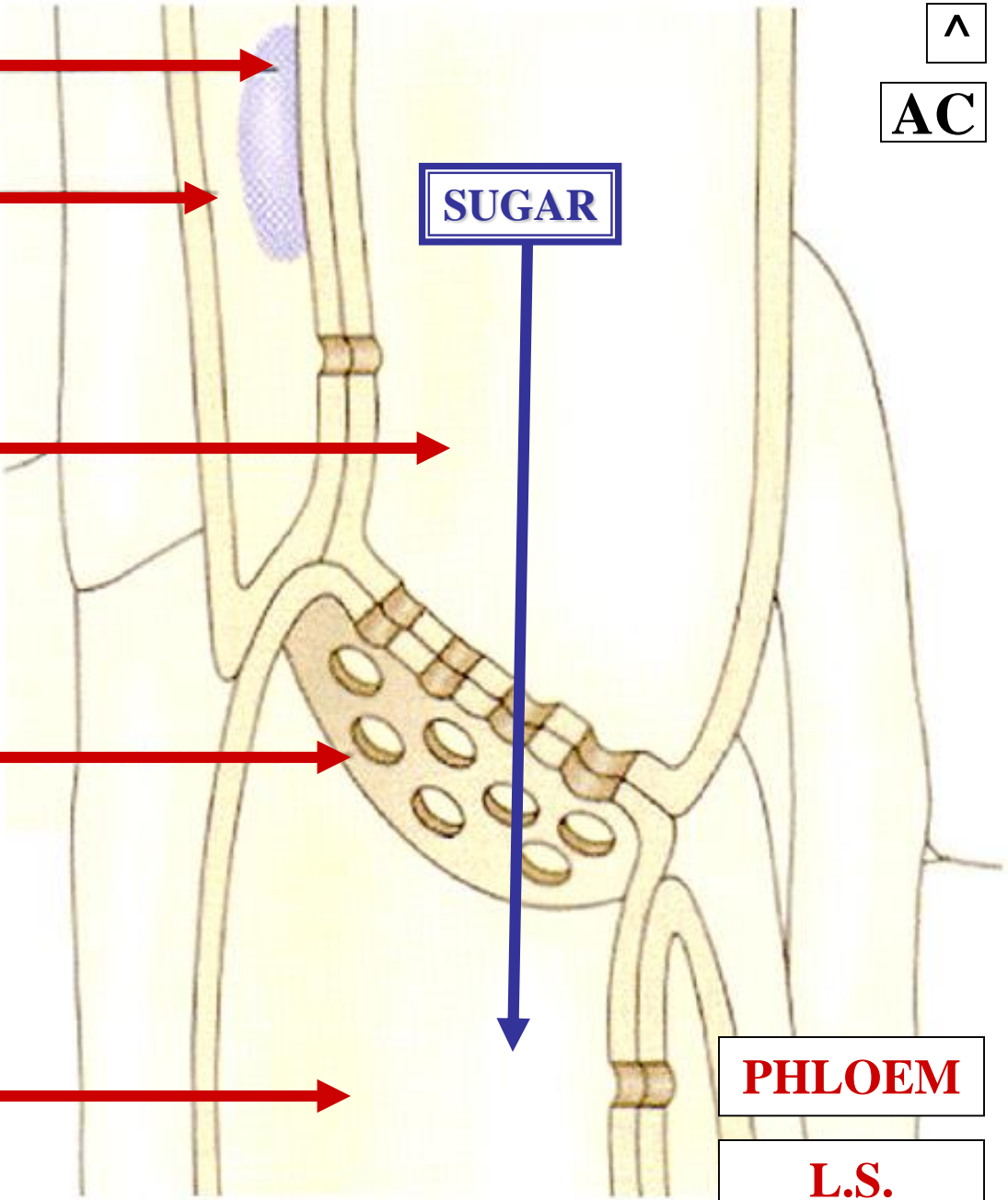
SIEVE CELL



**SIEVE AREA
SMALL PORES**



SIEVE CELL



^

AC

SUGAR

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

AC

[]



[]



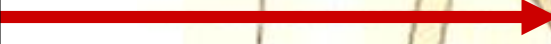
SUGAR



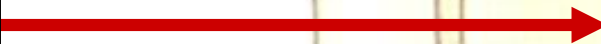
SIEVE CELL



SIEVE AREA
SMALL PORES

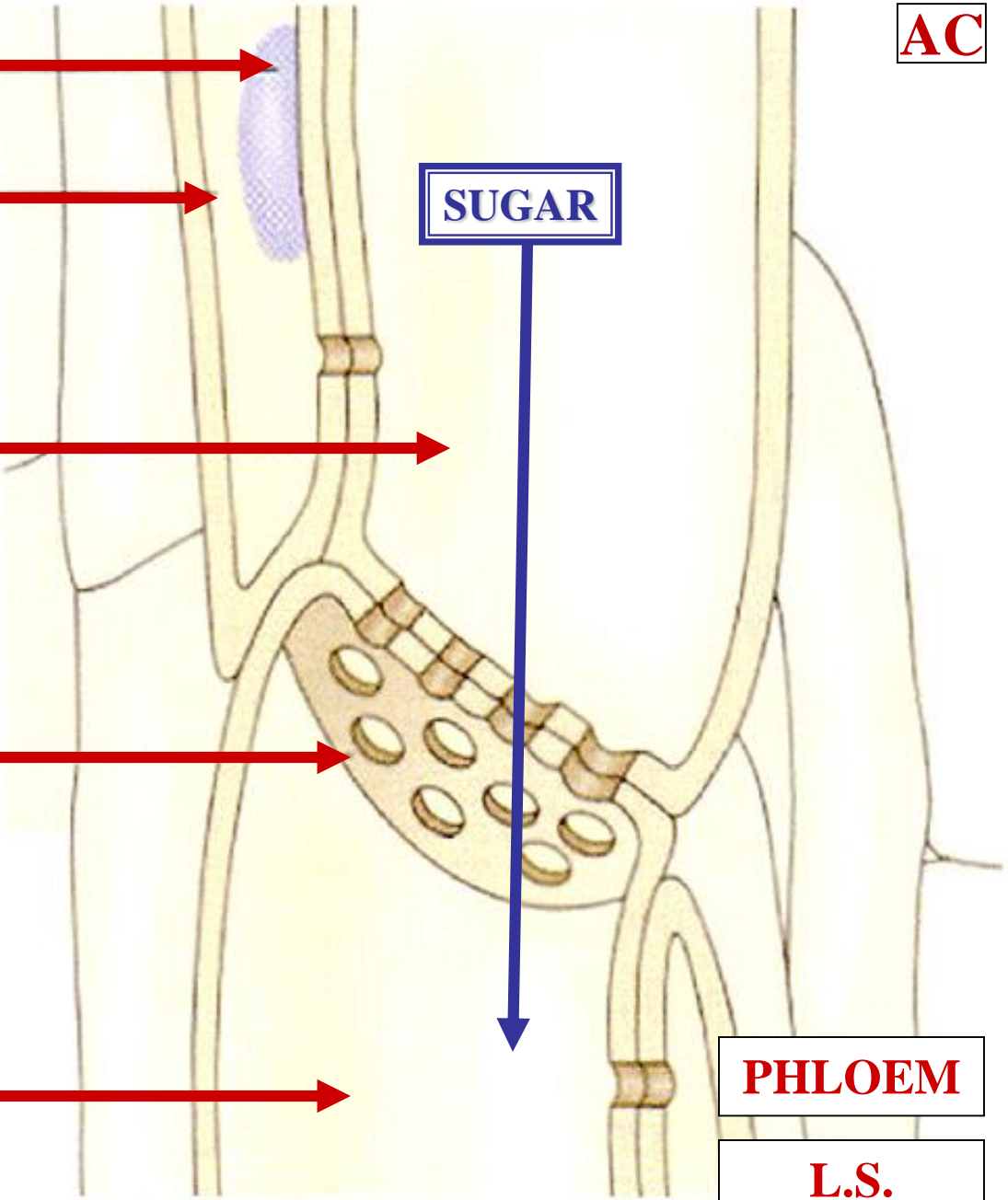


SIEVE CELL



PHLOEM

L.S.



N

[]

ALBUMINOUS CELL

SUGAR

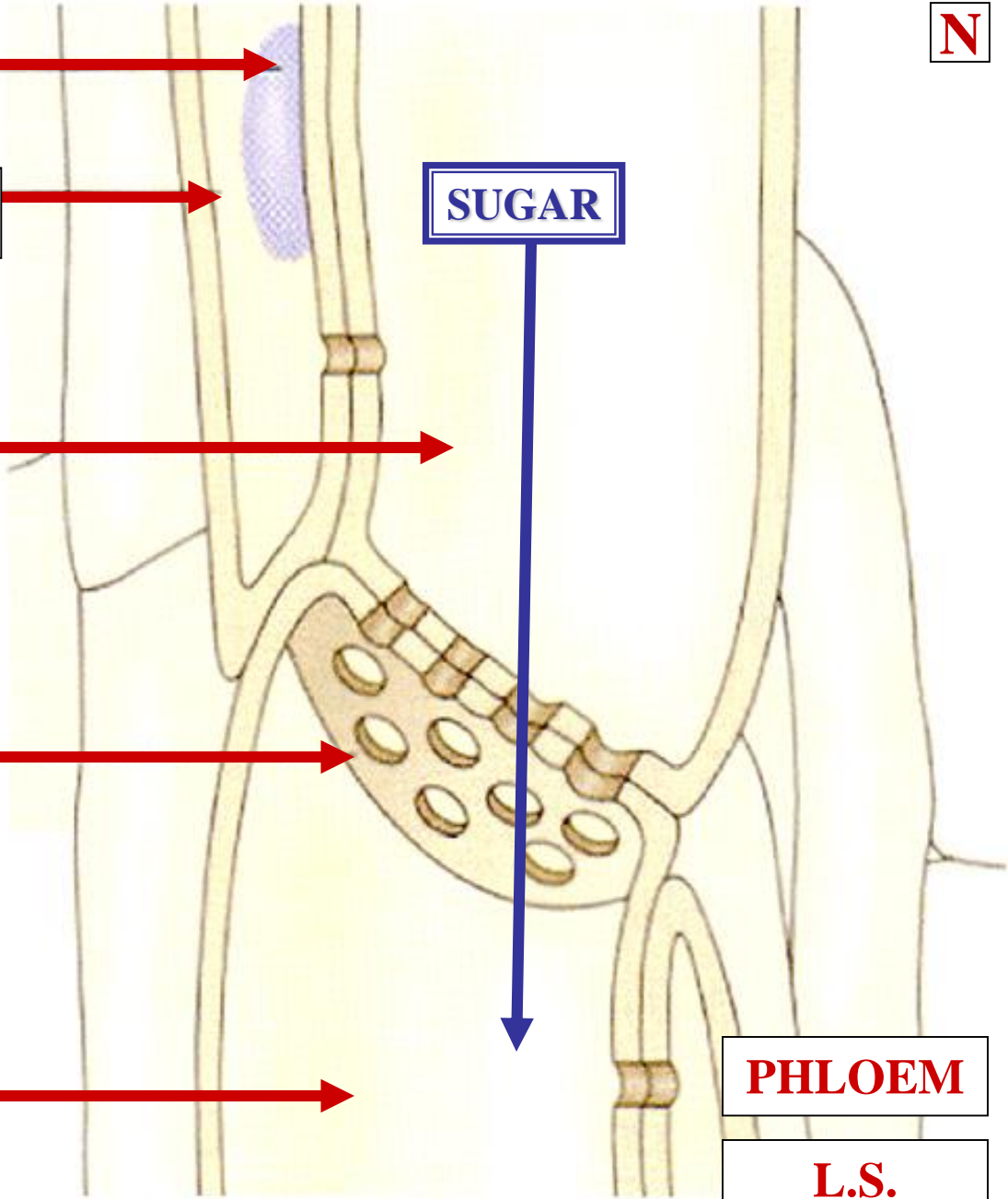
SIEVE CELL

**SIEVE AREA
SMALL PORES**

SIEVE CELL

PHLOEM

L.S.



NUCLEUS



ALBUMINOUS CELL



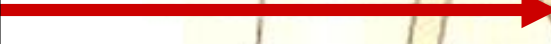
SUGAR



SIEVE CELL



**SIEVE AREA
SMALL PORES**

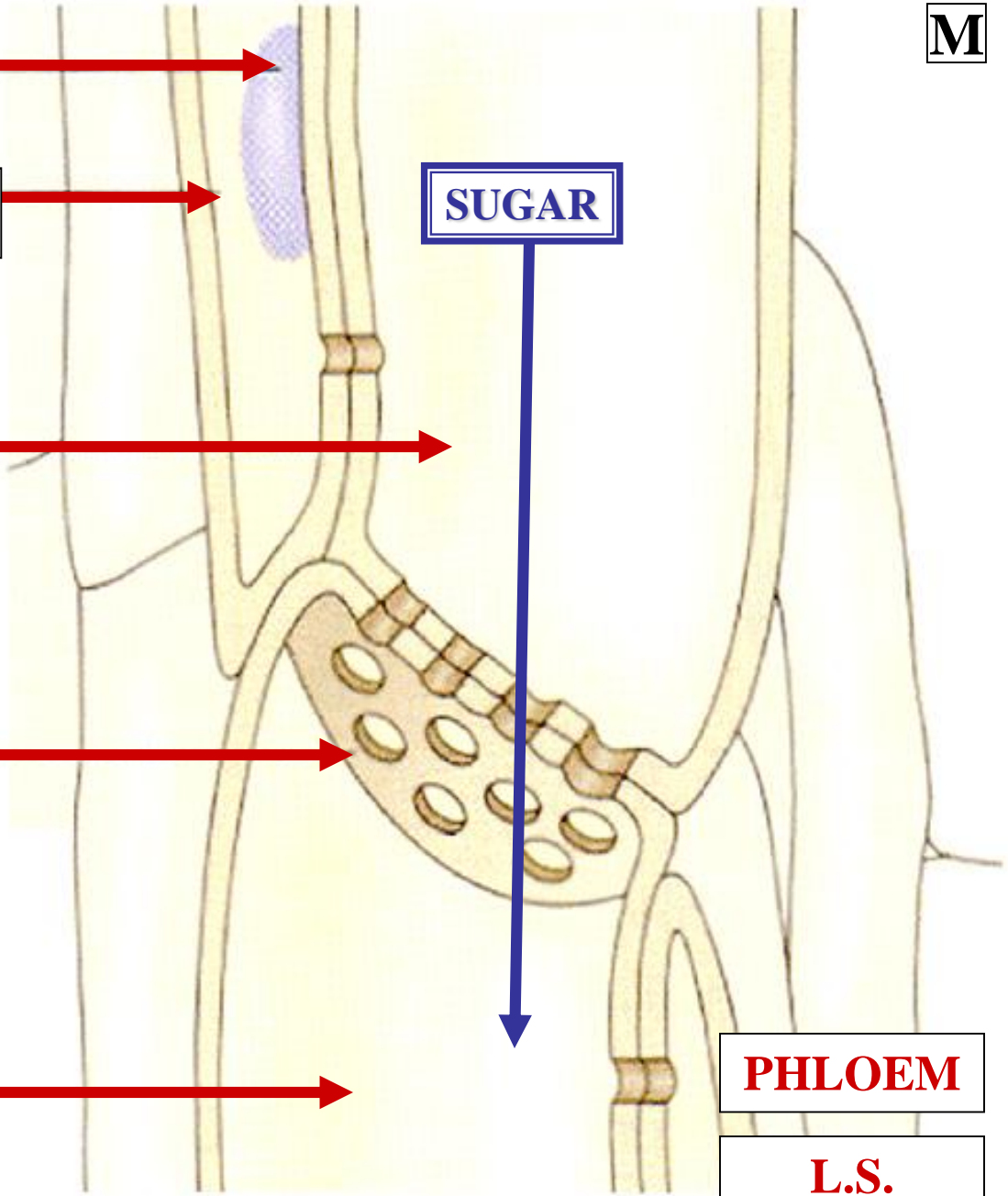


SIEVE CELL



PHLOEM

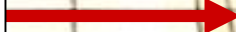
L.S.



NUCLEUS



ALBUMINOUS CELL



**METABOLICALLY
CONTROLS SIEVE CELL**

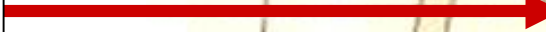
SUGAR



SIEVE CELL



**SIEVE AREA
SMALL PORES**

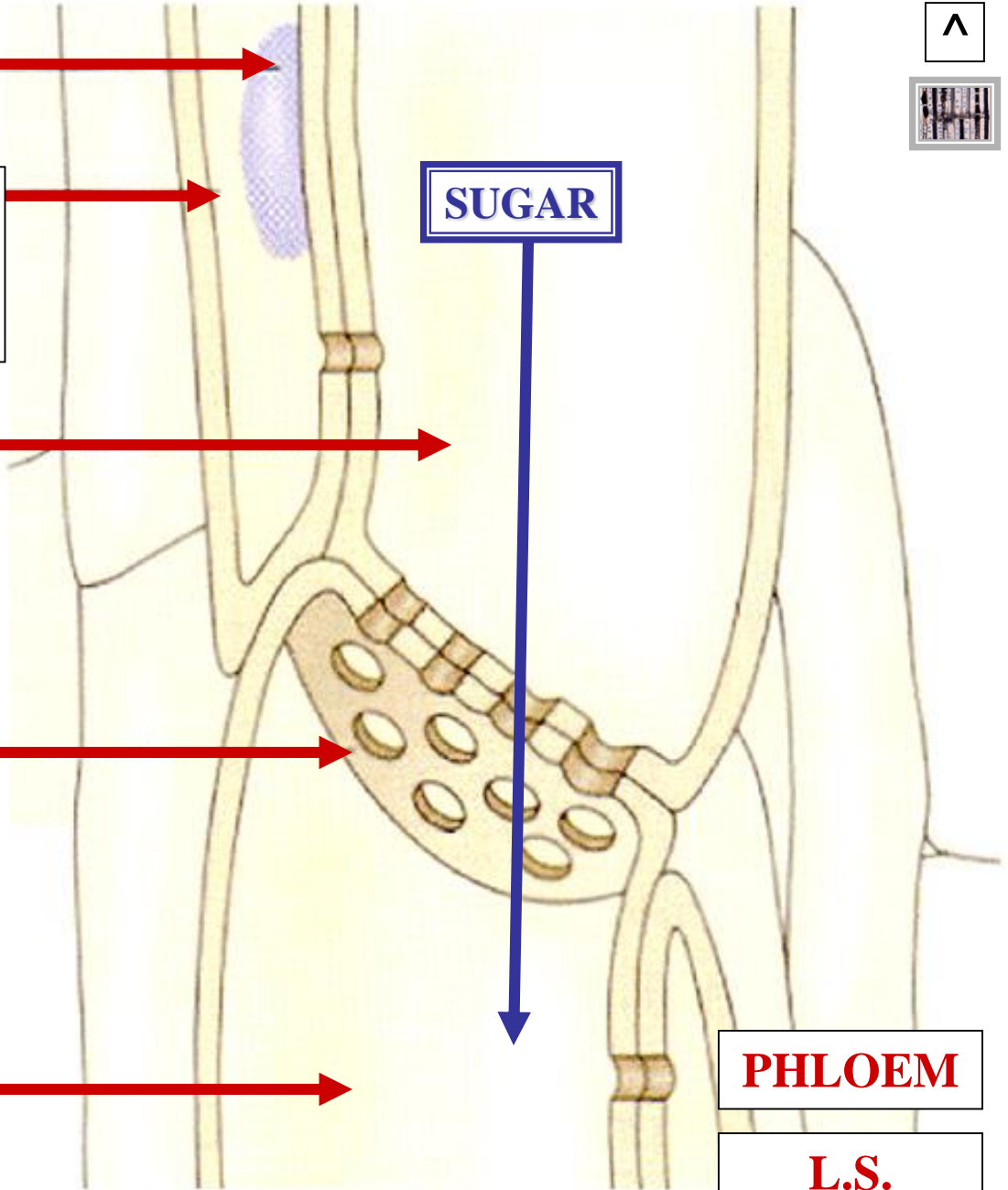


SIEVE CELL



PHLOEM

L.S.





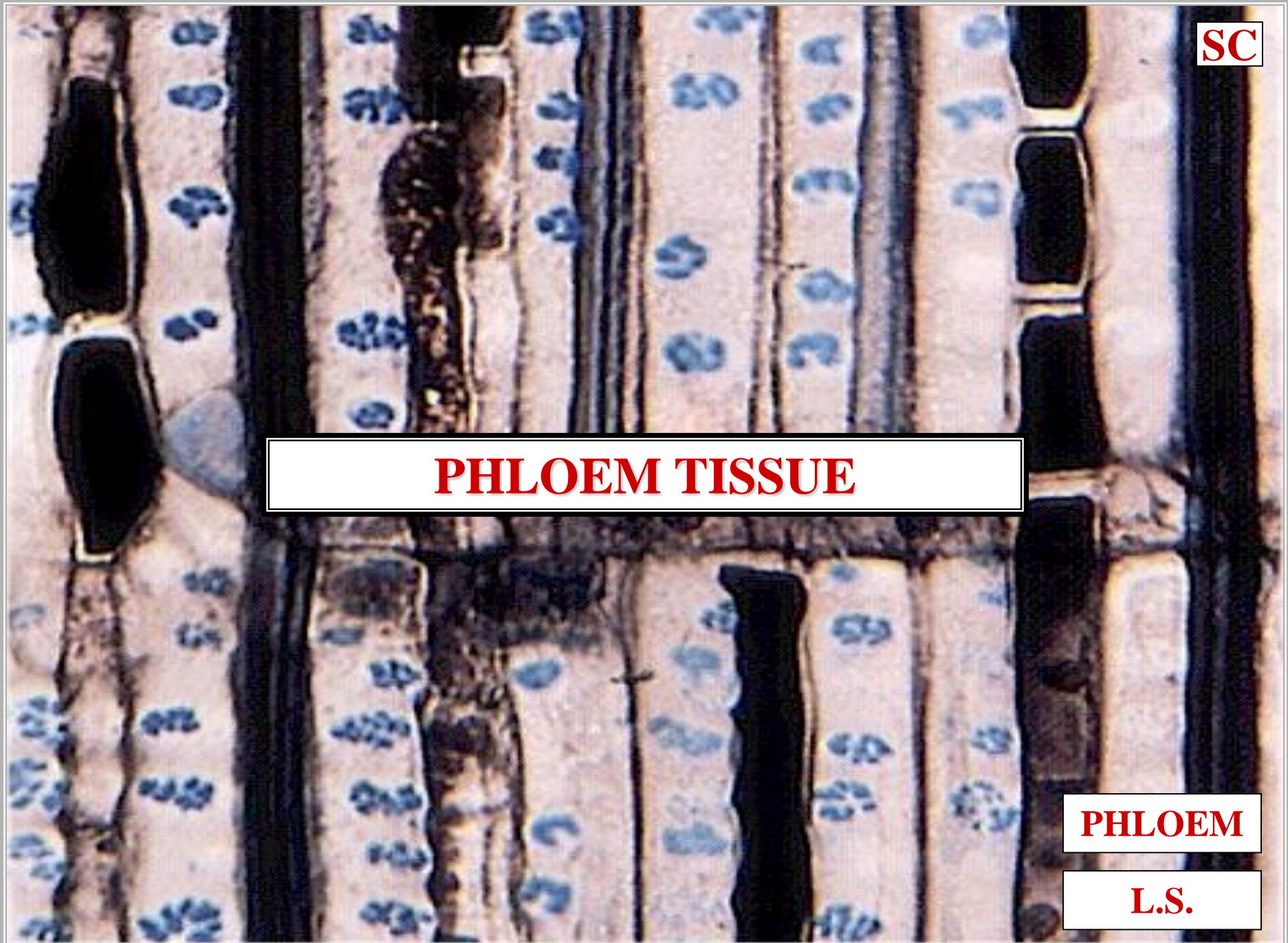
PT

SIEVE CELL ALBUMINOUS CELL MICROGRAPHS

PHLOEM TISSUE

PHLOEM

L.S.

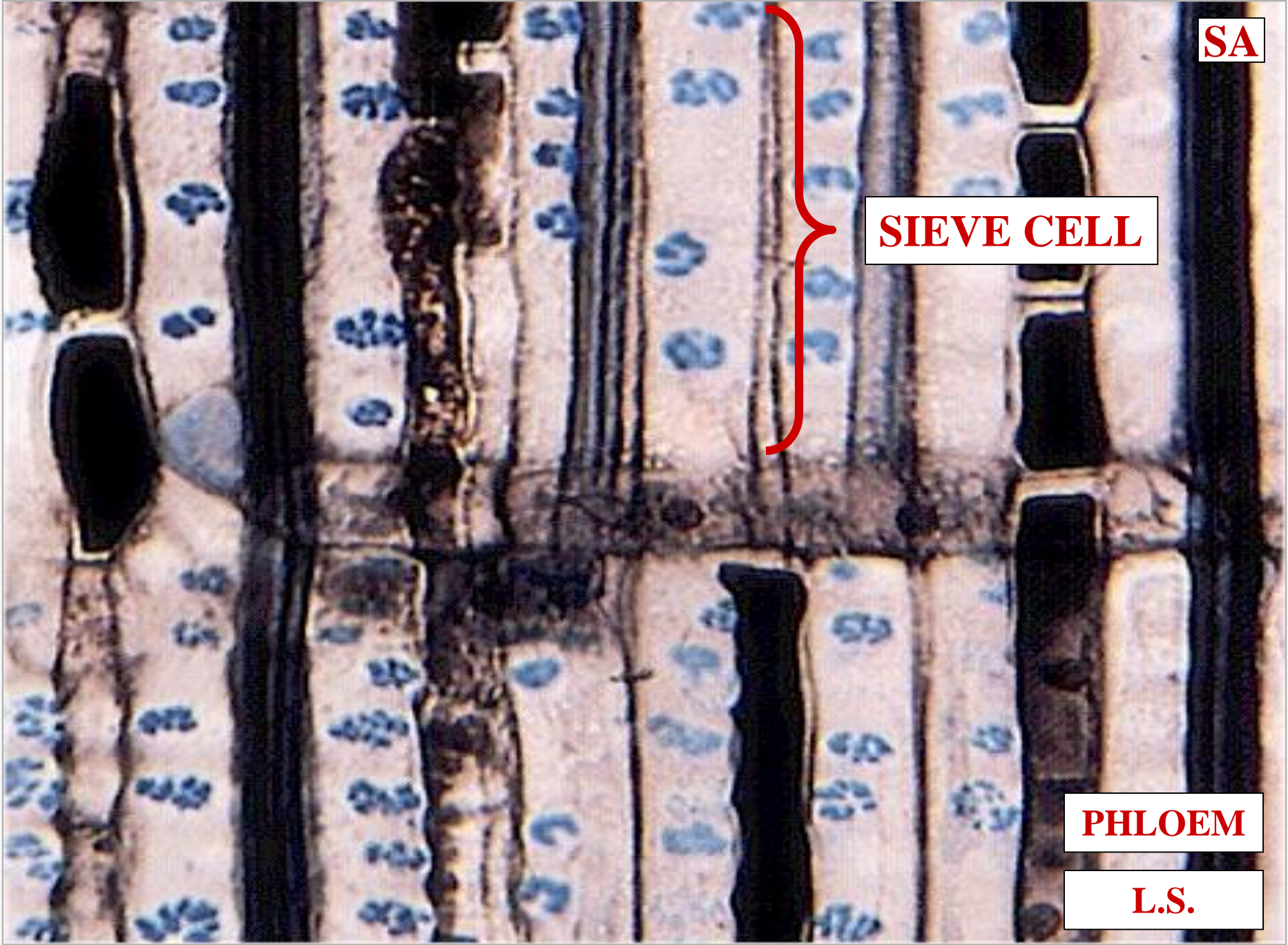


SA

SIEVE CELL

PHLOEM

L.S.



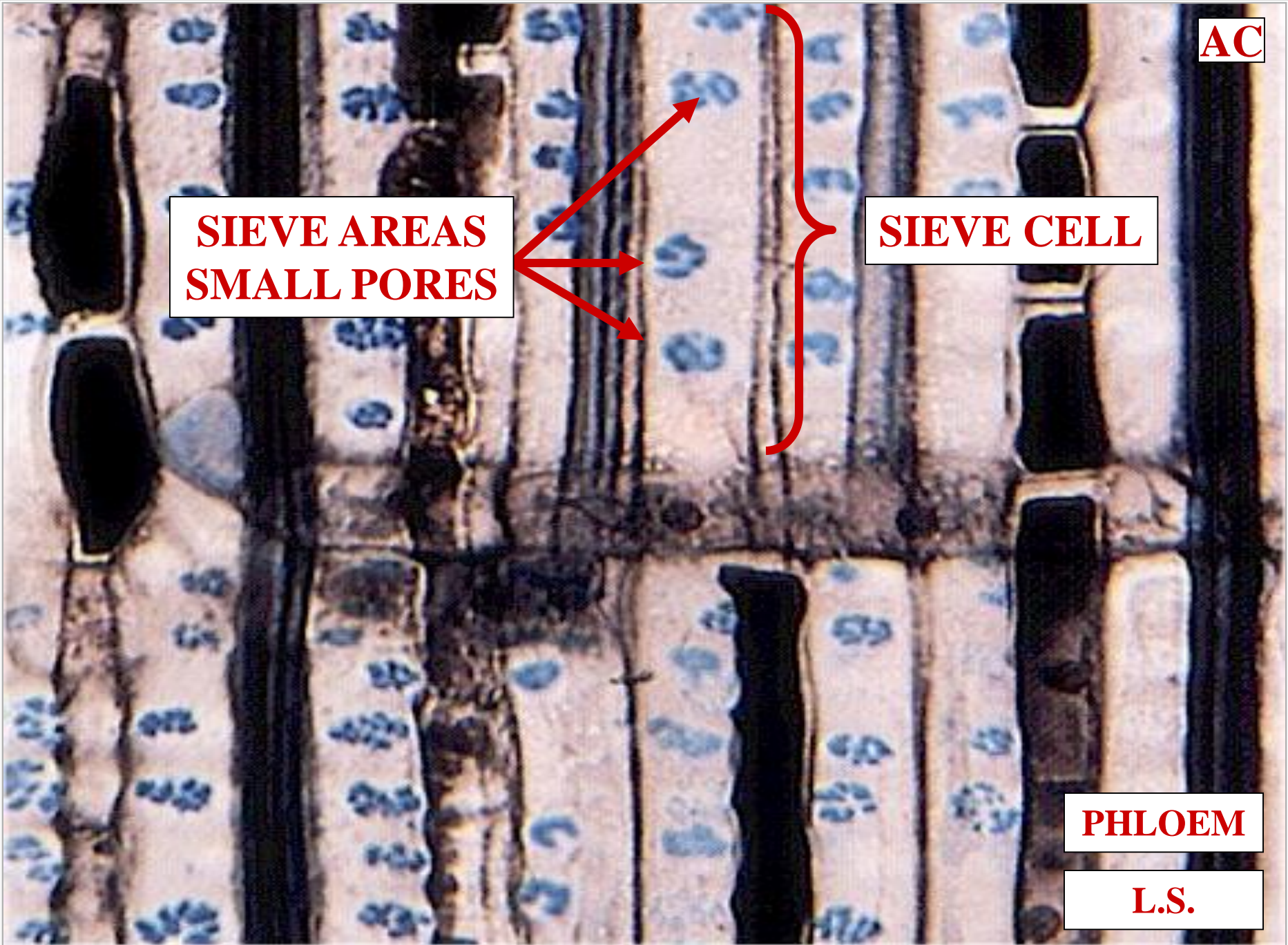
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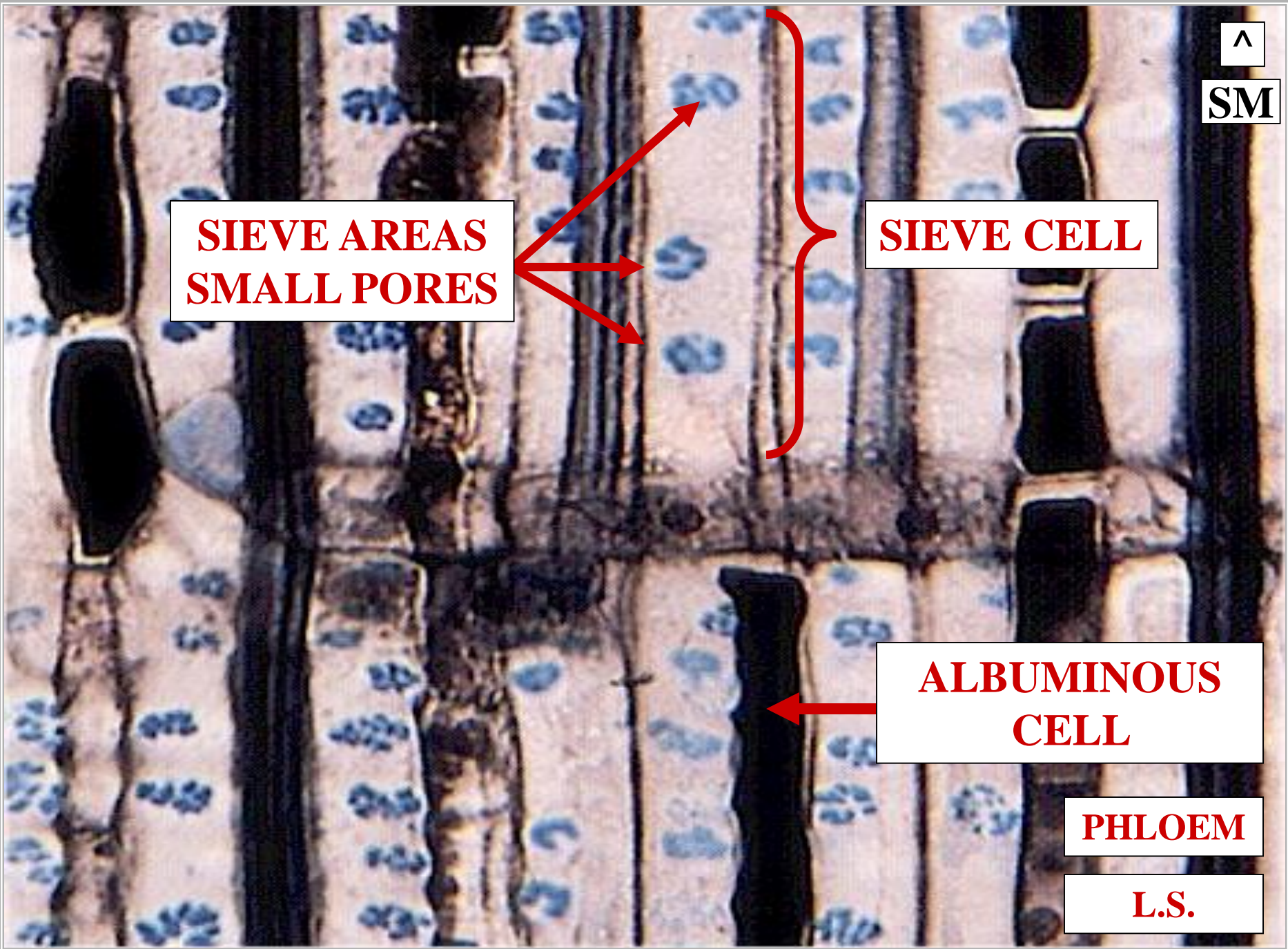
**SIEVE AREAS
SMALL PORES**

SIEVE CELL

PHLOEM

L.S.





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SM

**SIEVE AREAS
SMALL PORES**

SIEVE CELL

**ALBUMINOUS
CELL**

PHLOEM

L.S.

SIEVE MEMBER



SIEVE ELEMENTS
SIEVE MEMBER

KNOWN ANGIOSPERMS ONLY

SIEVE ELEMENTS
SIEVE MEMBER

SIEVE ELEMENTS

SIEVE MEMBER

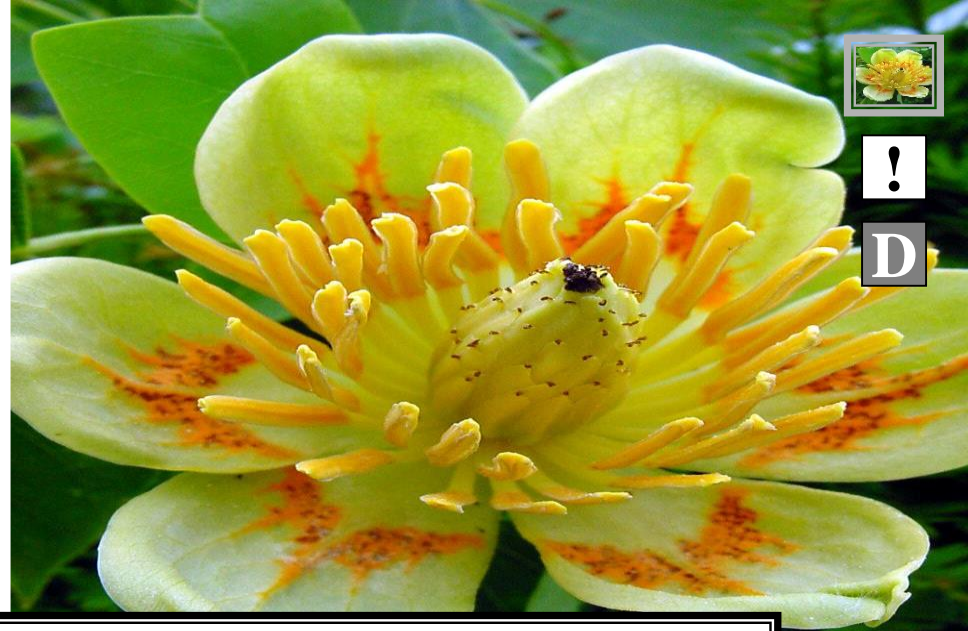


KNOWN ANGIOSPERMS ONLY

END WALL WITH SIEVE PLATE

SIEVE ELEMENTS

SIEVE MEMBER



ANGIOSPERMS





**SIEVE MEMBERS
DIAGNOSTIC TO
ANGIOSPERMS**

SP

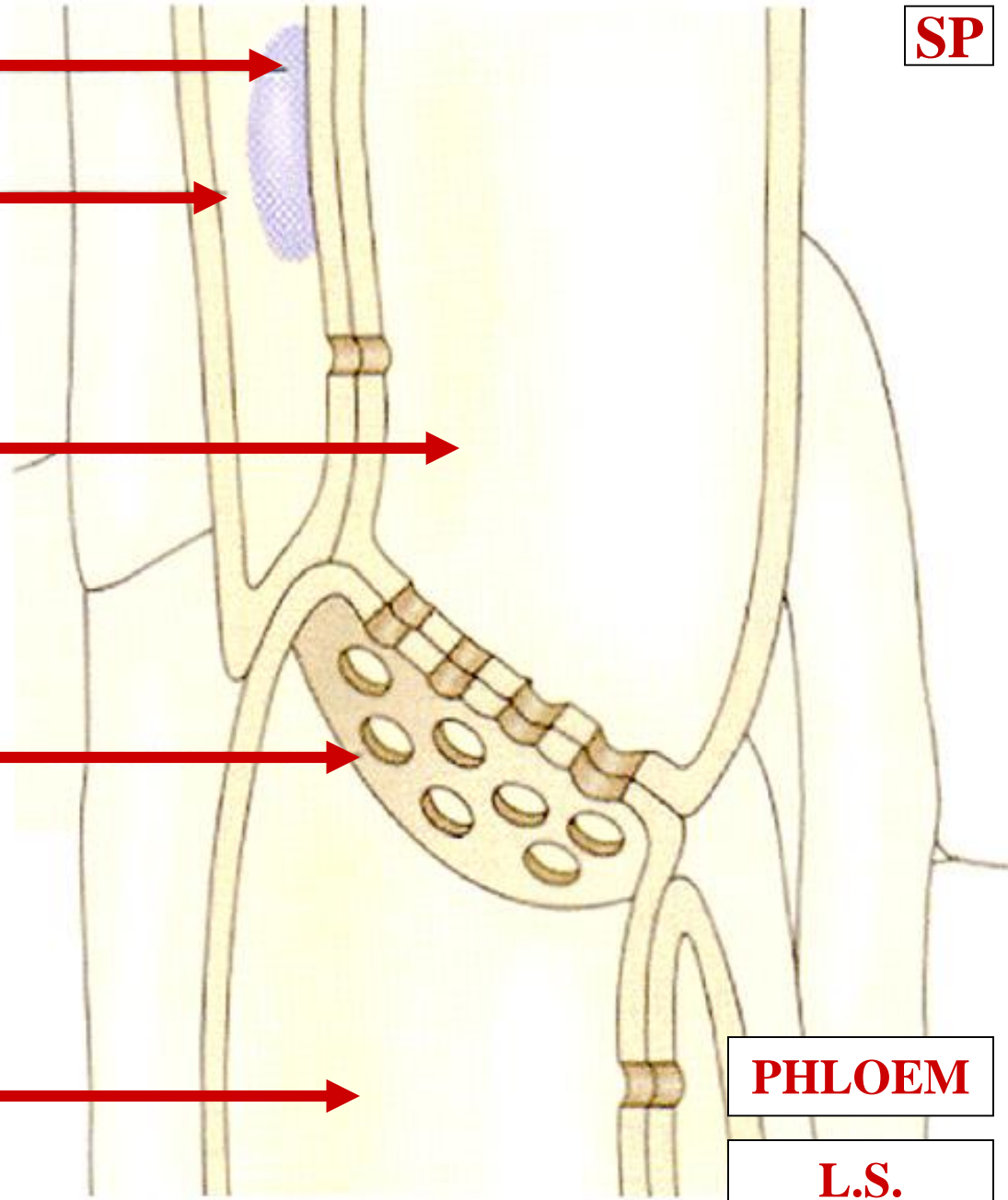
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SIEVE MEMBER

END WALL

SIEVE MEMBER



PHLOEM

L.S.

SP

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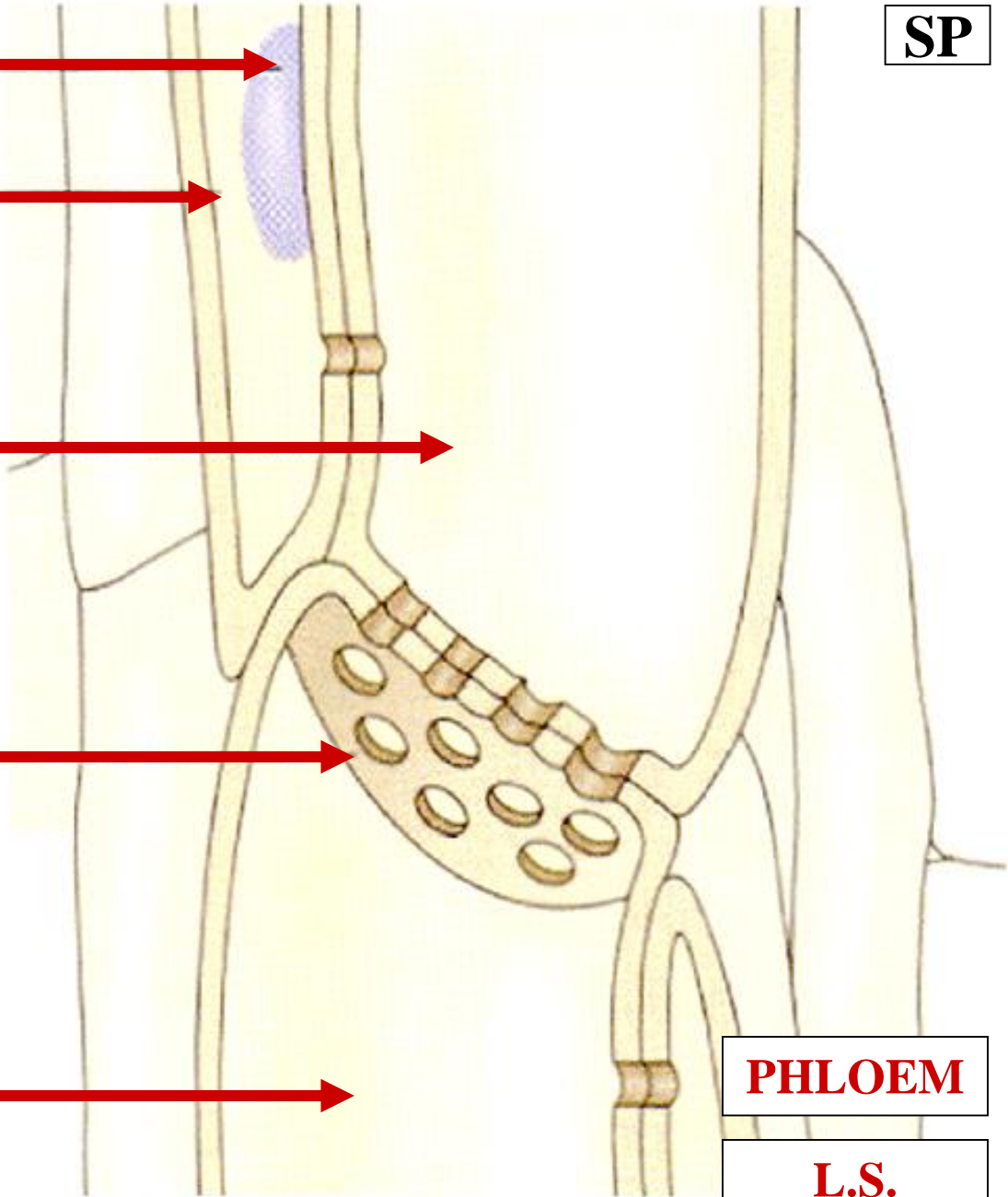
SIEVE MEMBER

SIEVE PLATE

SIEVE MEMBER

PHLOEM

L.S.



SIEVE PLATE

SIEVE ELEMENTS



SIEVE MEMBER / SIEVE PLATE

LARGE PORES

SIEVE ELEMENTS

SIEVE MEMBER / SIEVE PLATE

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SIEVE MEMBER



**SIEVE PLATE
LARGE PORES**

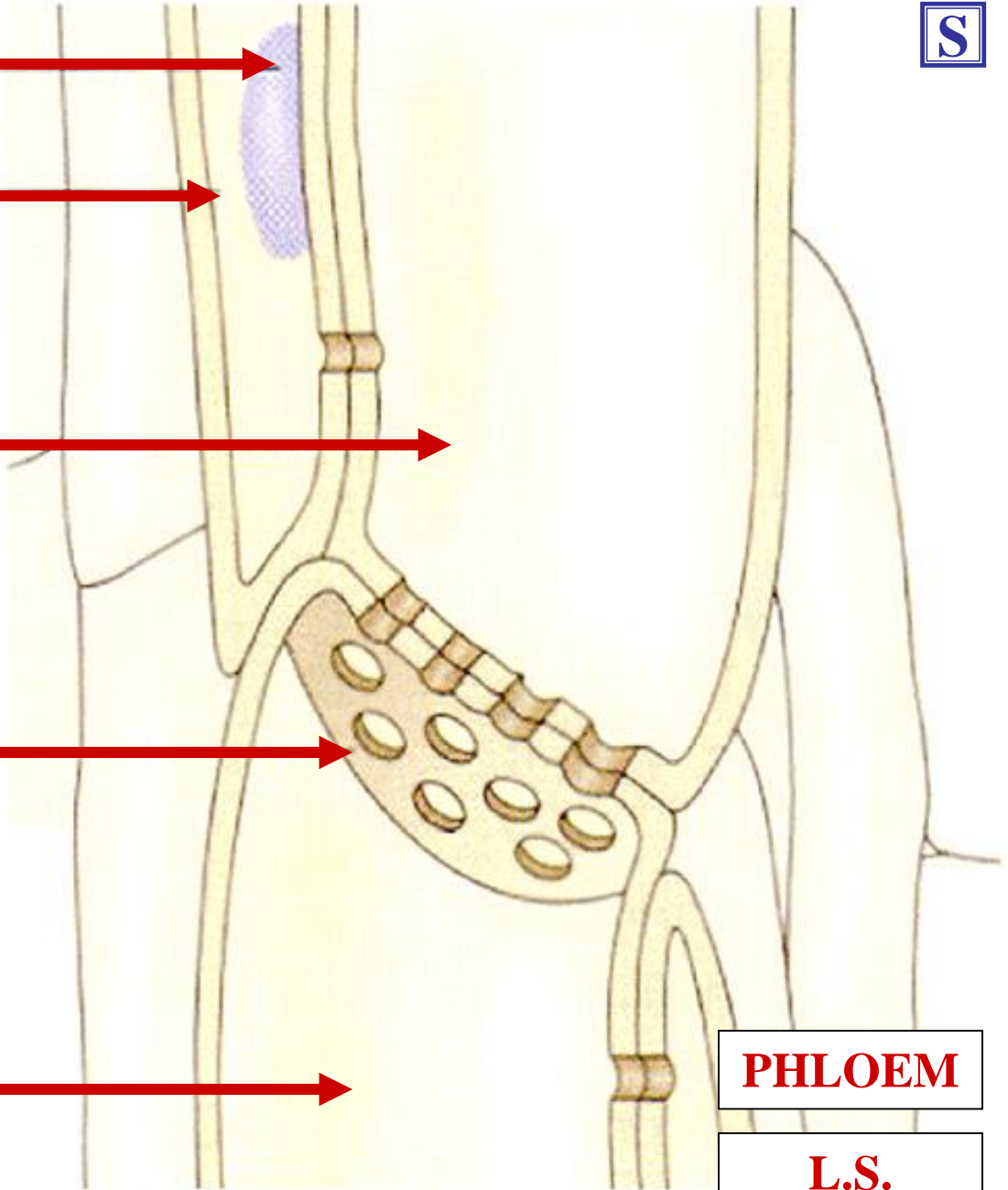


SIEVE MEMBER



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SIEVE MEMBER



**SIEVE PLATE
LARGE PORES**



SIEVE MEMBER



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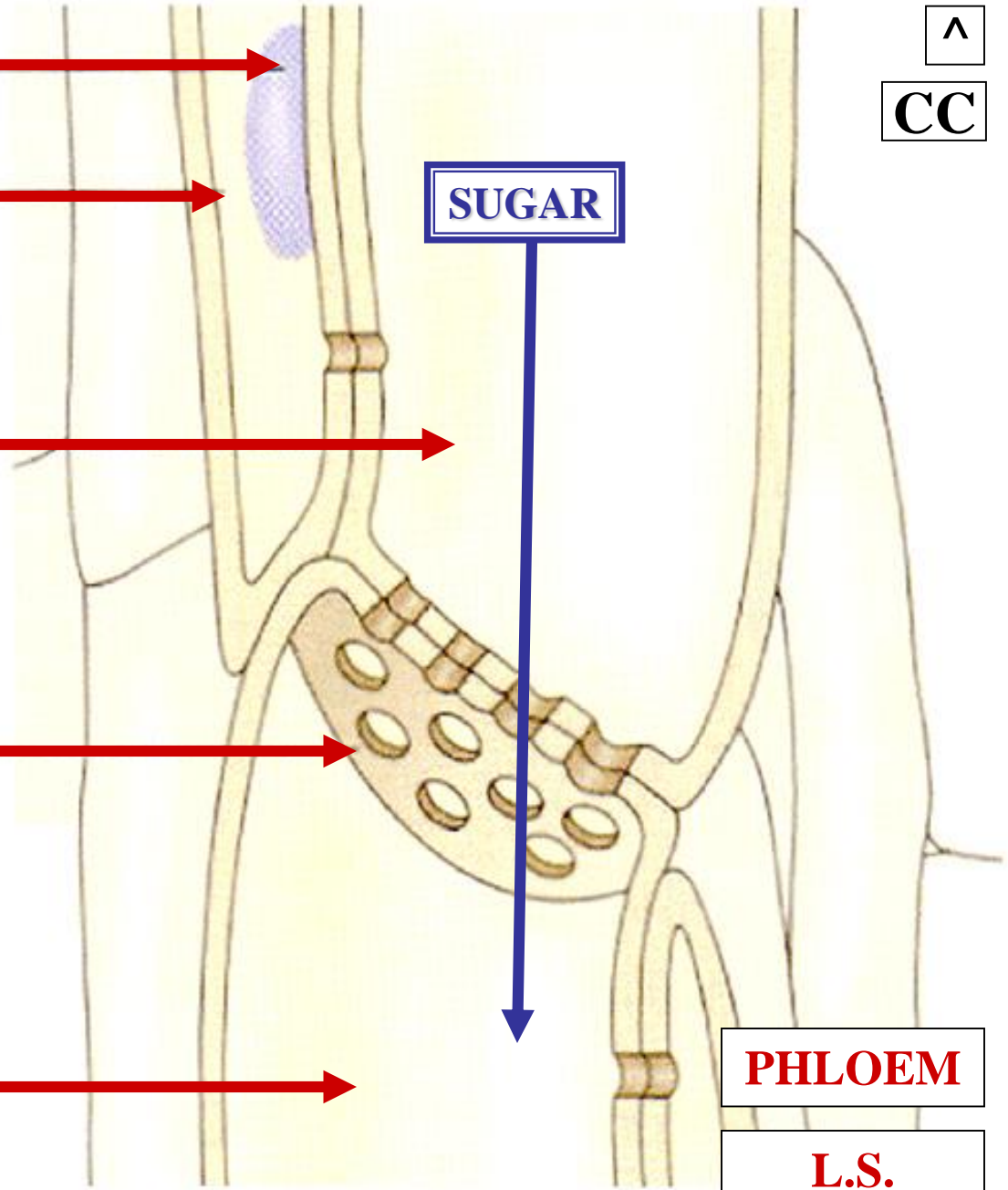
CC

SUGAR



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

SIEVE MEMBER COMPANION CELL



ASSOCIATED WITH SIEVE MEMBER

NUCLEATED

METABOLICALLY CONTROLS SIEVE MEMBER

SIEVE MEMBER COMPANION CELL

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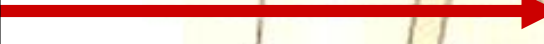
SUGAR



SIEVE MEMBER



**SIEVE PLATE
LARGE PORES**

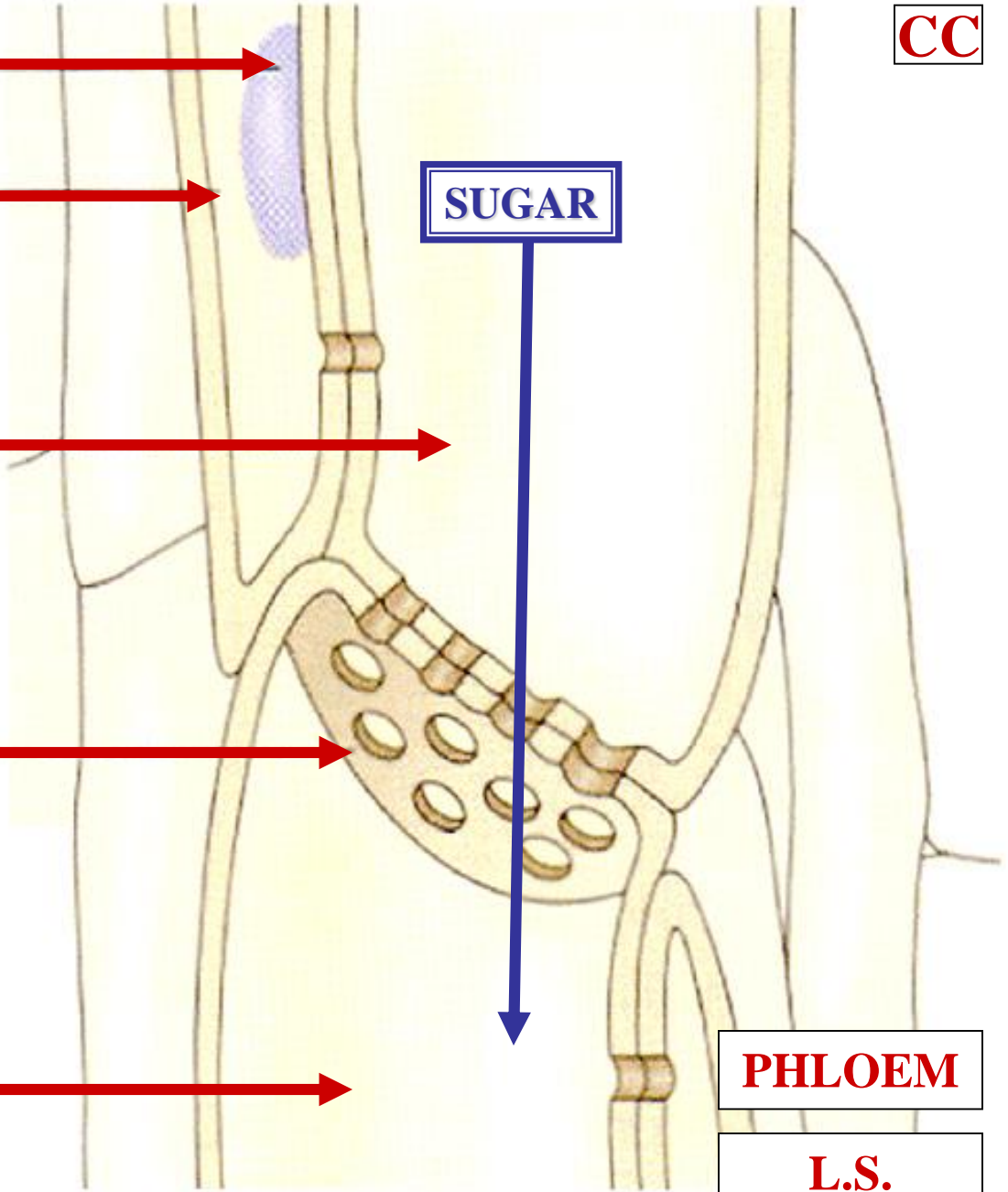


SIEVE MEMBER



PHLOEM

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SUGAR

CAMPANION CELL

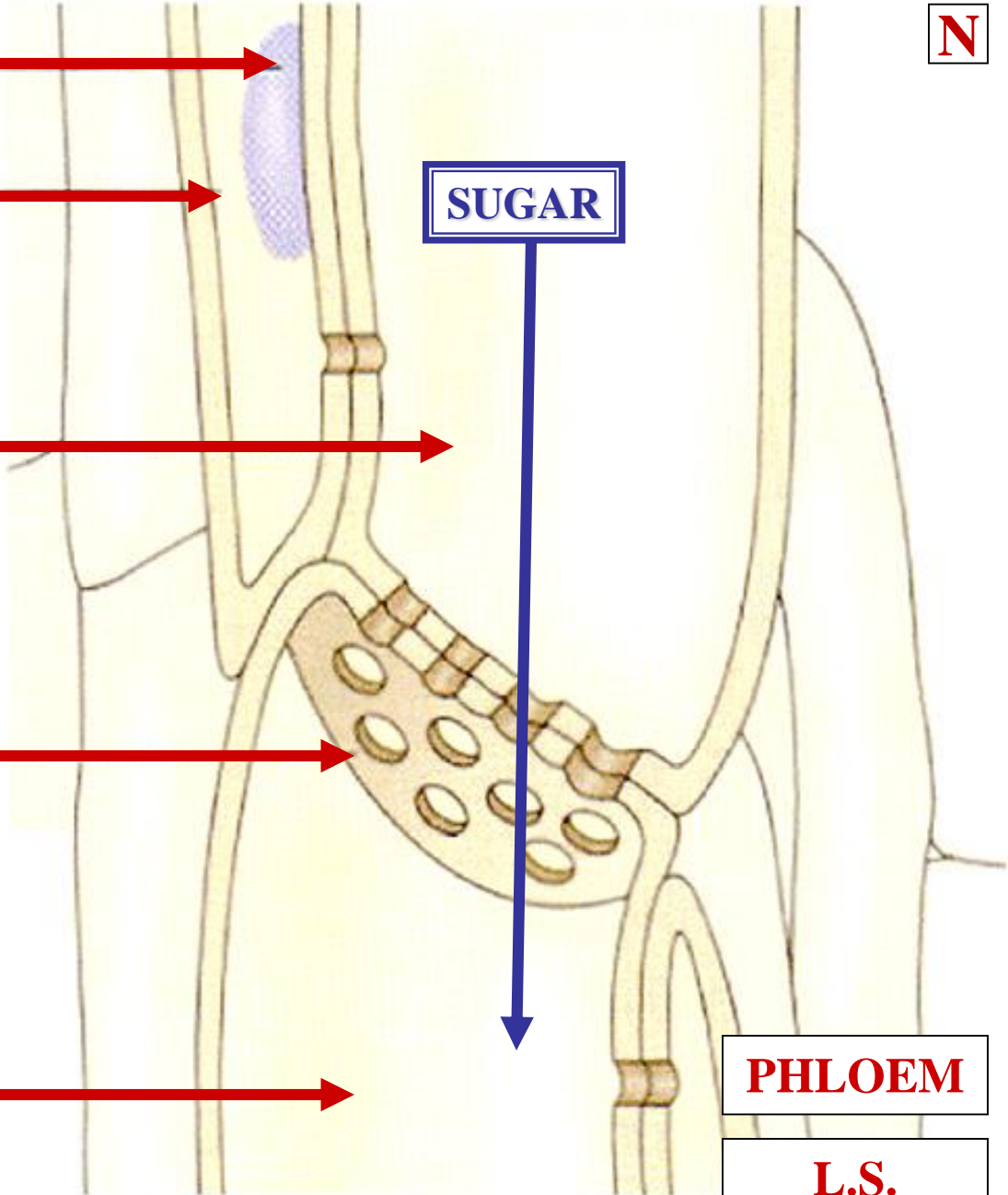
SIEVE MEMBER

SIEVE PLATE
LARGE PORES

SIEVE MEMBER

PHLOEM

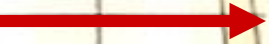
L.S.



NUCLEUS



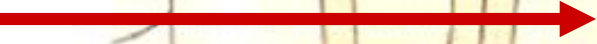
CAMPANION CELL



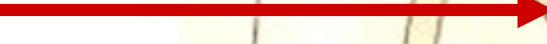
SUGAR



SIEVE MEMBER



**SIEVE PLATE
LARGE PORES**

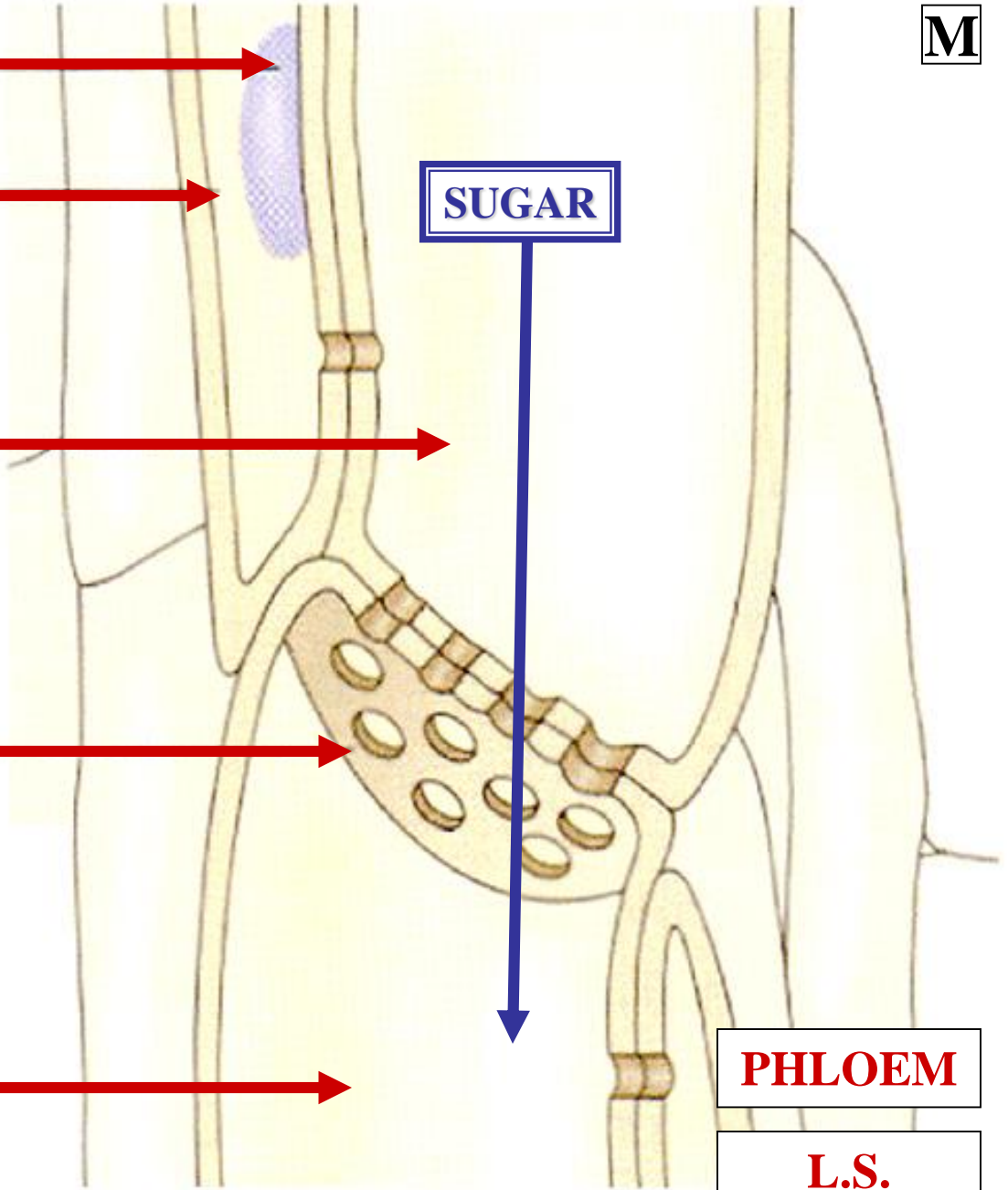


SIEVE MEMBER



PHLOEM

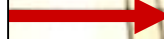
L.S.



NUCLEUS



CAMPANION CELL
METABOLICALLY CONTROLS
SIEVE MEMBER



SIEVE MEMBER



SIEVE PLATE
LARGE PORES



SIEVE MEMBER



SUGAR



PHLOEM

L.S.

