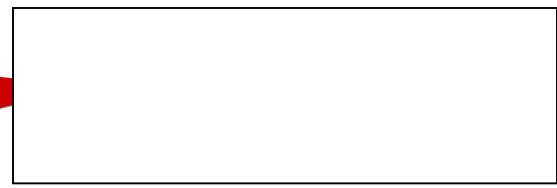


SECONDARY XYLEM



SECONDARY XYLEM



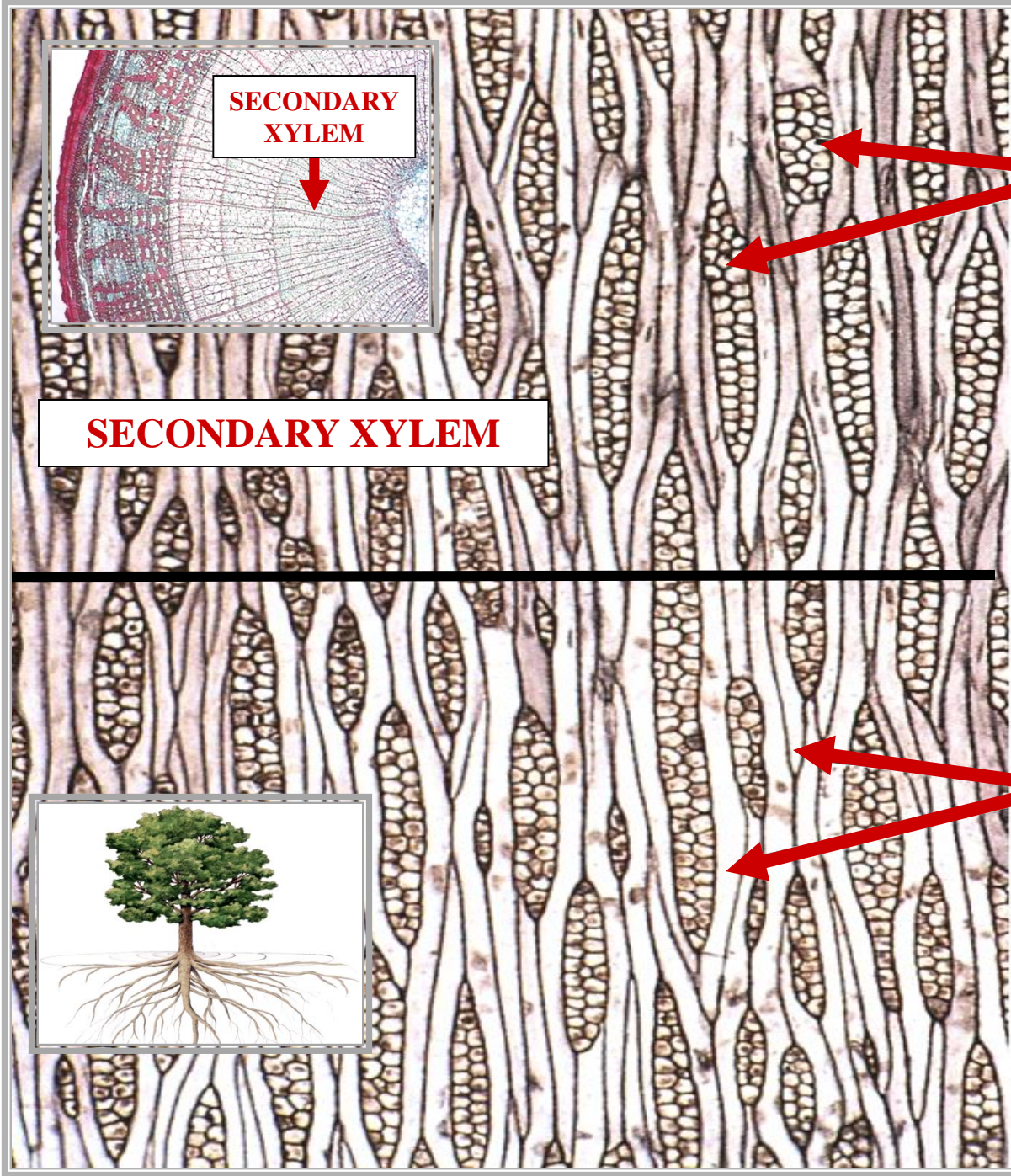
CROSS SECTION

AXIAL PARENCHYMA



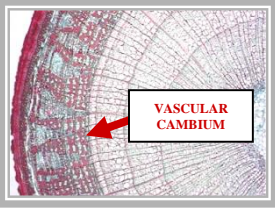
DICOT ~2 STEM

L.S.



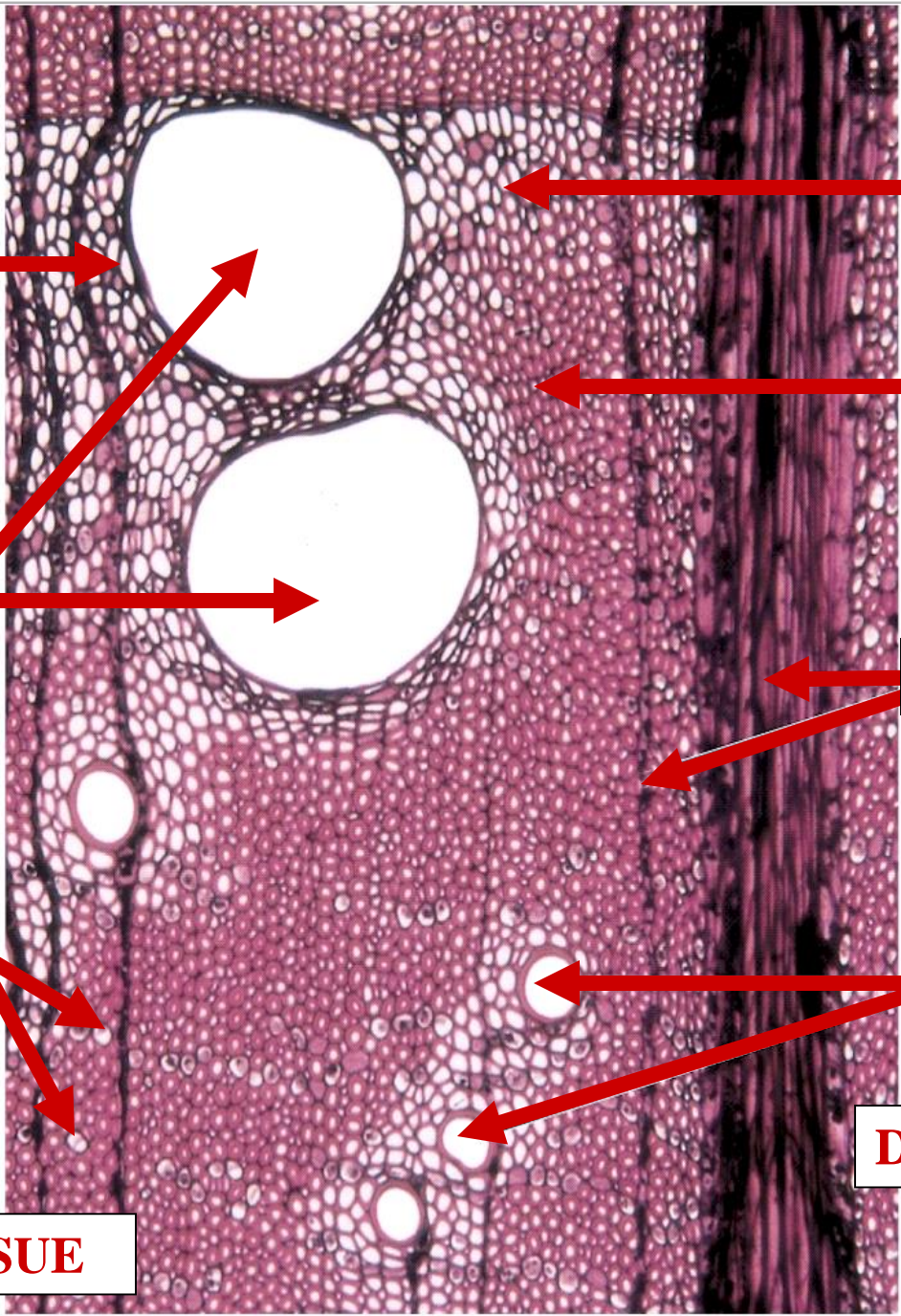
! **AT:**

**AXIAL
PARENCHYMA**



**AXIAL
PARENCHYMA**

~2 XYLEM TISSUE



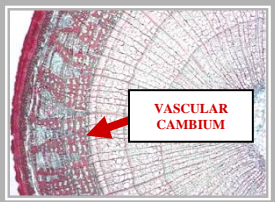
DICOT ~2 STEM

C.S.

2W

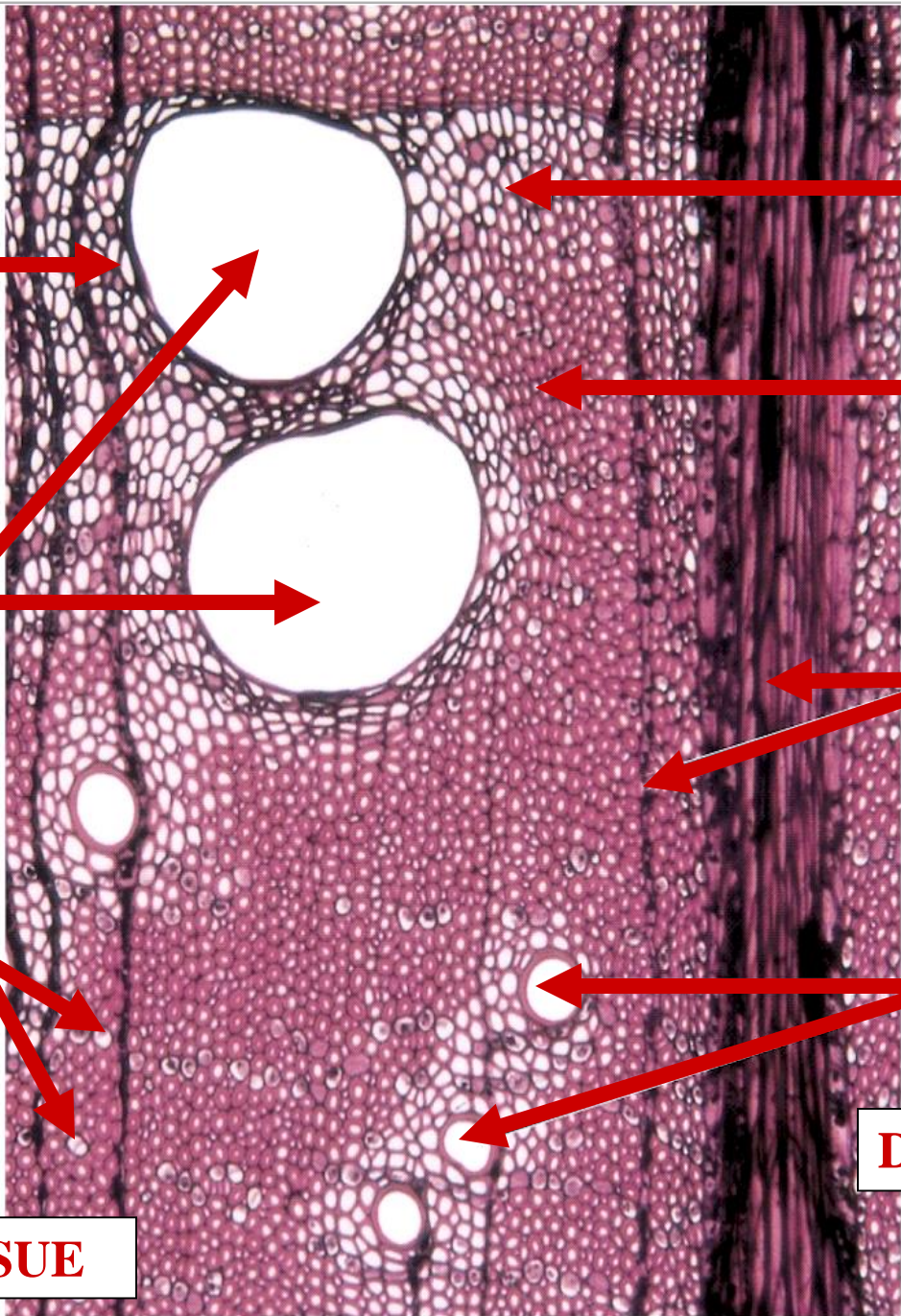
**AXIAL
PARENCHYMA
ATYPICAL**

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**AXIAL
PARENCHYMA
ATYPICAL**

~2 XYLEM TISSUE



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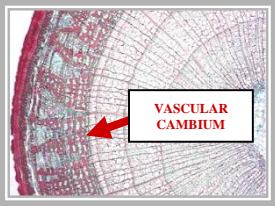
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DICOT ~2 STEM

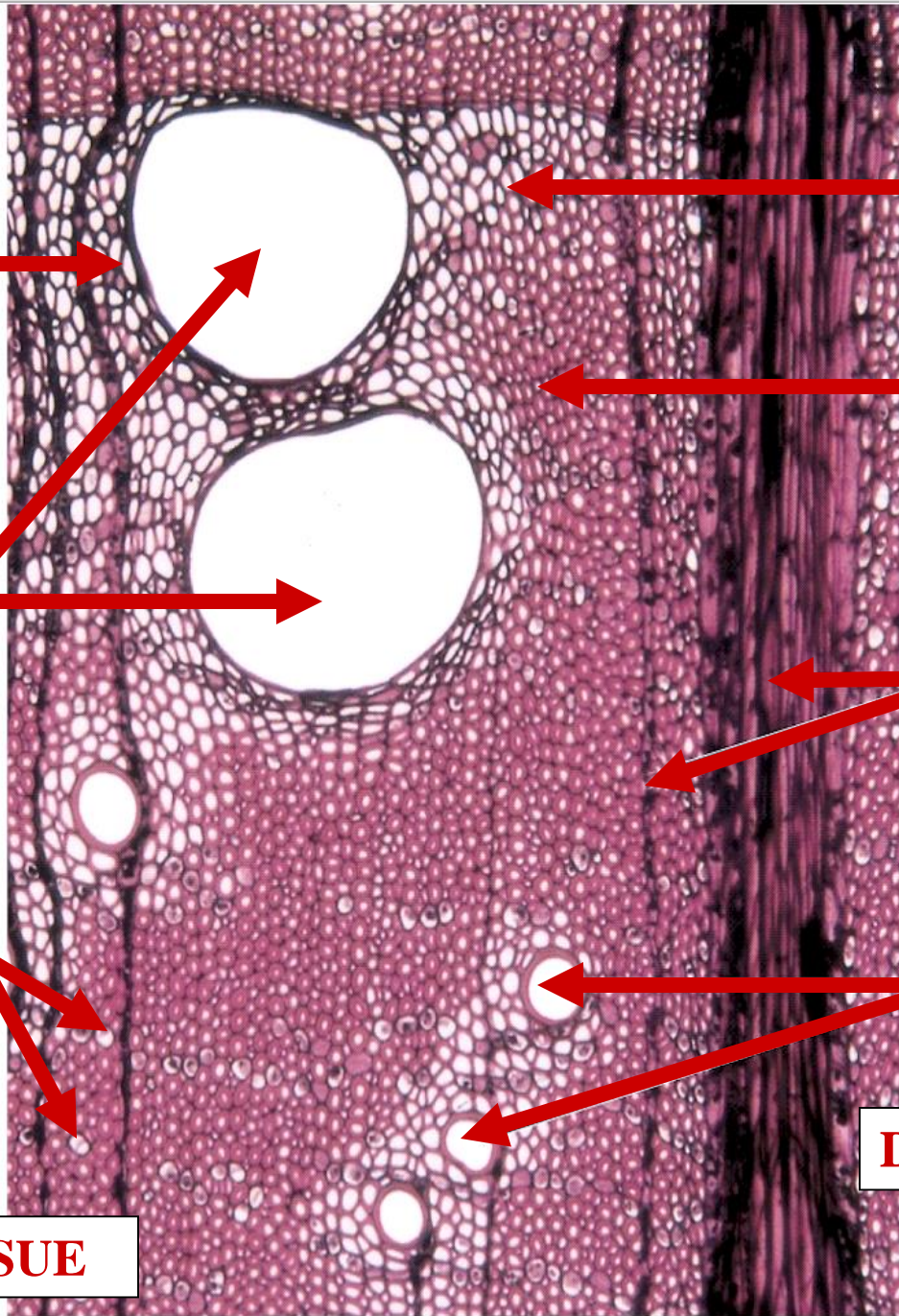
C.S.

**AXIAL
PARENCHYMA
~2 CELL WALL
PRESENT**



**AXIAL
PARENCHYMA
~2 CELL WALL
PRESENT**

~2 XYLEM TISSUE

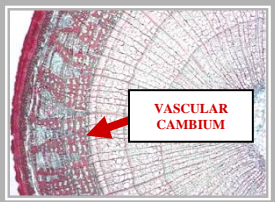


DICOT ~2 STEM

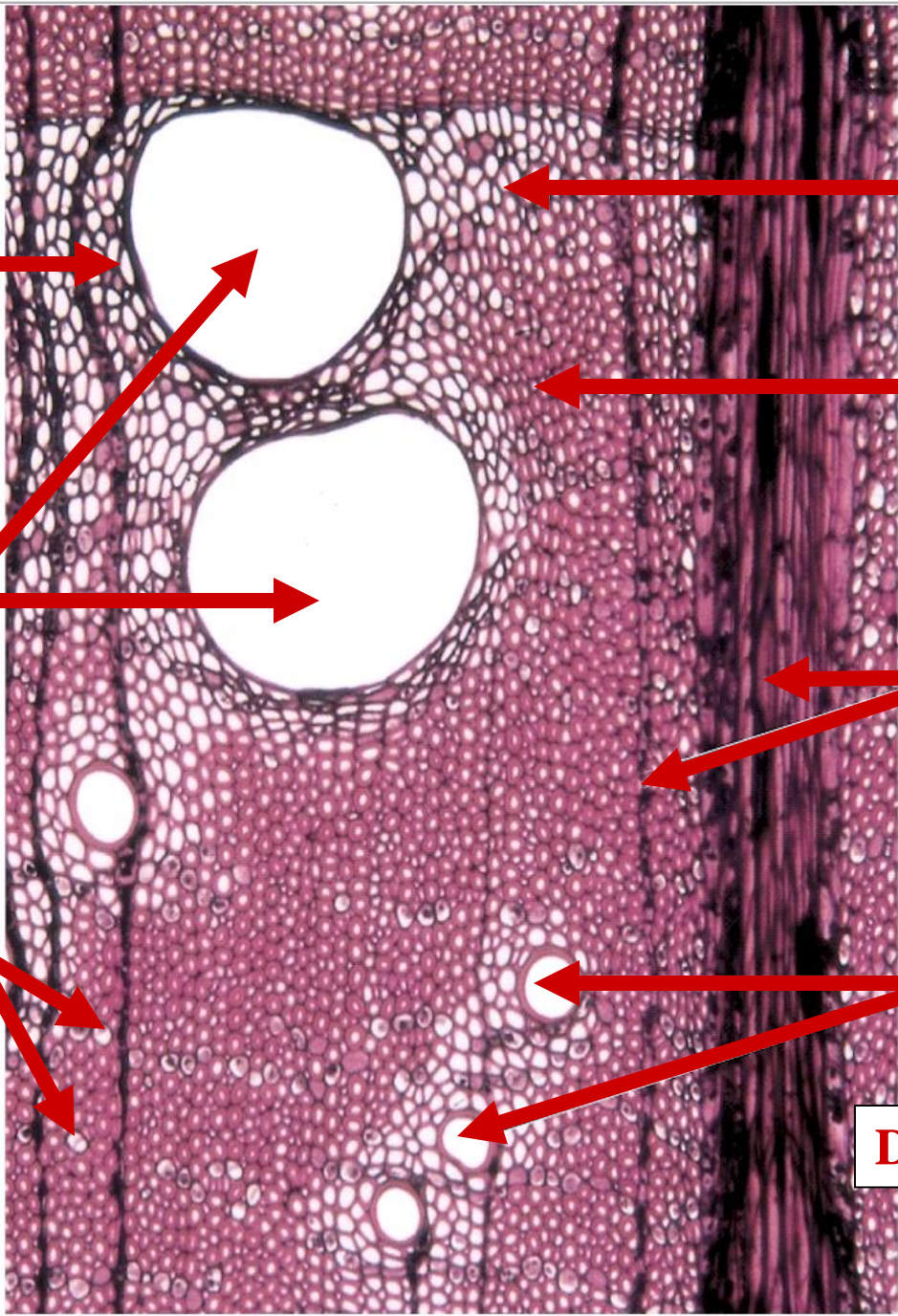
C.S.

VT

**AXIAL
PARENCHYMA
FUNCTION**

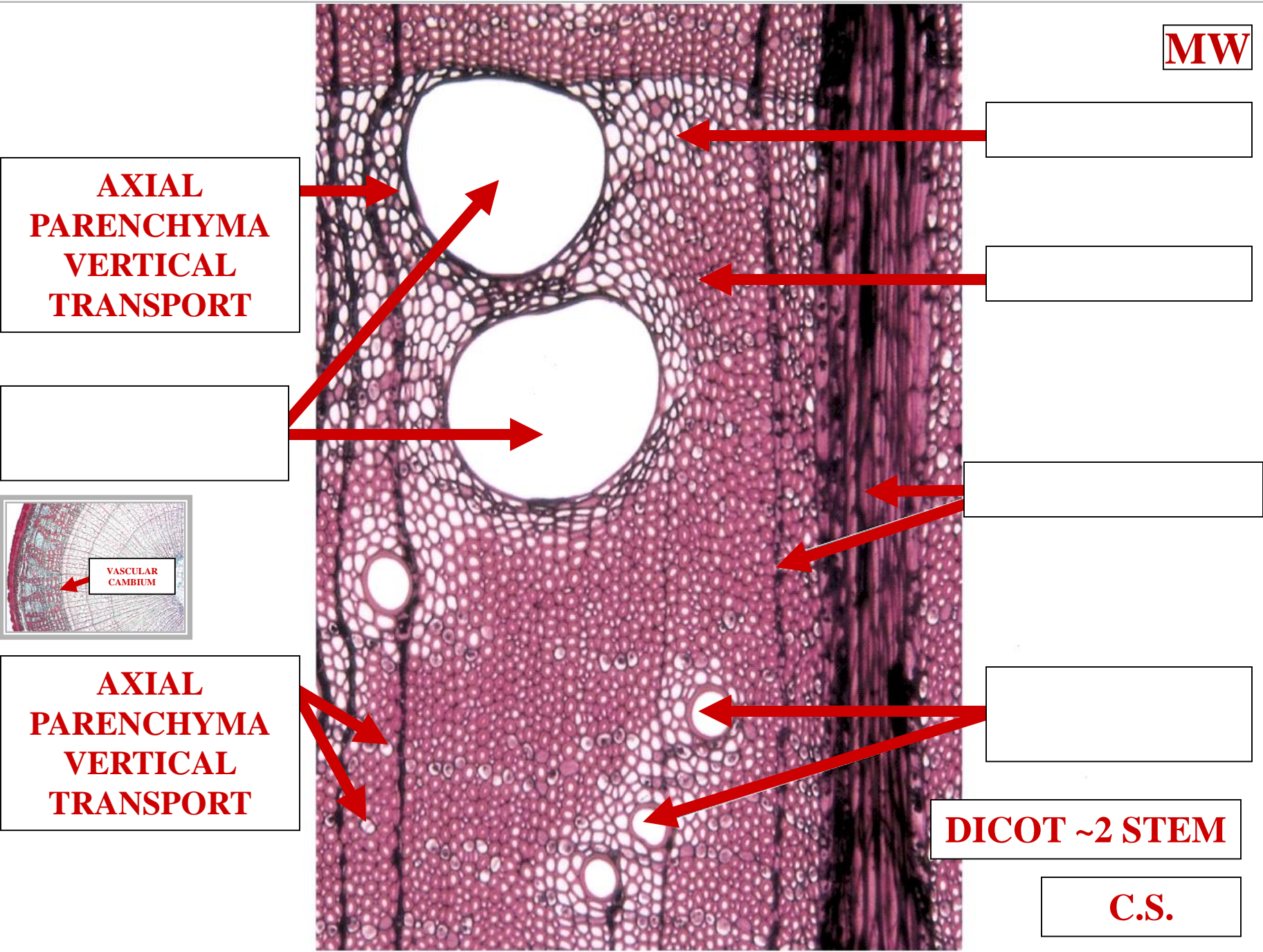


**AXIAL
PARENCHYMA
FUNCTION**



DICOT ~2 STEM

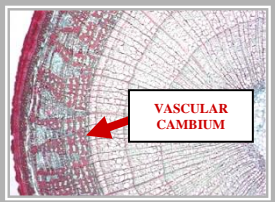
C.S.



MW

AXIAL
PARENCHYMA
VERTICAL
TRANSPORT

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VASCULAR
CAMBIUM

AXIAL
PARENCHYMA
VERTICAL
TRANSPORT

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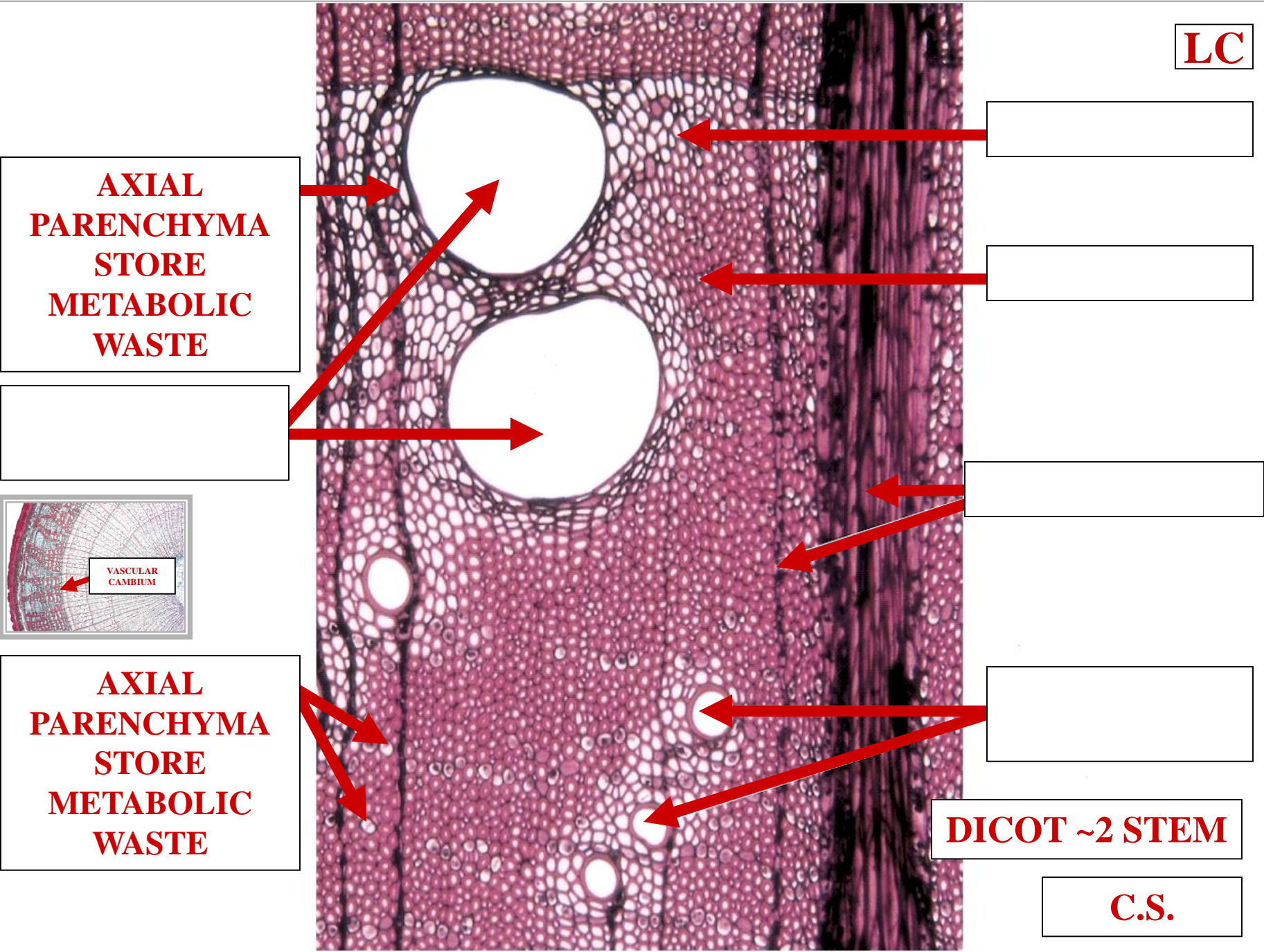
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DICOT ~2 STEM

C.S.



LC

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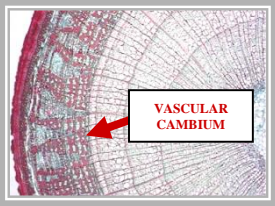
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DICOT ~2 STEM

C.S.

**AXIAL
PARENCHYMA
STORE
METABOLIC
WASTE**

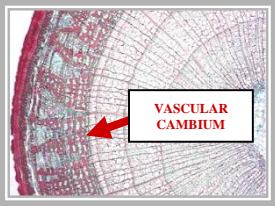
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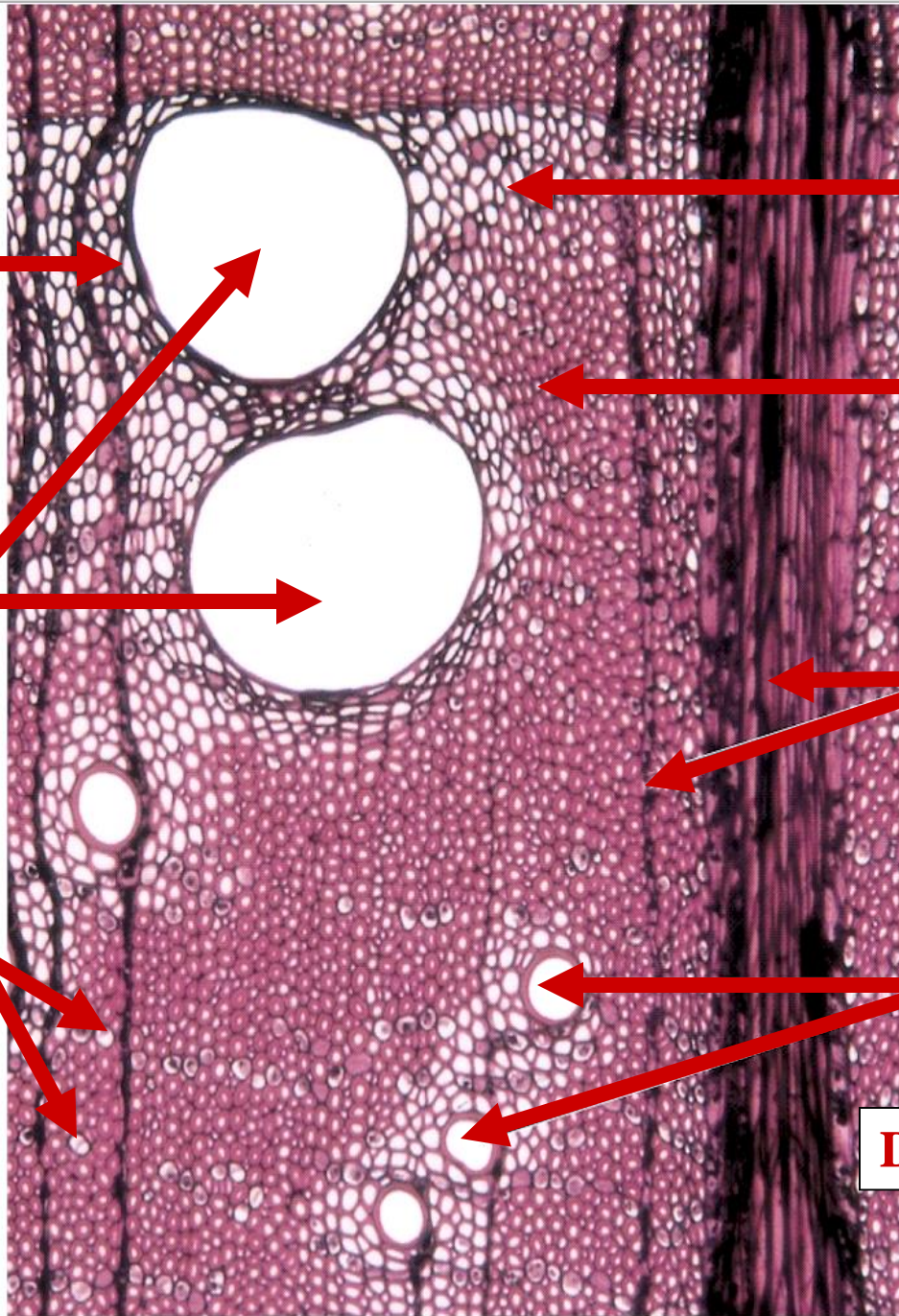
**AXIAL
PARENCHYMA
STORE
METABOLIC
WASTE**



**AXIAL
PARENCHYMA
LIVING CELLS
HEAL WOUNDS**



**AXIAL
PARENCHYMA
LIVING CELLS
HEAL WOUNDS**



DICOT ~2 STEM

C.S.

**AXIAL
PARENCHYMA
CELL TYPES**

**SECONDARY XYLEM
AXIAL PARENCHYMA
CELL TYPES**

PARATRACHEAL

**SECONDARY XYLEM
AXIAL PARENCHYMA
CELL TYPES**



**SECONDARY XYLEM
AXIAL PARENCHYMA
CELL TYPES**

**PARATRACHEAL
APOTRACHEAL**

**SECONDARY XYLEM
AXIAL PARENCHYMA
CELL TYPES**

**AXIAL
PARATRACHEAL
PARENCHYMA**

**AXIAL
PARATRACHEAL
PARENCHYMA**

AXIAL PARATRACHEAL PARENCHYMA



OBLIGATE VESSEL MEMBRANE ASSOCIATION

AXIAL PARATRACHEAL PARENCHYMA

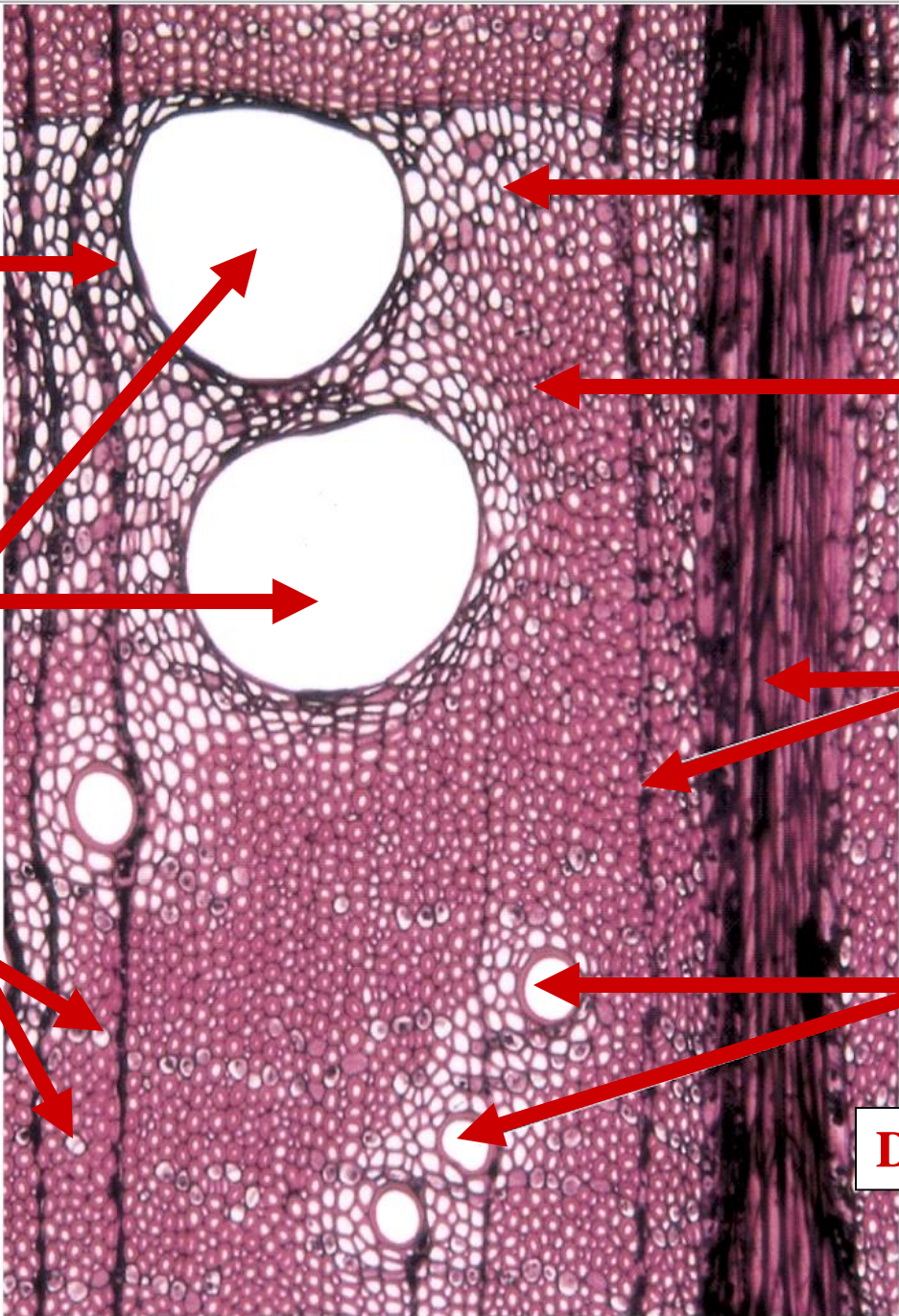


**PARATRACHEAL
PARENCHYMA**

**VESSEL
MEMBERS**

DICOT ~2 STEM

C.S.



**AXIAL
PARATRACHEAL
PARENCHYMA
TYPES**

**SECONDARY XYLEM
AXIAL PARATRACHEAL
PARENCHYMA CELL TYPES**

SCANTY

**SECONDARY XYLEM
AXIAL PARATRACHEAL
PARENCHYMA CELL TYPES**

**SECONDARY XYLEM
AXIAL PARATRACHEAL
PARENCHYMA CELL TYPES**

**SCANTY
VASICENTRIC**

**SECONDARY XYLEM
AXIAL PARATRACHEAL
PARENCHYMA CELL TYPES**

**SECONDARY XYLEM
AXIAL PARATRACHEAL
PARENCHYMA CELL TYPES**

**SCANTY
VASICENTRIC
ALIFORM**

**SECONDARY XYLEM
AXIAL PARATRACHEAL
PARENCHYMA CELL TYPES**

SCANTY

AXIAL

PARATRACHEAL

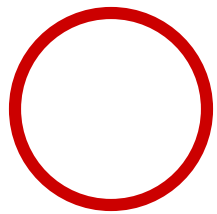
PARENCHYMA



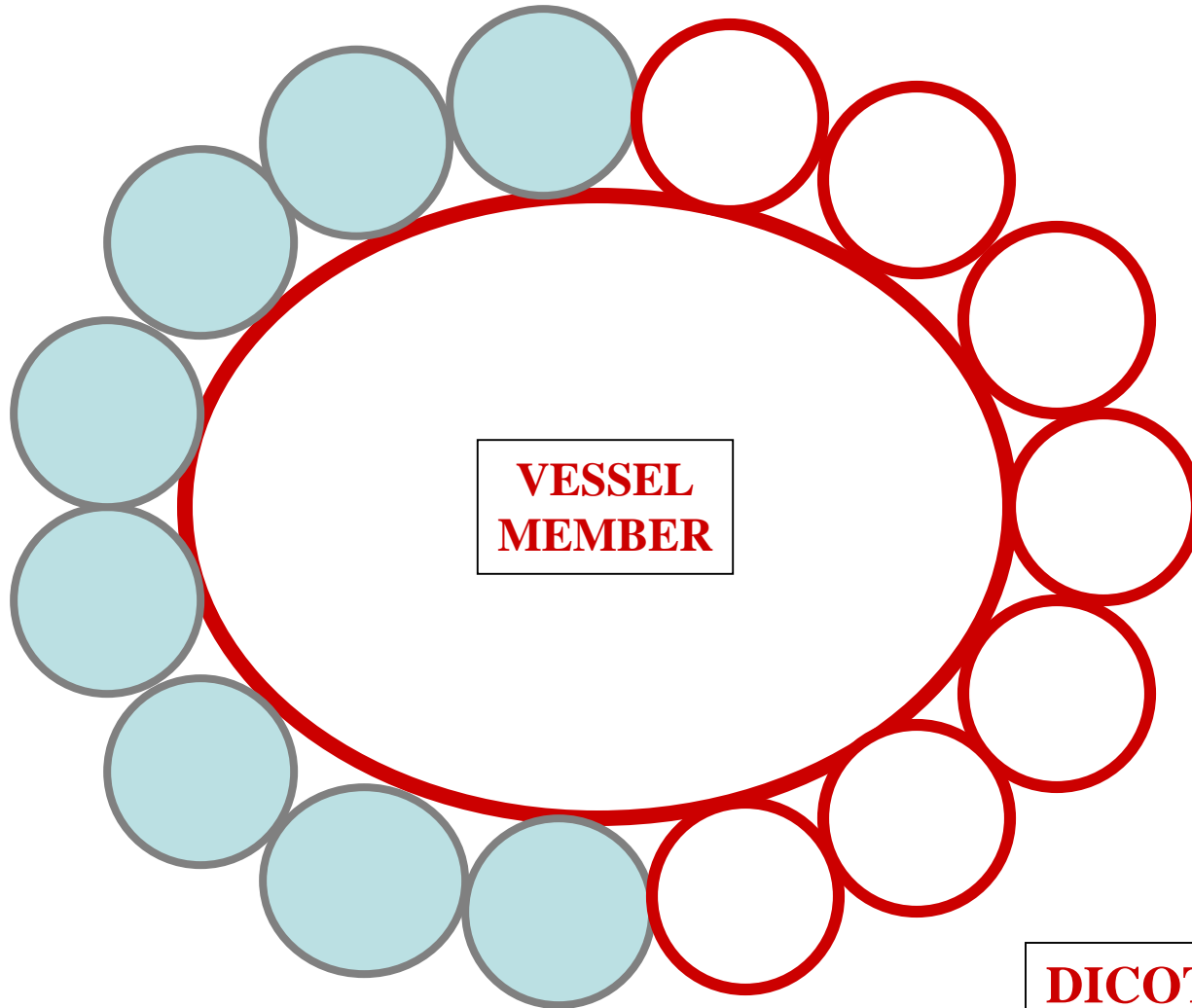
**SCANTY
AXIAL PARATRACHEAL
PARENCHYMA**

**INCOMPLETE
PARENCHYMA SHEATH ABOUT
VESSEL MEMBER**

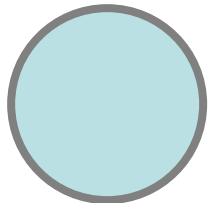
**SCANTY
AXIAL PARATRACHEAL
PARENCHYMA**



= **TRACHEID OR FIBER**



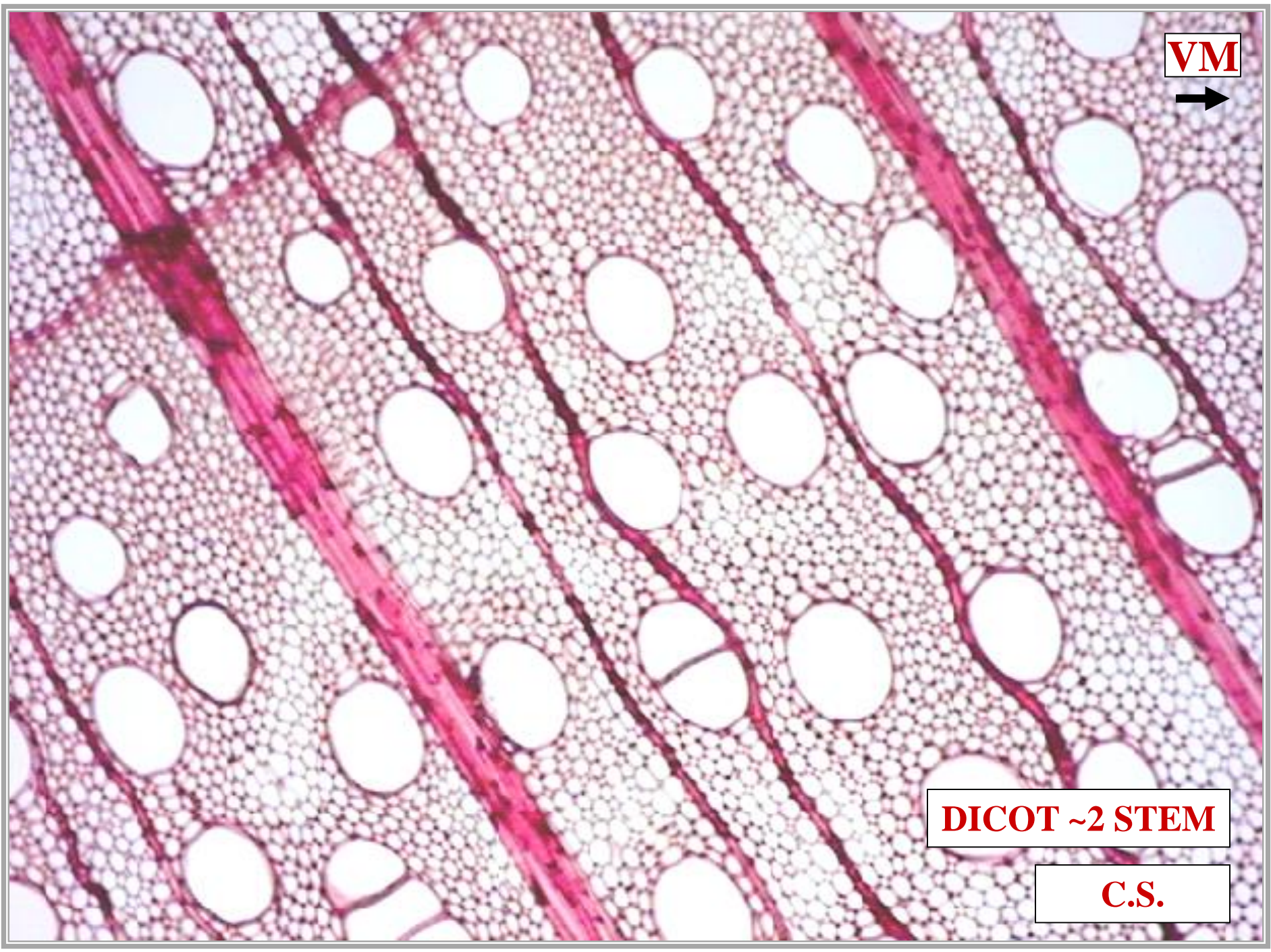
**VESSEL
MEMBER**



= **AXIAL PARENCHYMA**

DICOT ~2 STEM

C.S.



VM



DICOT ~2 STEM

C.S.



VESSEL MEMBER

A micrograph showing a cross-section of a dicot stem. The image displays several vascular bundles arranged in a ring. Each bundle contains xylem and phloem. A black arrow points from a text box labeled 'VESSEL MEMBER' to a large, clear, oval-shaped structure within the xylem of one of the bundles. The surrounding tissue consists of small, densely packed cells.

DICOT ~2 STEM

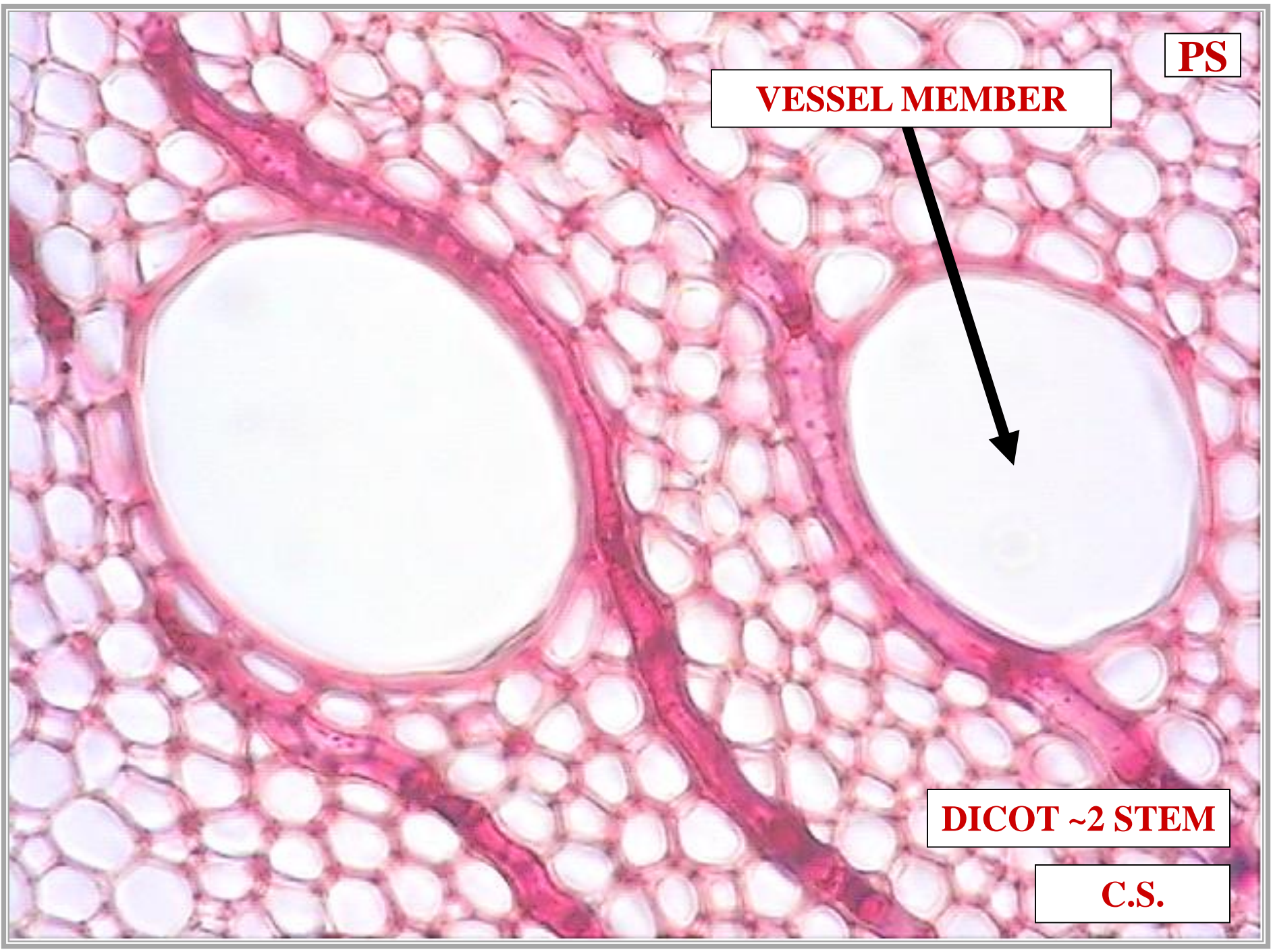
C.S.

PS

VESSEL MEMBER

DICOT ~2 STEM

C.S.

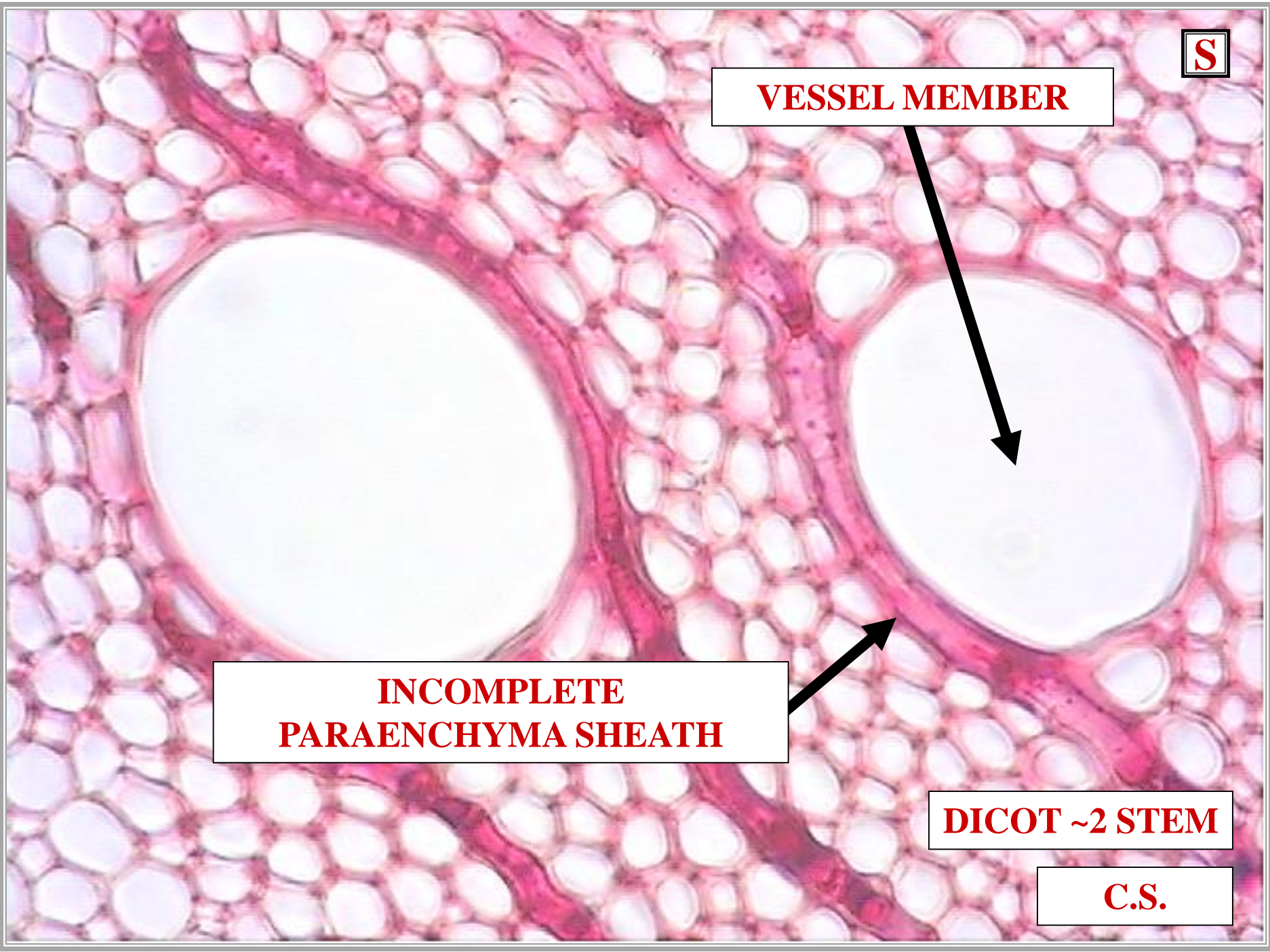


VESSEL MEMBER

**INCOMPLETE
PARAENCHYMA SHEATH**

DICOT ~2 STEM

C.S.



^

V

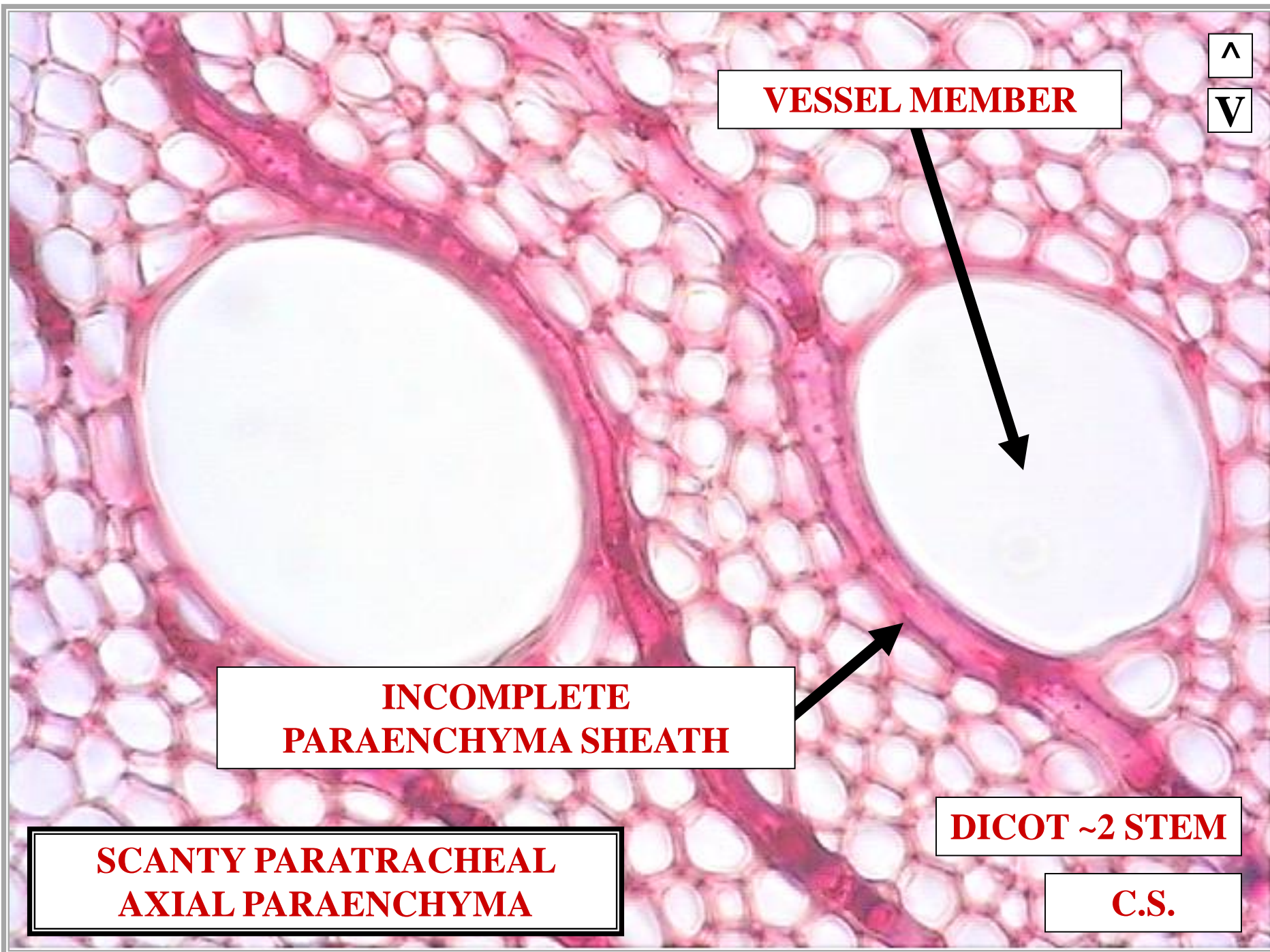
VESSEL MEMBER

**INCOMPLETE
PARAENCHYMA SHEATH**

**SCANTY PARATRACHEAL
AXIAL PARAENCHYMA**

DICOT ~2 STEM

C.S.



VASICENTRIC

AXIAL

PARATRACHEAL

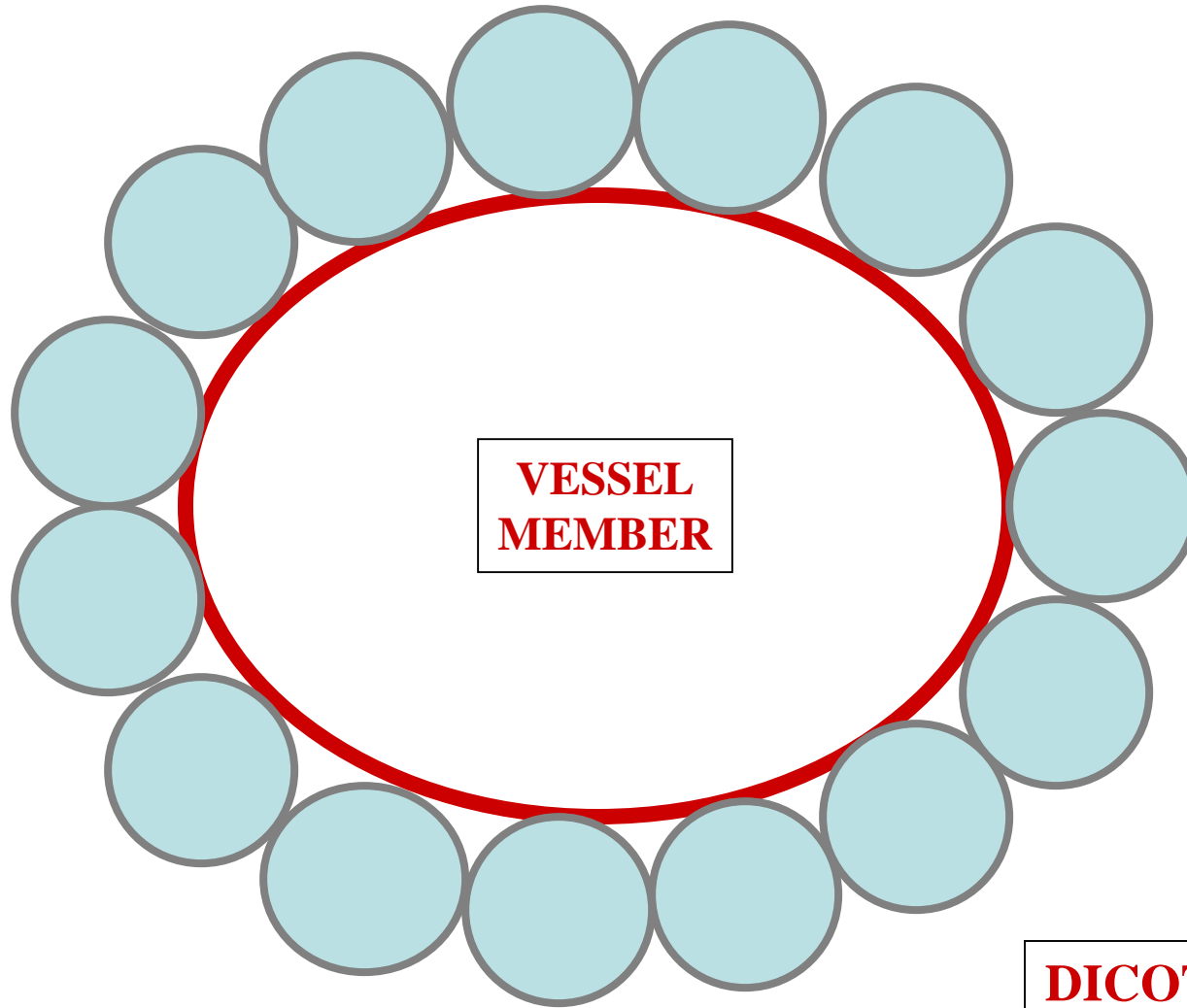
PARENCHYMA



**VASICENTRIC
AXIAL PARATRACHEAL
PARENCHYMA**

**COMPLETE
PARENCHYMA SHEATH ABOUT
VESSEL MEMBER**

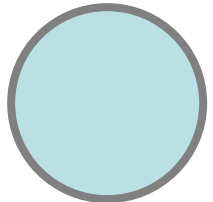
**VASICENTRIC
AXIAL PARATRACHEAL
PARENCHYMA**



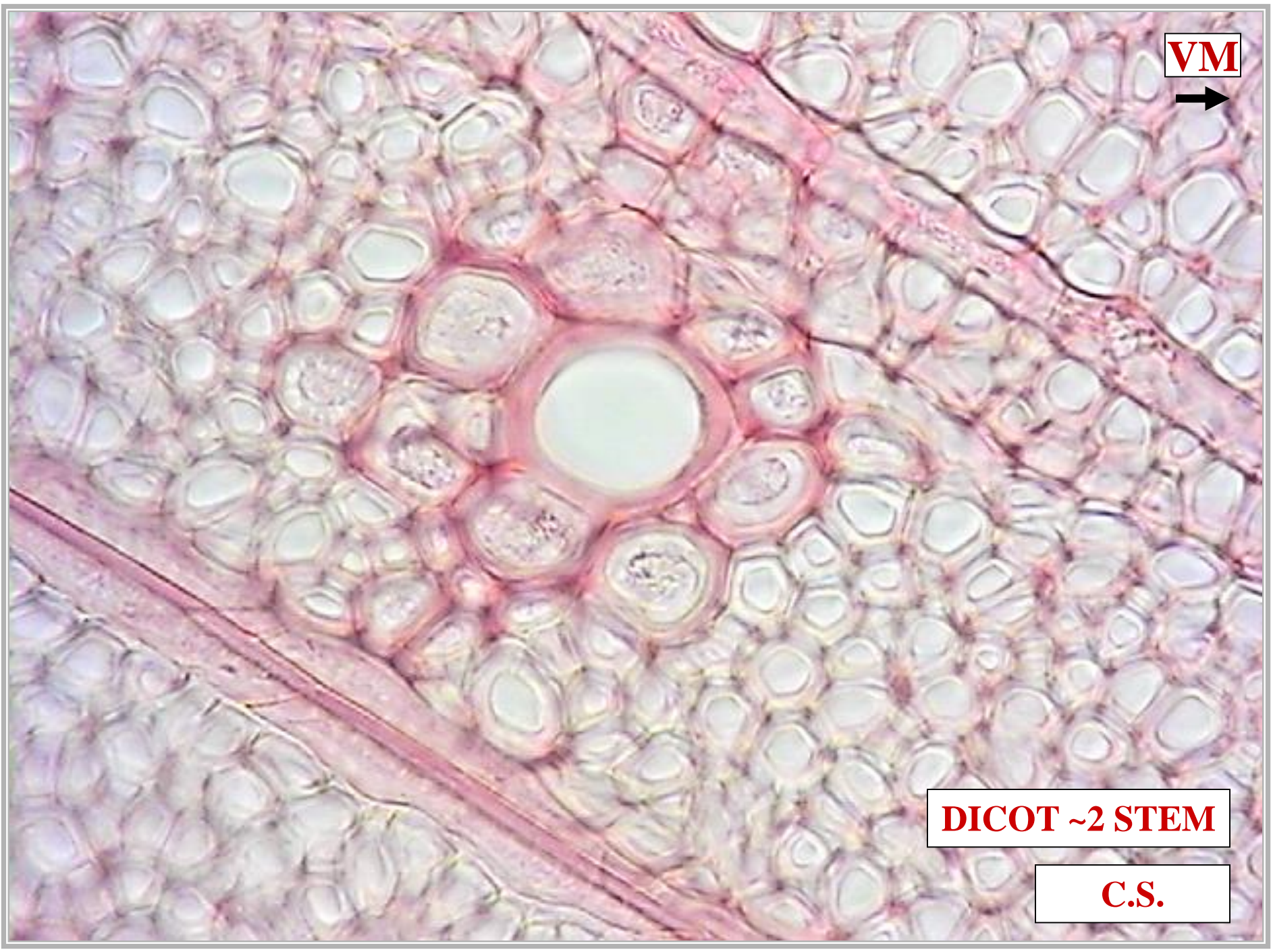
**VESSEL
MEMBER**

DICOT ~2 STEM

C.S.



= AXIAL PARENCHYMA



VM



DICOT ~2 STEM

C.S.

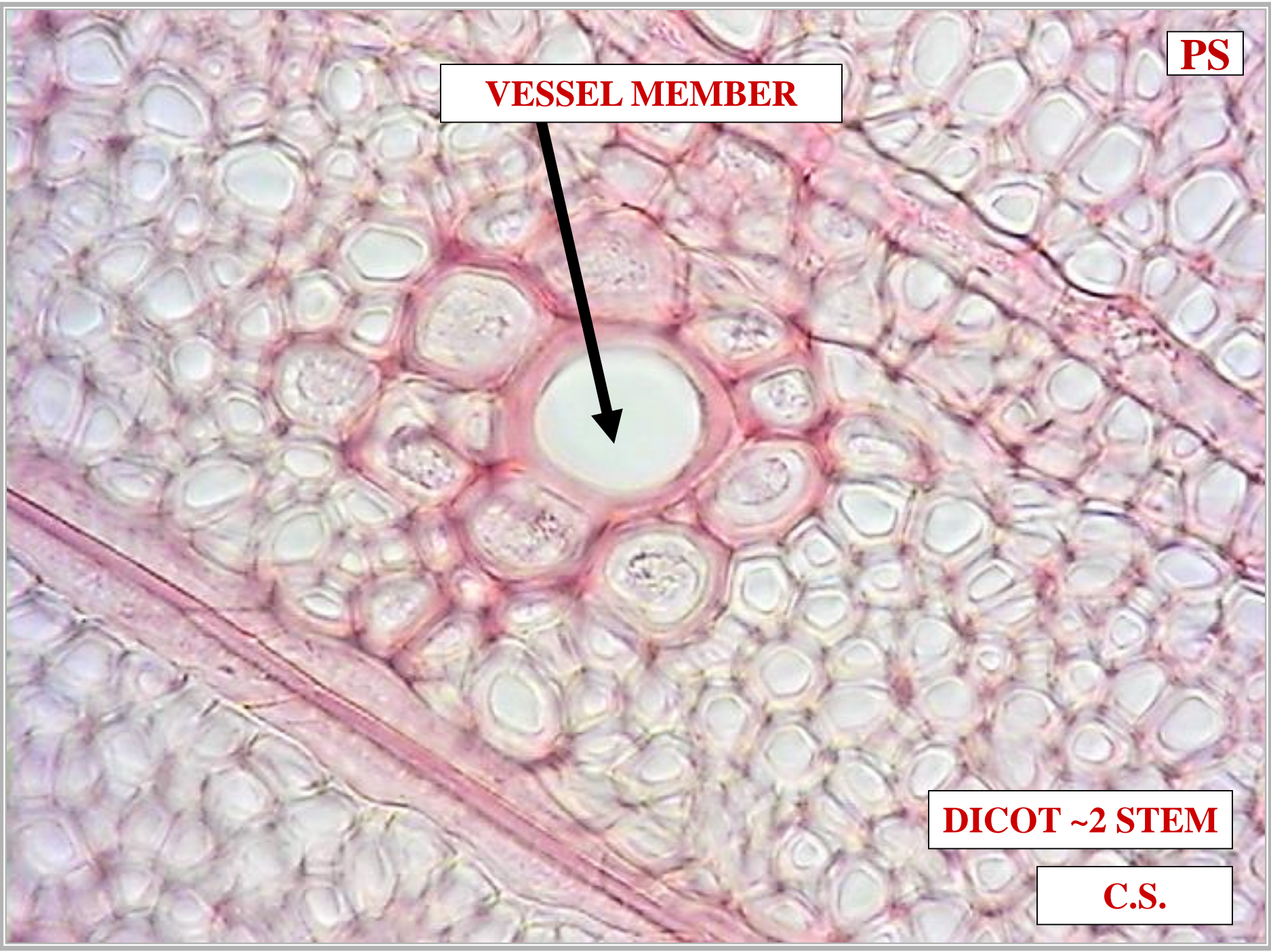
PS

VESSEL MEMBER



DICOT ~2 STEM

C.S.



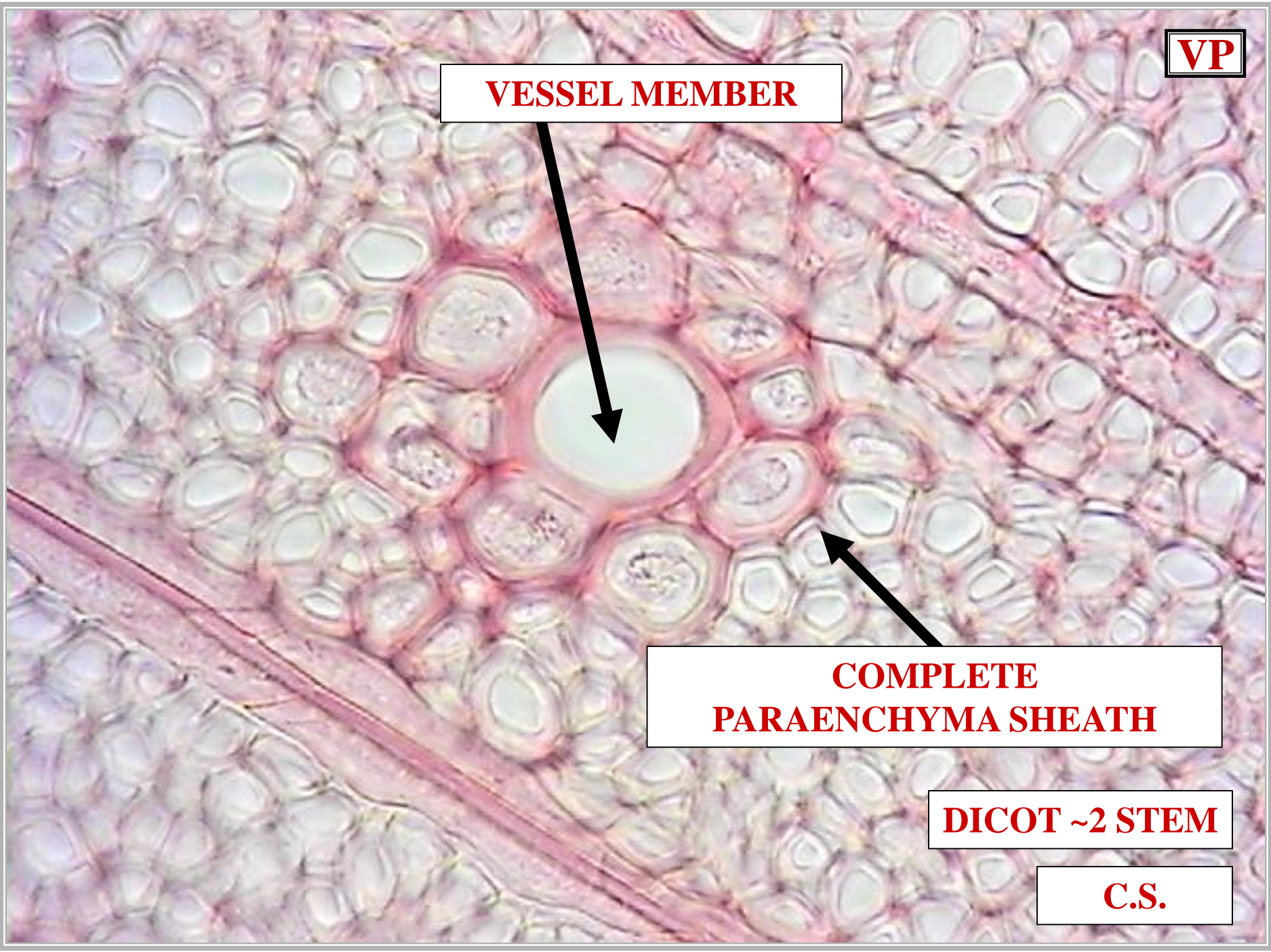
VP

VESSEL MEMBER

**COMPLETE
PARAENCHYMA SHEATH**

DICOT ~2 STEM

C.S.



^

A

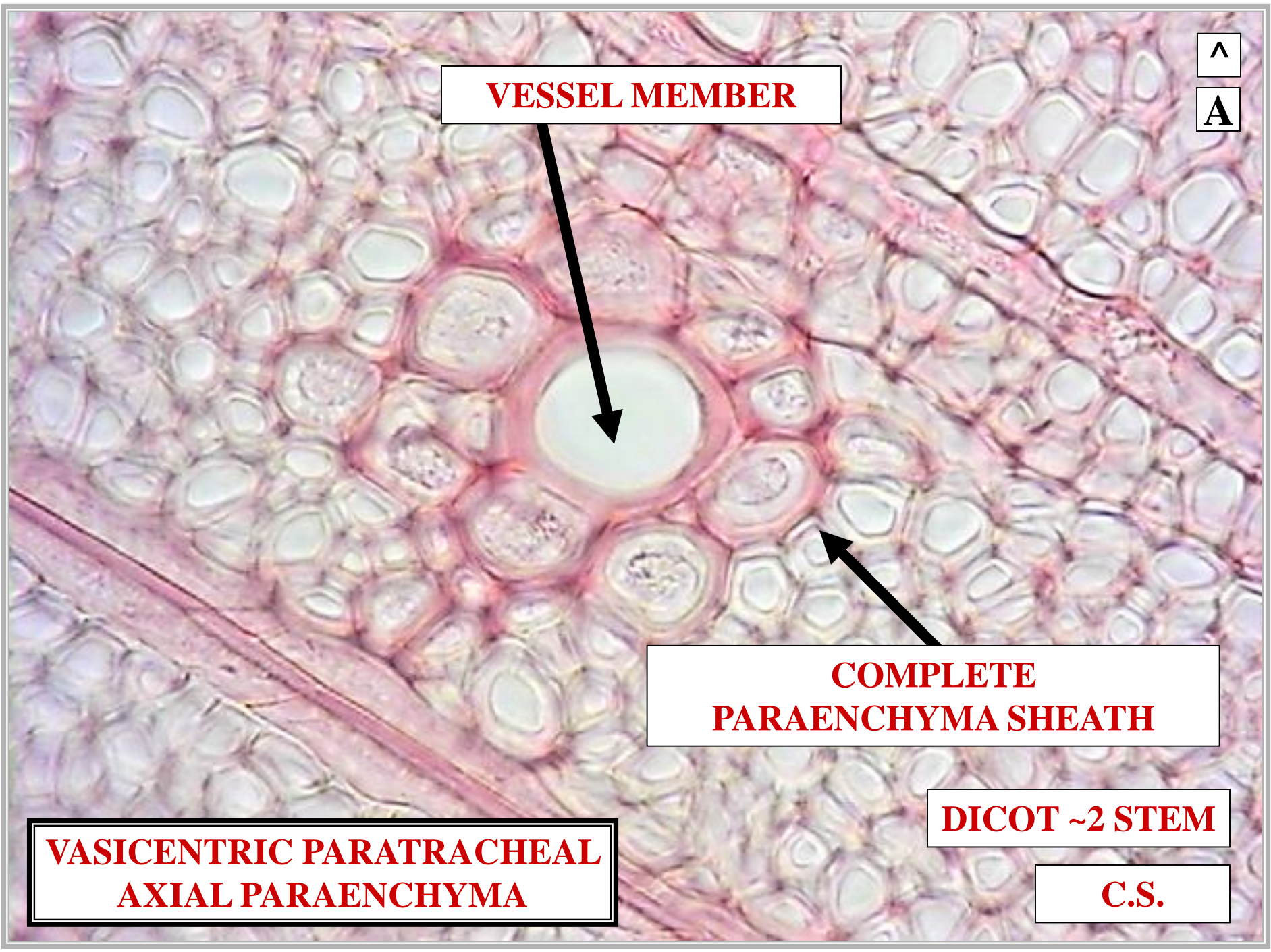
VESSEL MEMBER

**COMPLETE
PARAENCHYMA SHEATH**

**VASICENTRIC PARATRACHEAL
AXIAL PARAENCHYMA**

DICOT ~2 STEM

C.S.



ALIFORM

AXIAL

PARATRACHEAL

PARENCHYMA



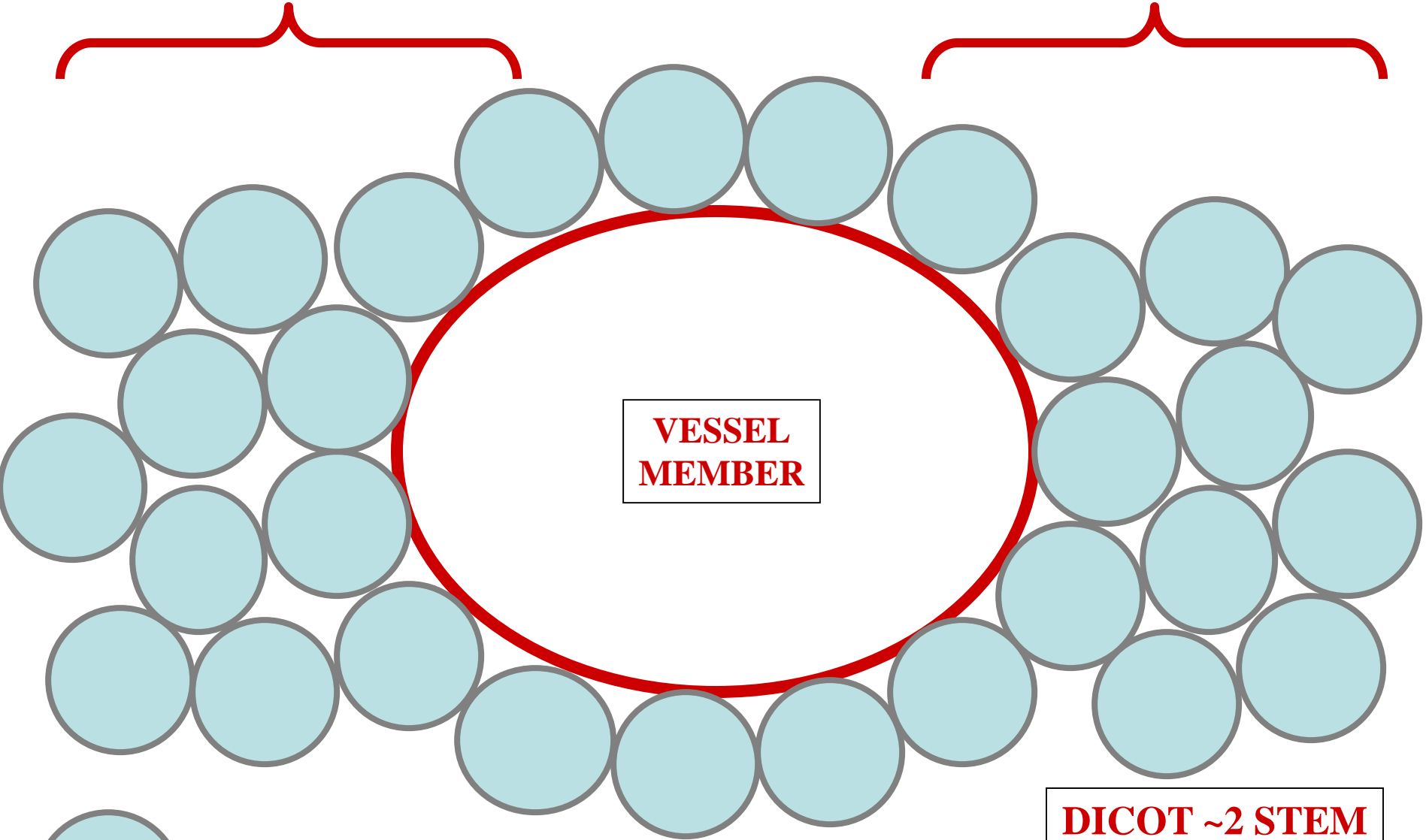
**ALIFORM
AXIAL PARATRACHEAL
PARENCHYMA**

**WING-LIKE
PARENCHYMA SHEATH ABOUT
VESSEL MEMBER**

**ALIFORM
AXIAL PARATRACHEAL
PARENCHYMA**

WING

WING



= AXIAL PARENCHYMA

DICOT ~2 STEM

C.S.

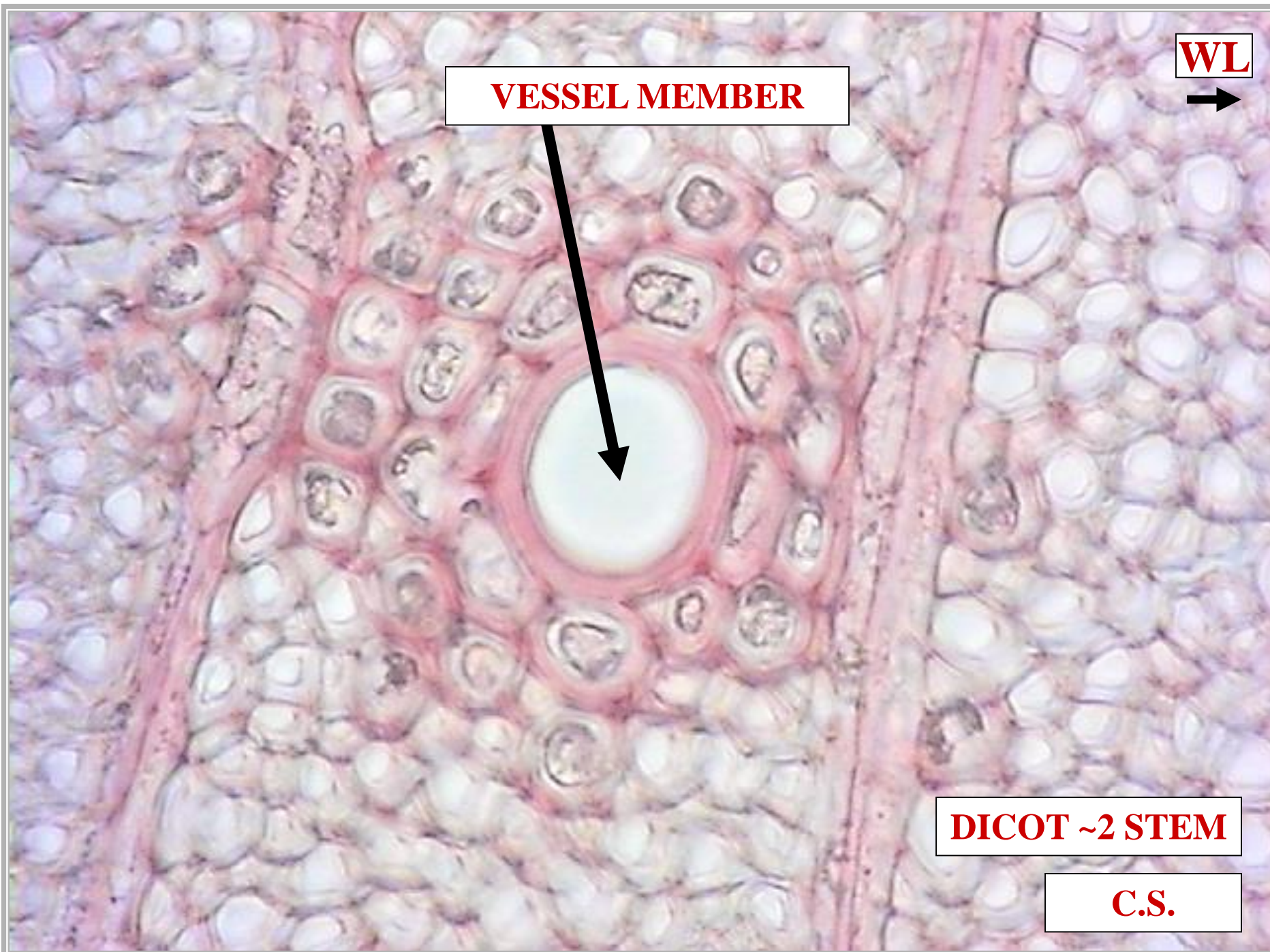
VM



DICOT ~2 STEM

C.S.





VESSEL MEMBER

WL



DICOT ~2 STEM

C.S.

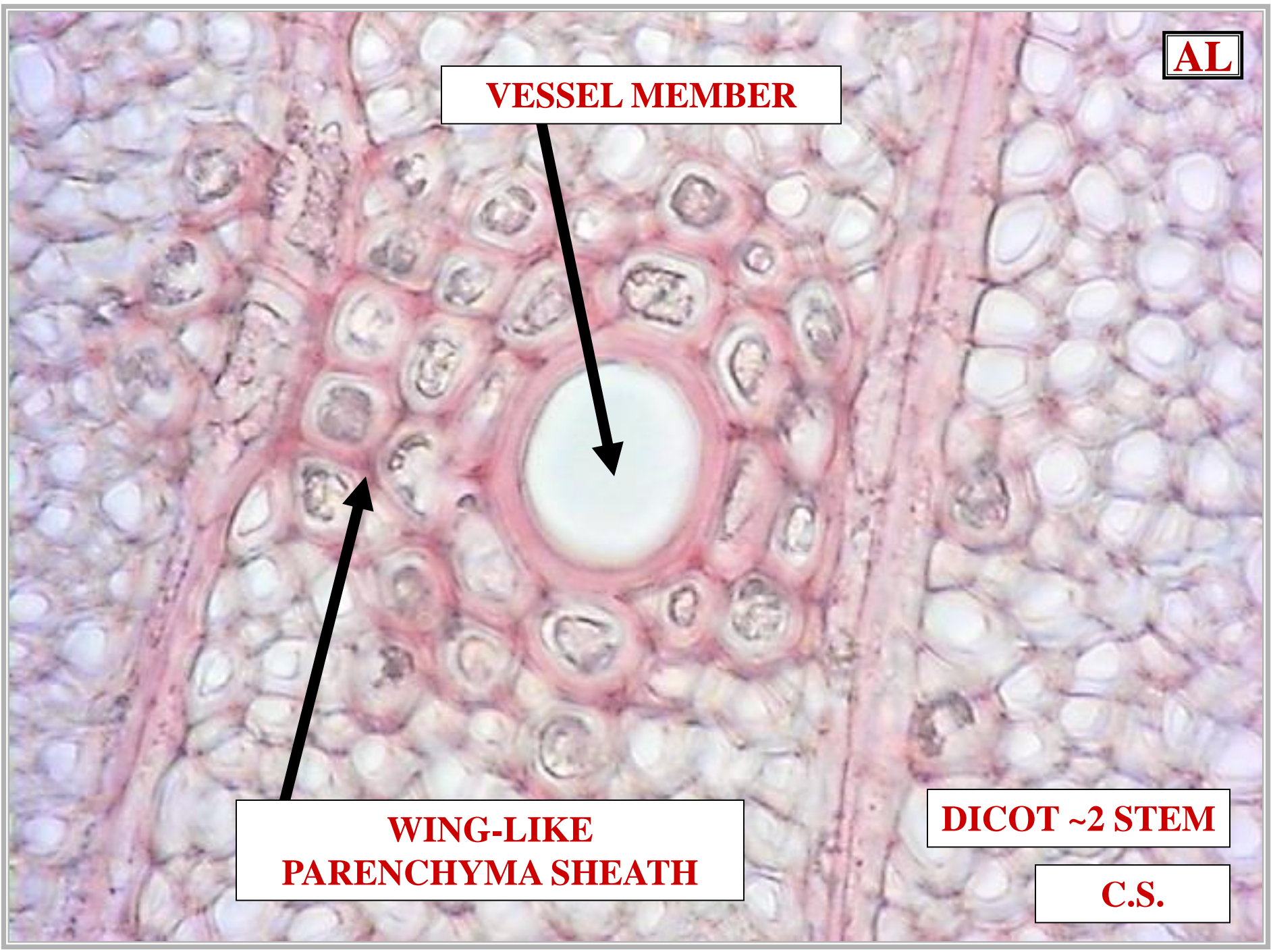
AL

VESSEL MEMBER

**WING-LIKE
PARENCHYMA SHEATH**

DICOT ~2 STEM

C.S.





VESSEL MEMBER



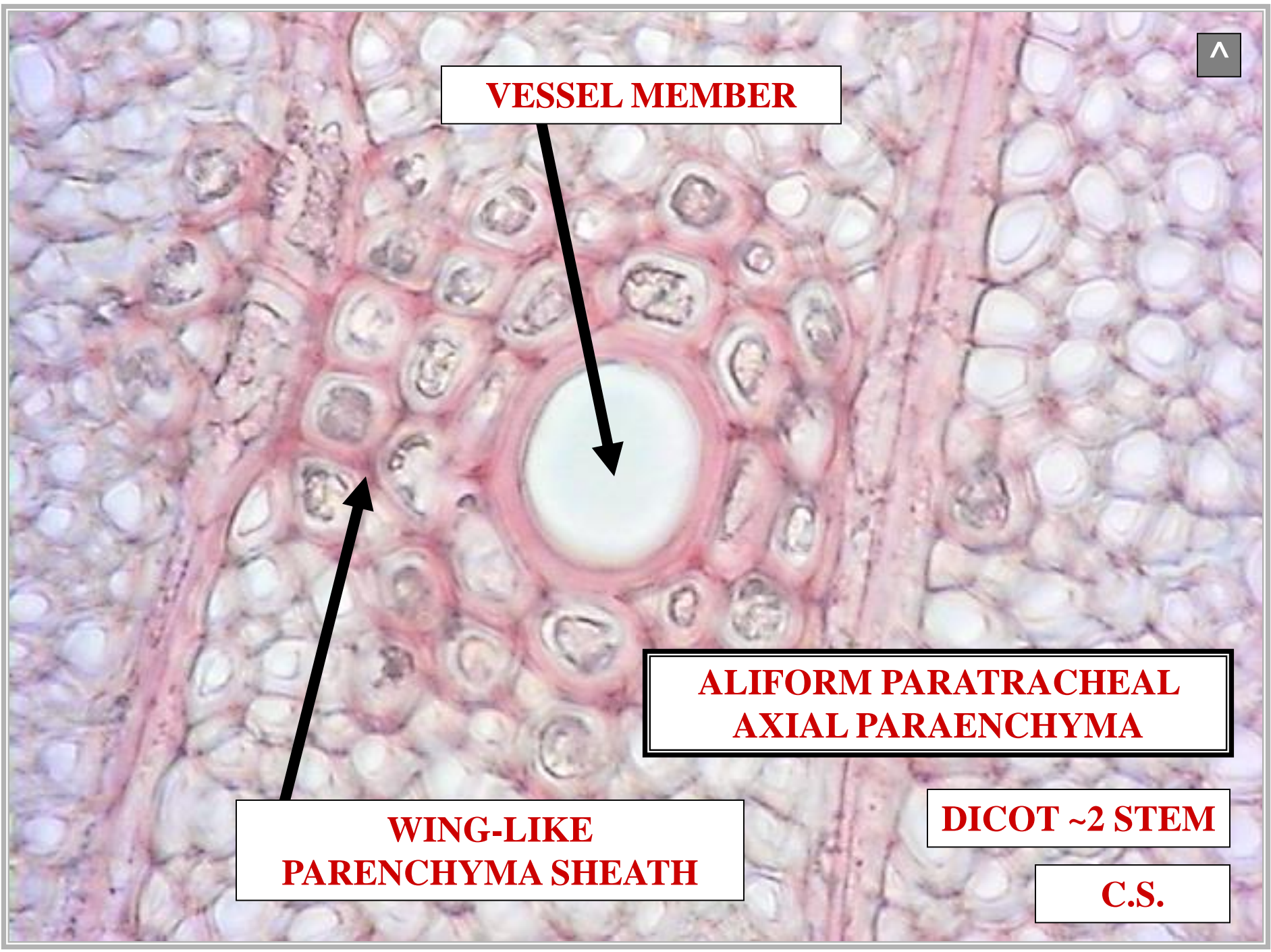
**ALIFORM PARATRACHEAL
AXIAL PARAENCHYMA**

**WING-LIKE
PARENCHYMA SHEATH**



DICOT ~2 STEM

C.S.



TYLOSES

TYLOSES



**TYLOSES
AXIAL PARATRACHEAL
PARENCHYMA**

**PARENCHYMA CELL GROWS
INTO VESSEL MEMBER VIA PITS**

**TYLOSES
AXIAL PARATRACHEAL
PARENCHYMA**

**TYLOSES
AXIAL PARATRACHEAL
PARENCHYMA**



**PARENCHYMA CELL GROWS
INTO VESSEL MEMBER VIA PITS**

OBSTRUCTS WATER FLOW

**TYLOSES
AXIAL PARATRACHEAL
PARENCHYMA**



P

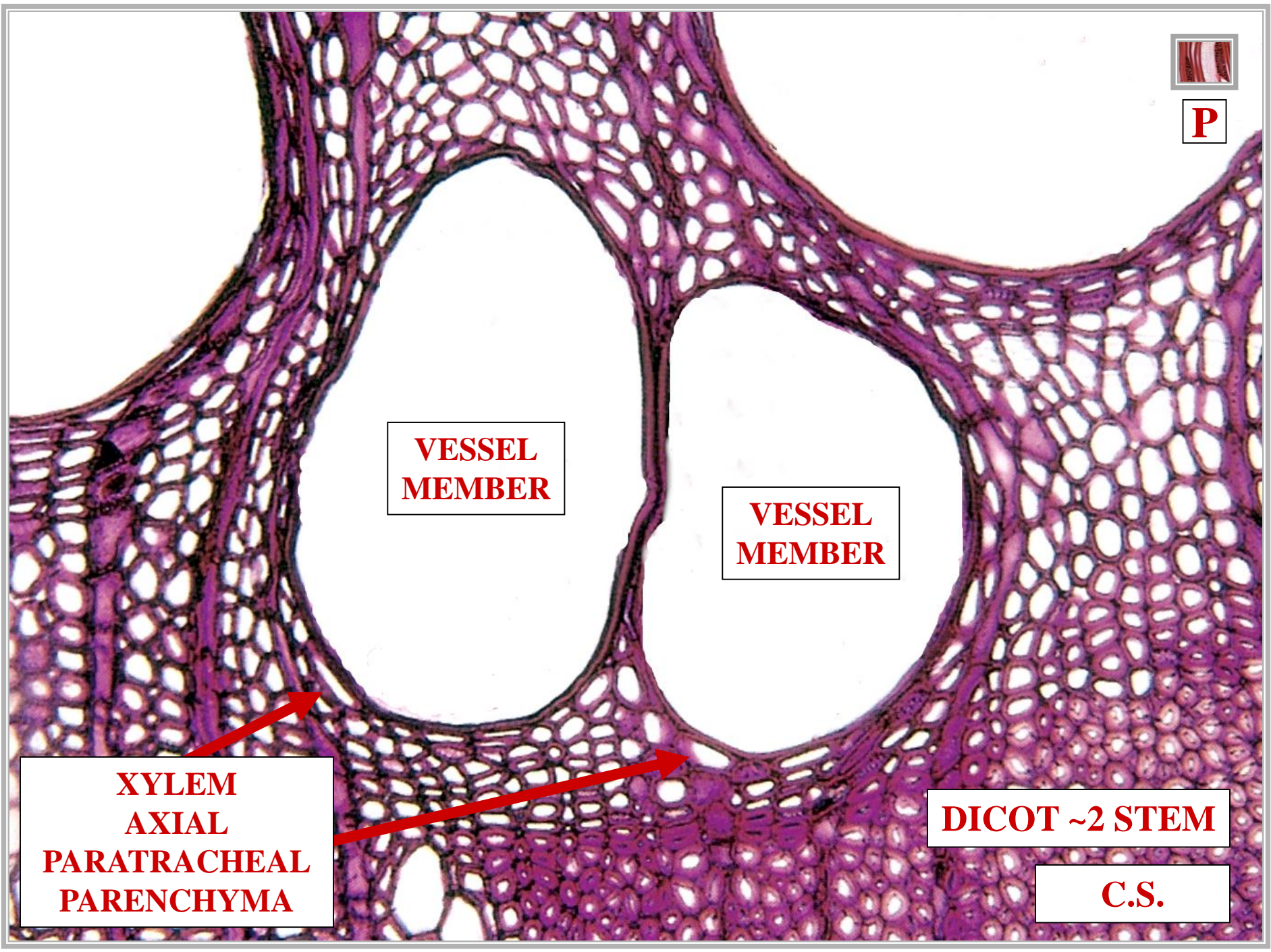
**VESSEL
MEMBER**

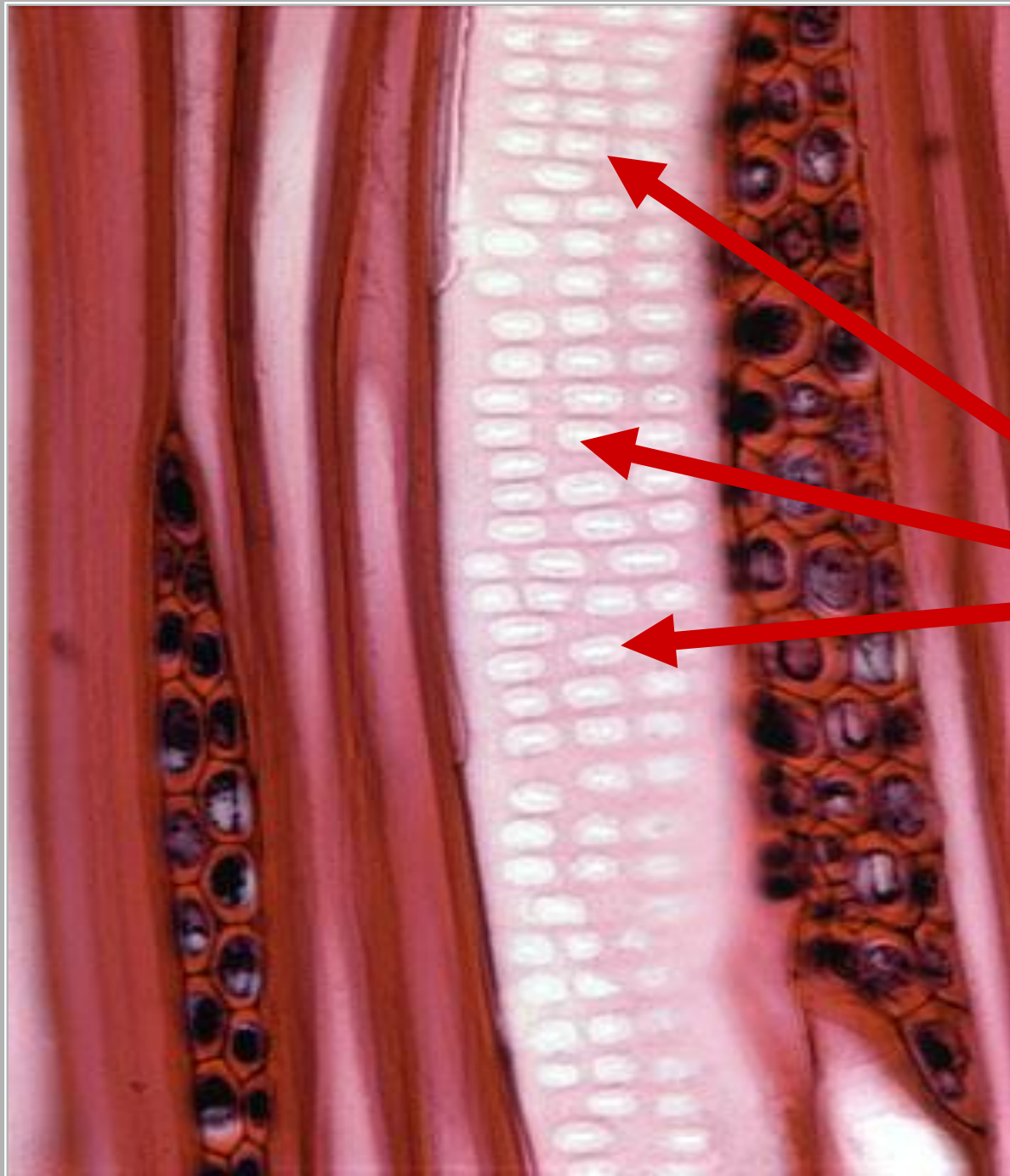
**VESSEL
MEMBER**

**XYLEM
AXIAL
PARATRACHEAL
PARENCHYMA**

DICOT ~2 STEM

C.S.





**VESSEL
MEMBER**

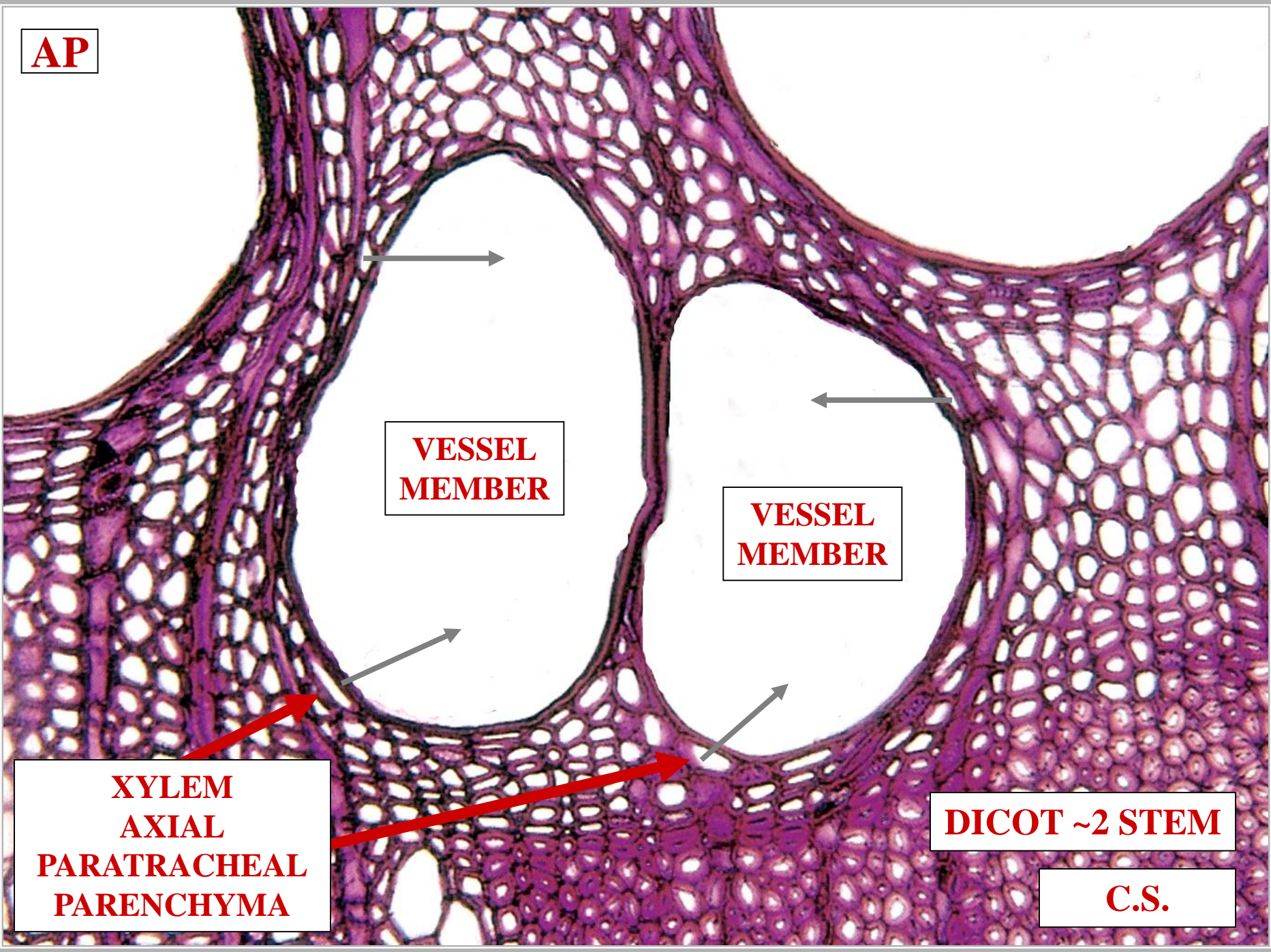


PITS

DICOT ~2 STEM

L.S.

AP



**VESSEL
MEMBER**

**VESSEL
MEMBER**

**XYLEM
AXIAL
PARATRACHEAL
PARENCHYMA**

DICOT ~2 STEM

C.S.

TY

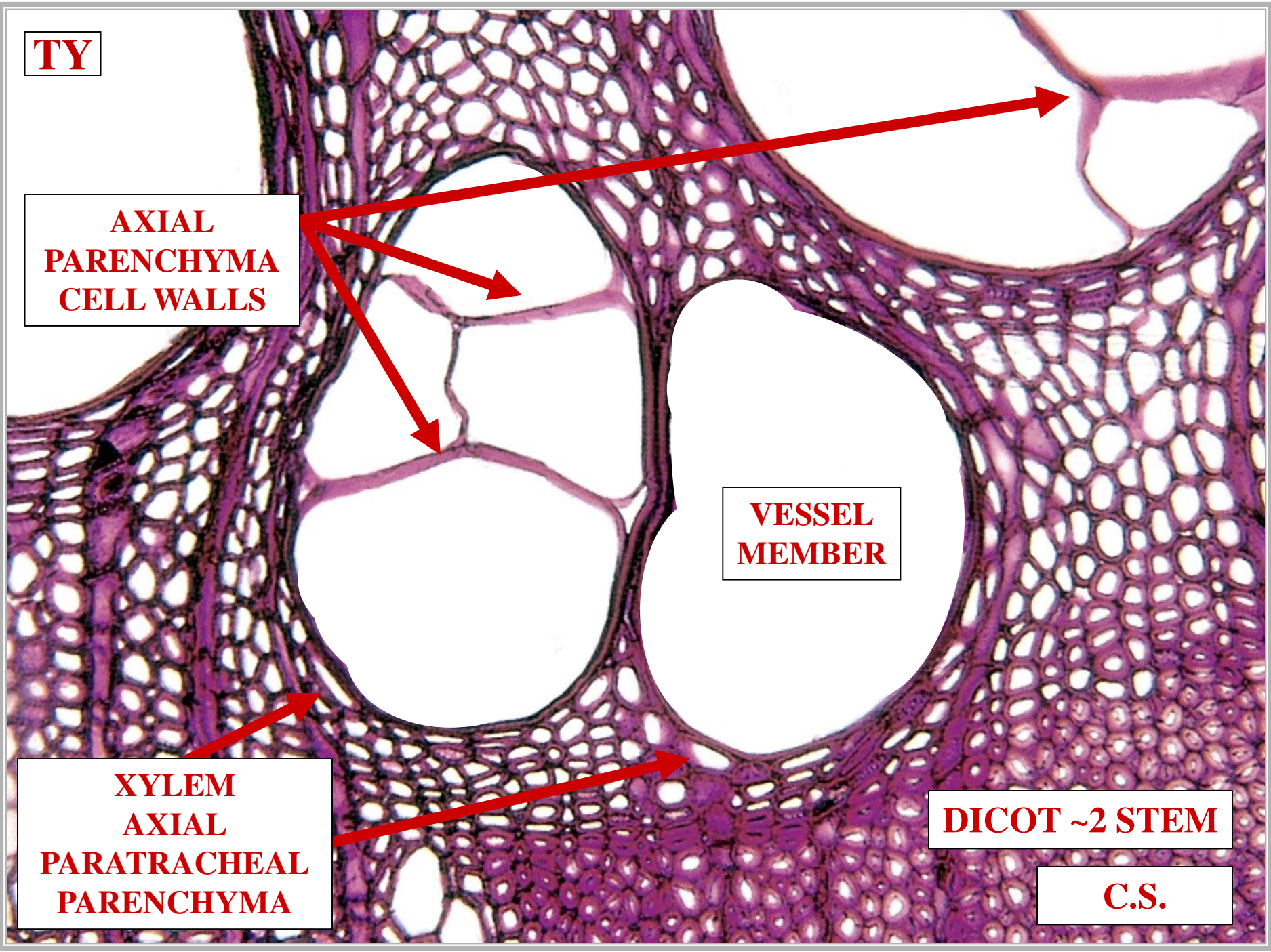
**AXIAL
PARENCHYMA
CELL WALLS**

**VESSEL
MEMBER**

**XYLEM
AXIAL
PARATRACHEAL
PARENCHYMA**

DICOT ~2 STEM

C.S.



W

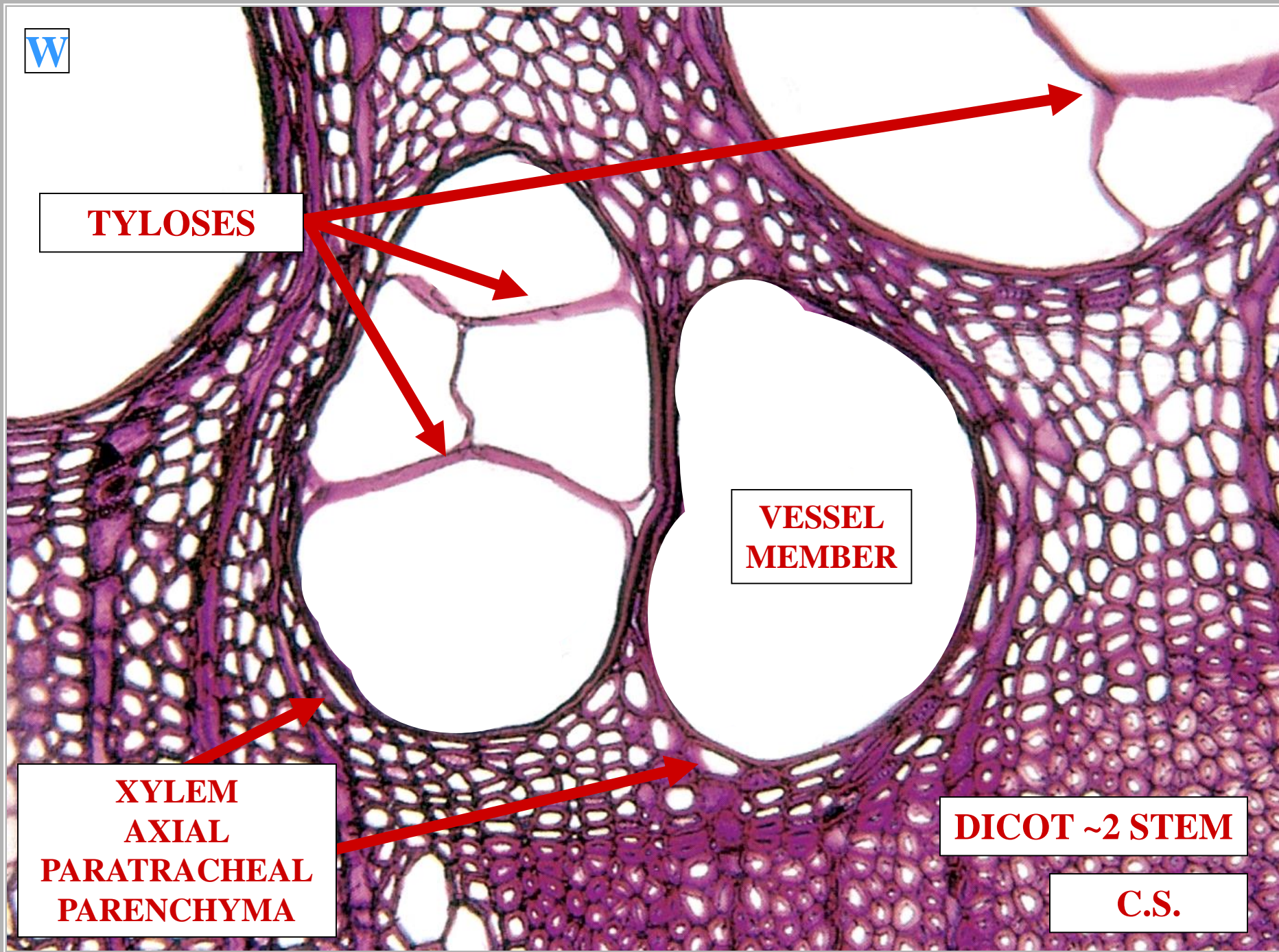
TYLOSES

**VESSEL
MEMBER**

**XYLEM
AXIAL
PARATRACHEAL
PARENCHYMA**

DICOT ~2 STEM

C.S.





LS



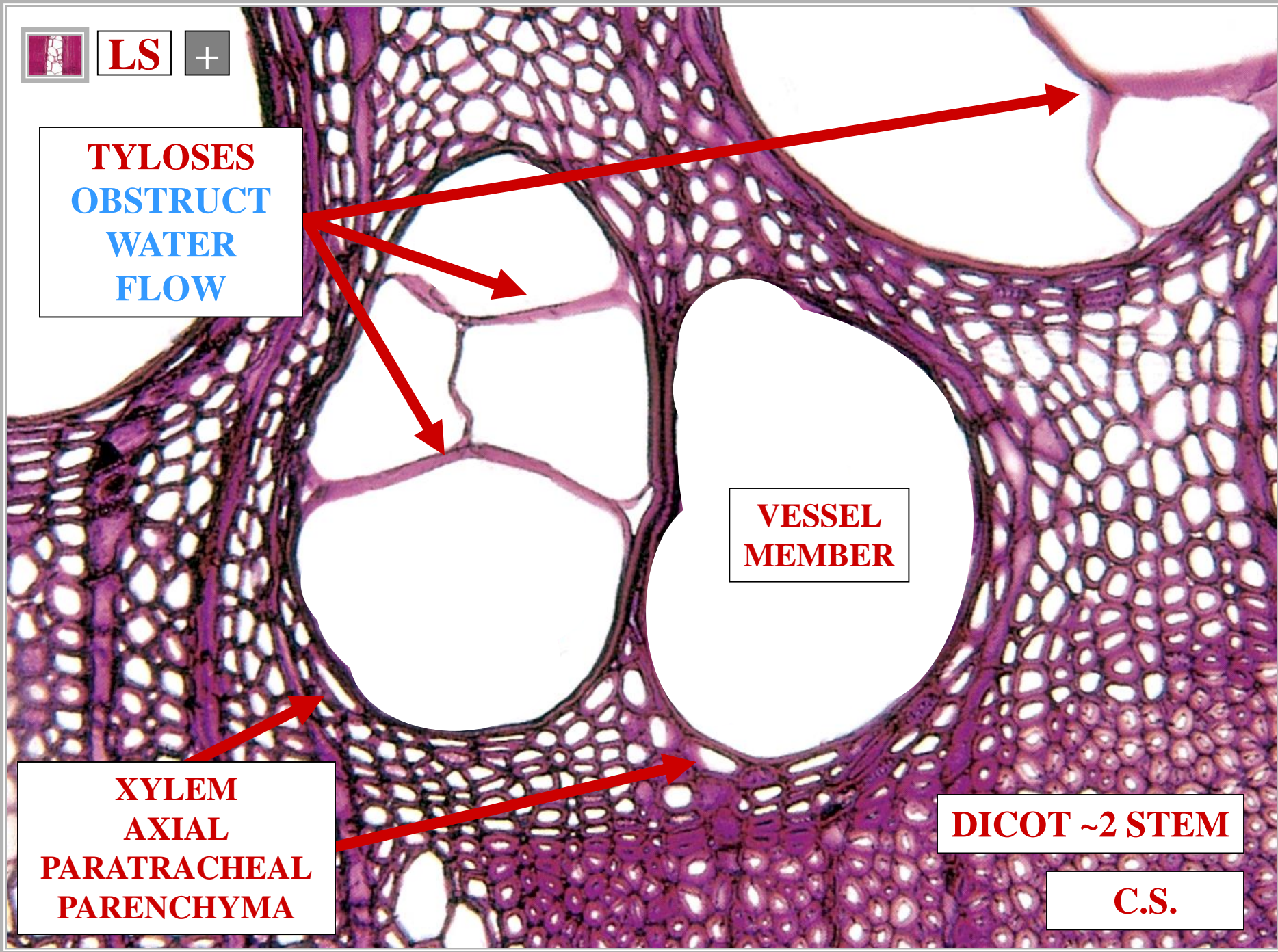
**TYLOSES
OBSTRUCT
WATER
FLOW**

**VESSEL
MEMBER**

**XYLEM
AXIAL
PARATRACHEAL
PARENCHYMA**

DICOT ~2 STEM

C.S.



0

TYLOSES

**AXIAL
PARATRACHEAL
PARENCHYMA**

**AXIAL
PARATRACHEAL
PARENCHYMA
CELL WALLS**

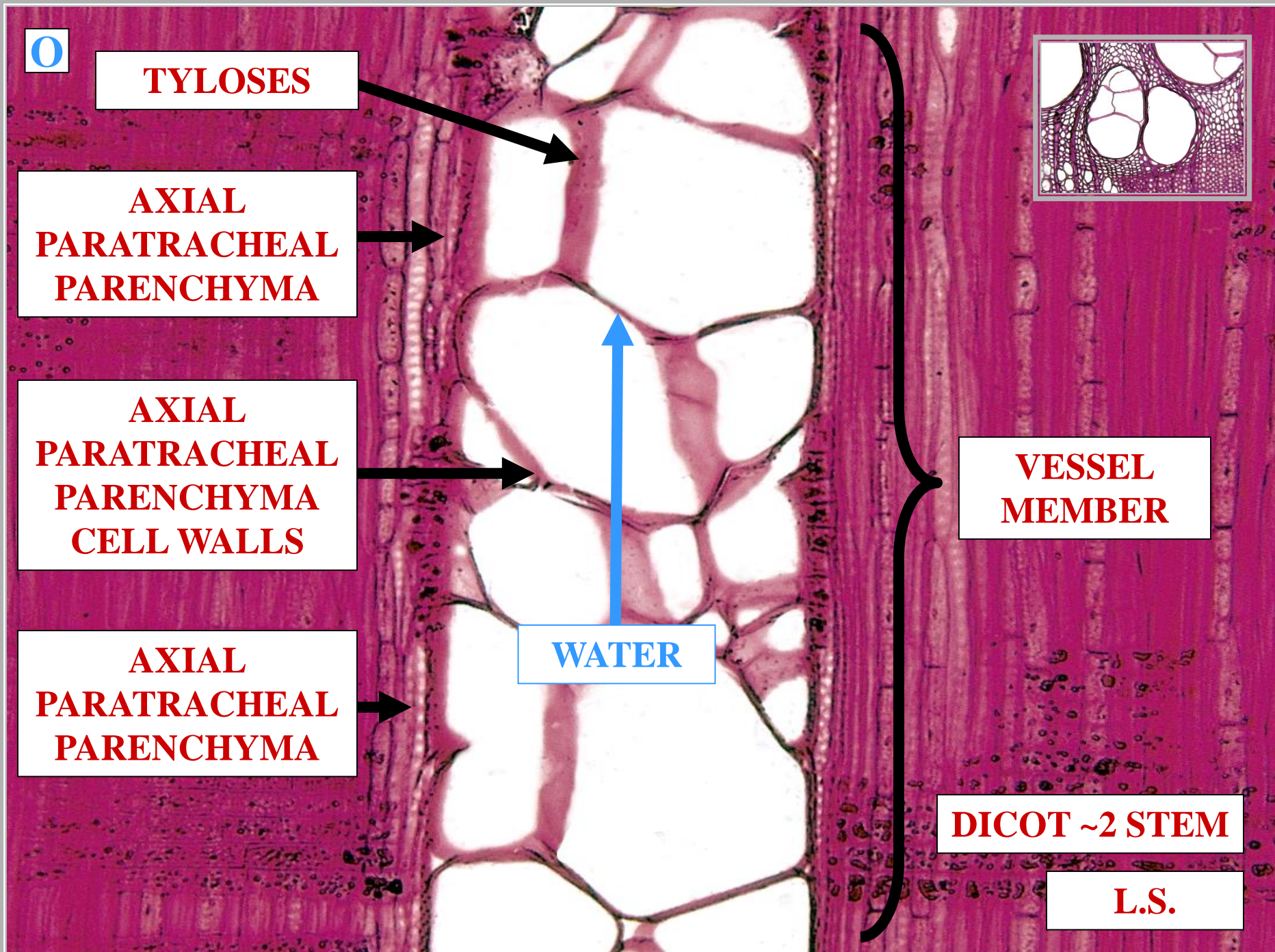
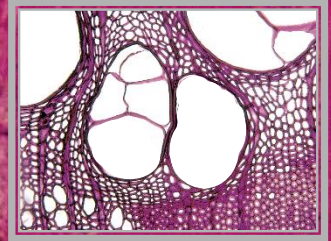
**AXIAL
PARATRACHEAL
PARENCHYMA**

WATER

**VESSEL
MEMBER**

DICOT ~2 STEM

L.S.



^

TYLOSES

**AXIAL
PARATRACHEAL
PARENCHYMA**

**TYLOSES
OBSTRUCT
WATER
FLOW**

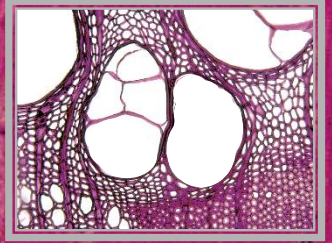
**AXIAL
PARATRACHEAL
PARENCHYMA**

WATER

**VESSEL
MEMBER**

DICOT ~2 STEM

L.S.



**AXIAL
APOTRACHEAL
PARENCHYMA**

**AXIAL
APOTRACHEAL
PARENCHYMA**

AXIAL APOTRACHEAL PARENCHYMA



**NO OBLIGATE
VESSEL MEMBRANE
ASSOCIATION**

**AXIAL APOTRACHEAL
PARENCHYMA**



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VESSEL MEMBERS

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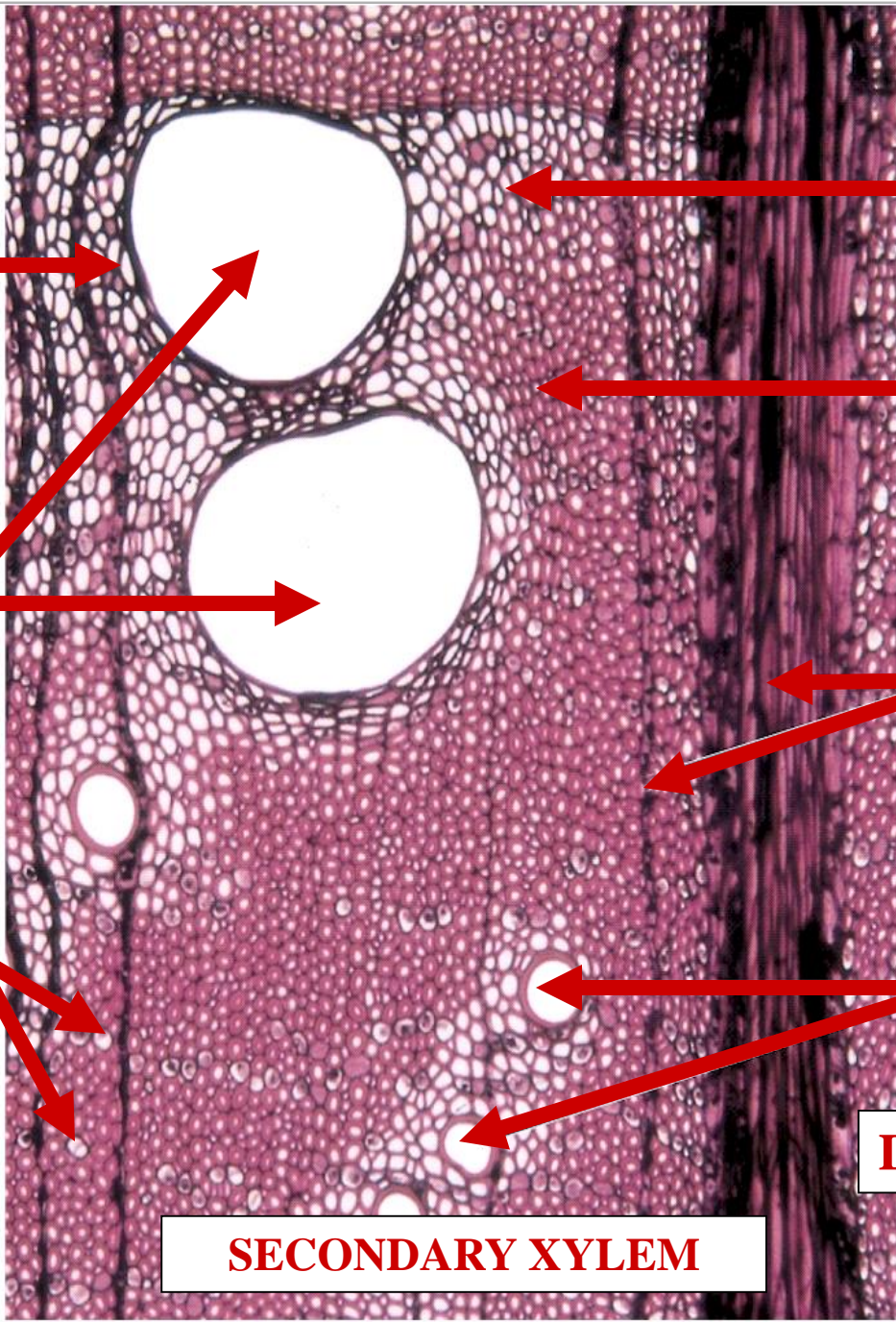
APOTRACHEAL PARENCHYMA

VESSEL MEMBERS

DICOT ~2 STEM

SECONDARY XYLEM

C.S.



**AXIAL
APOTRACHEAL
PARENCHYMA
TYPES**

**SECONDARY XYLEM
AXIAL APOTRACHEAL
PARENCHYMA CELL TYPES**

DIFFUSE

**SECONDARY XYLEM
AXIAL APOTRACHEAL
PARENCHYMA CELL TYPES**

**SECONDARY XYLEM
AXIAL APOTRACHEAL
PARENCHYMA CELL TYPES**

**DIFFUSE
BANDED**

**SECONDARY XYLEM
AXIAL APOTRACHEAL
PARENCHYMA CELL TYPES**

**SECONDARY XYLEM
AXIAL APOTRACHEAL
PARENCHYMA CELL TYPES**

DIFFUSE

BANDED

TERMINAL

**SECONDARY XYLEM
AXIAL APOTRACHEAL
PARENCHYMA CELL TYPES**

DIFFUSE

AXIAL

APOTRACHEAL

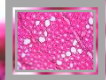
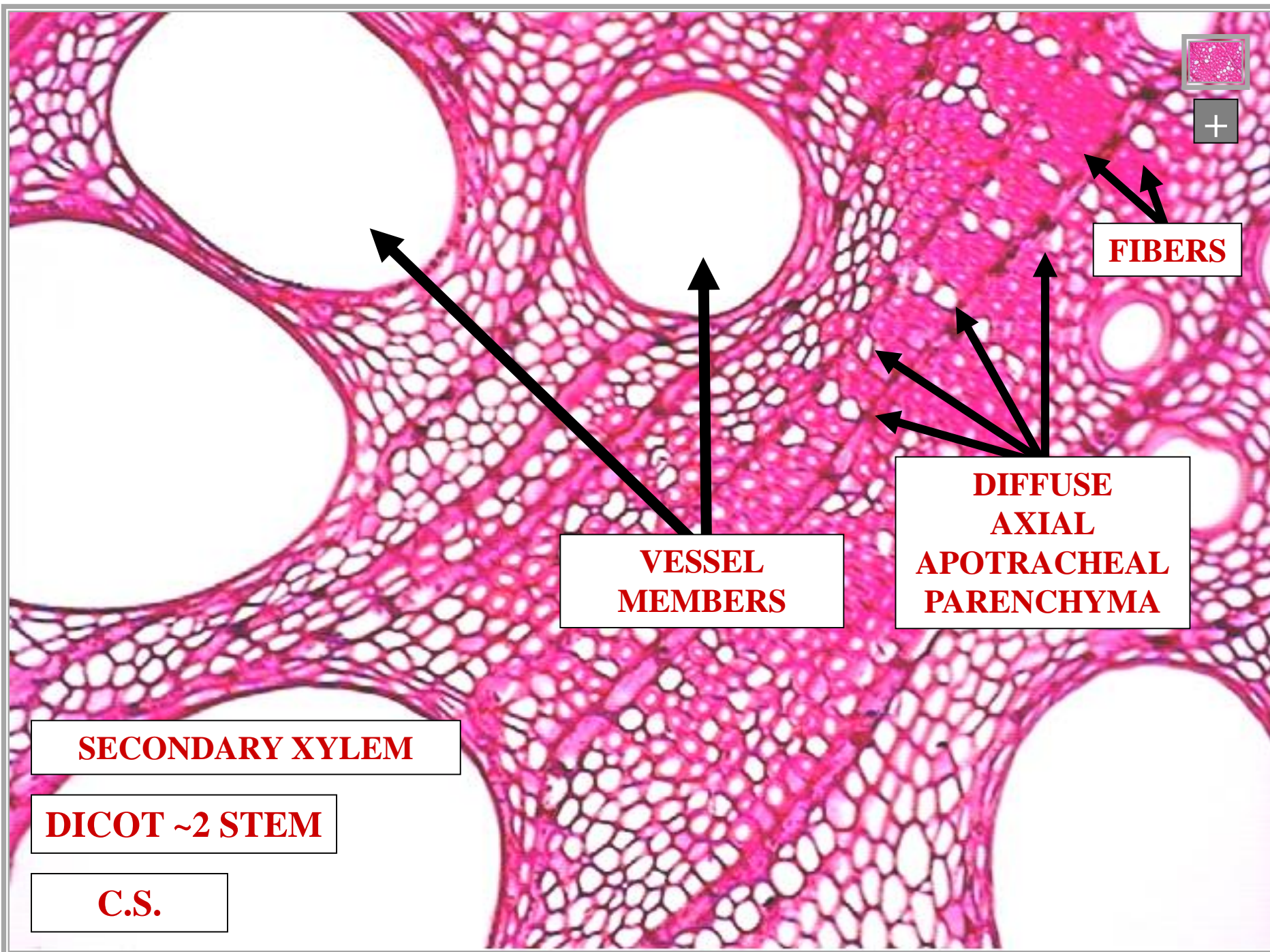
PARENCHYMA



**DIFFUSE
AXIAL APOTRACHEAL
PARENCHYMA**

ISOLATED PARENCHYMA CELLS

**DIFFUSE
AXIAL APOTRACHEAL
PARENCHYMA**



FIBERS

**DIFFUSE
AXIAL
APOTRACHEAL
PARENCHYMA**

**VESSEL
MEMBERS**

SECONDARY XYLEM

DICOT ~2 STEM

C.S.

^
B

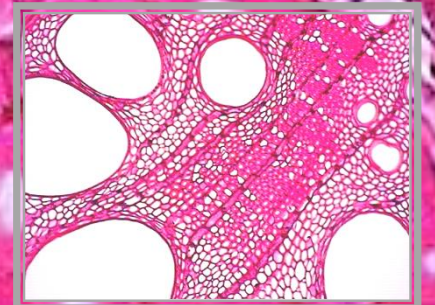
FIBERS

**DIFFUSE
AXIAL
APOTRACHEAL
PARENCHYMA**

SECONDARY XYLEM

DICOT ~2 STEM

C.S.



BANDED

AXIAL

APOTRACHEAL

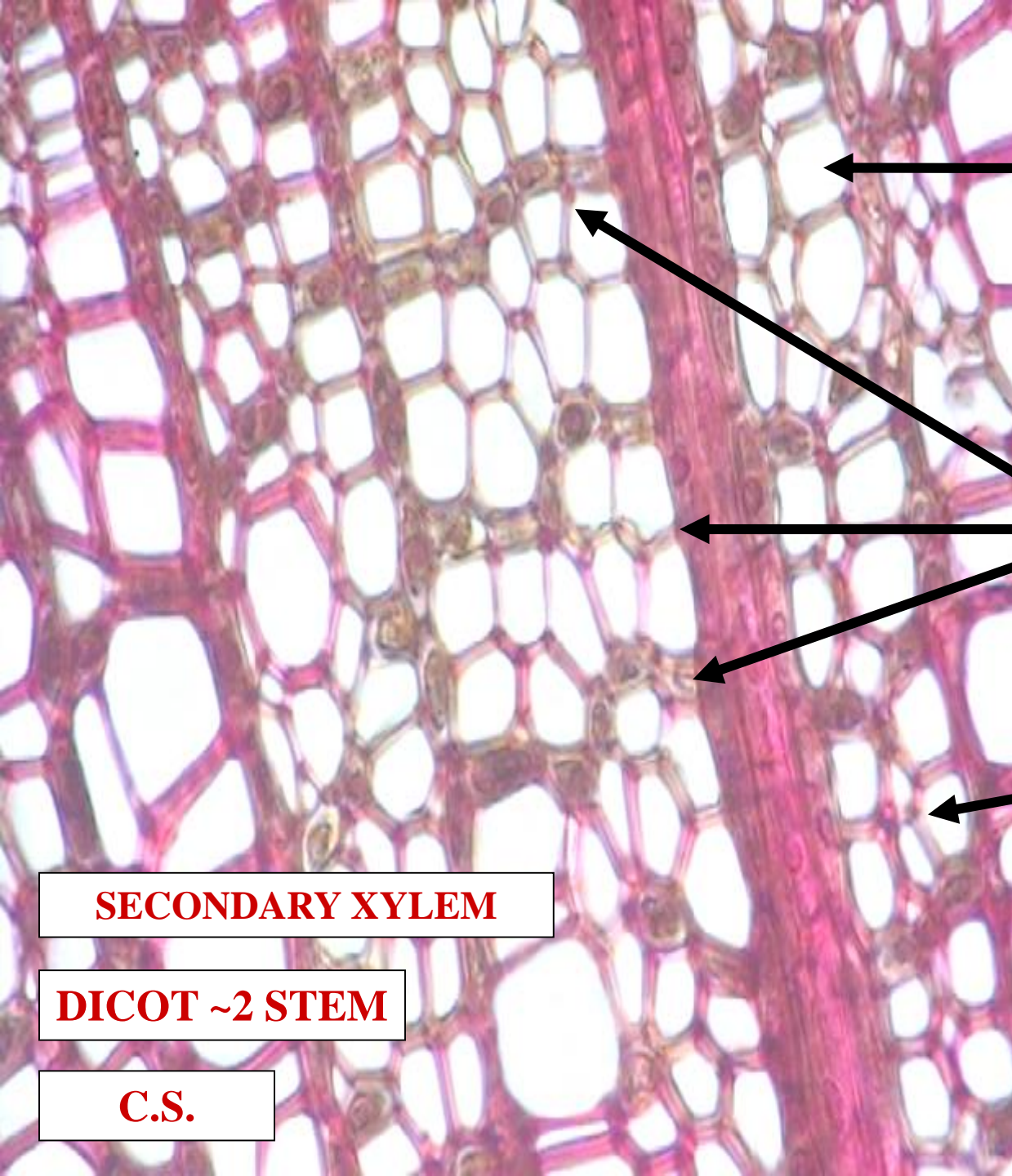
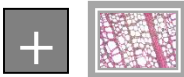
PARENCHYMA



**BANDED
AXIAL APOTRACHEAL
PARENCHYMA**

PARENCHYMA CELL STRANDS

**BANDED
AXIAL APOTRACHEAL
PARENCHYMA**



FIBER

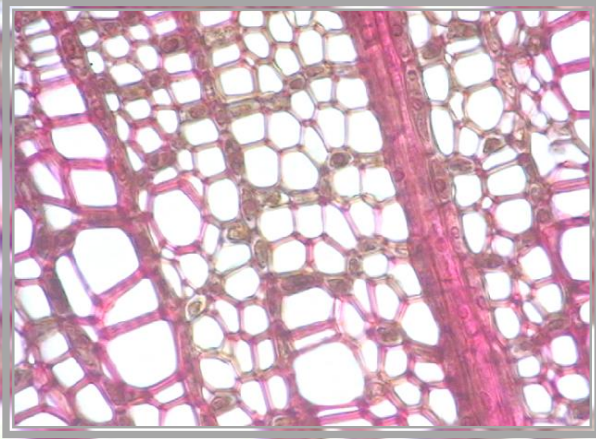
**BANDED
AXIAL
APOTRACHEAL
PARENCHYMA**

FIBER

SECONDARY XYLEM

DICOT ~2 STEM

C.S.



FIBER

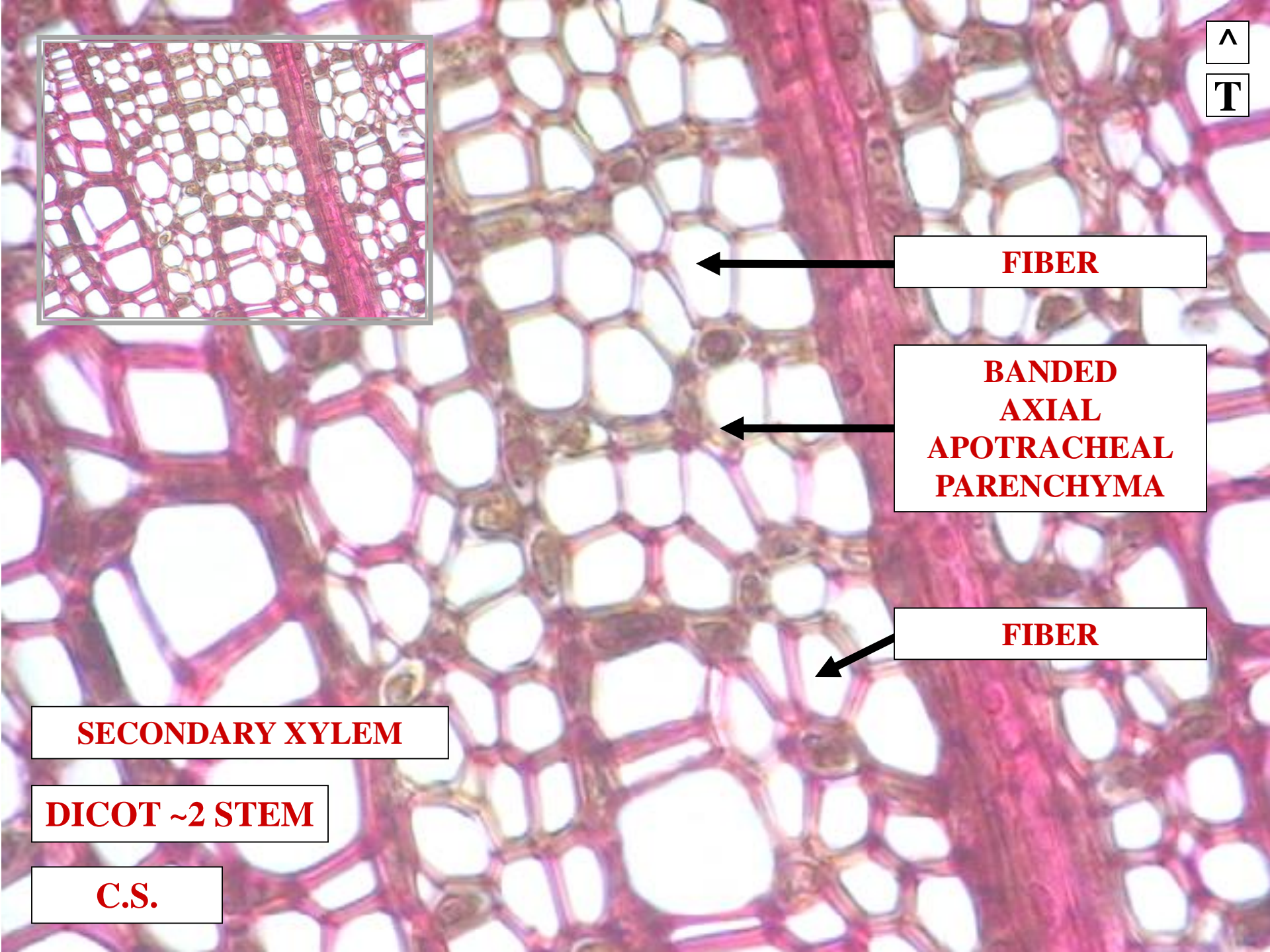
**BANDED
AXIAL
APOTRACHEAL
PARENCHYMA**

FIBER

SECONDARY XYLEM

DICOT ~2 STEM

C.S.



TERMINAL

AXIAL

APOTRACHEAL

PARENCHYMA



**TERMINAL
AXIAL
APOTRACHEAL
PARENCHYMA**

PARENCHYMA CELL STRANDS

**TERMINAL
AXIAL
APOTRACHEAL
PARENCHYMA**



TERMINAL

AXIAL

APOTRACHEAL

PARENCHYMA

PARENCHYMA CELL STRANDS

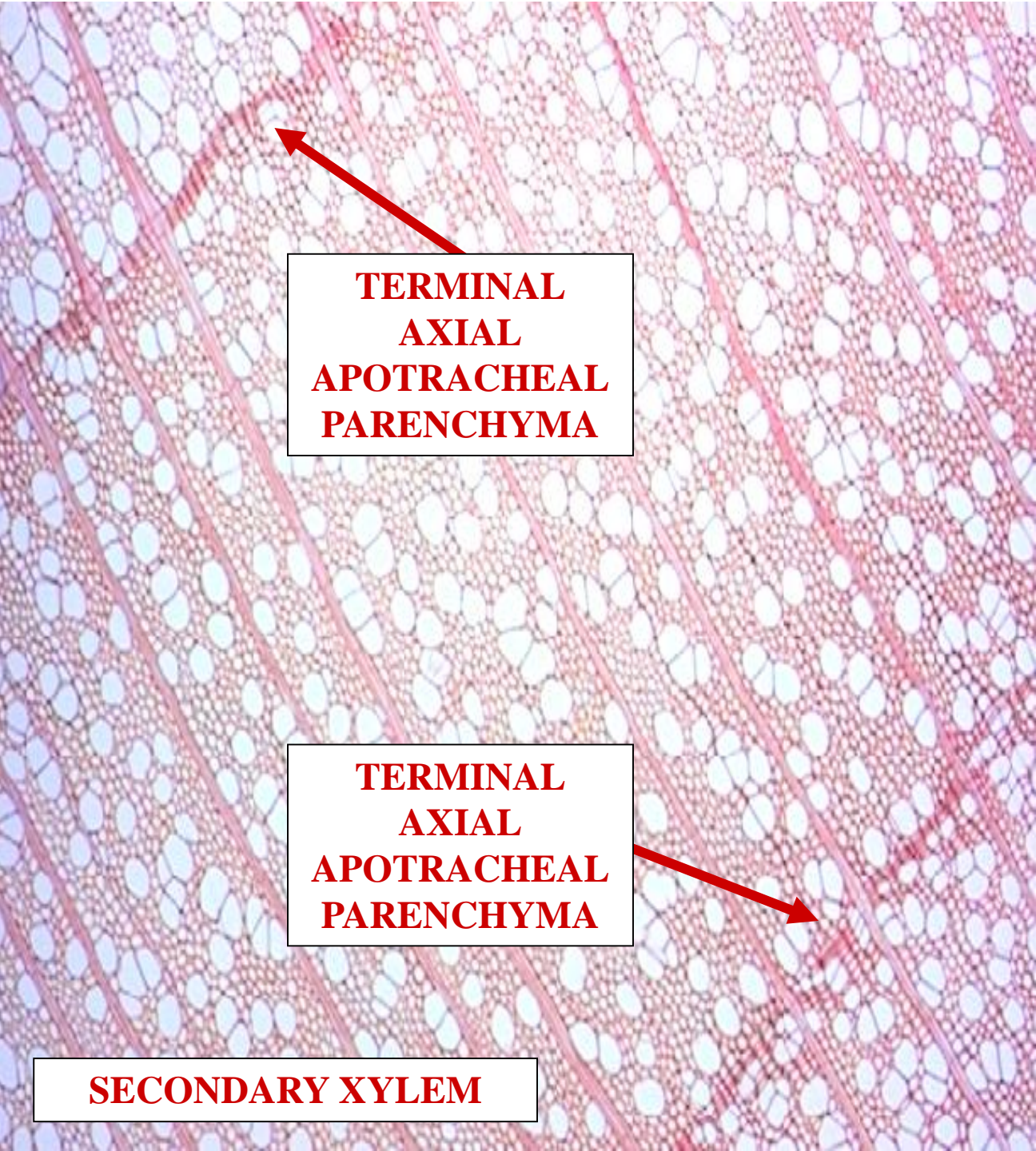
END ANNUAL RING

TERMINAL

AXIAL

APOTRACHEAL

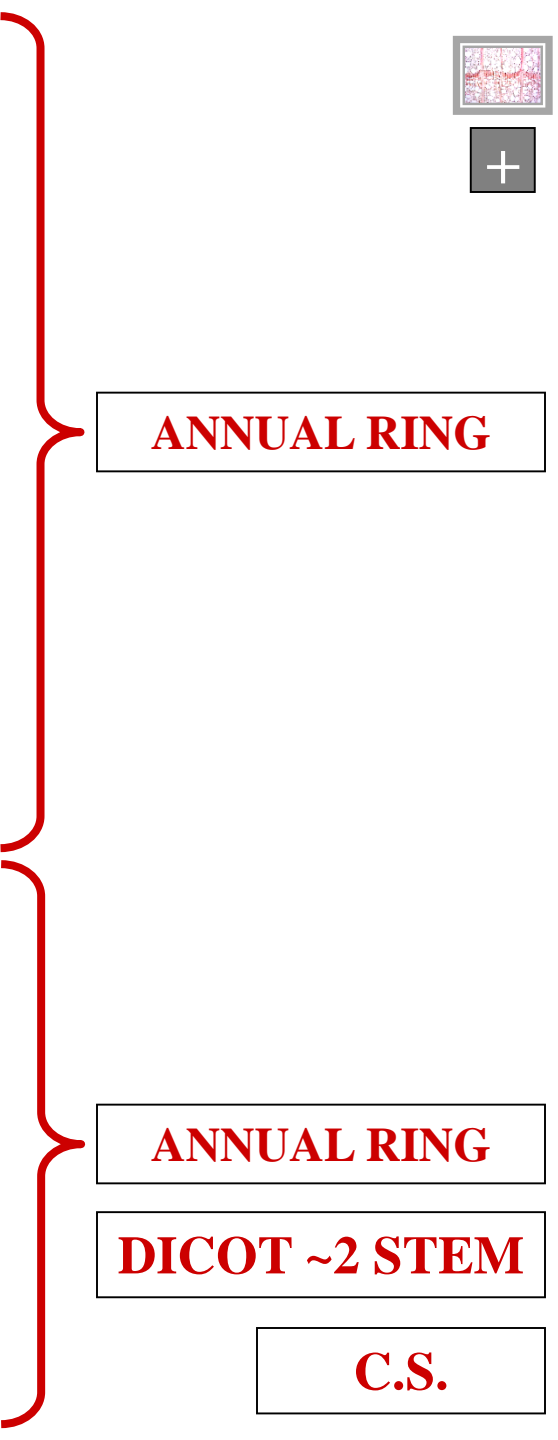
PARENCHYMA

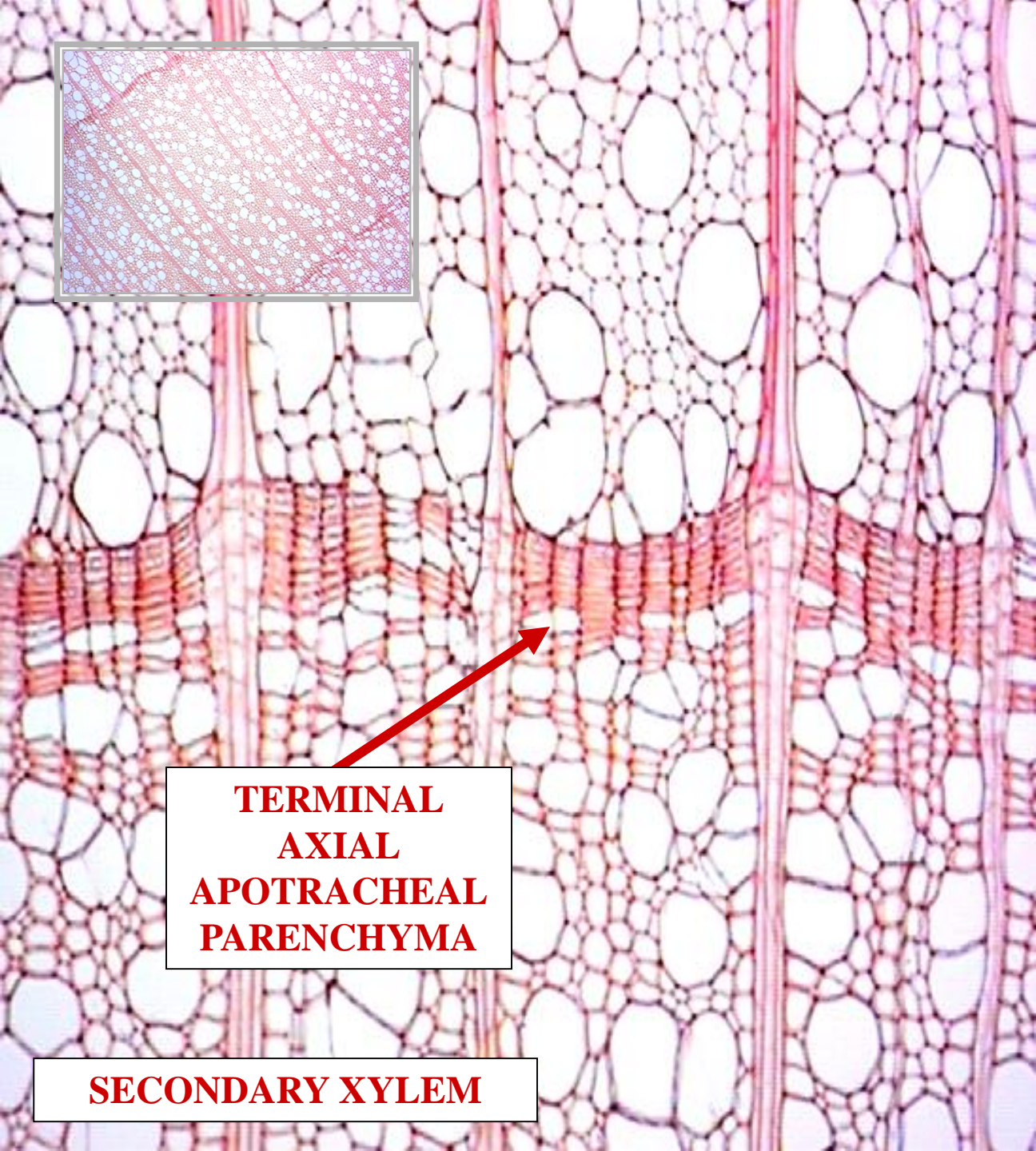


**TERMINAL
AXIAL
APOTRACHEAL
PARENCHYMA**

**TERMINAL
AXIAL
APOTRACHEAL
PARENCHYMA**

SECONDARY XYLEM





ANNUAL RING

ANNUAL RING

DICOT ~2 STEM

C.S.

**TERMINAL
AXIAL
APOTRACHEAL
PARENCHYMA**

SECONDARY XYLEM

RAY
PARENCHYMA

RAY

PARENCHYMA

**SECONDARY XYLEM TISSUE
RAY PARENCHYMA**

LATERAL ORIENTATION

**SECONDARY XYLEM TISSUE
RAY PARENCHYMA**

SECONDARY XYLEM TISSUE RAY PARENCHYMA



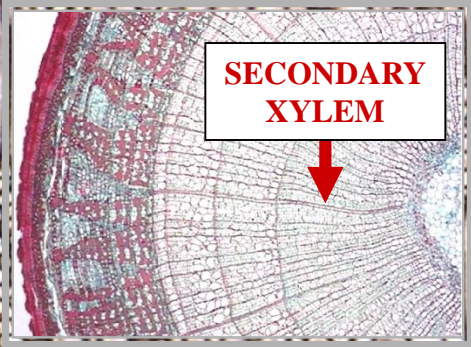
LATERAL ORIENTATION

RAY INITIAL DERIVED

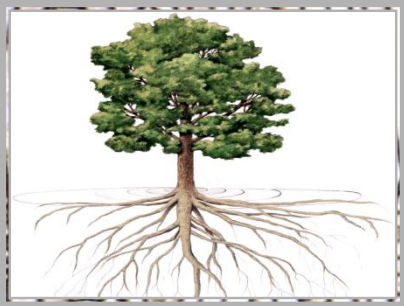
SECONDARY XYLEM TISSUE RAY PARENCHYMA

LO

**RAY
PARENCHYMA**

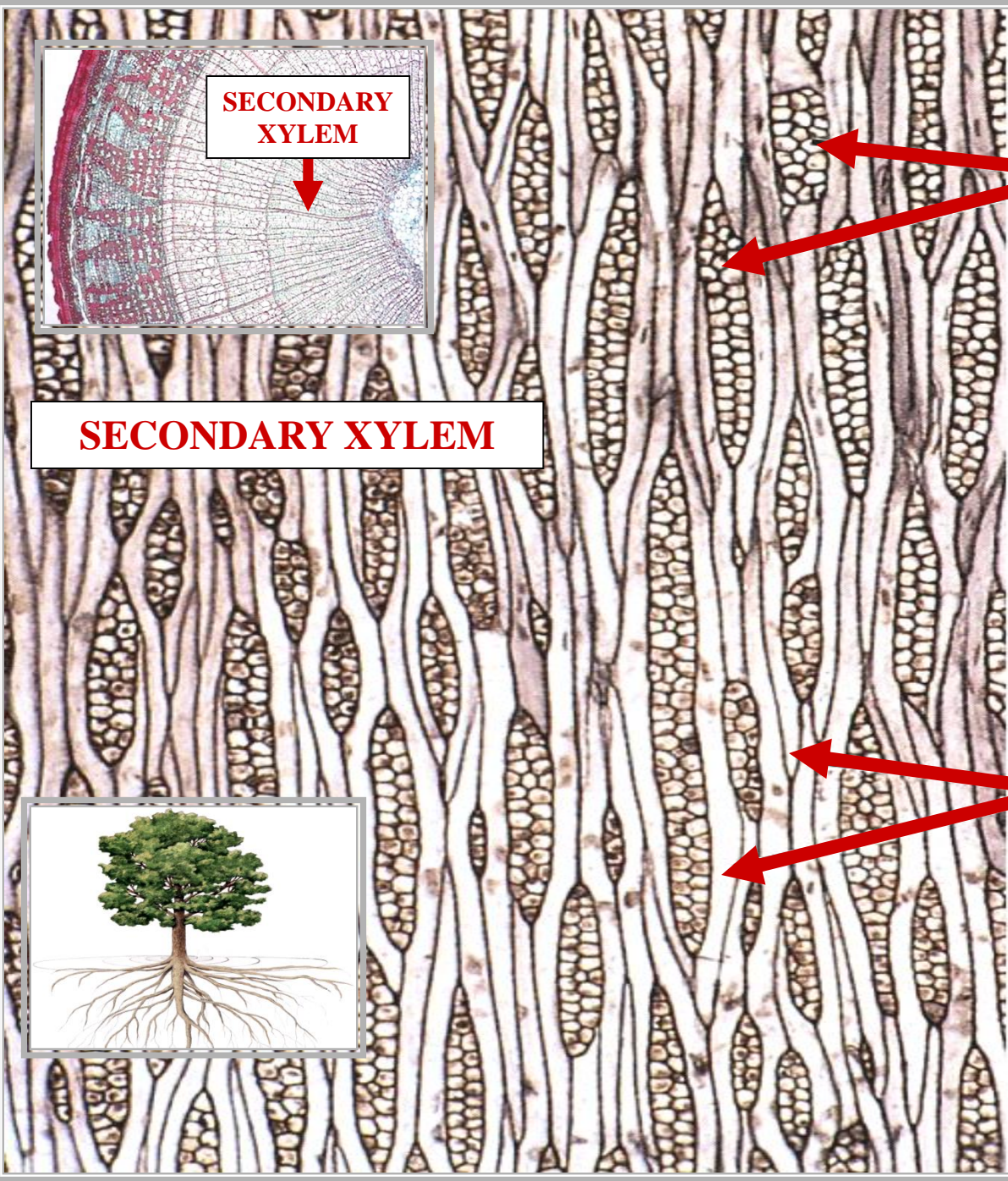


SECONDARY XYLEM



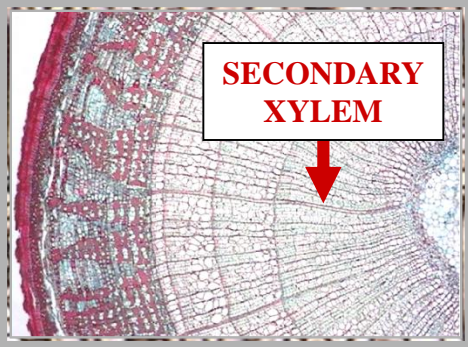
DICOT ~2 STEM

L.S.

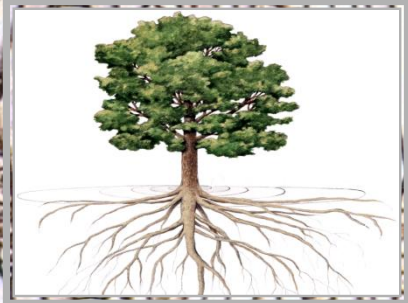


VC RI

LATERAL ORIENTATION



SECONDARY XYLEM

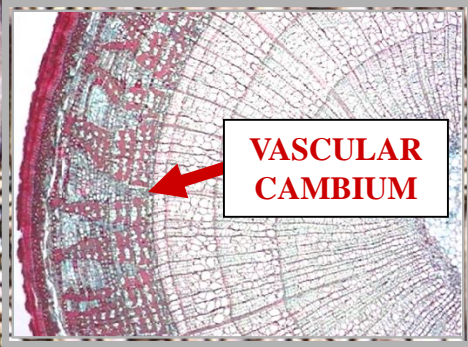


DICOT ~2 STEM

L.S.

+

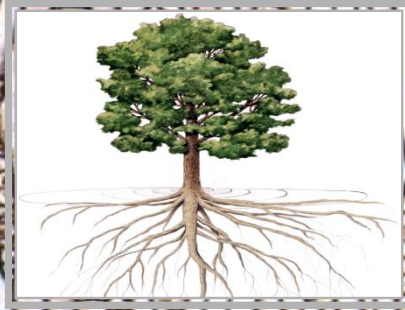
RP



**VASCULAR
CAMBIUM**

**RAY
INITIAL
DERIVED**

SECONDARY XYLEM

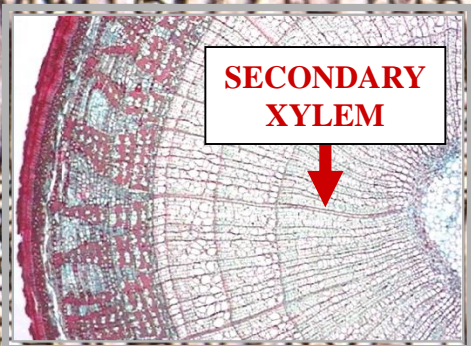


VASCULAR CAMBIUM



DICOT ~2 STEM

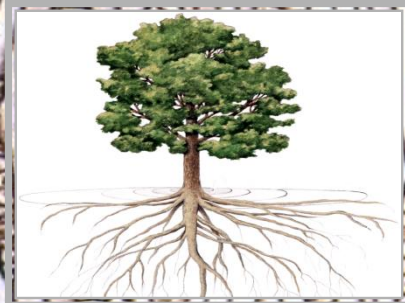
L.S.



SECONDARY XYLEM

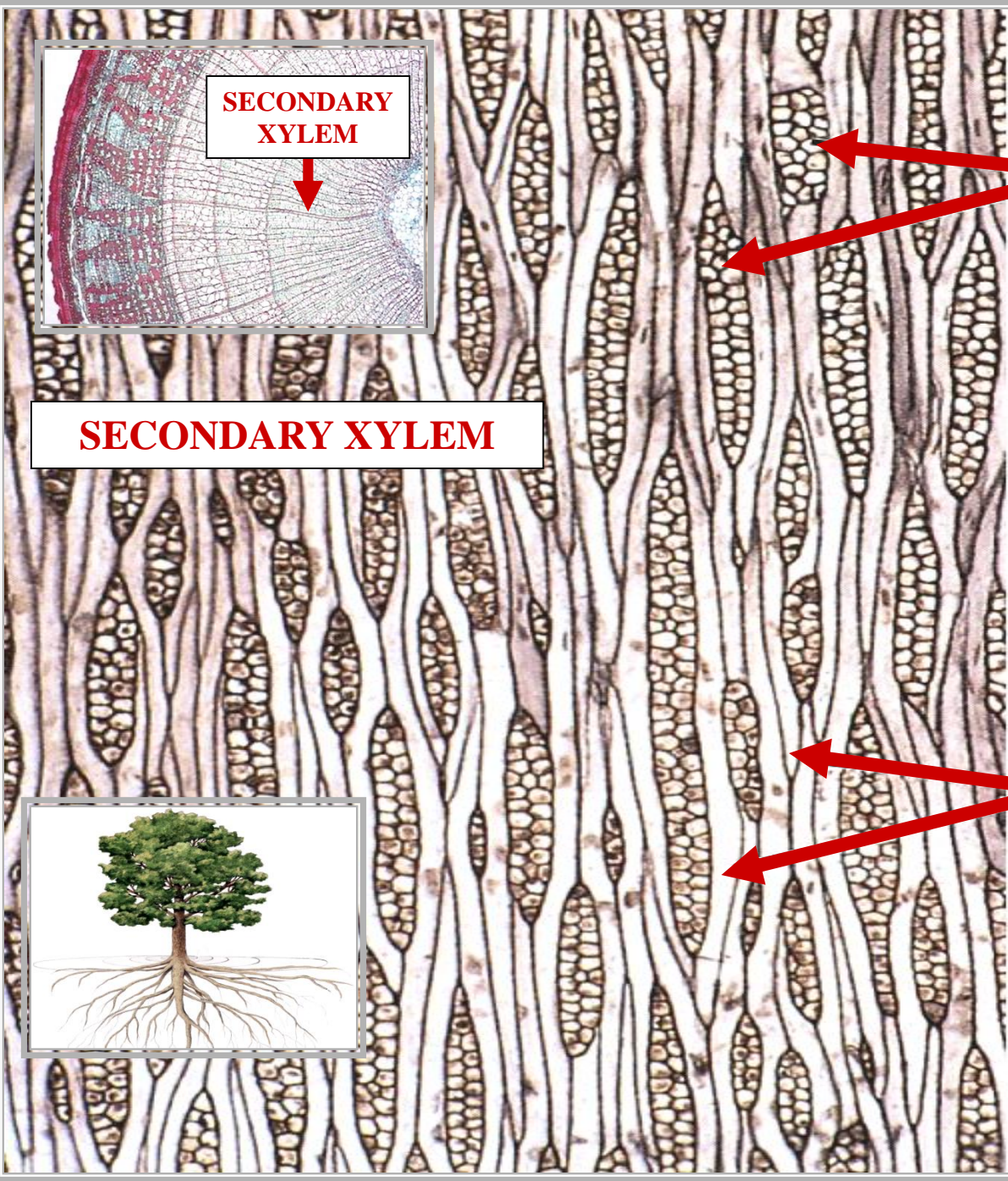
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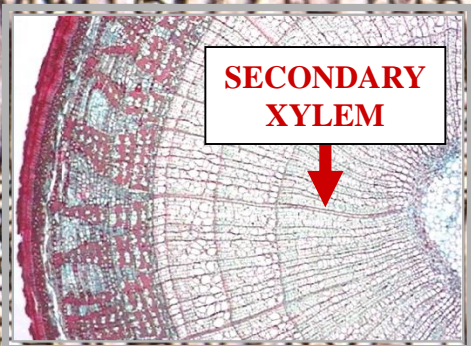
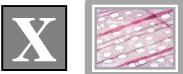
SECONDARY XYLEM



DICOT ~2 STEM

L.S.



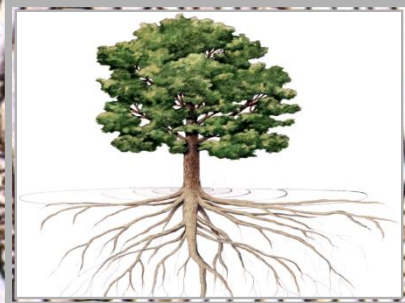


SECONDARY XYLEM

RAY PARENCHYMA

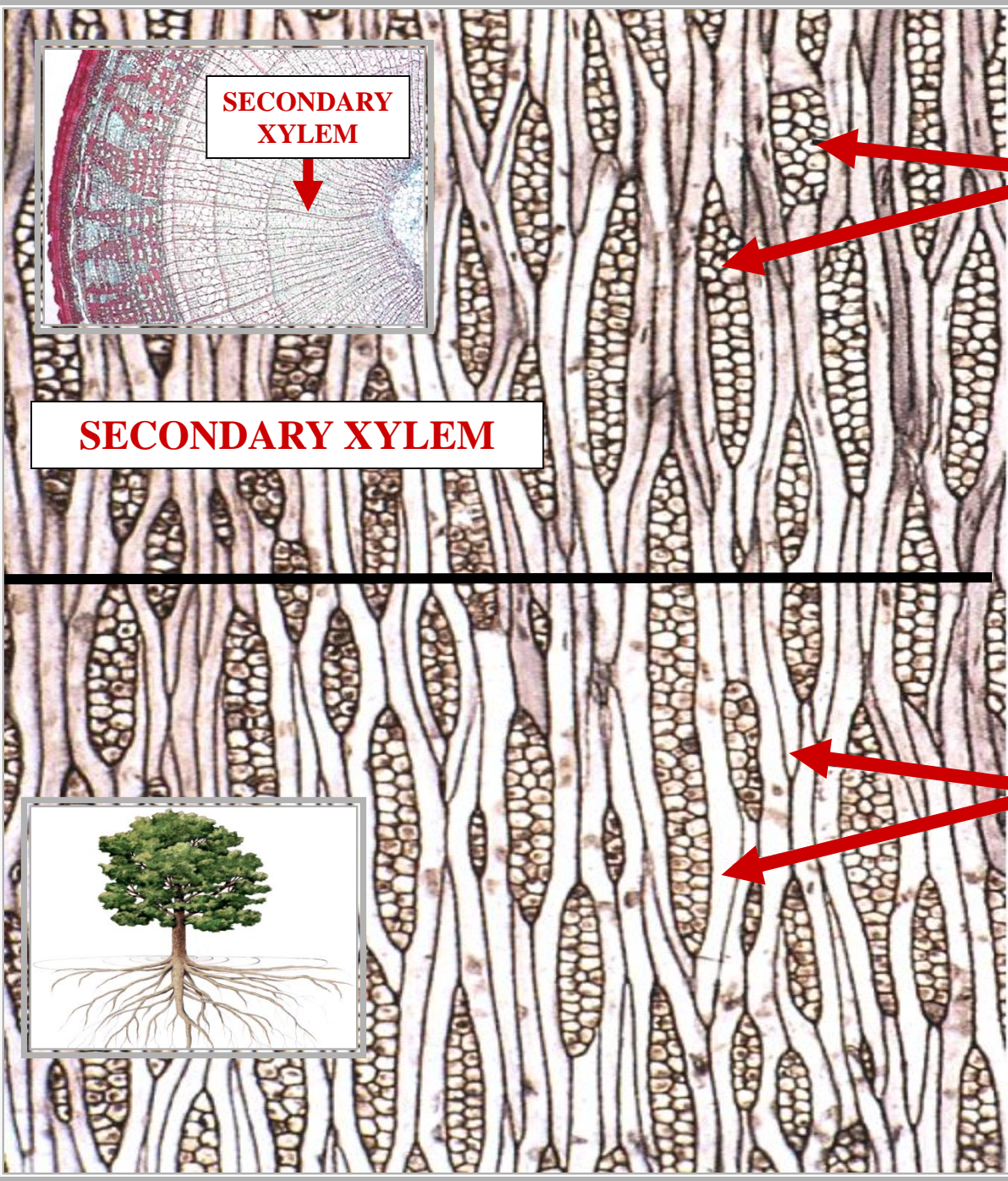
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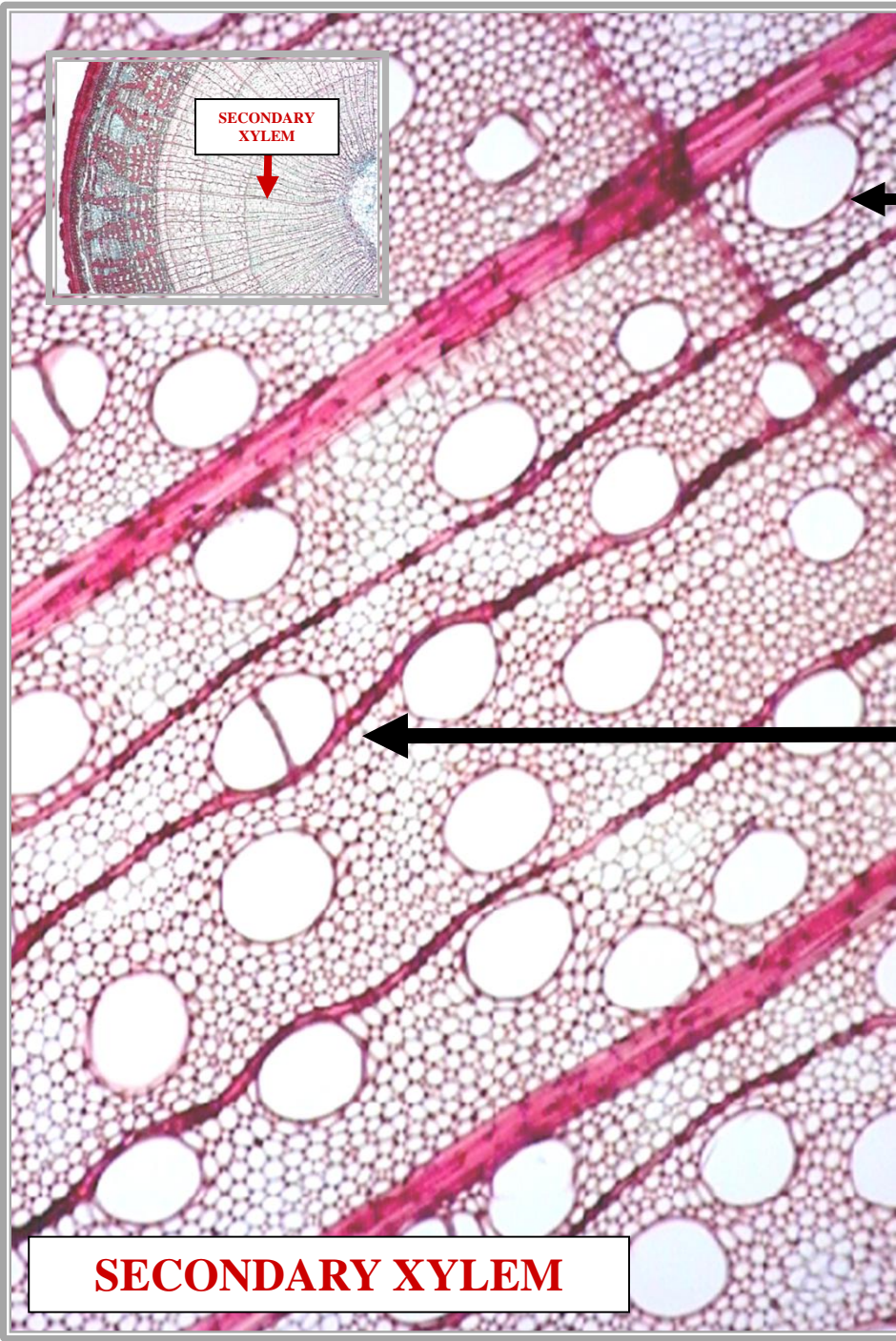
CROSS SECTION



DICOT ~2 STEM

L.S.





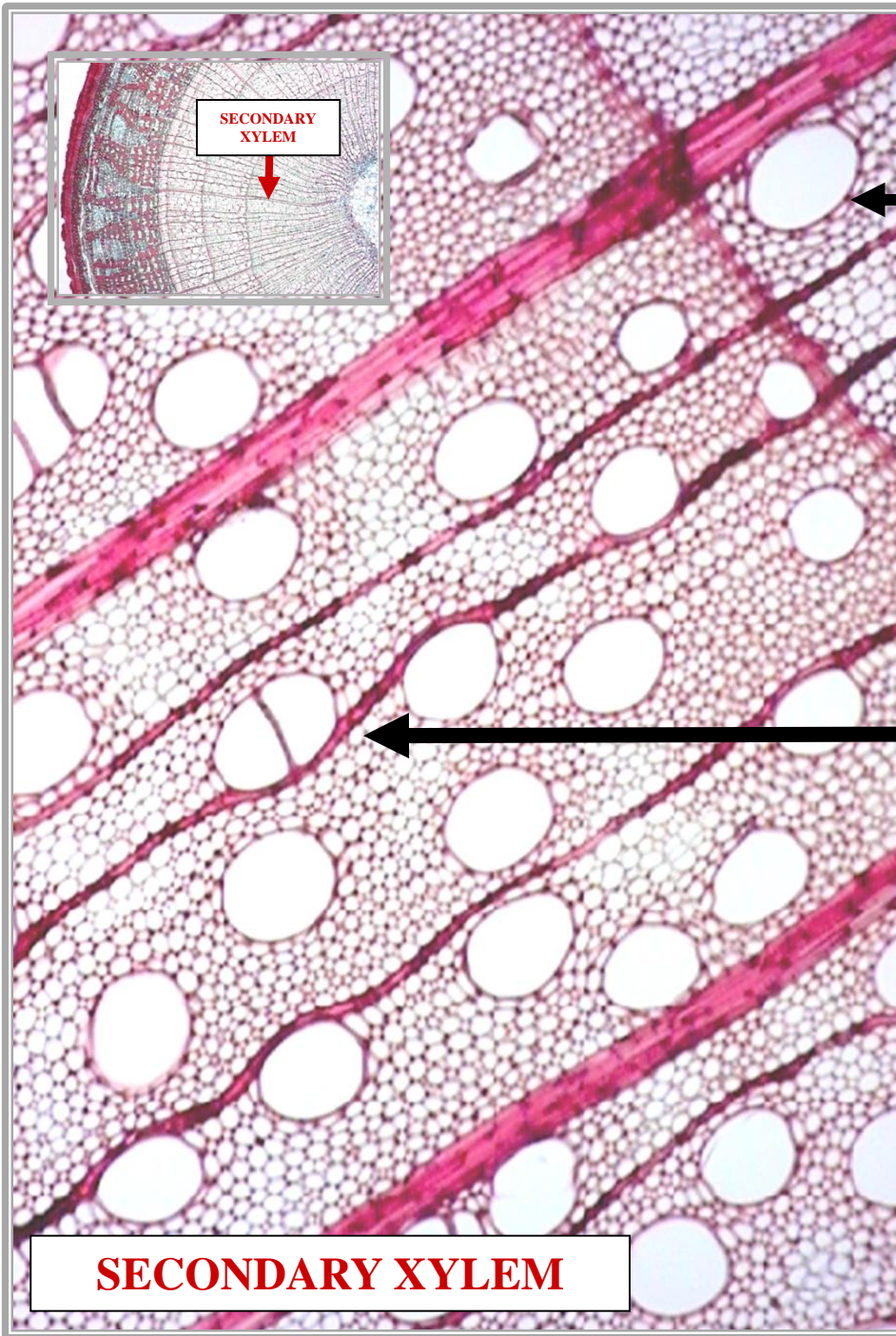
VESSEL MEMBER

RAY PARENCHYMA

SECONDARY XYLEM

DICOT ~2 STEM

C.S.



SECONDARY XYLEM

VESSEL MEMBER

RAY PARENCHYMA ATYPICAL

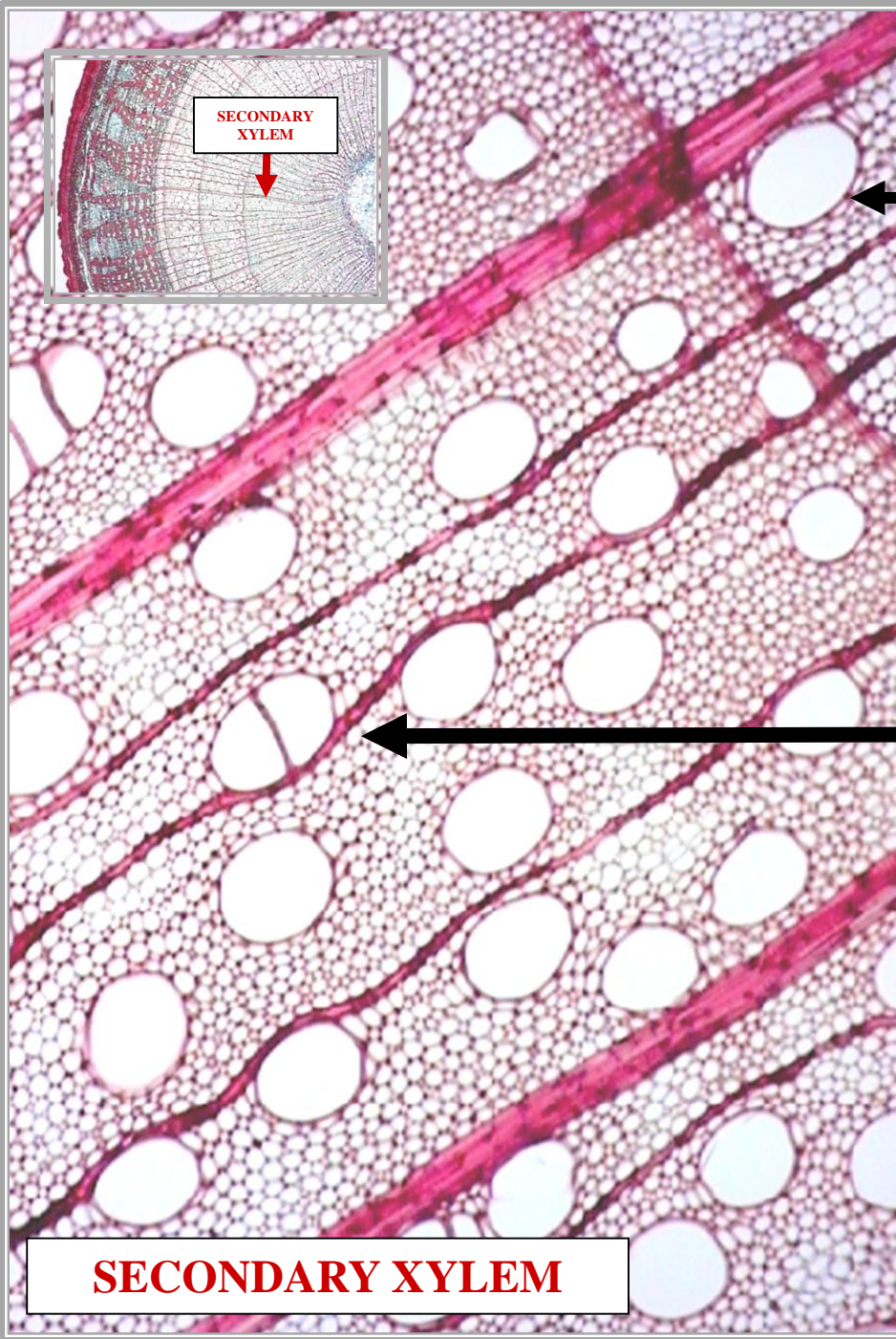
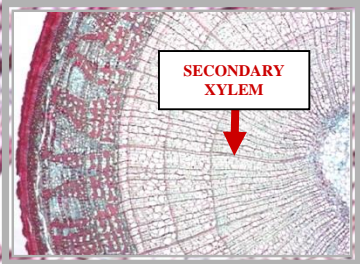
SECONDARY XYLEM

DICOT ~2 STEM

C.S.



F:



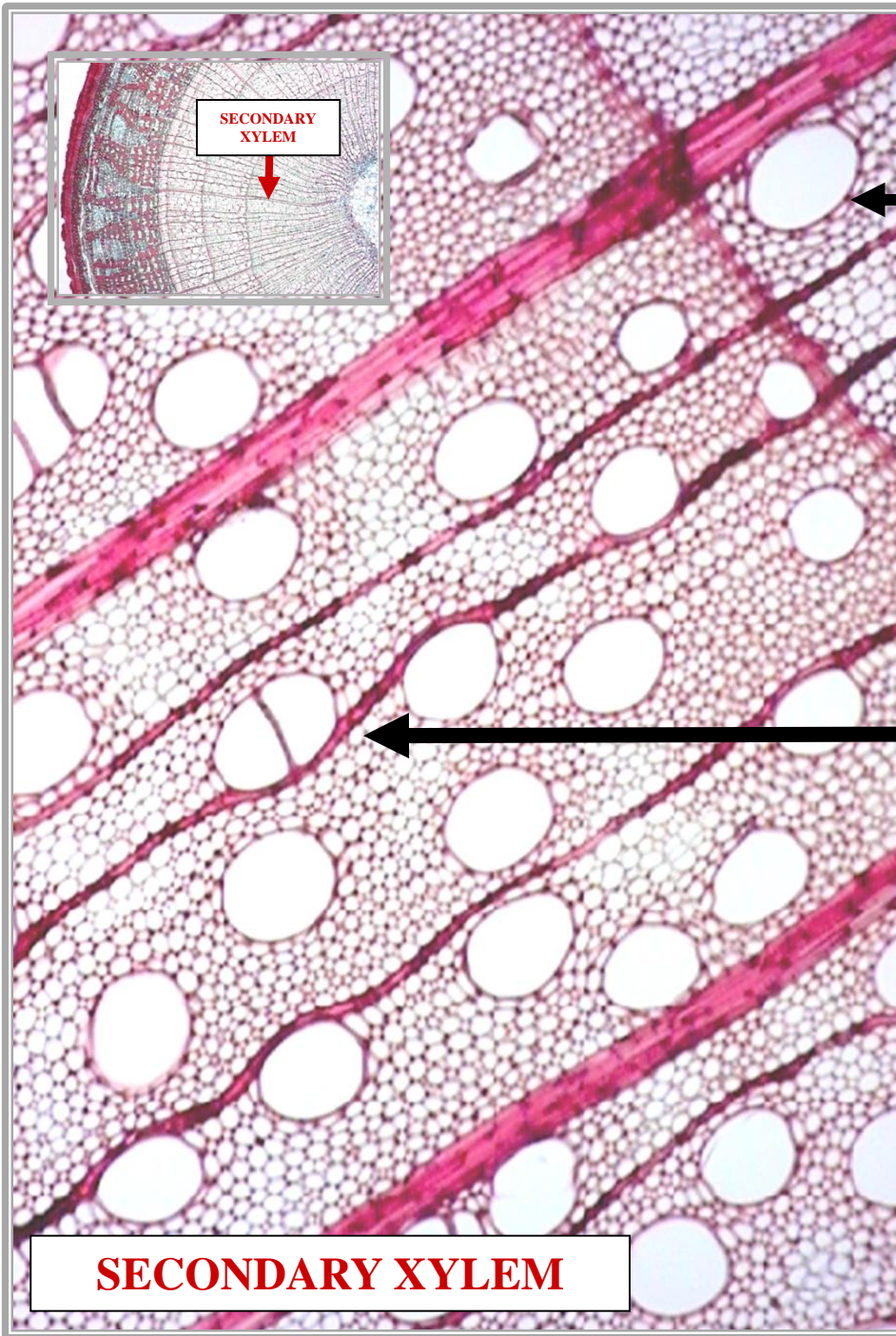
VESSEL MEMBER

**RAY PARENCHYMA
~2 CELL WALL
PRESENT**

SECONDARY XYLEM

DICOT ~2 STEM

C.S.



SECONDARY XYLEM

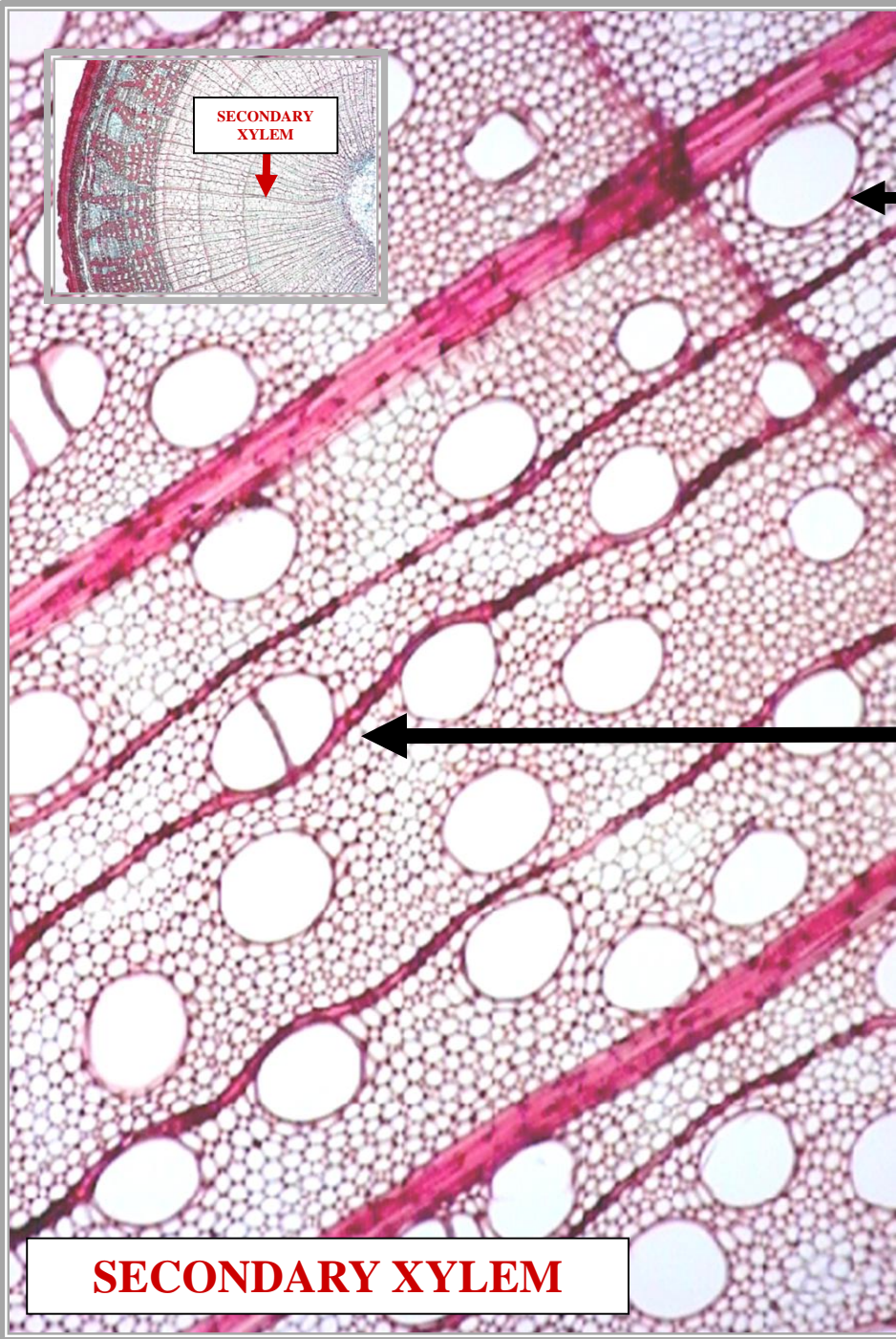
VESSEL MEMBER

**RAY PARENCHYMA
FUNCTION**

SECONDARY XYLEM

DICOT ~2 STEM

C.S.



SECONDARY XYLEM

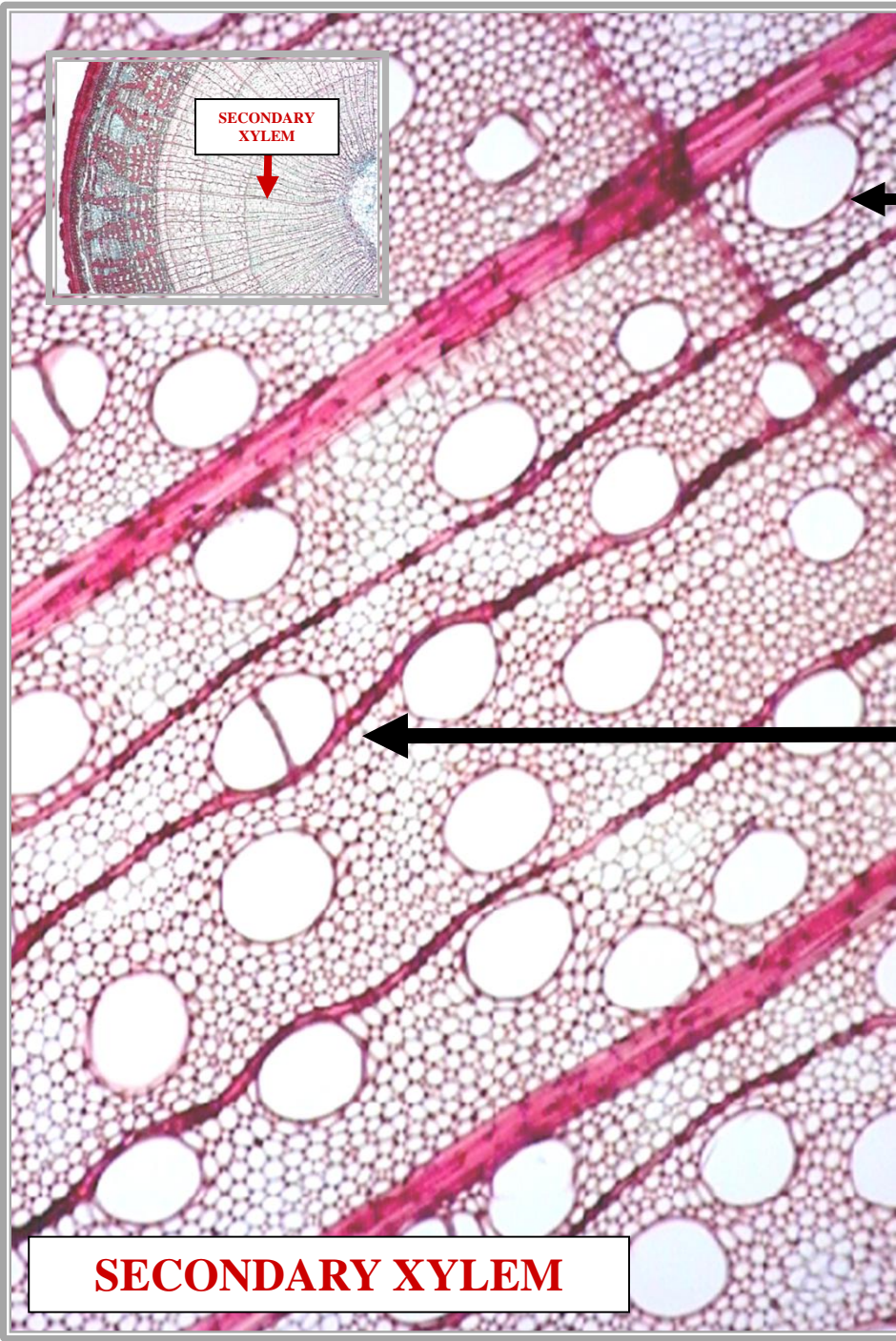
VESSEL MEMBER

RAY PARENCHYMA
LATERAL
TRANSPORT

SECONDARY XYLEM

DICOT ~2 STEM

C.S.



SECONDARY XYLEM

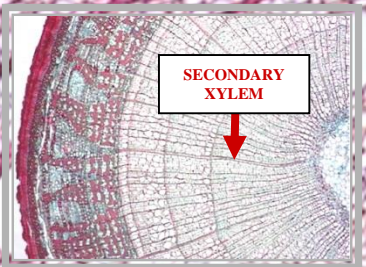
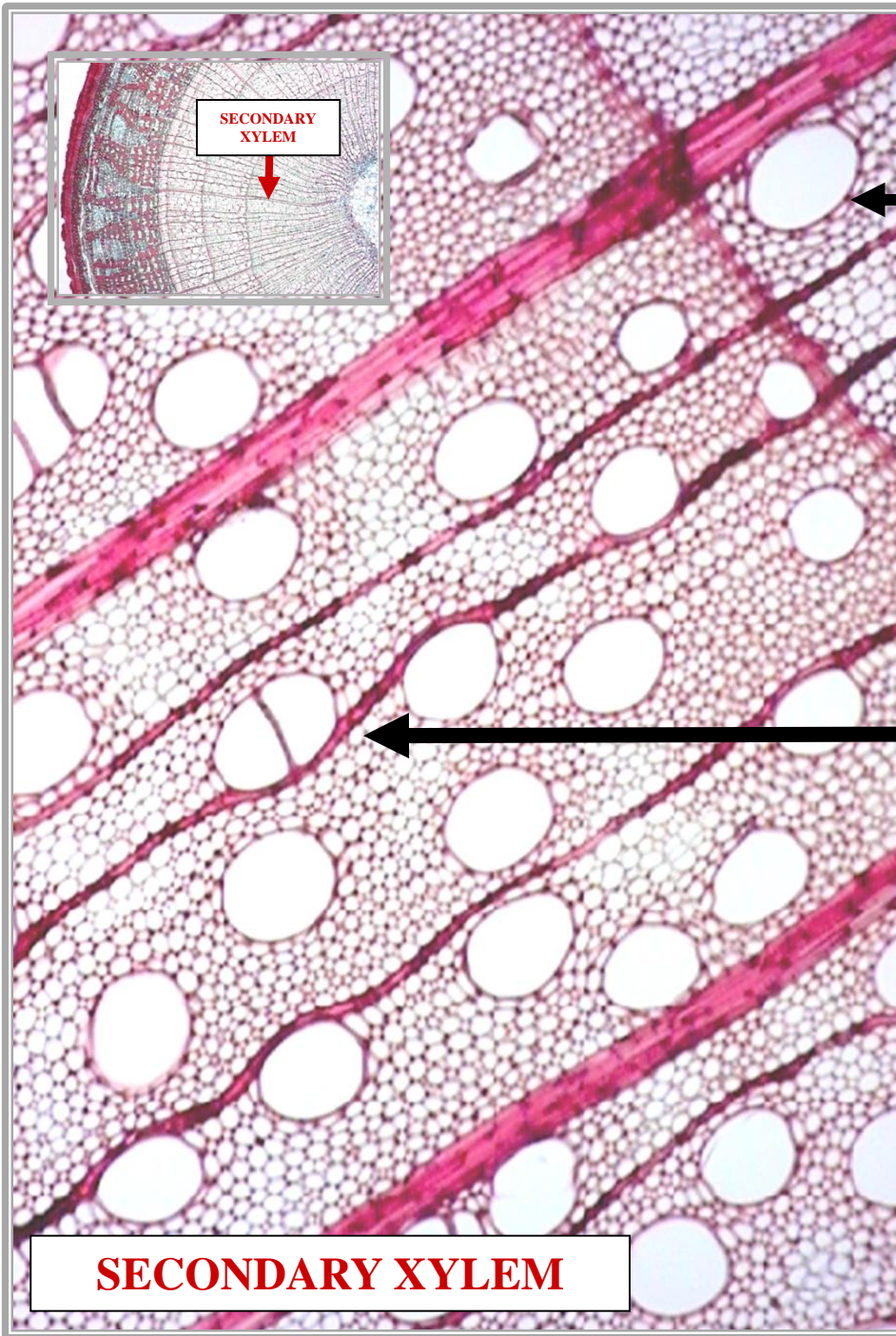
VESSEL MEMBER

**RAY PARENCHYMA
STORE
METABOLIC WASTE**

SECONDARY XYLEM

DICOT ~2 STEM

C.S.



VESSEL MEMBER

**RAY PARENCHYMA
LIVING CELLS
HEAL WOUNDS**

SECONDARY XYLEM

DICOT ~2 STEM

C.S.

**RAY
PARENCHYMA
CELL TYPES**

**SECONDARY XYLEM
RAY PARENCHYMA
CELL TYPES**

PROCUMBENT CELL

**SECONDARY XYLEM
RAY PARENCHYMA
CELL TYPES**

**SECONDARY XYLEM
RAY PARENCHYMA
CELL TYPES**



**PROCUMBENT CELL
UPRIGHT CELL**

**SECONDARY XYLEM
RAY PARENCHYMA
CELL TYPES**

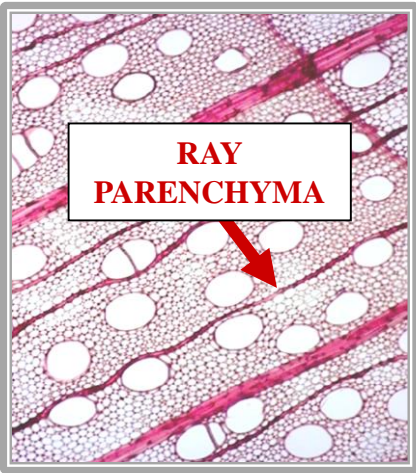
PROCUMBENT CELL



**RAY PARENCHYMA
CELL TYPES
PROCUMBENT CELL**

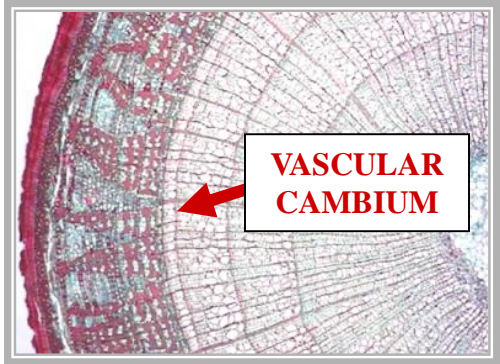
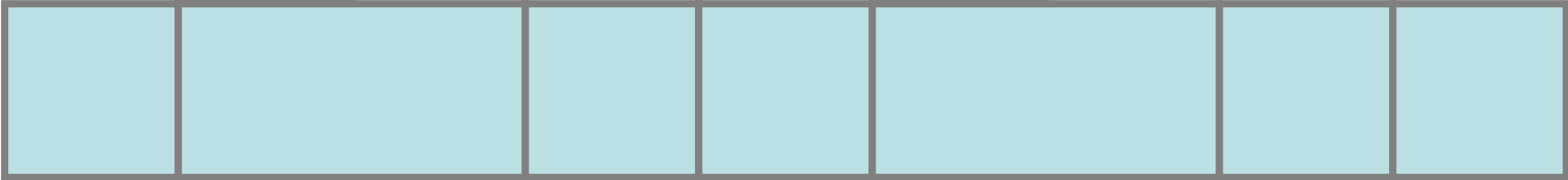
RECTANGULAR SHAPE

**RAY PARENCHYMA
CELL TYPES
PROCUMBENT CELL**



RAY
PARENCHYMA

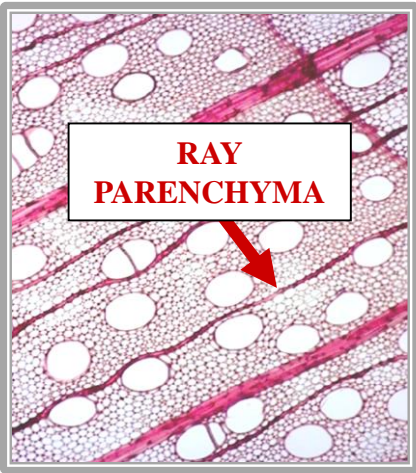
RAY
PARENCHYMA



VASCULAR
CAMBIUM

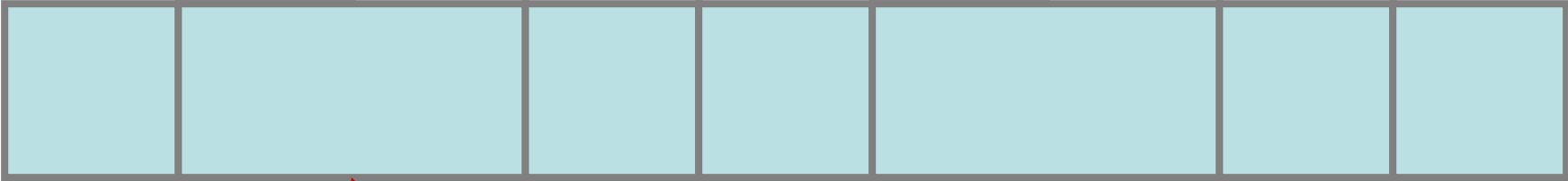
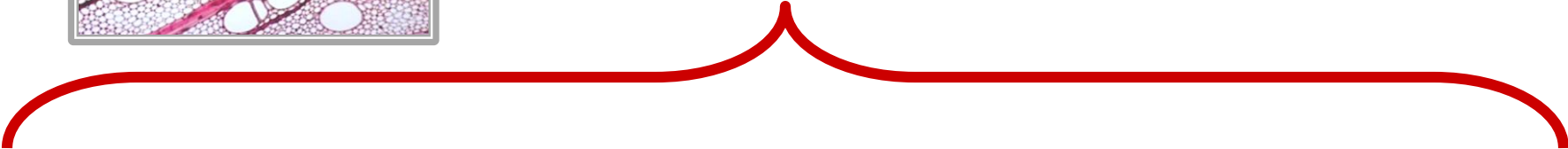
DICOT ~2 STEM

C.S.

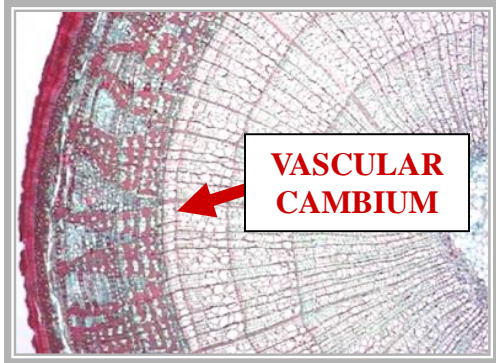


**RAY
PARENCHYMA**

**RAY
PARENCHYMA**



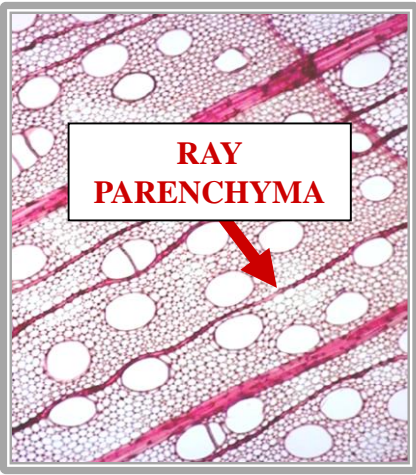
**PROCUMBENT
CELL**



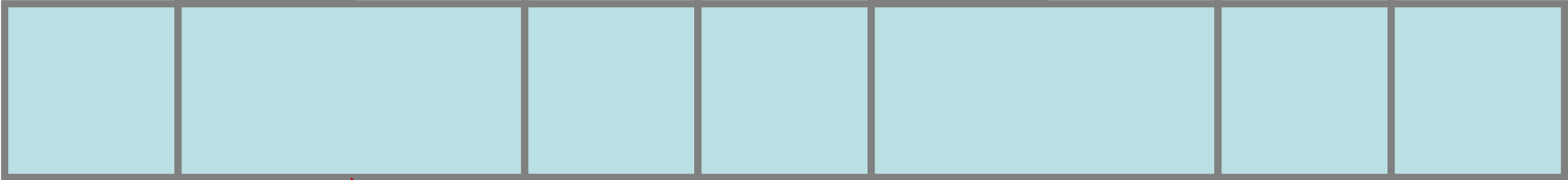
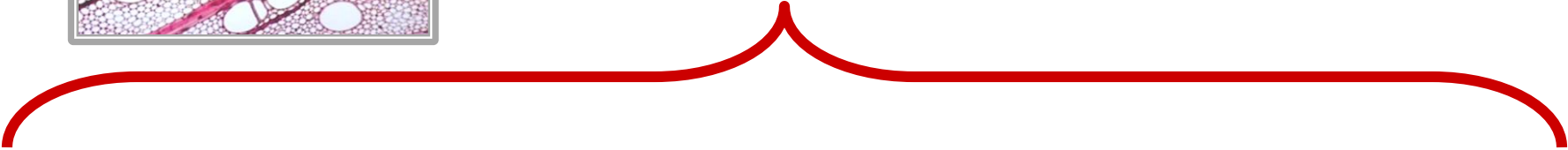
**VASCULAR
CAMBIUM**

DICOT ~2 STEM

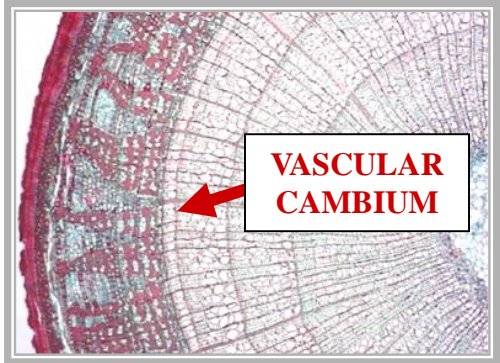
C.S.



RAY
PARENCHYMA



PROCUMBENT
CELL
RECTANGULAR
SHAPE



DICOT ~2 STEM

C.S.

UPRIGHT CELL

**RAY PARENCHYMA
CELL TYPES
UPRIGHT CELL**



SQUARE SHAPE

**RAY PARENCHYMA
CELL TYPES
UPRIGHT CELL**