



MAGNOLIOPSIDA





FLOWER: PERIANTH SEGMENTS



FLOWER: 3 PERIANTH SEGMENTS



LILIOPSIDA

**CLASS
CHARACTER
EXCEPTIONS
EXIST**



DISTRIBUTION



E

COSMOPOLITAN

EARTH



EXCEPTION

EARTH



POLAR REGIONS



PELAGIC REGIONS

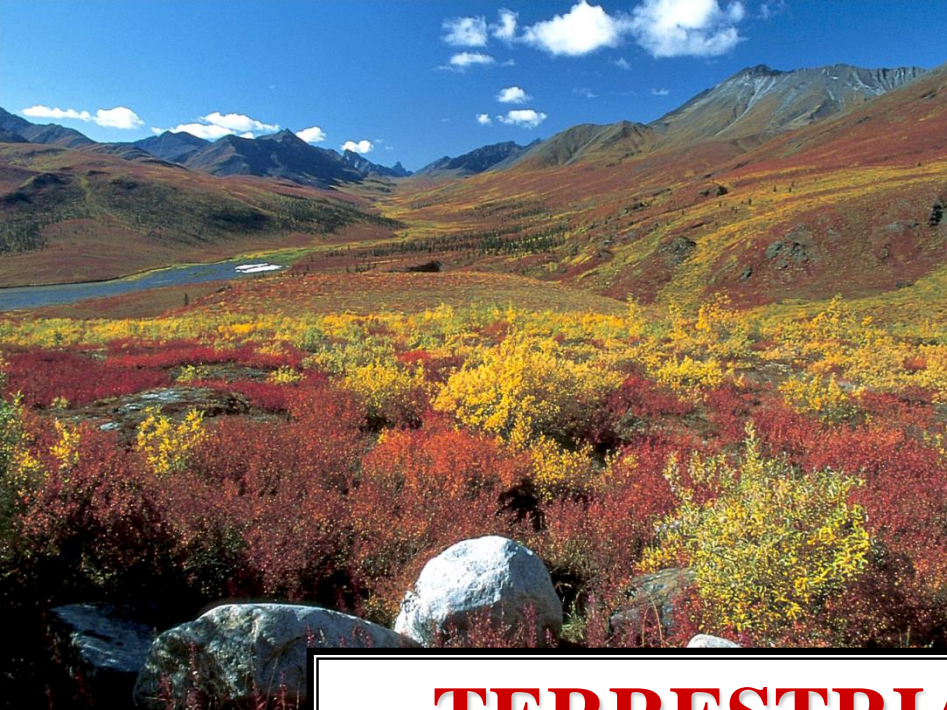
A satellite view of the Earth showing the Western Hemisphere, including North and South America, the Atlantic Ocean, and the Pacific Ocean. The image shows cloud patterns and the curvature of the planet.

DOMINATELY TROPICAL

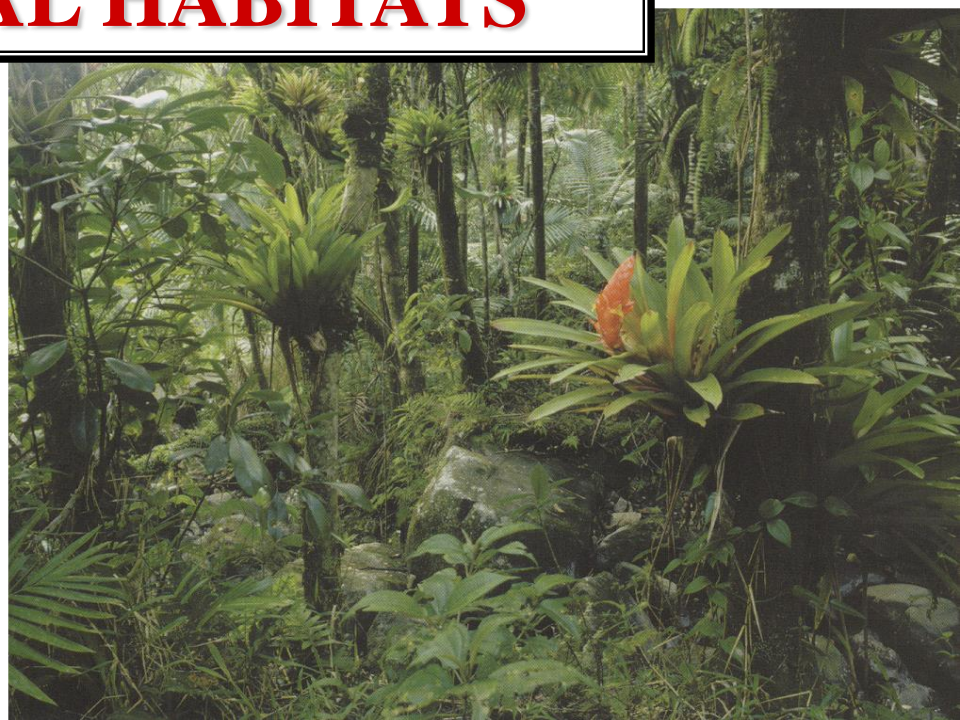
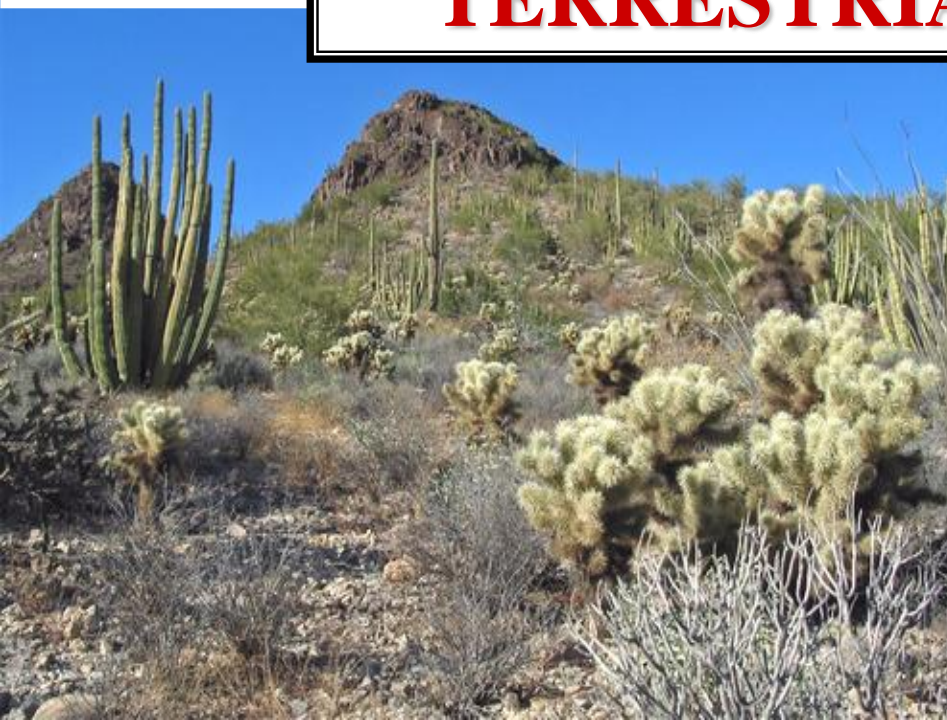
EARTH



HABITAT

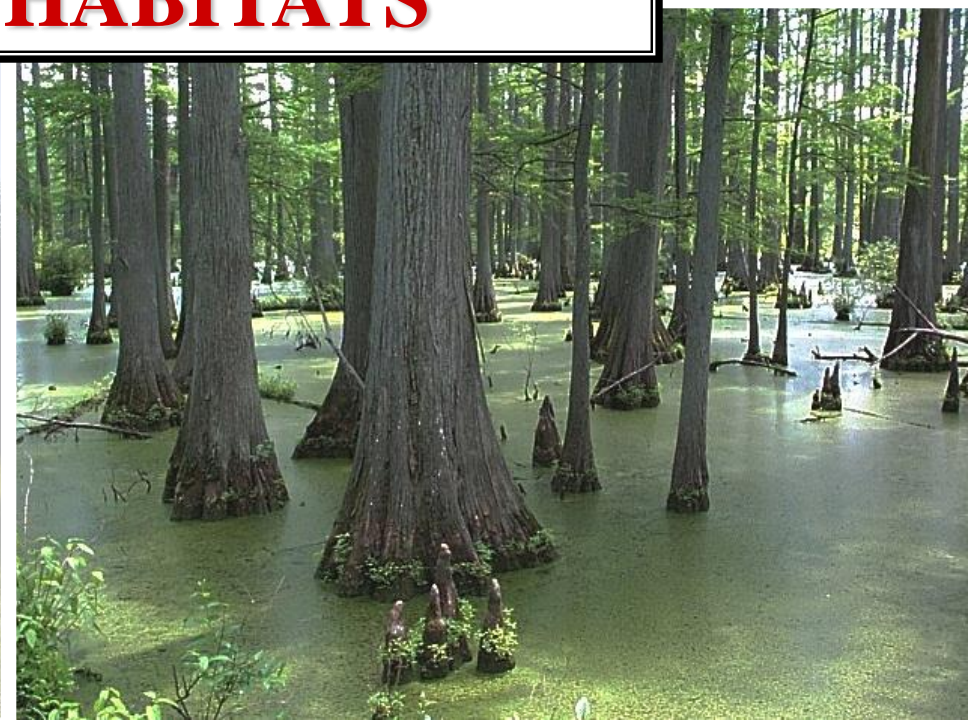


TERRESTRIAL HABITATS



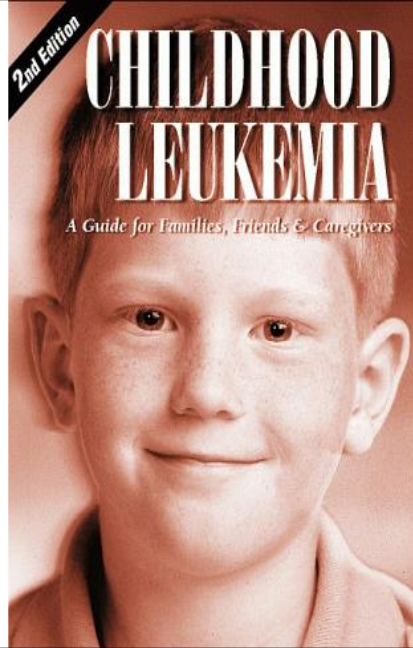


AQUATIC HABITATS





ECONOMIC IMPORTANCE



COMMERCIALLY VITAL



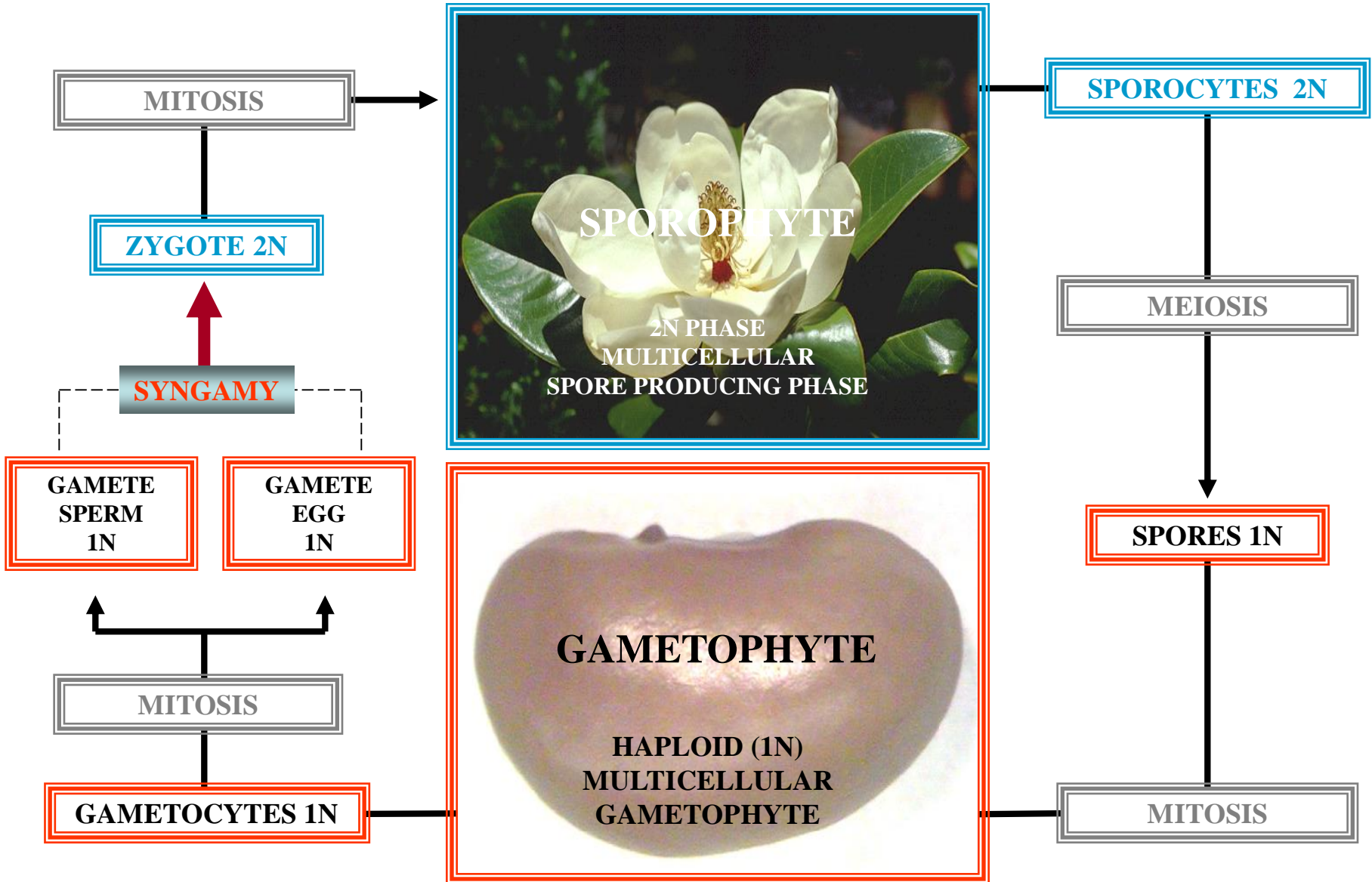


GENERAL CHARACTERS

MAGNOLIOPHYTA



LIFE CYCLE





SPOROPHYTE CHARACTERS



NUTRITION

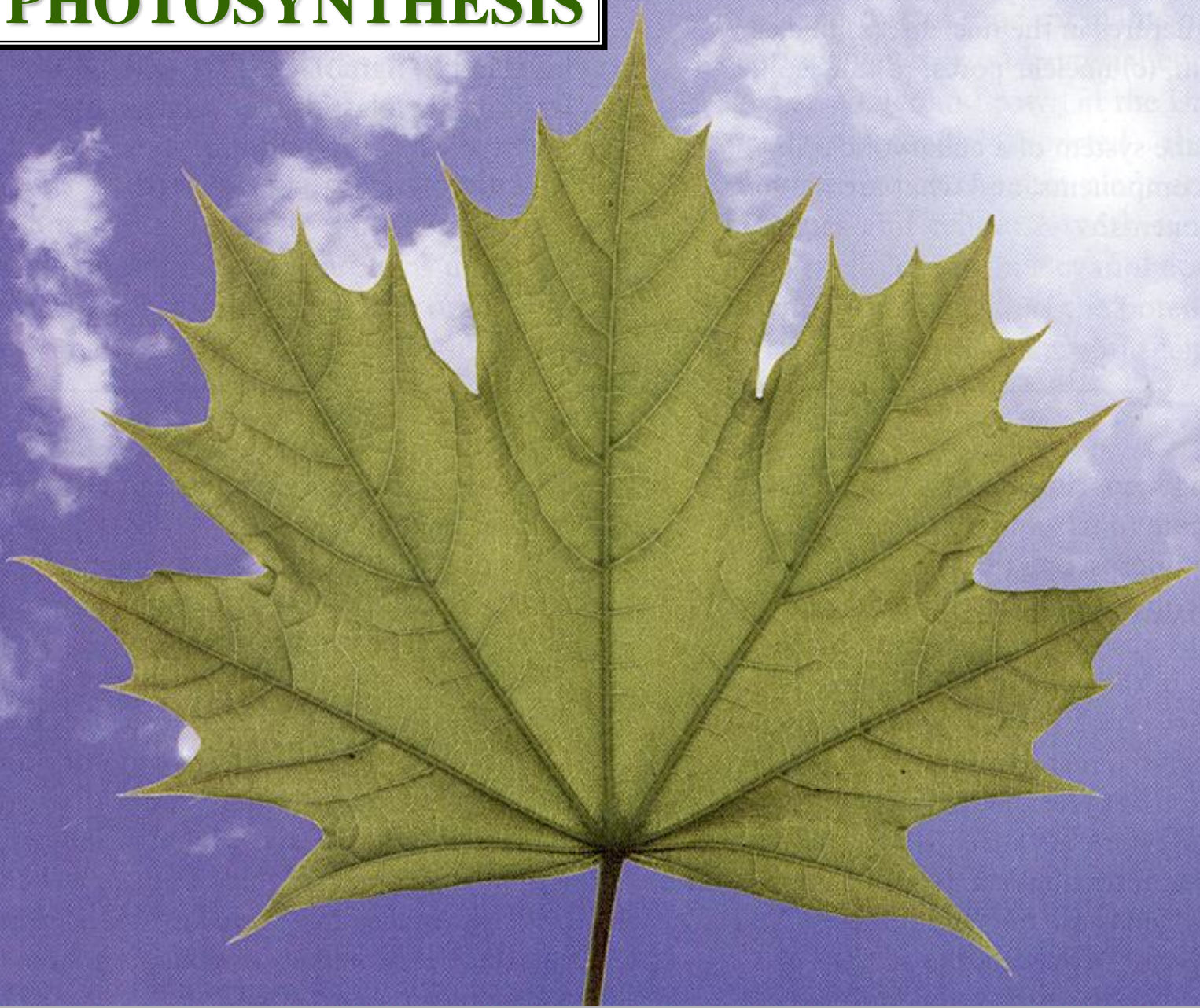
NUTRITION MODES



PHOTOSYNTHETIC

PHOTOSYNTHESIS

P

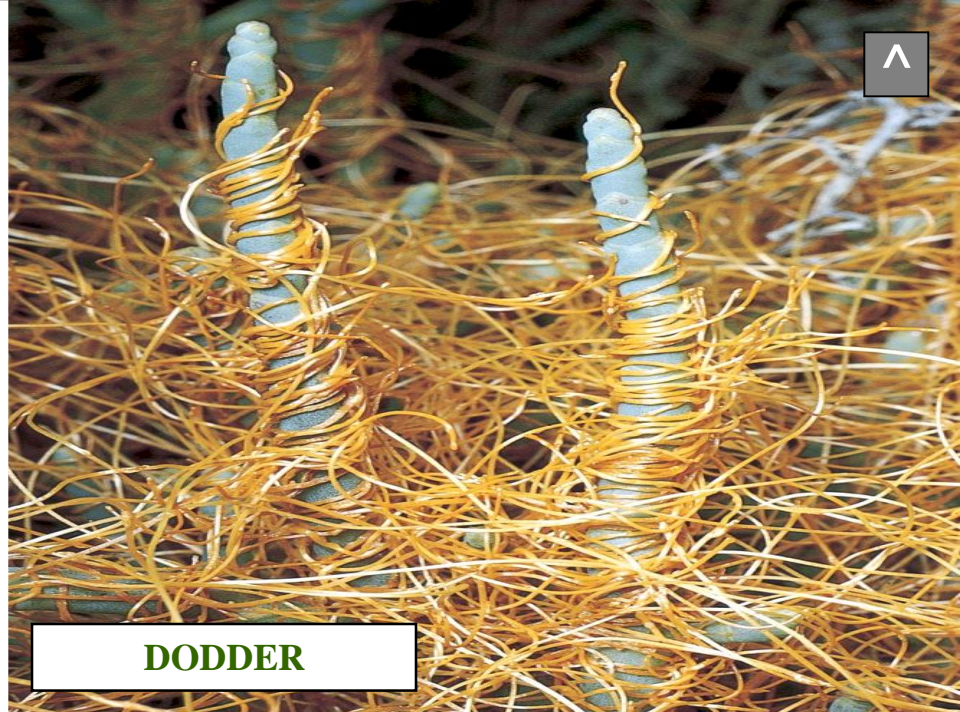




PARASITIC



MISTLETOE



DODDER



INDIAN PIPE



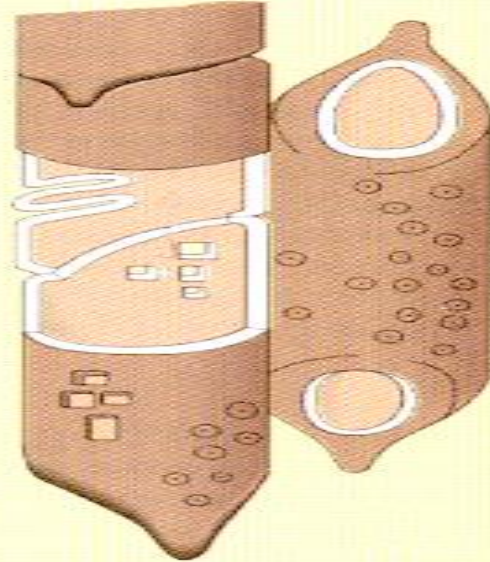
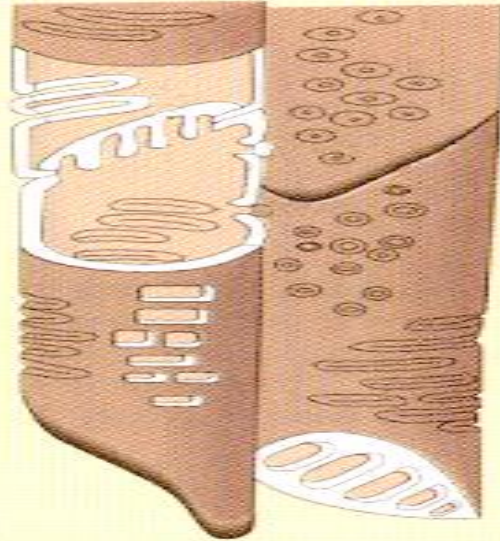
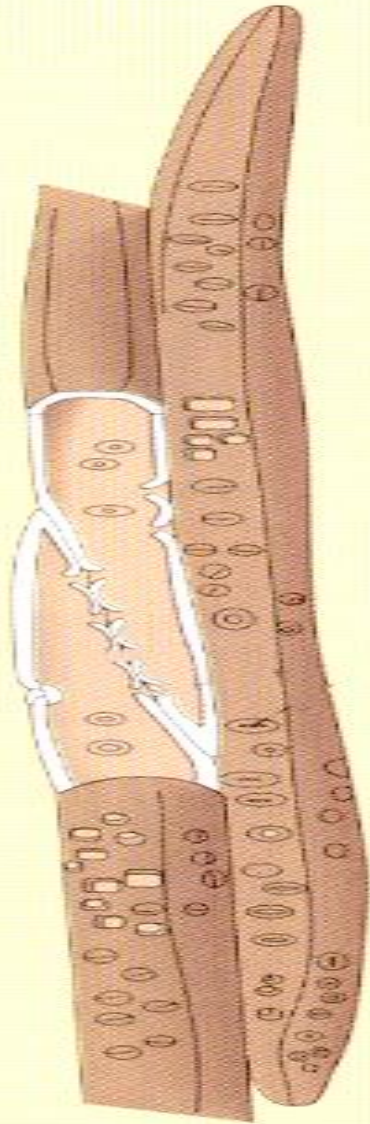
SQUAW ROOT



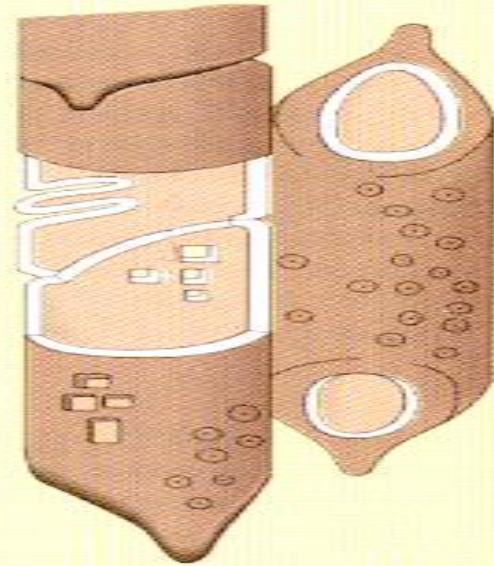
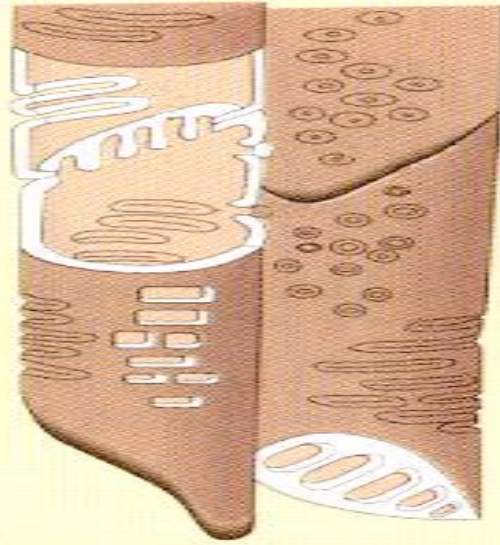
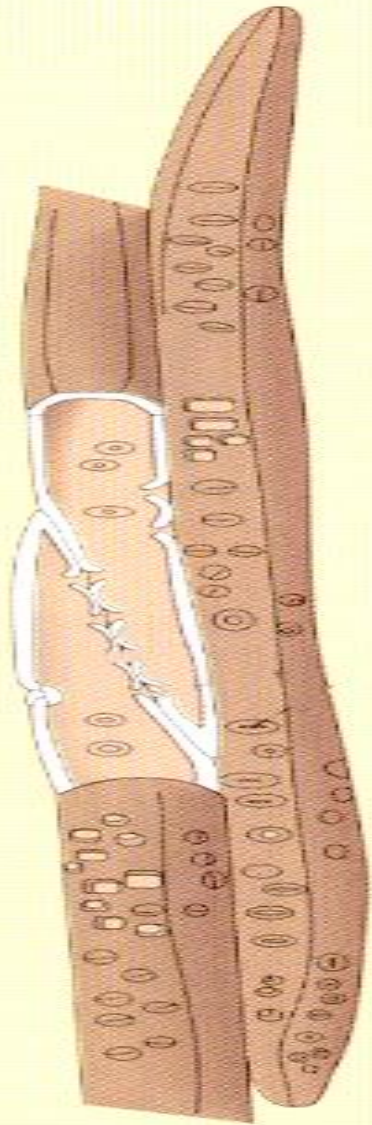
VASCULAR TISSUE



XYLEM



XYLEM CELLS



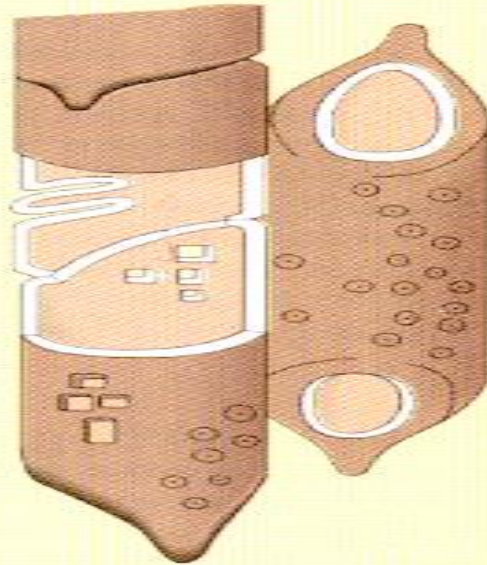
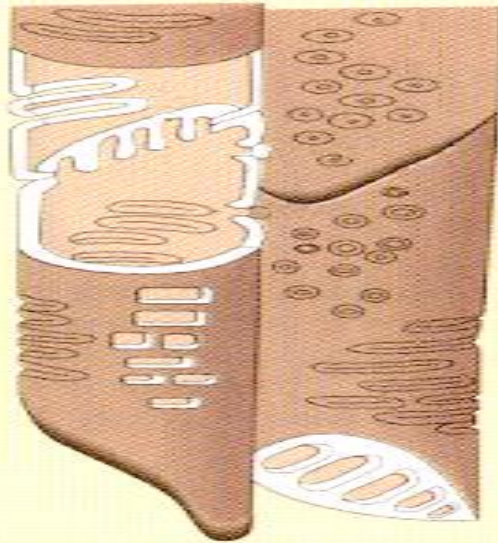
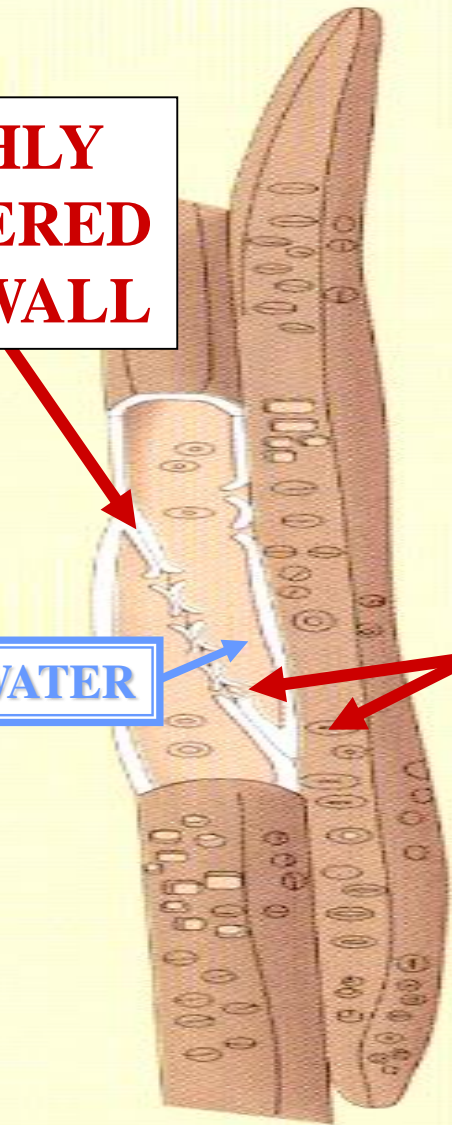
TRACHEARY ELEMENTS

**HIGHLY
TAPPED
END WALL**

WATER

PITS

?

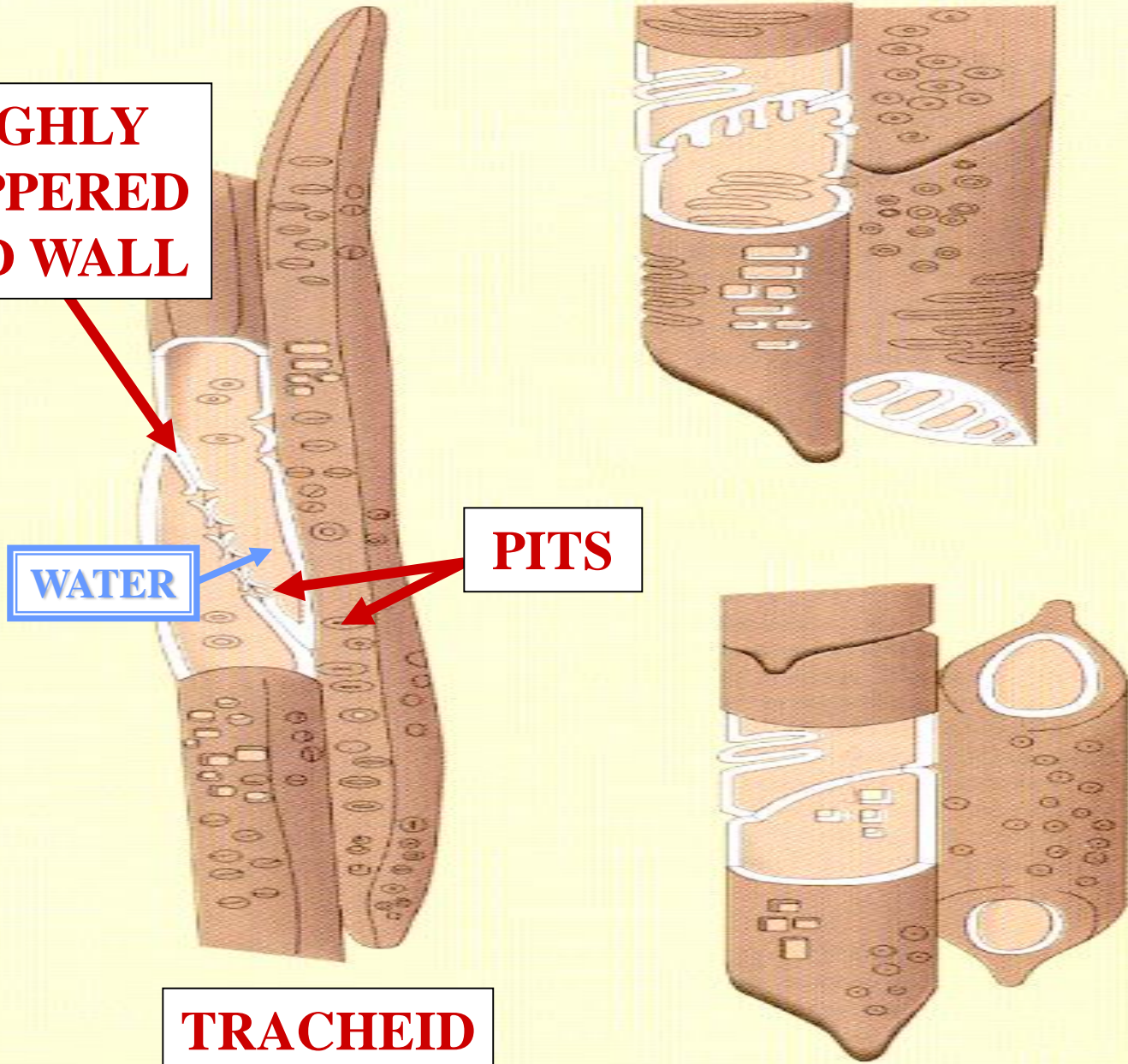


**HIGHLY
TAPPED
END WALL**

WATER

PITS

TRACHEID



**HIGHLY
TAPPED
END WALL**

**LESS
TAPPED
END WALL**

?

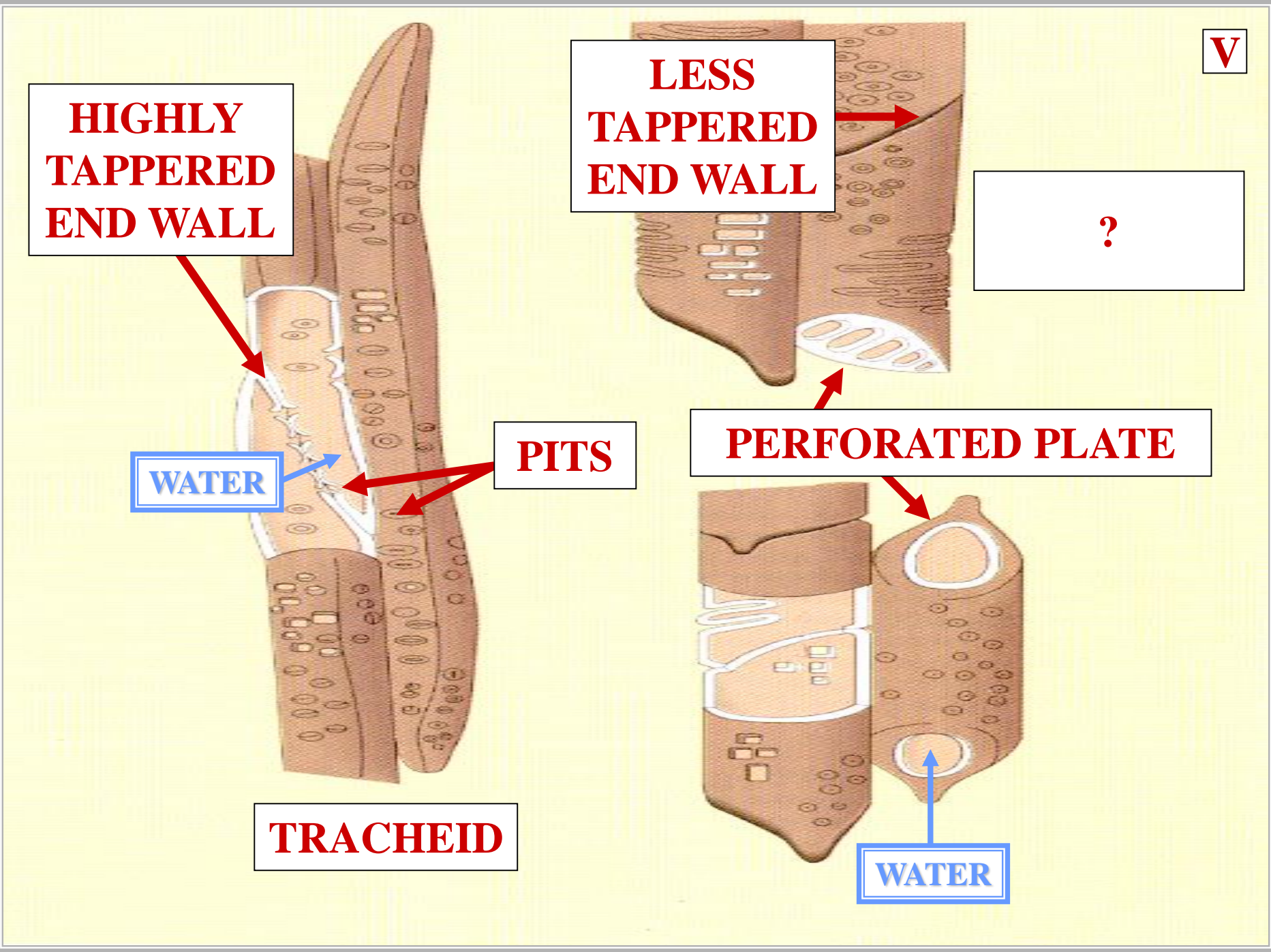
WATER

PITS

PERFORATED PLATE

TRACHEID

WATER





**HIGHLY
TAPPED
END WALL**



WATER



PITS



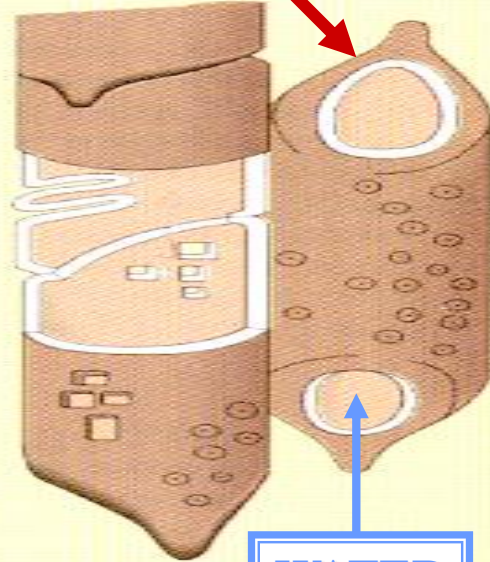
TRACHEID

**LESS
TAPPED
END WALL**



**VESSEL
MEMBER**

PERFORATED PLATE



WATER





TRACHEIDS & VESSEL MEMBERS



PHLOEM

NUCLEUS

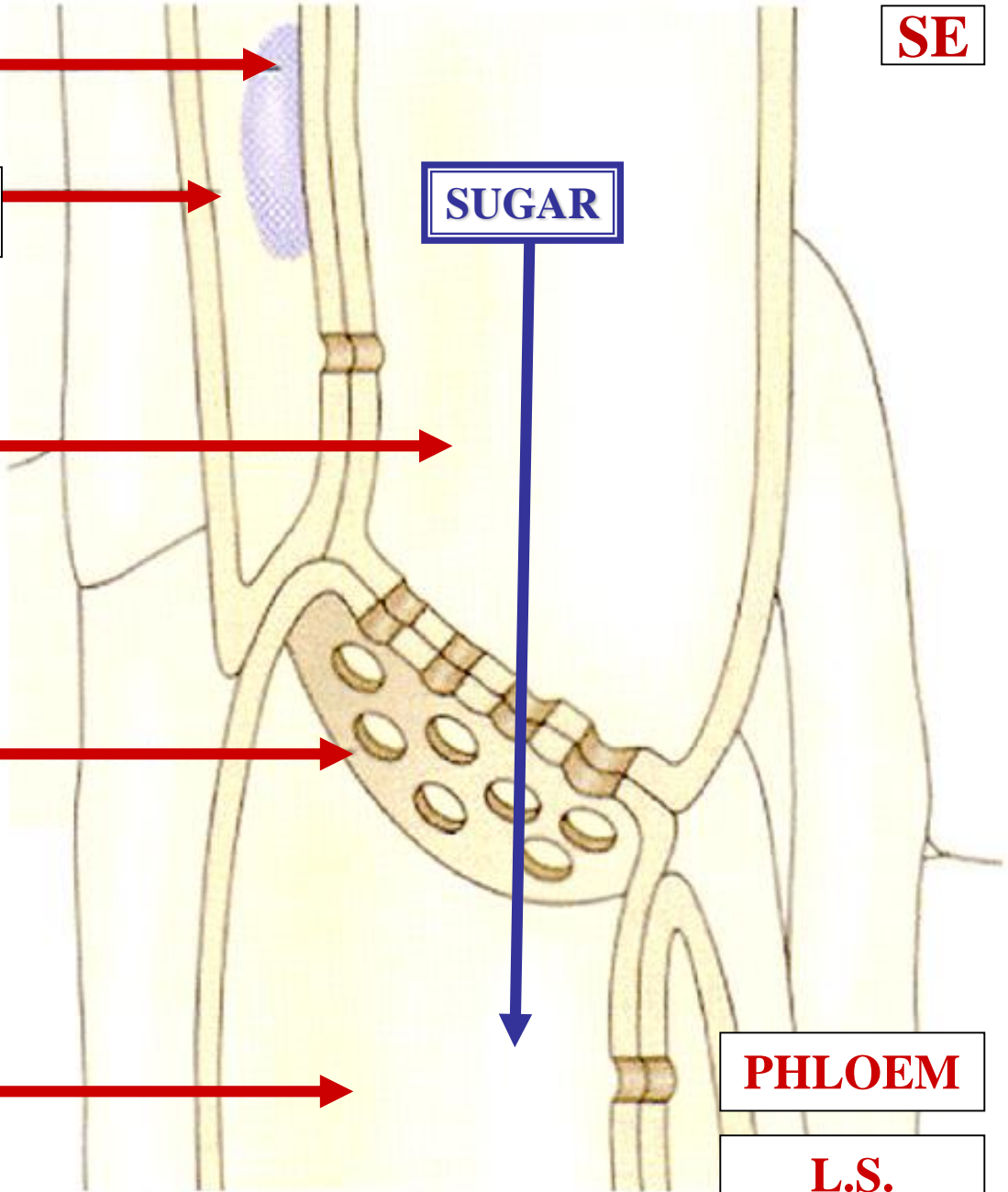
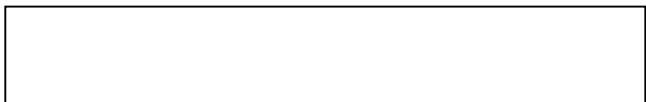
SE

SUGAR

END WALL

PHLOEM

L.S.



S

NUCLEUS



SUGAR



SIEVE ELEMENTS



END WALL

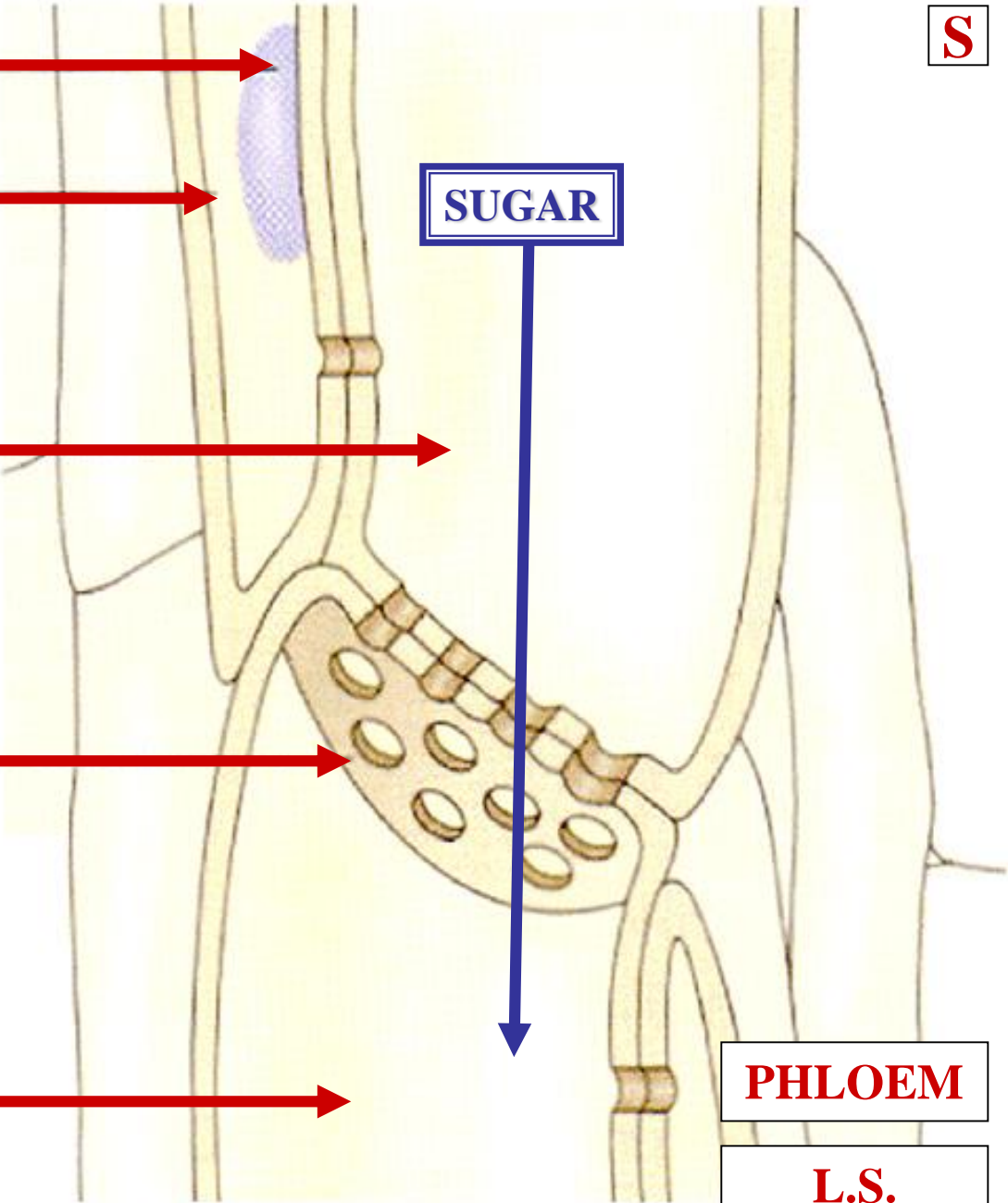


SIEVE ELEMENTS



PHLOEM

L.S.

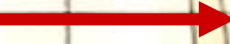


S

NUCLEUS



ALBUMINOUS CELL



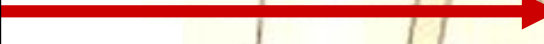
SUGAR



SIEVE CELL



**SIEVE AREA
SMALL PORES**

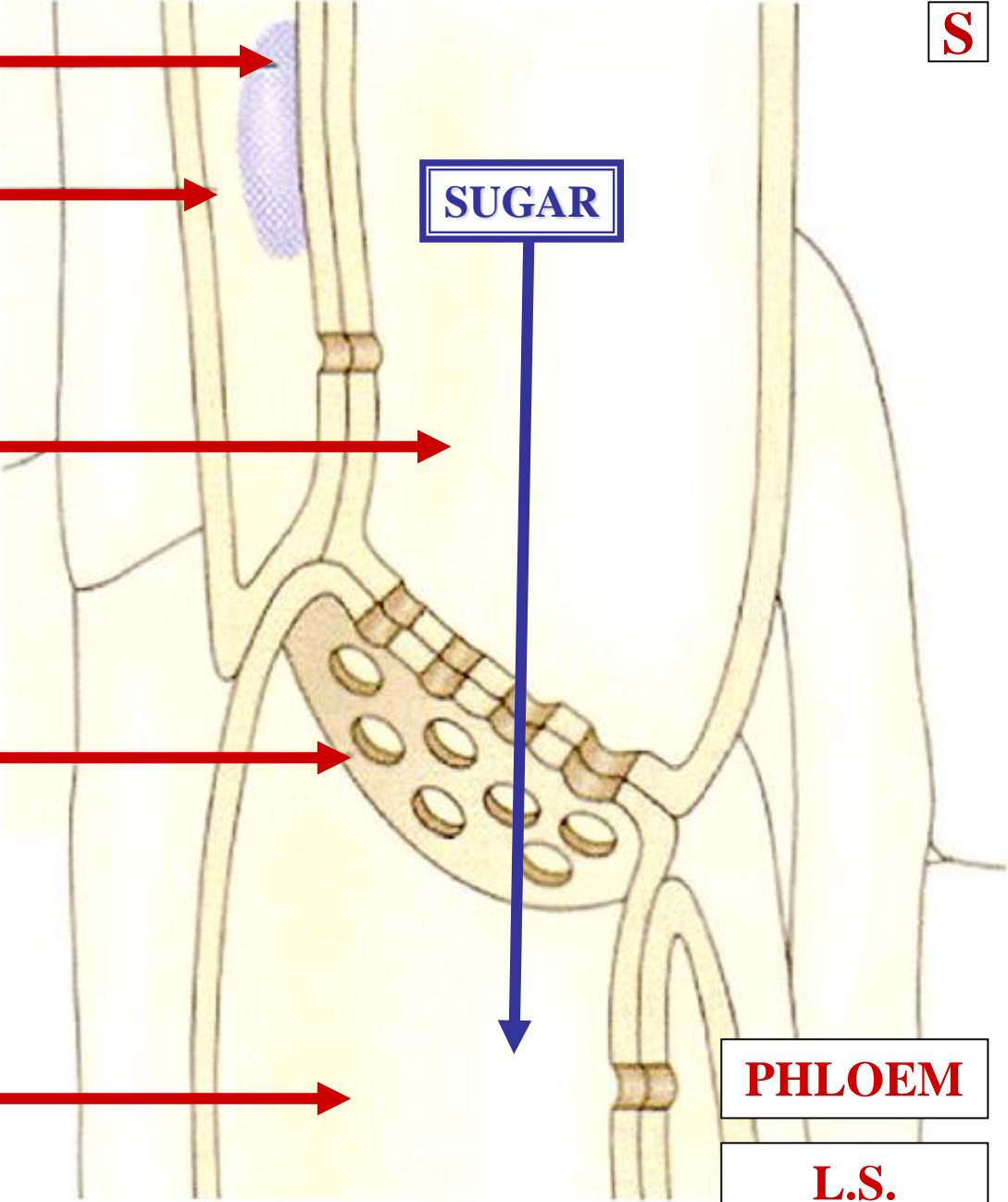


SIEVE CELL



PHLOEM

L.S.





NUCLEUS



CAMPANION CELL



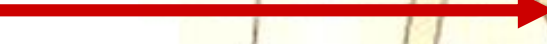
SUGAR



SIEVE MEMBER



**SIEVE PLATE
LARGE PORES**

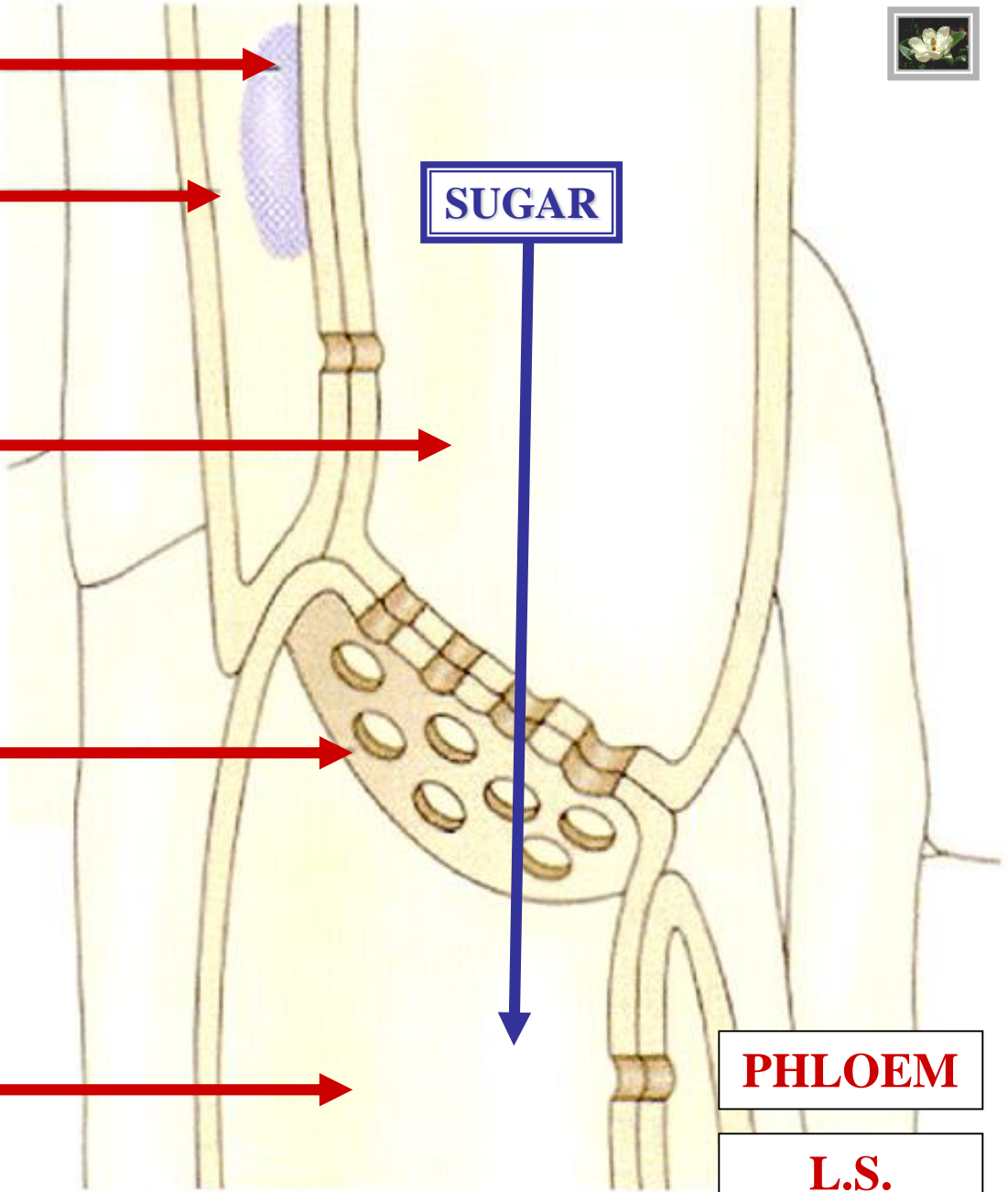


SIEVE MEMBER



PHLOEM

L.S.





SIEVE MEMBERS & COMPANION CELLS

DIAGNOSTIC TO ANGIOSPERMS



SIEVE MEMBERS & COMPANION CELLS



GROWTH

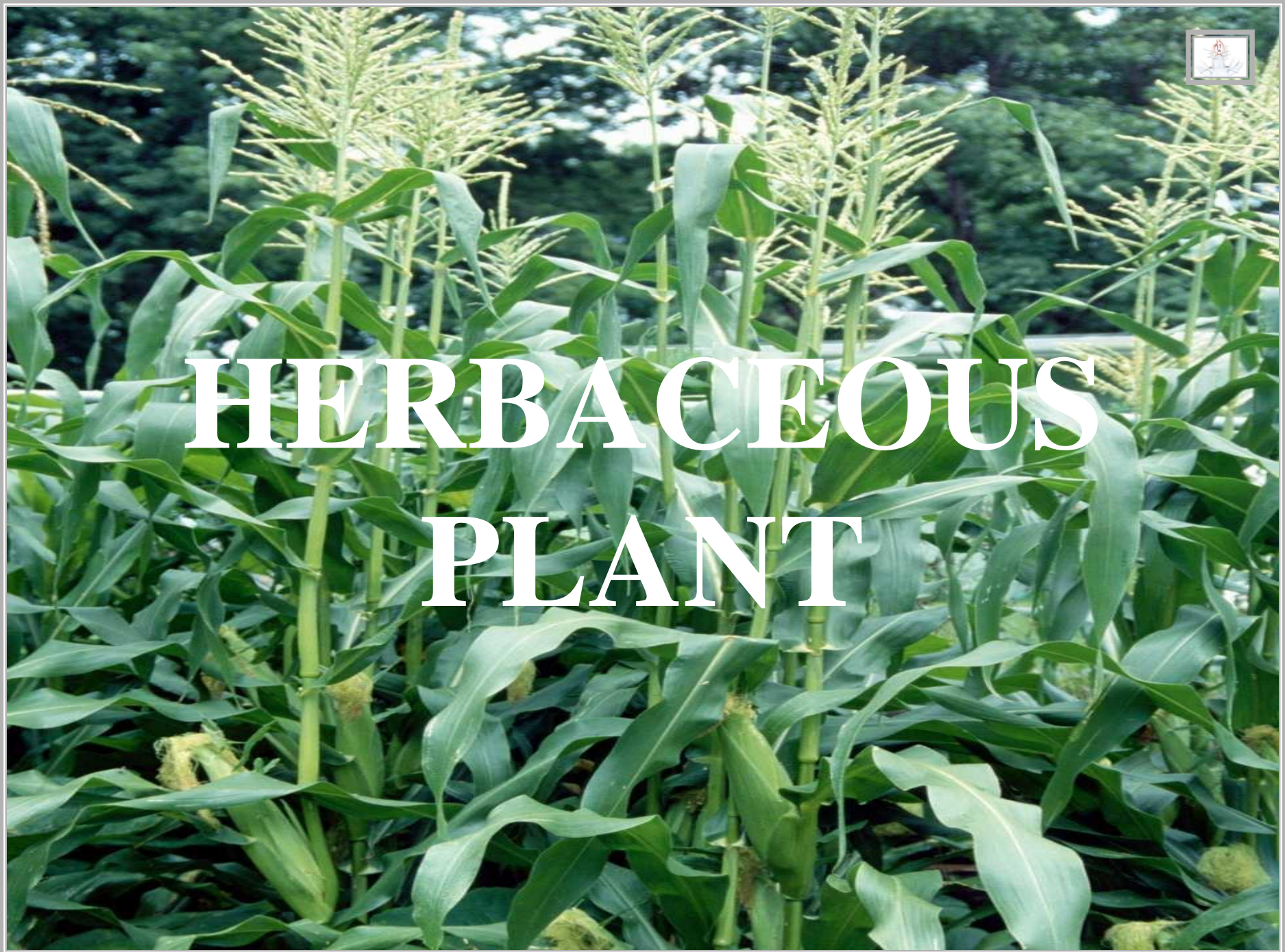
GROWTH TYPE

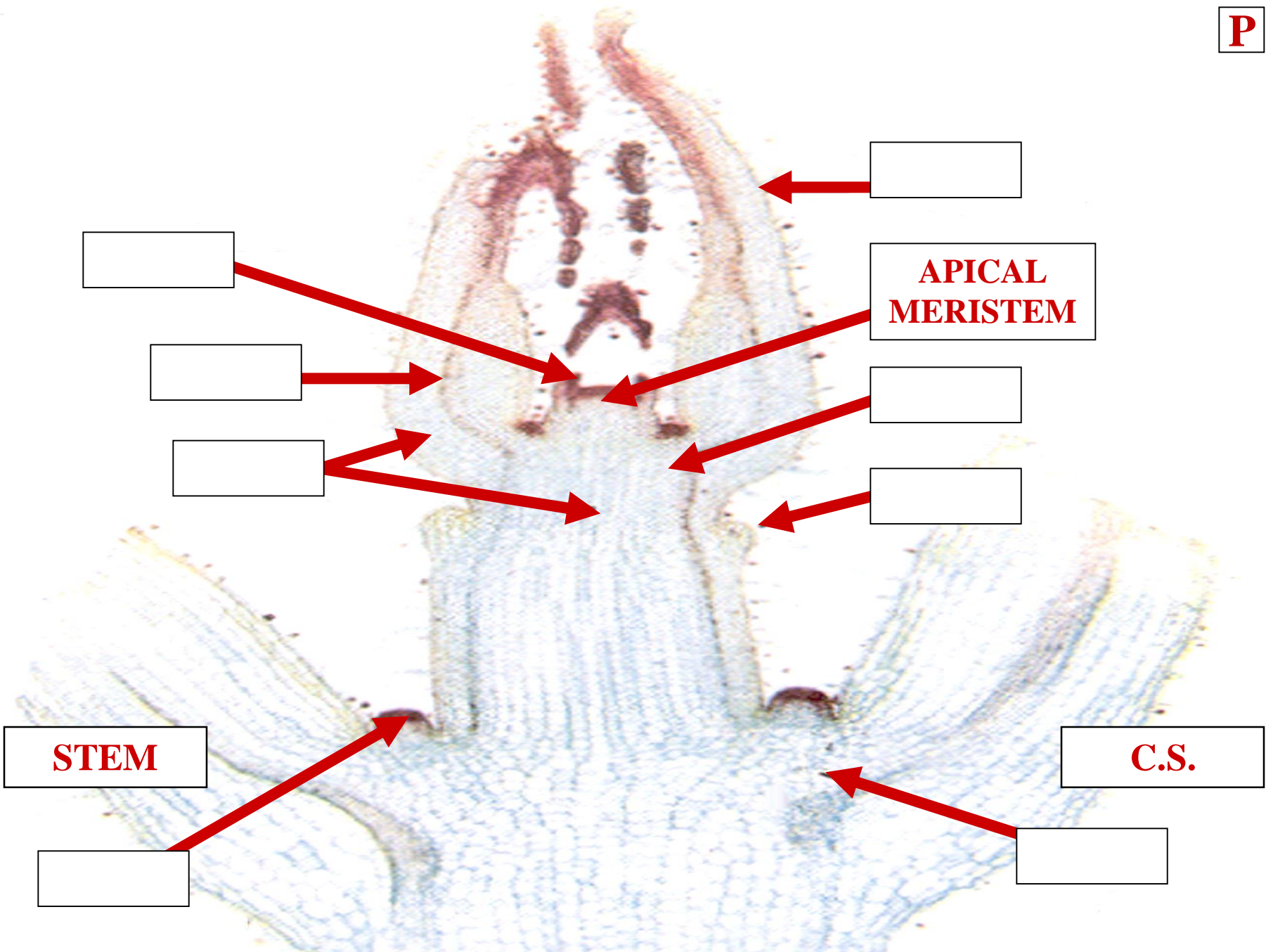


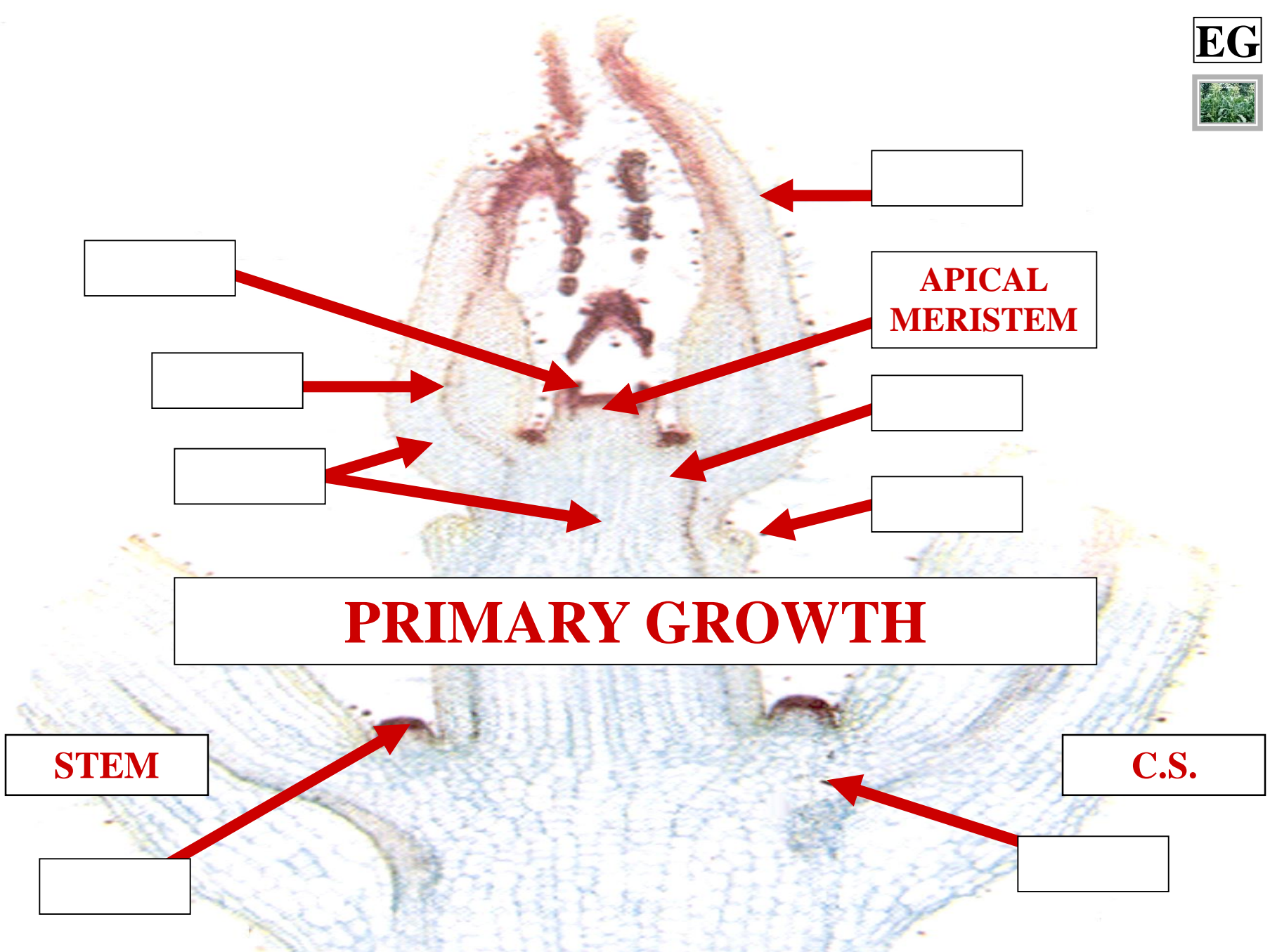
HERBACEOUS PLANTS



HERBACEOUS PLANT







[Empty box]

[Empty box]

**APICAL
MERISTEM**

[Empty box]

[Empty box]

[Empty box]

[Empty box]

PRIMARY GROWTH

STEM

C.S.

[Empty box]

[Empty box]



**HERBACEOUS
PLANT**



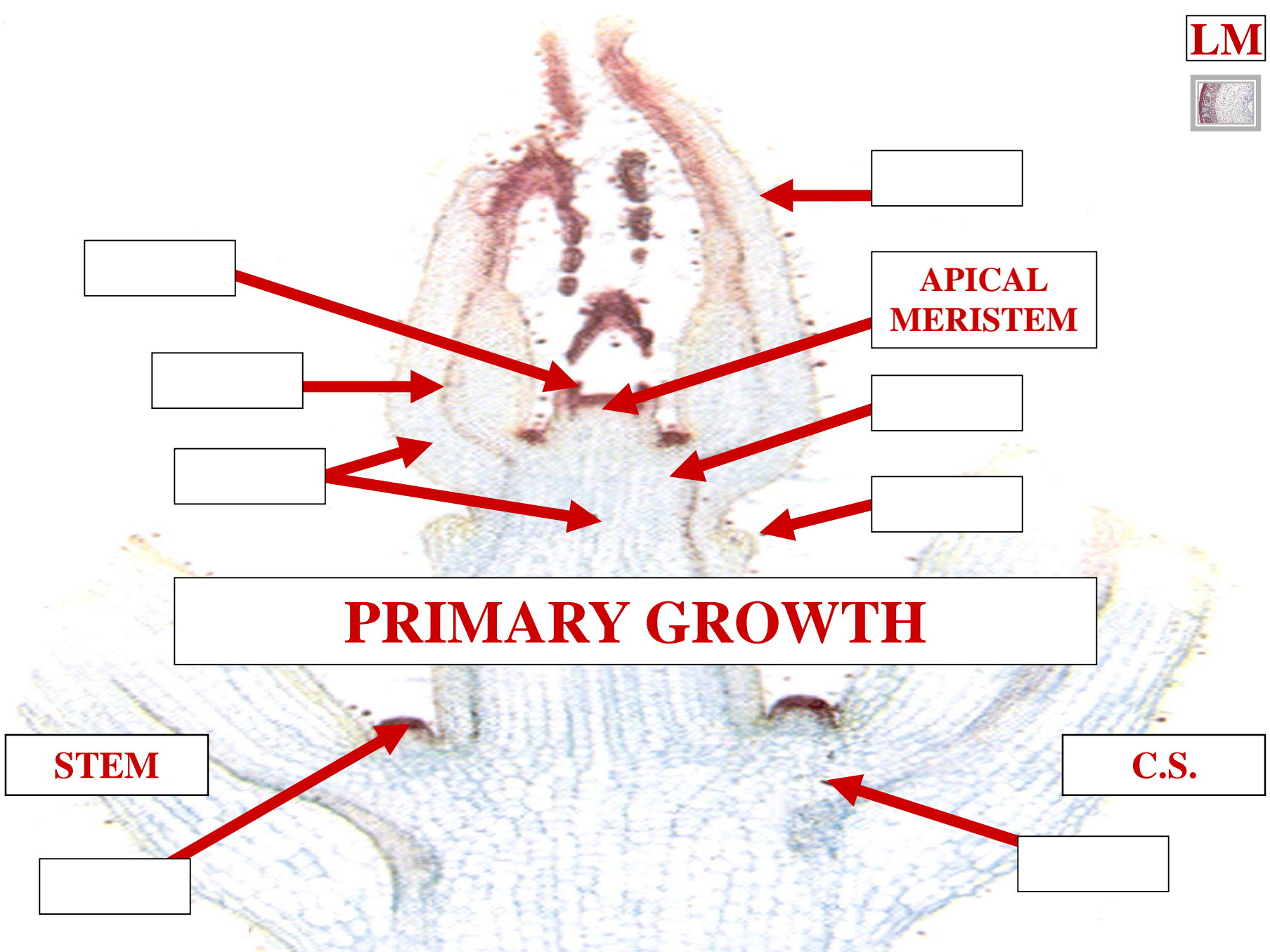


WOODY PLANTS

WOODY PLANT



LM



[]

[]

**APICAL
MERISTEM**

[]

[]

[]

[]

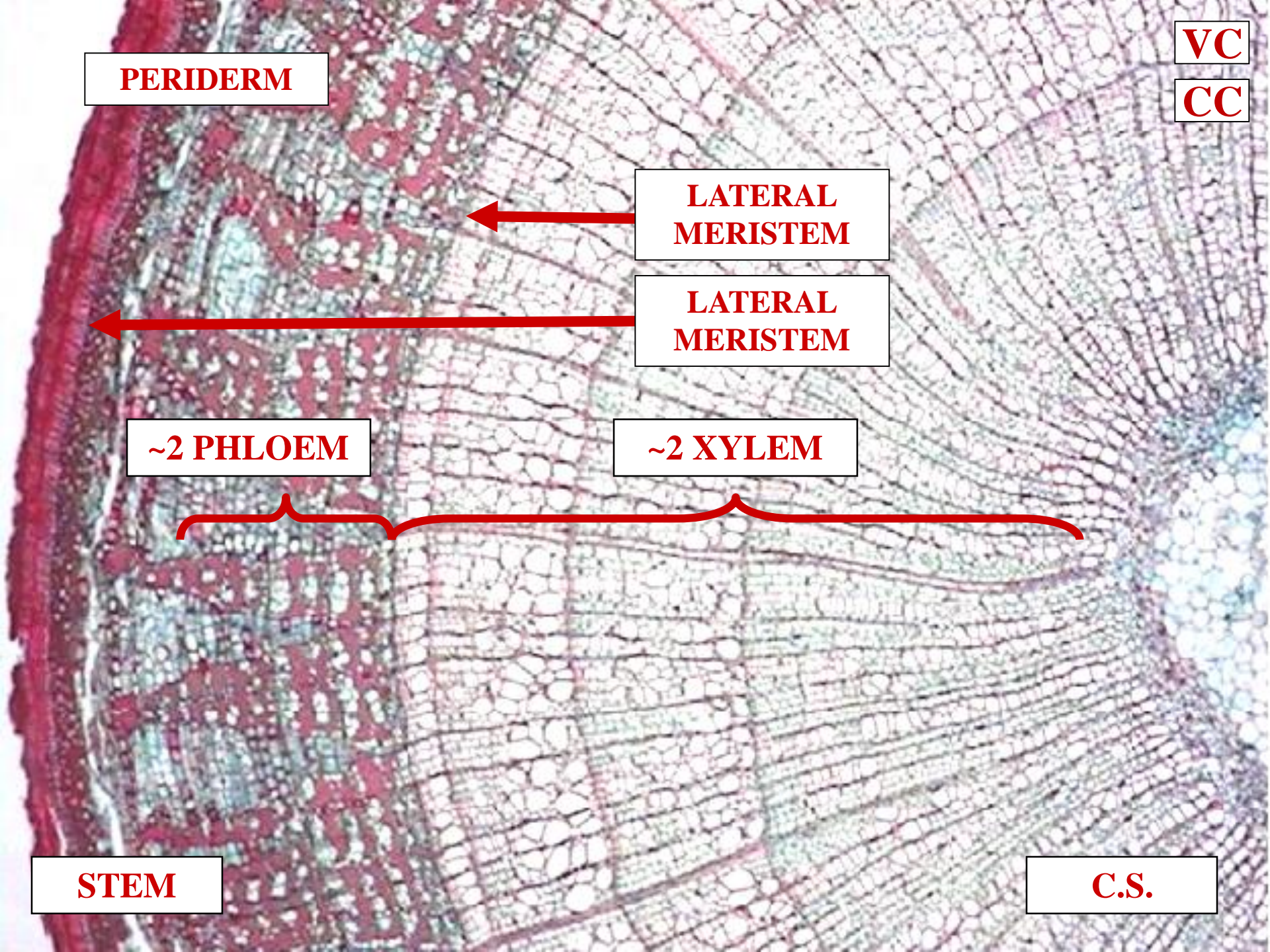
PRIMARY GROWTH

STEM

C.S.

[]

[]



VC

CC

PERIDERM

LATERAL MERISTEM

LATERAL MERISTEM

~2 PHLOEM

~2 XYLEM

STEM

C.S.

PERIDERM

**VASCULAR
CAMBIUM**

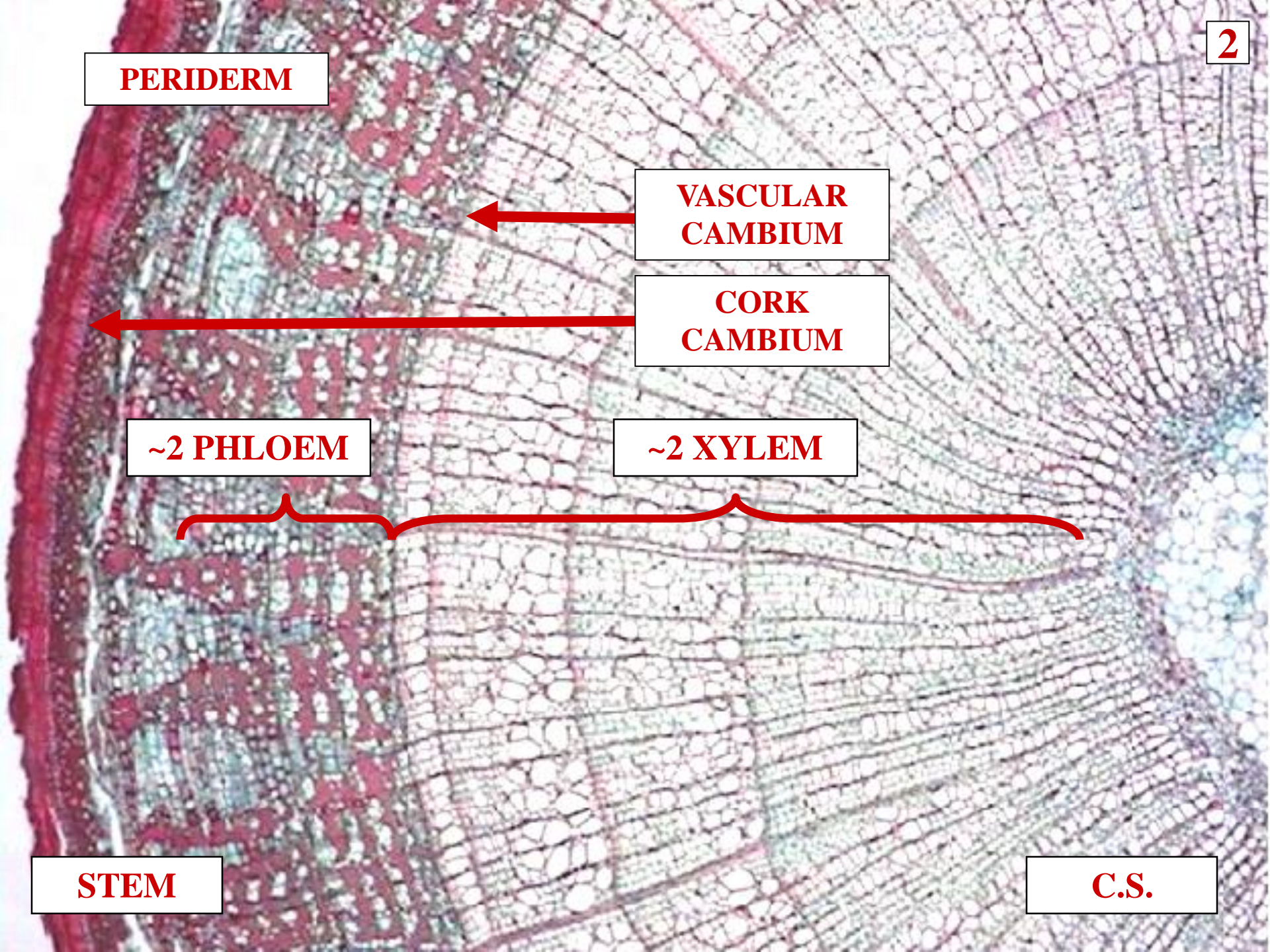
**CORK
CAMBIUM**

~2 PHLOEM

~2 XYLEM

STEM

C.S.





PERIDERM

**VASCULAR
CAMBIUM**

**CORK
CAMBIUM**

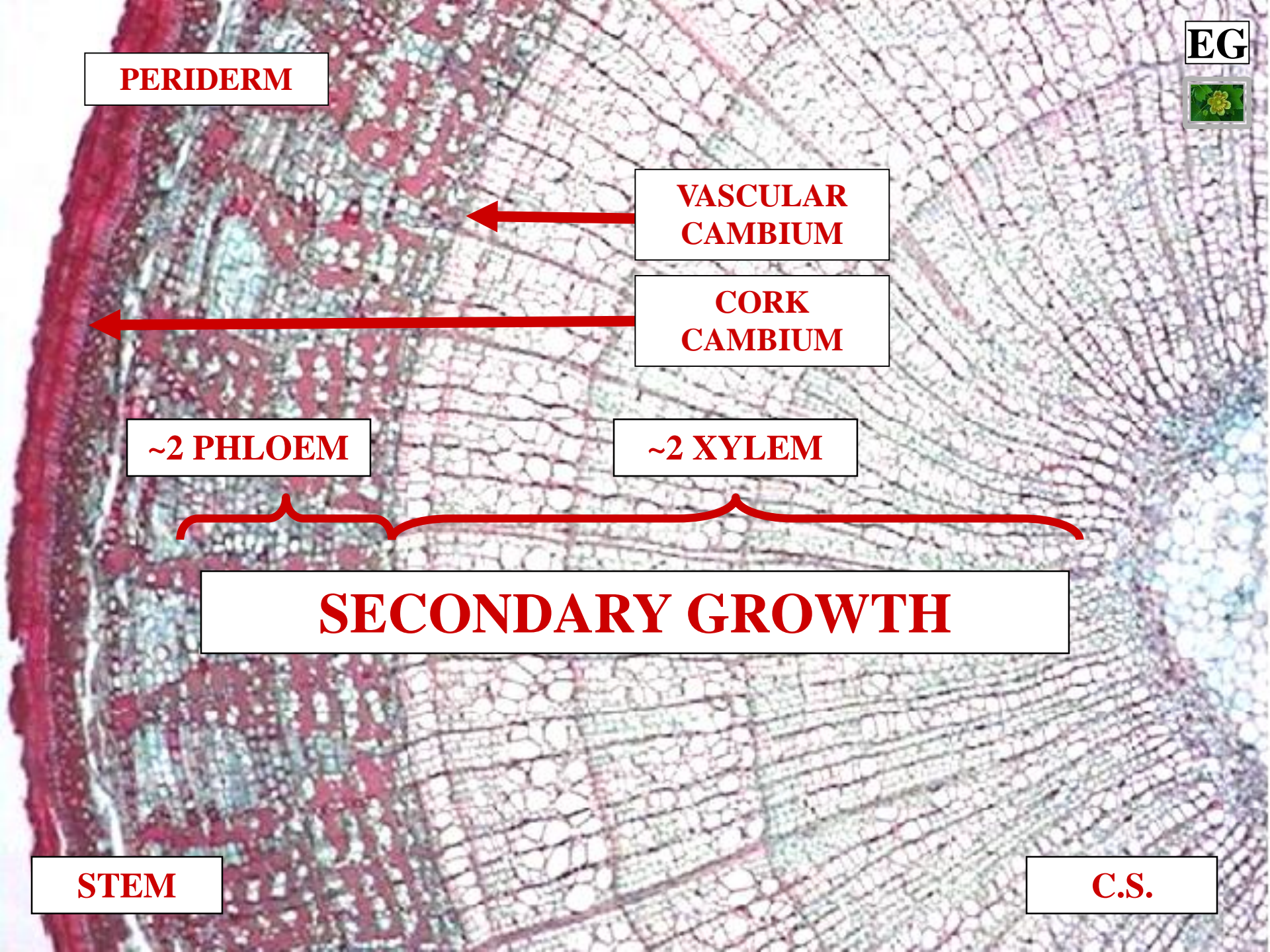
~2 PHLOEM

~2 XYLEM

SECONDARY GROWTH

STEM

C.S.





WOODY PLANT





GROWTH HABIT

ANNUAL PLANT

ANNUAL PLANT

GROWTH HABIT
ANNUAL

EG



COMPLETES
LIFE CYCLE
1 SEASON

GROWTH HABIT
ANNUAL



ANNUAL PLANT



BIENNIAL PLANT

BIENNIAL PLANT

GROWTH HABIT
BIENNIAL

COMPLETES
LIFE CYCLE
2 SEASONS

GROWTH HABIT
BIENNIAL



BIENNIAL PLANT FIRST SEASON

BASAL LEAF ROSSETTE

2



STORAGE ROOT



BIENNIAL PLANT SECOND SEASON



PERENNIAL PLANT

PERENNIAL PLANT

GROWTH HABIT PERENNIAL

EG



**COMPLETES
LIFE CYCLE
3+ SEASONS**

GROWTH HABIT PERENNIAL



WOODY PLANT



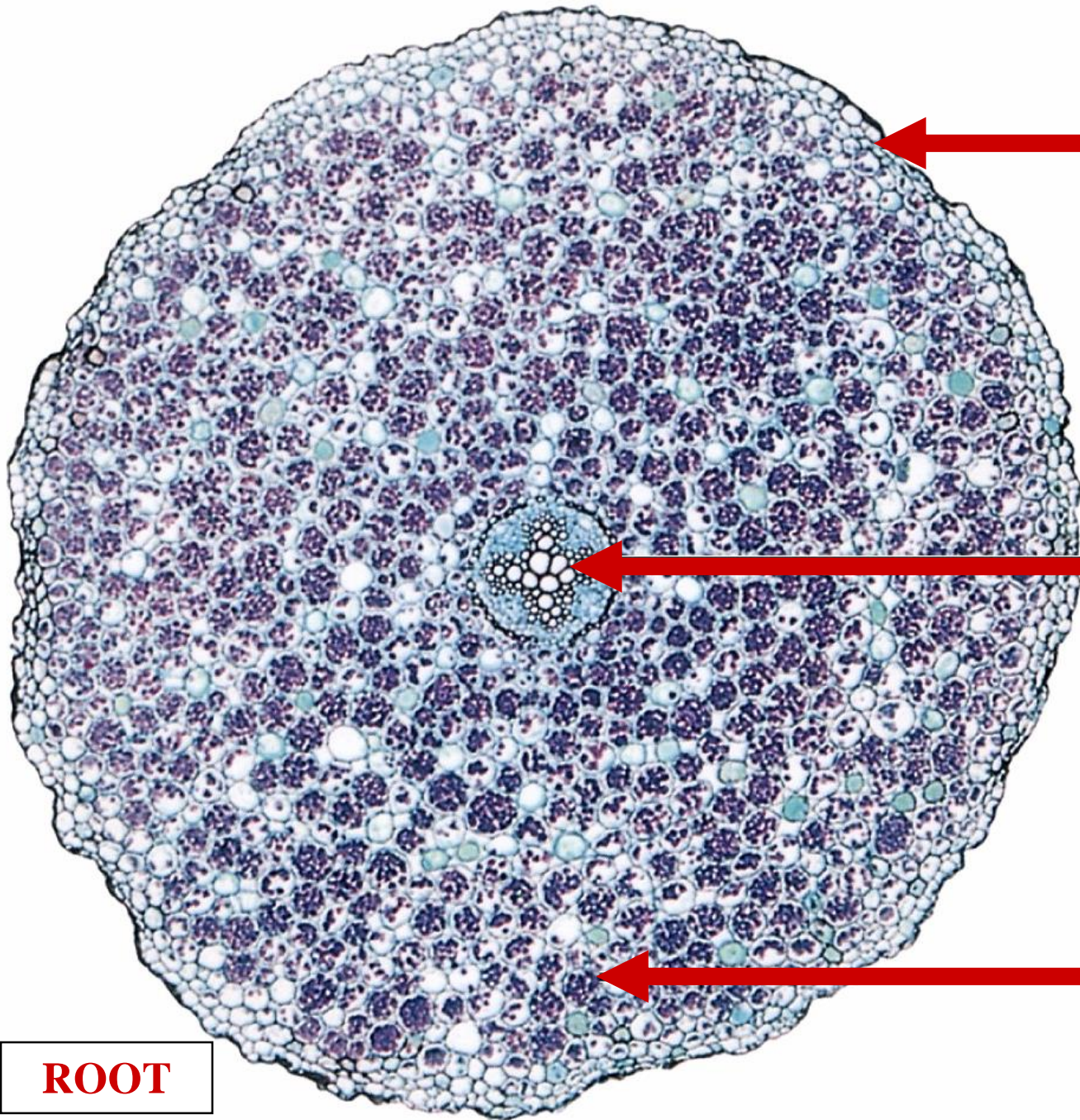


DICOT ANATOMY



DICOT PRIMARY ROOT ANATOMY

?



[]

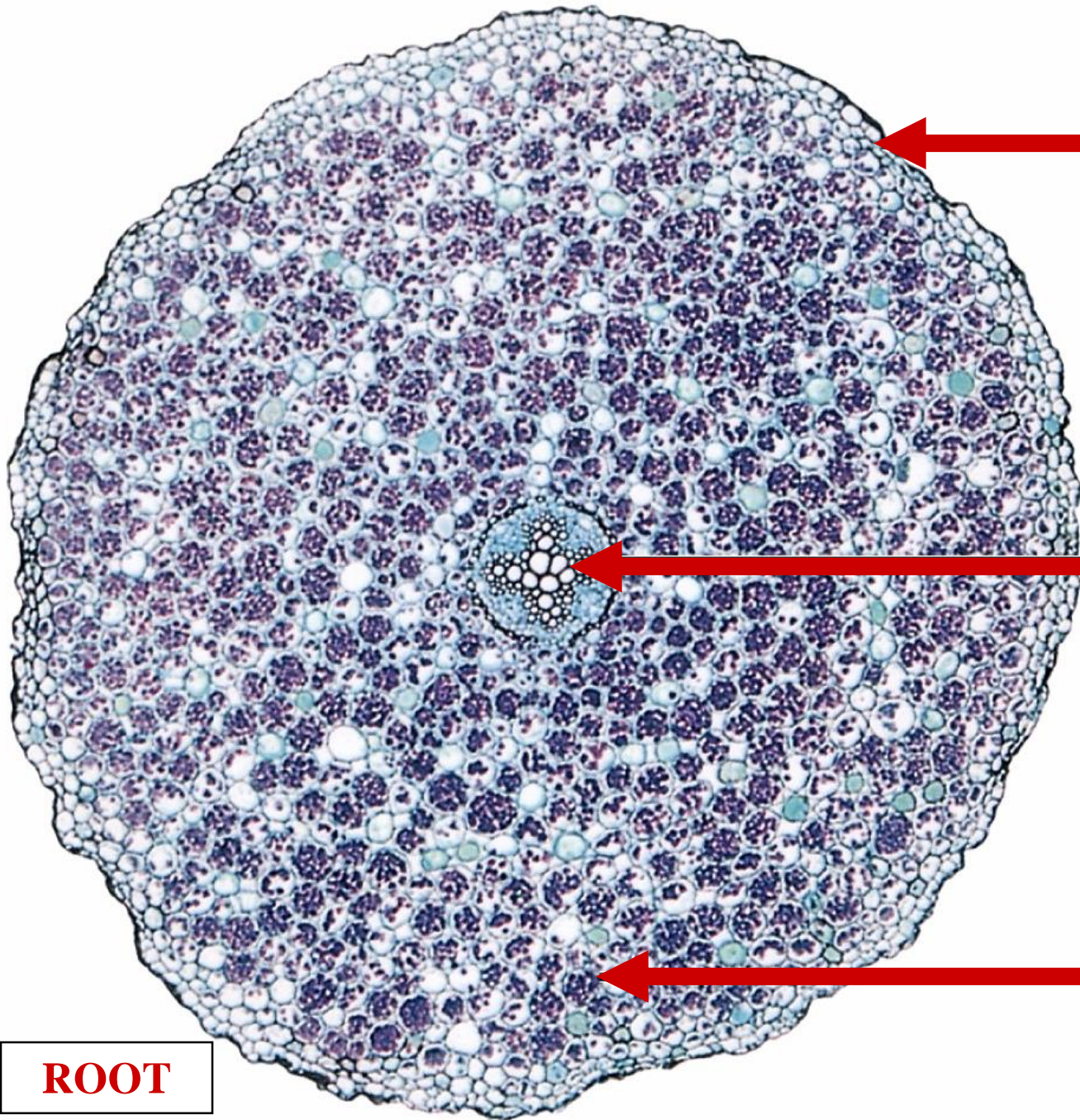
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[]

ROOT

C.S.

E



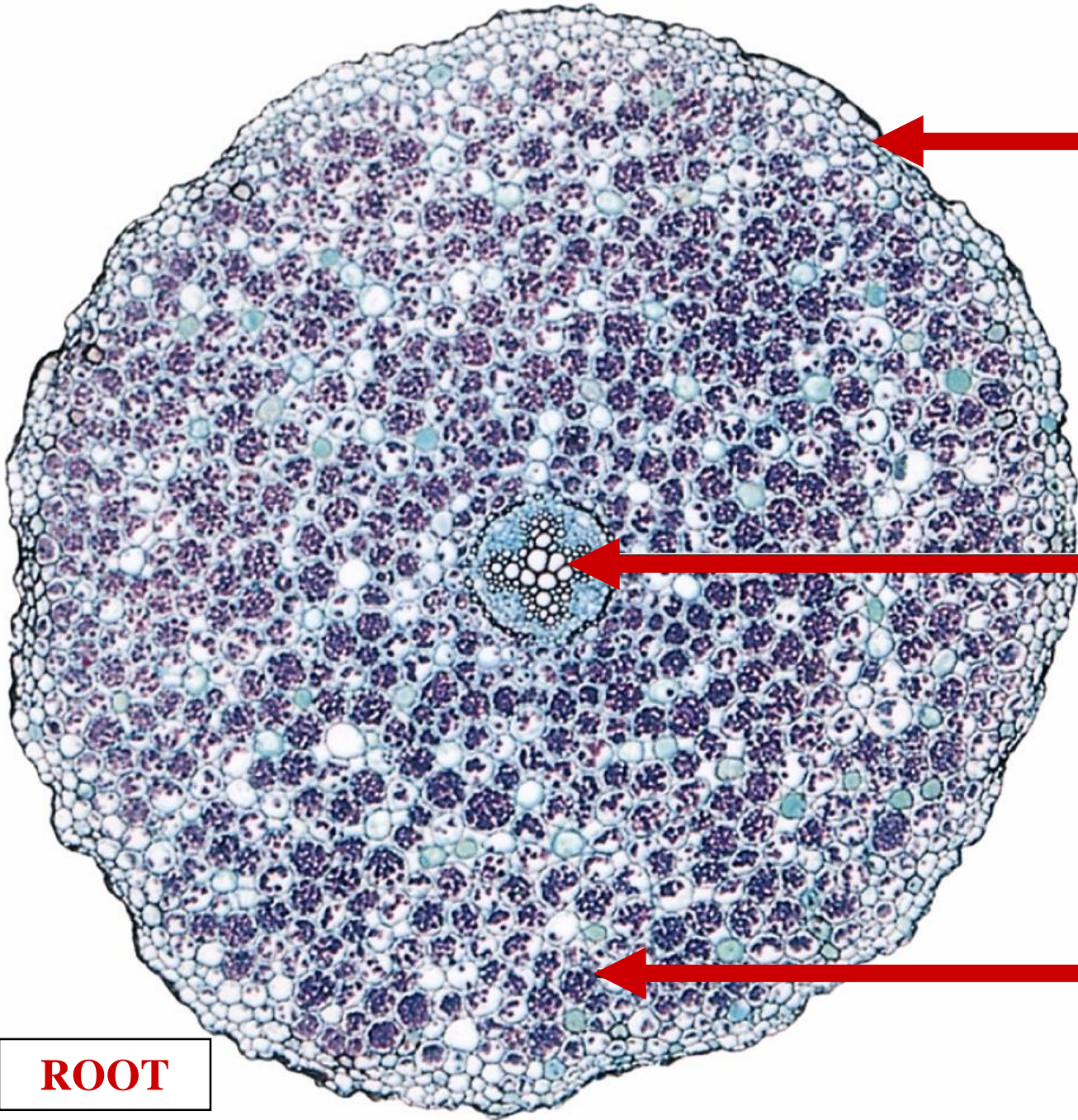
?

ROOT

C.S.

?

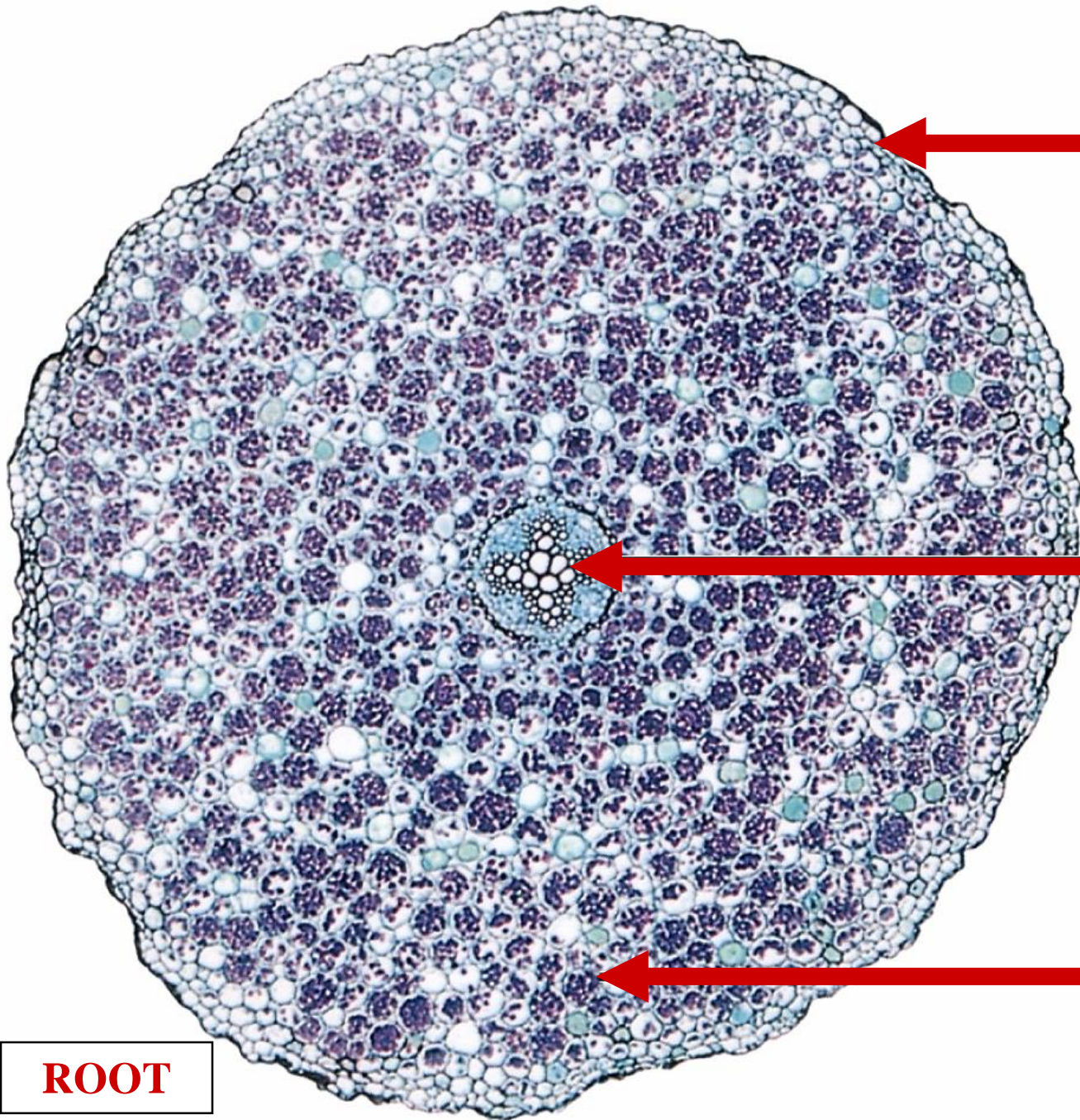
EPIDERMIS



ROOT

C.S.

C



EPIDERMIS

?

C.S.

ROOT

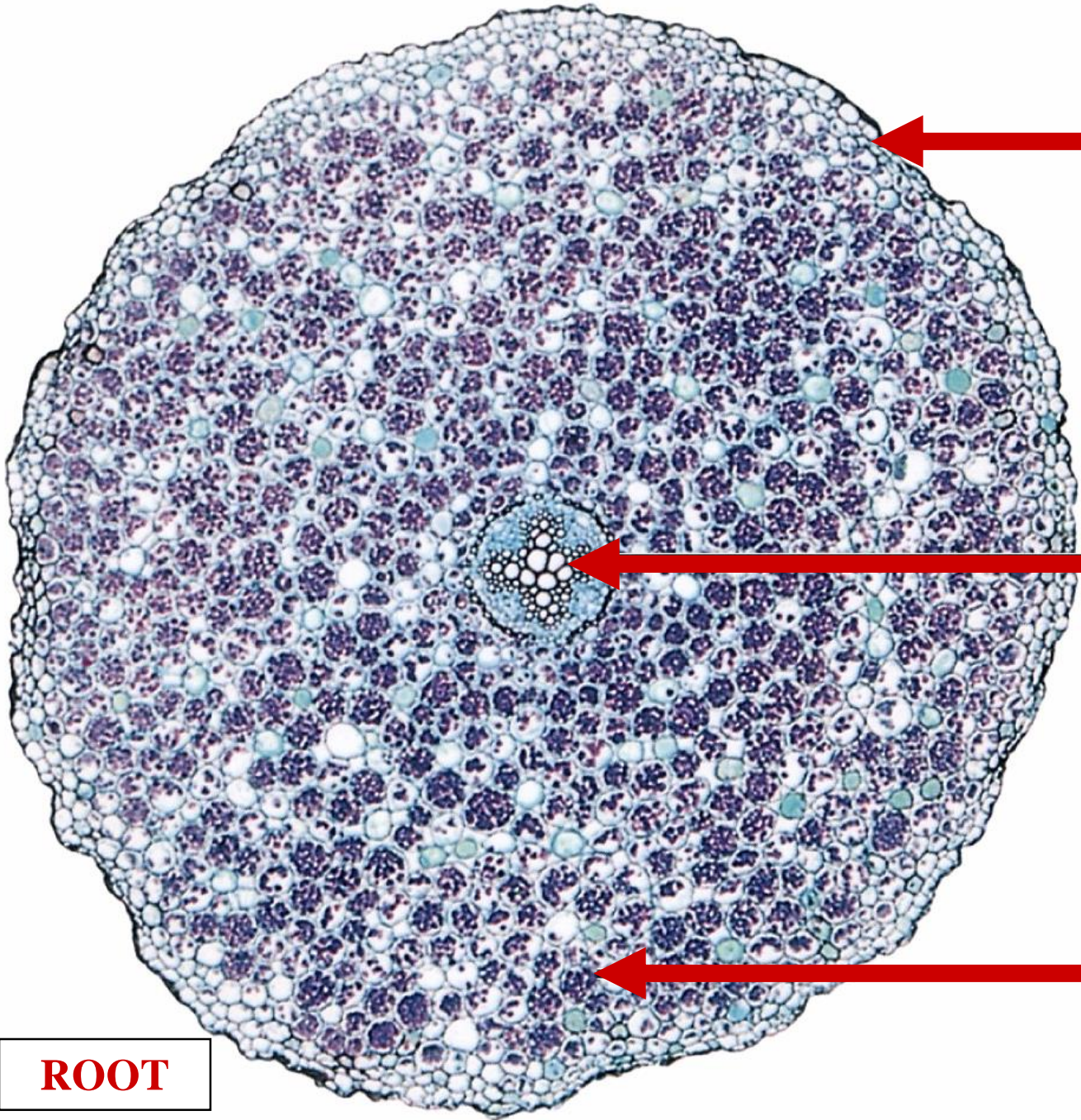
S

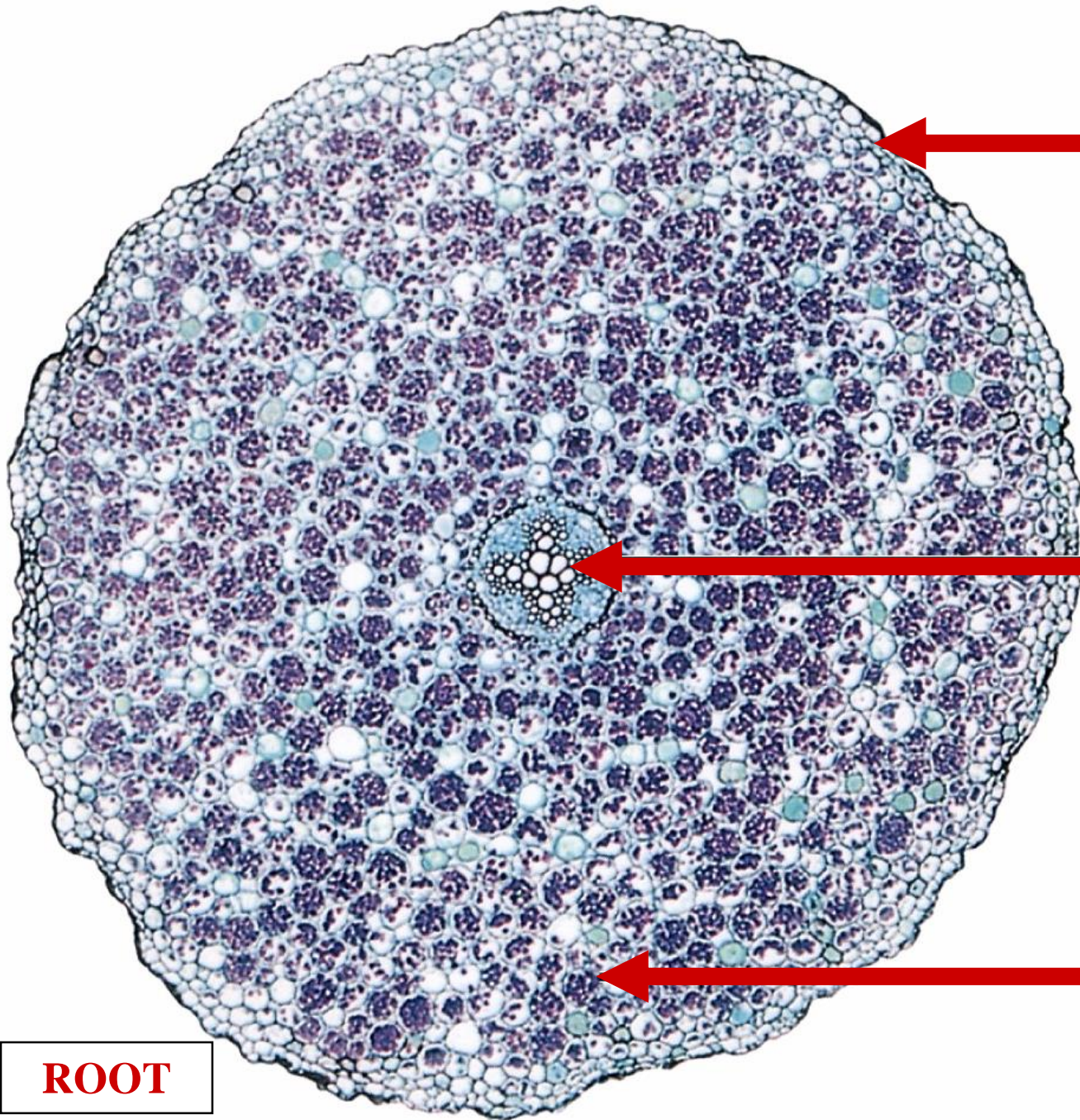
EPIDERMIS

CORTEX

ROOT

C.S.





EPIDERMIS

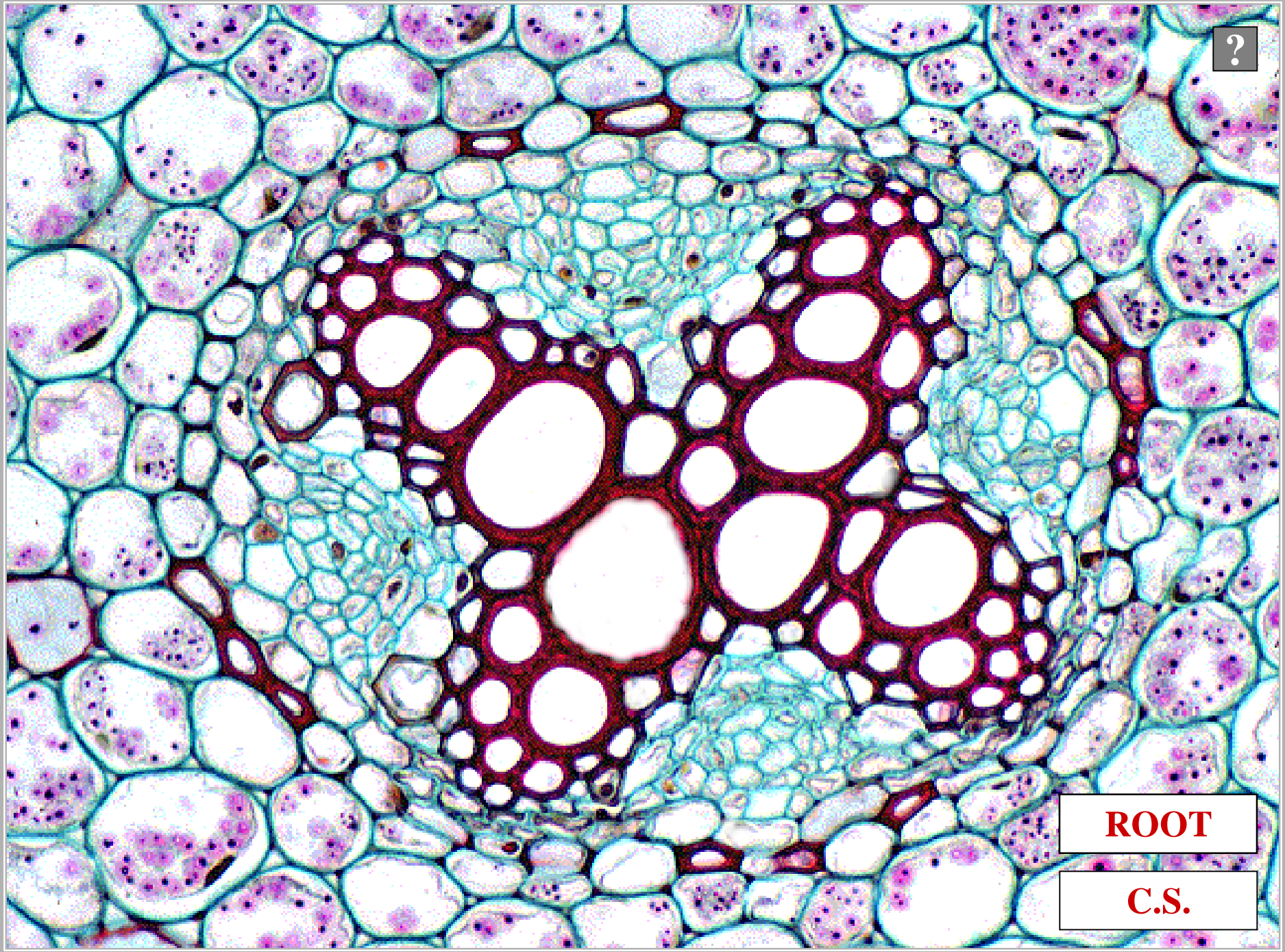
**STELE
REGION**

CORTEX

ROOT

C.S.

?

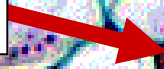


ROOT

C.S.

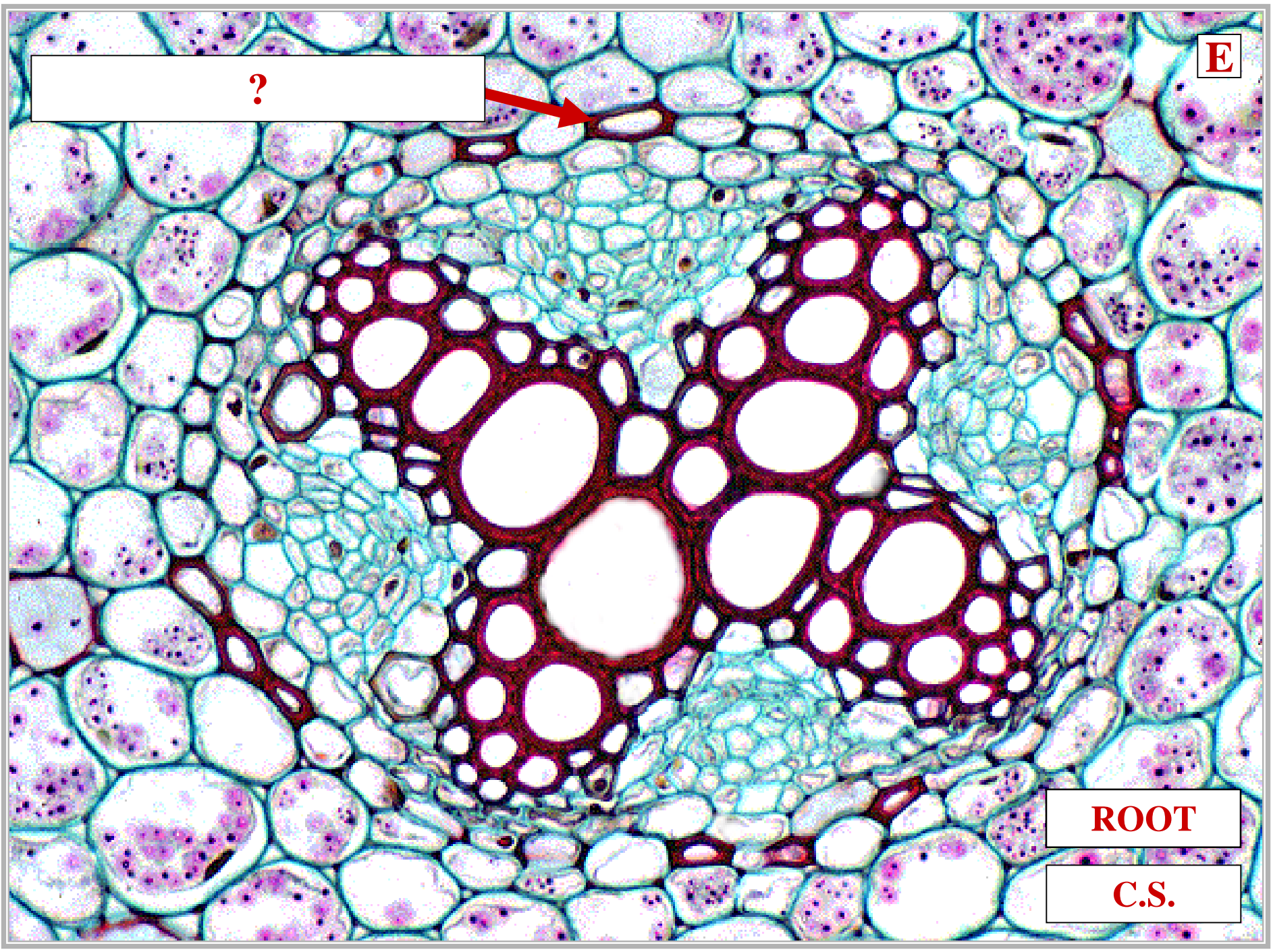
E

?



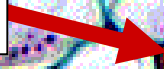
ROOT

C.S.



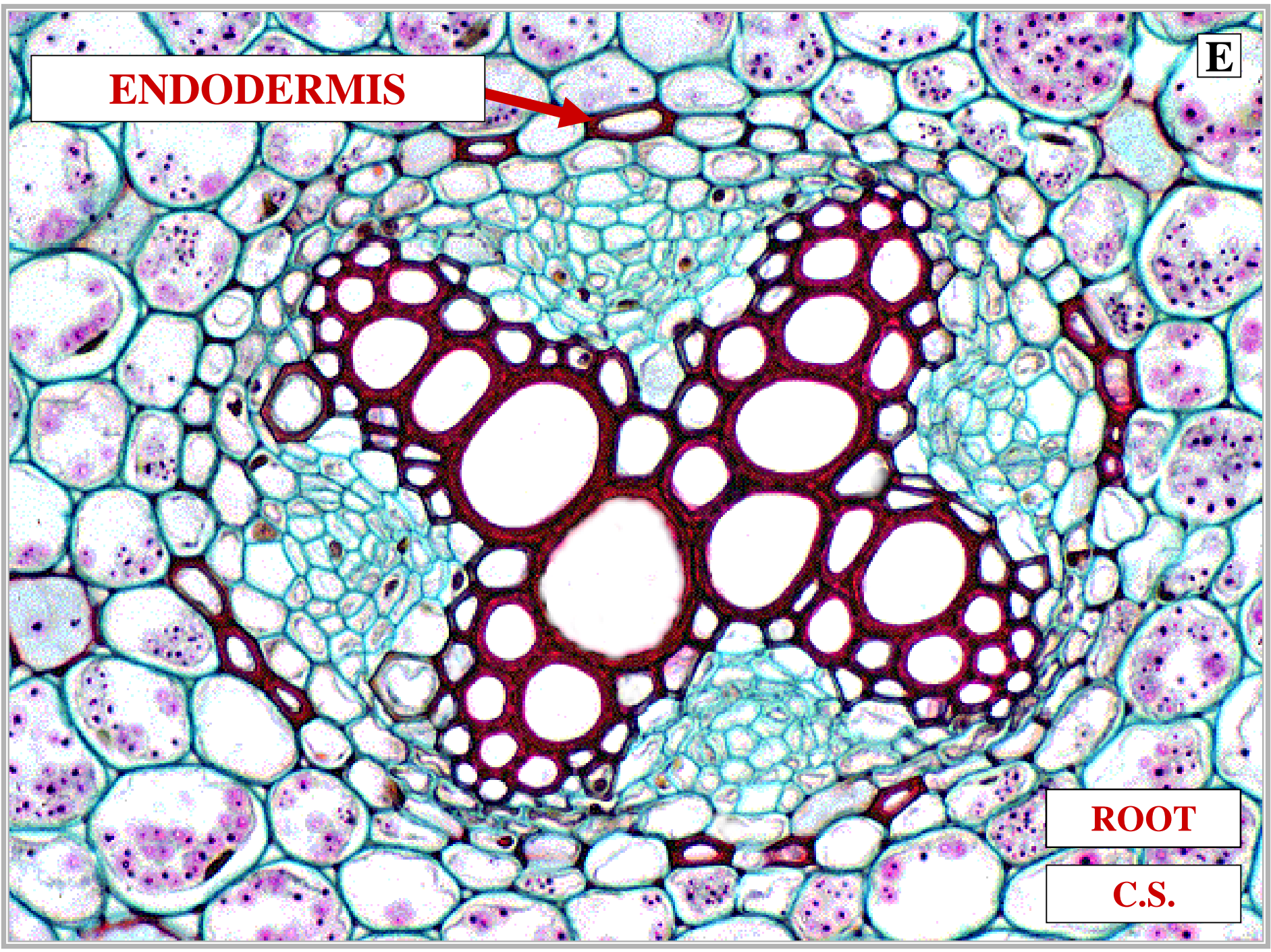
E

ENDODERMIS



ROOT

C.S.



ENDODERMIS

ENDODERMIS



**INNERMOST
CORTEX CELLS**

ENDODERMIS

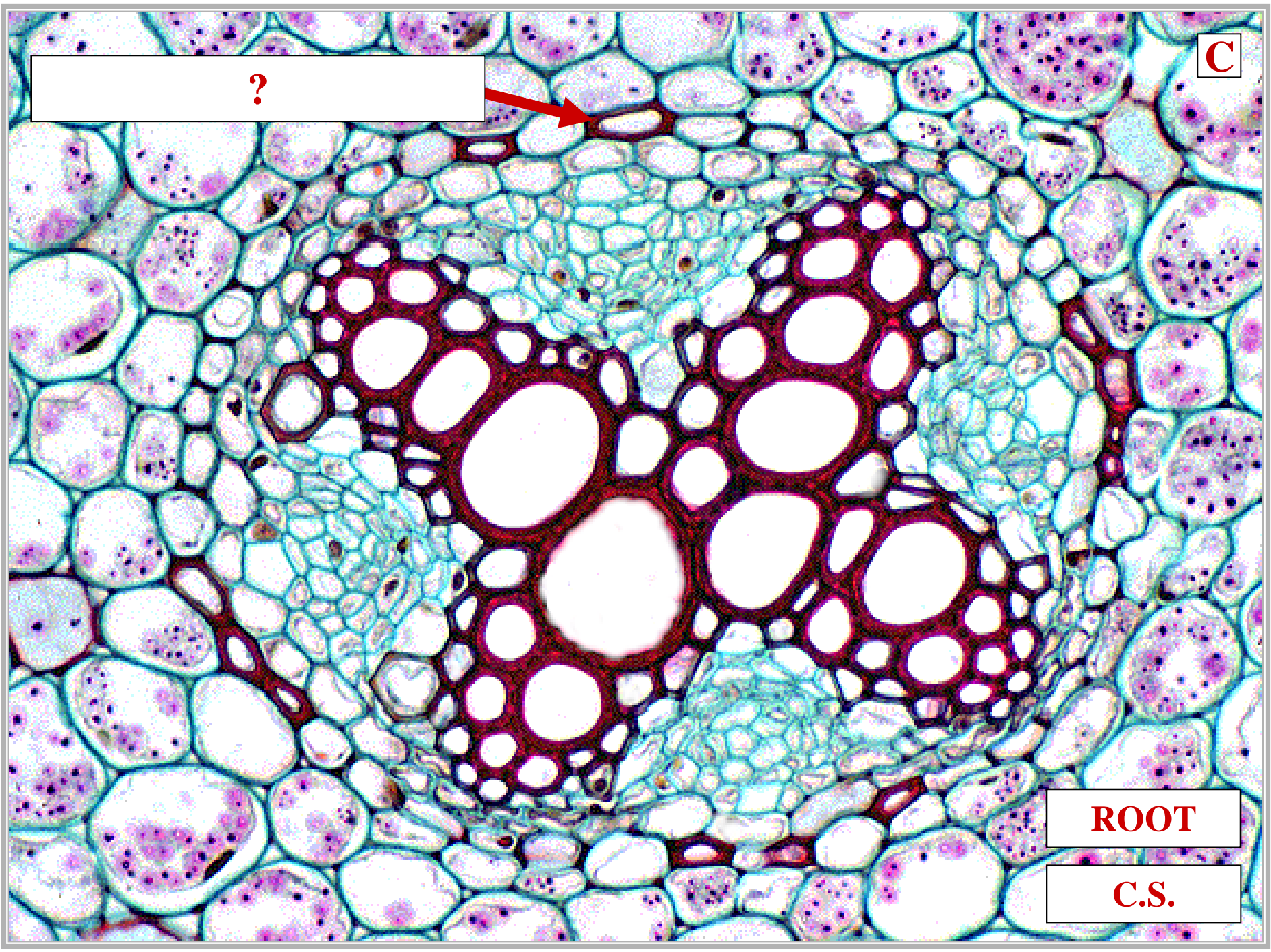
C

?



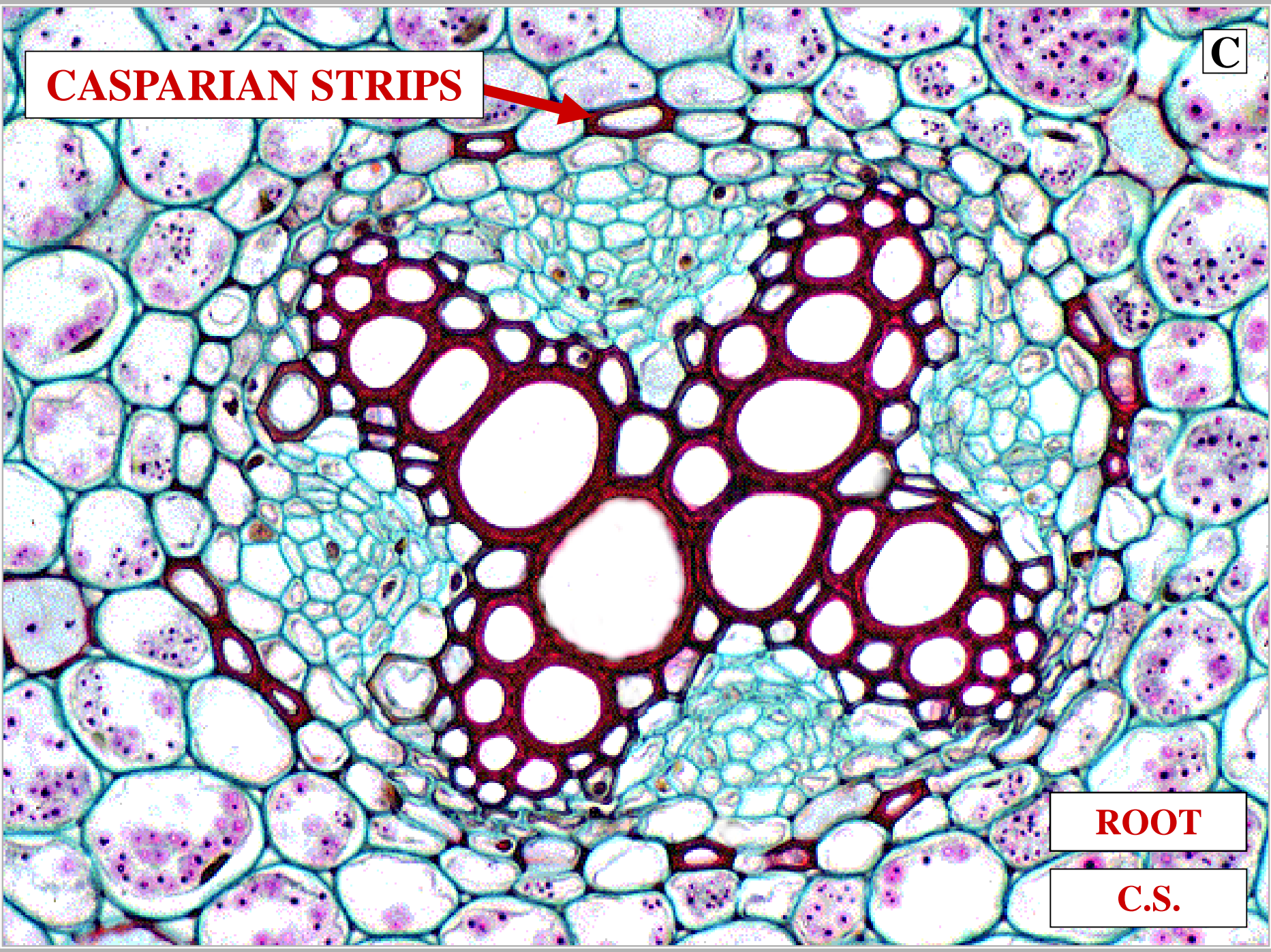
ROOT

C.S.



C

CASPARIAN STRIPS



ROOT

C.S.

CASPARIAN STRIPS

CASPARIAN STRIPS



STRIPS BETWEEN
ENDODERMIS CELLS

CASPARIAN STRIPS

P

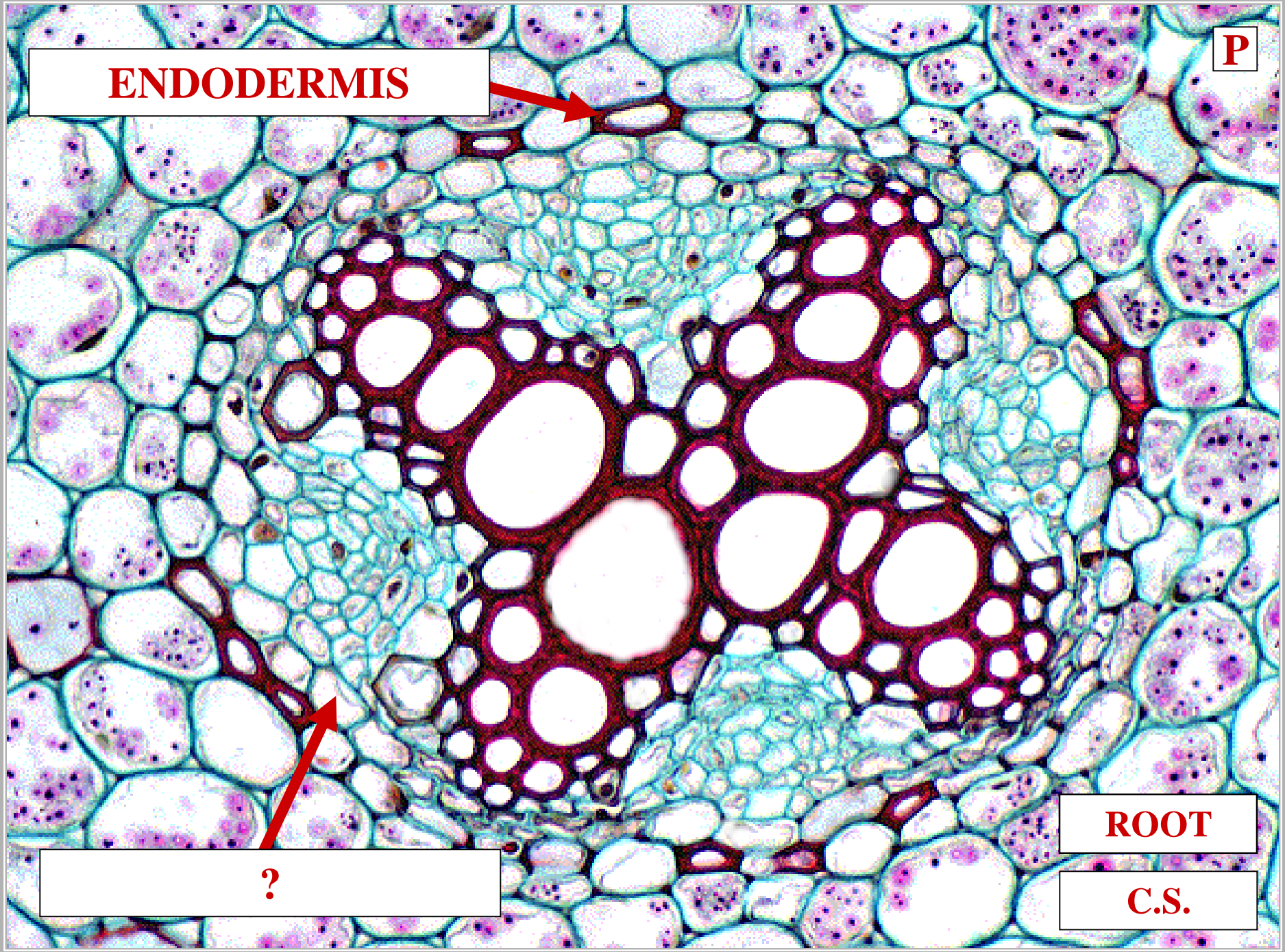
ENDODERMIS



?

ROOT

C.S.



P

ENDODERMIS

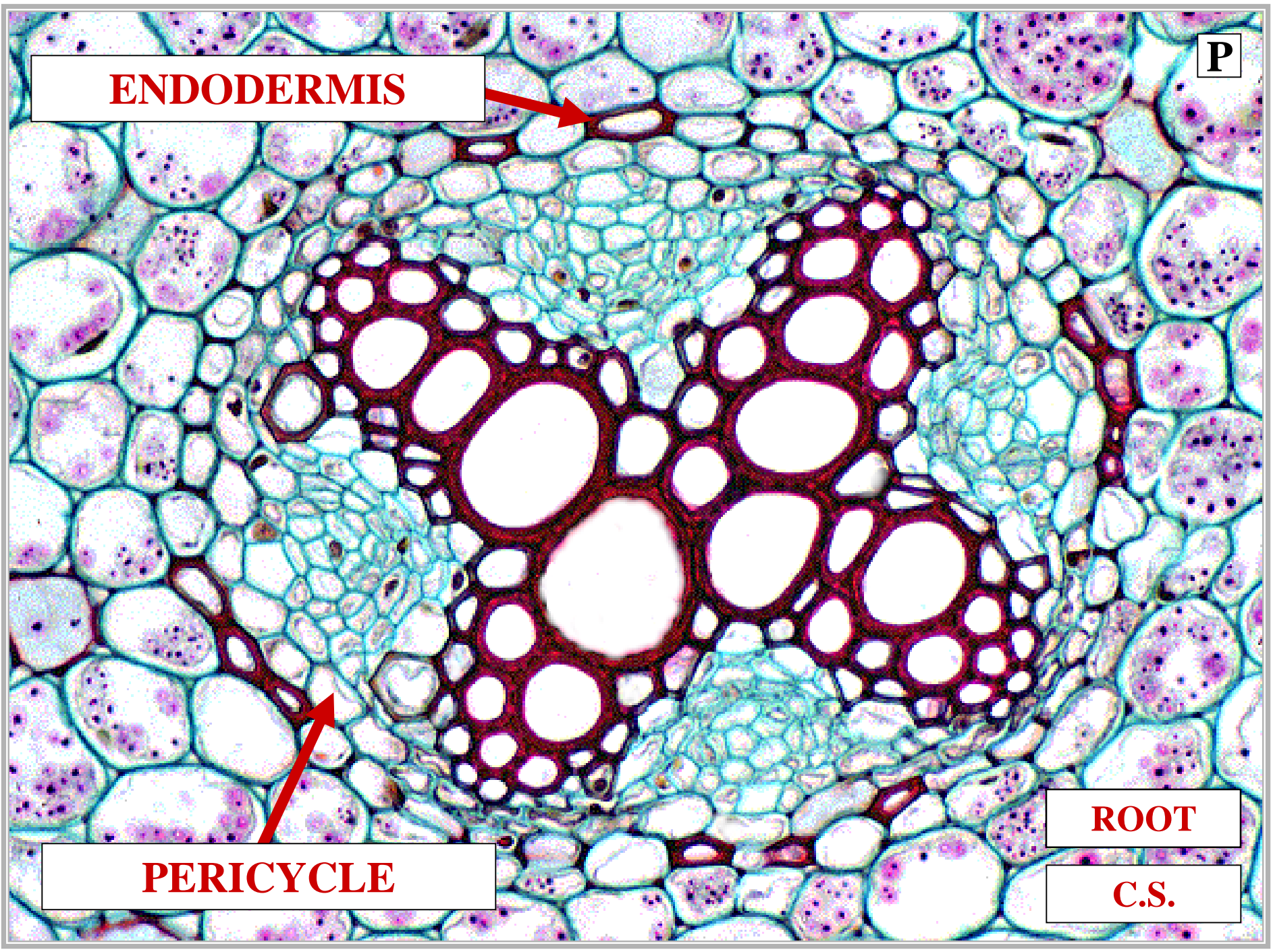


PERICYCLE



ROOT

C.S.



PERICYCLE



PERICYCLE

MERISTEMATIC

ORIGIN

LATERAL ROOTS

PERICYCLE

ENDODERMIS

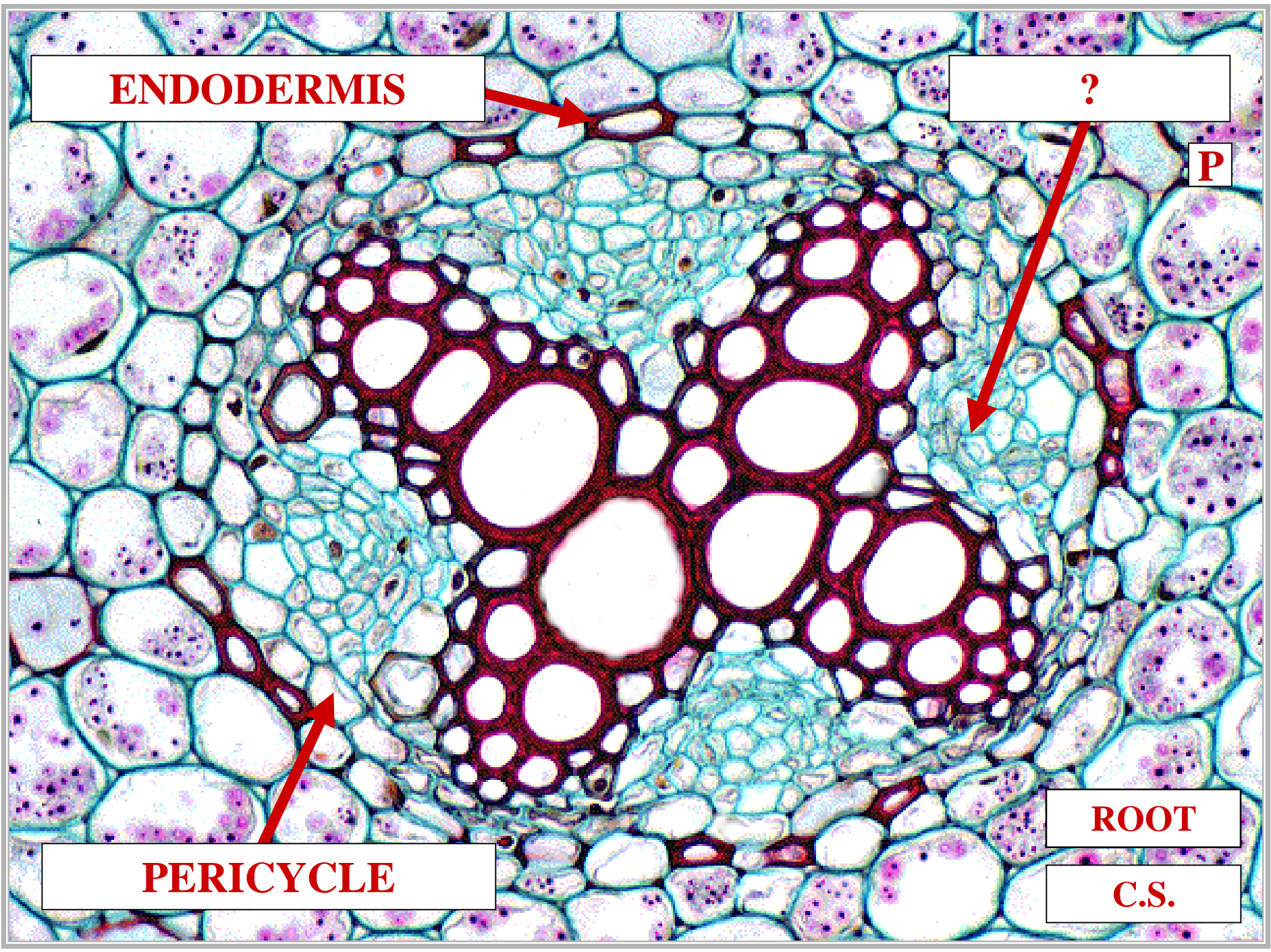
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P

PERICYCLE

ROOT

C.S.



ENDODERMIS

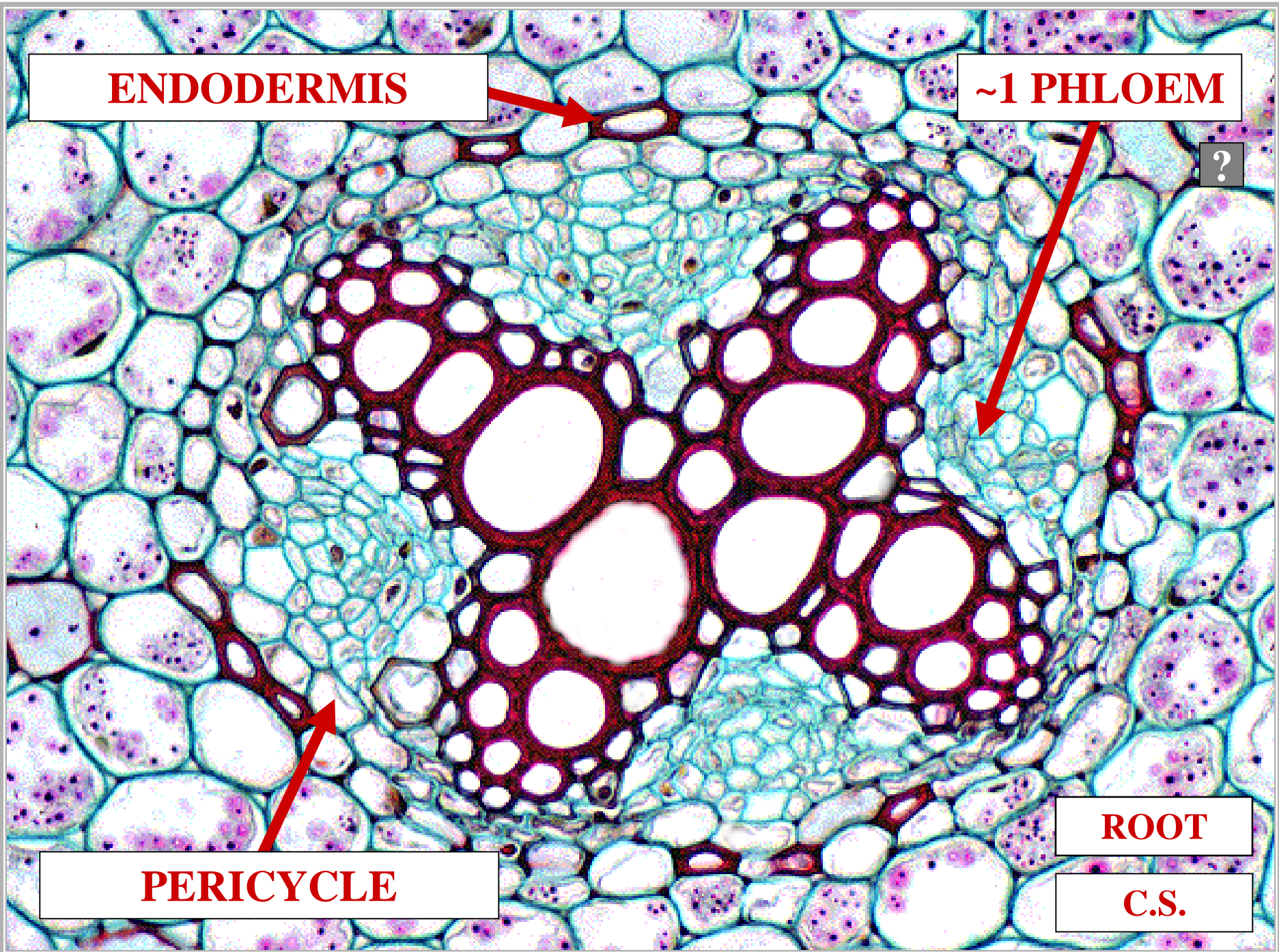
~1 PHLOEM

?

PERICYCLE

ROOT

C.S.



ENDODERMIS

~1 PHLOEM

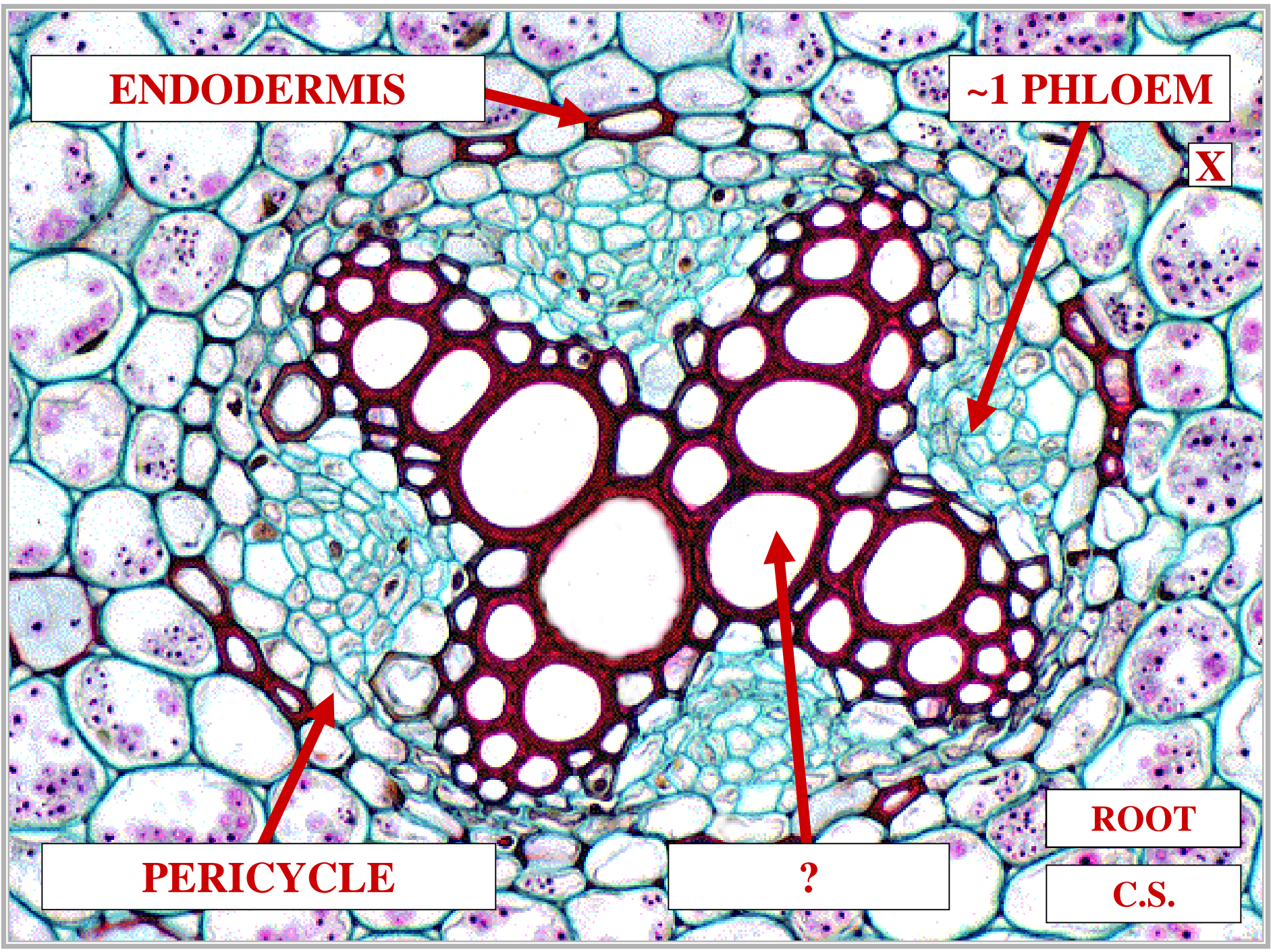
X

PERICYCLE

?

ROOT

C.S.



ENDODERMIS

~1 PHLOEM

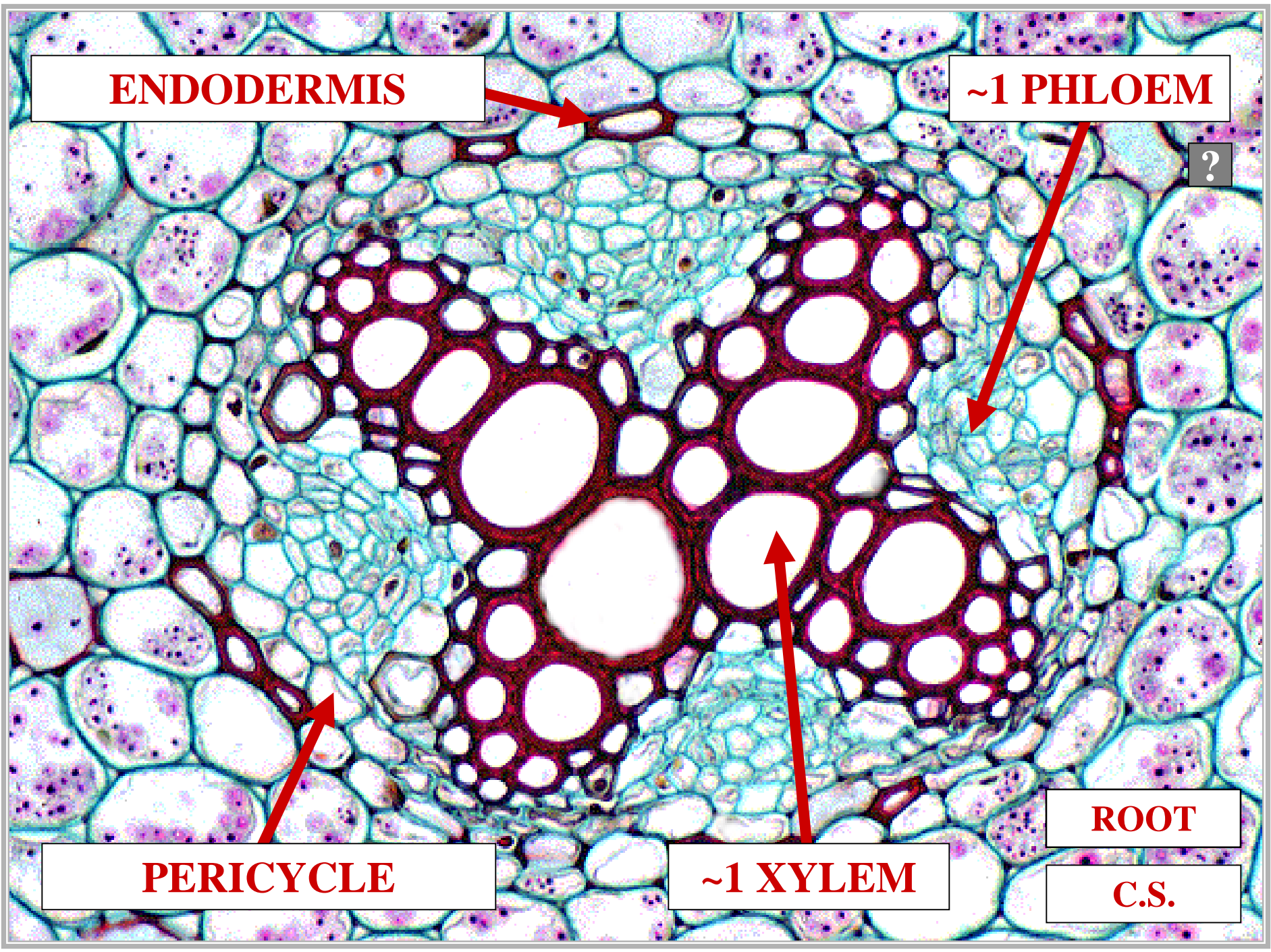
?

PERICYCLE

~1 XYLEM

ROOT

C.S.



ENDODERMIS

~1 PHLOEM

V

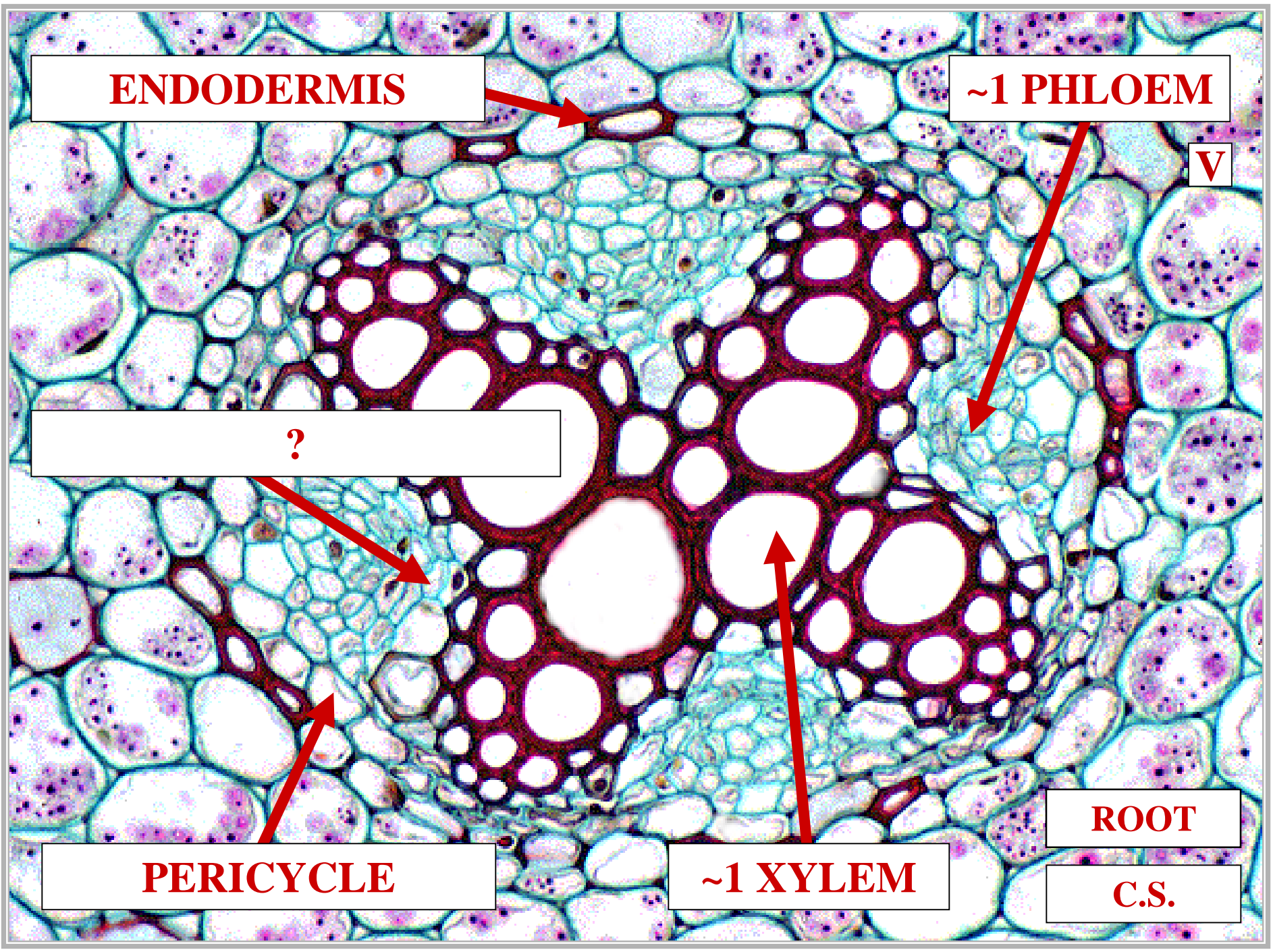
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PERICYCLE

~1 XYLEM

ROOT

C.S.



ENDODERMIS

~1 PHLOEM

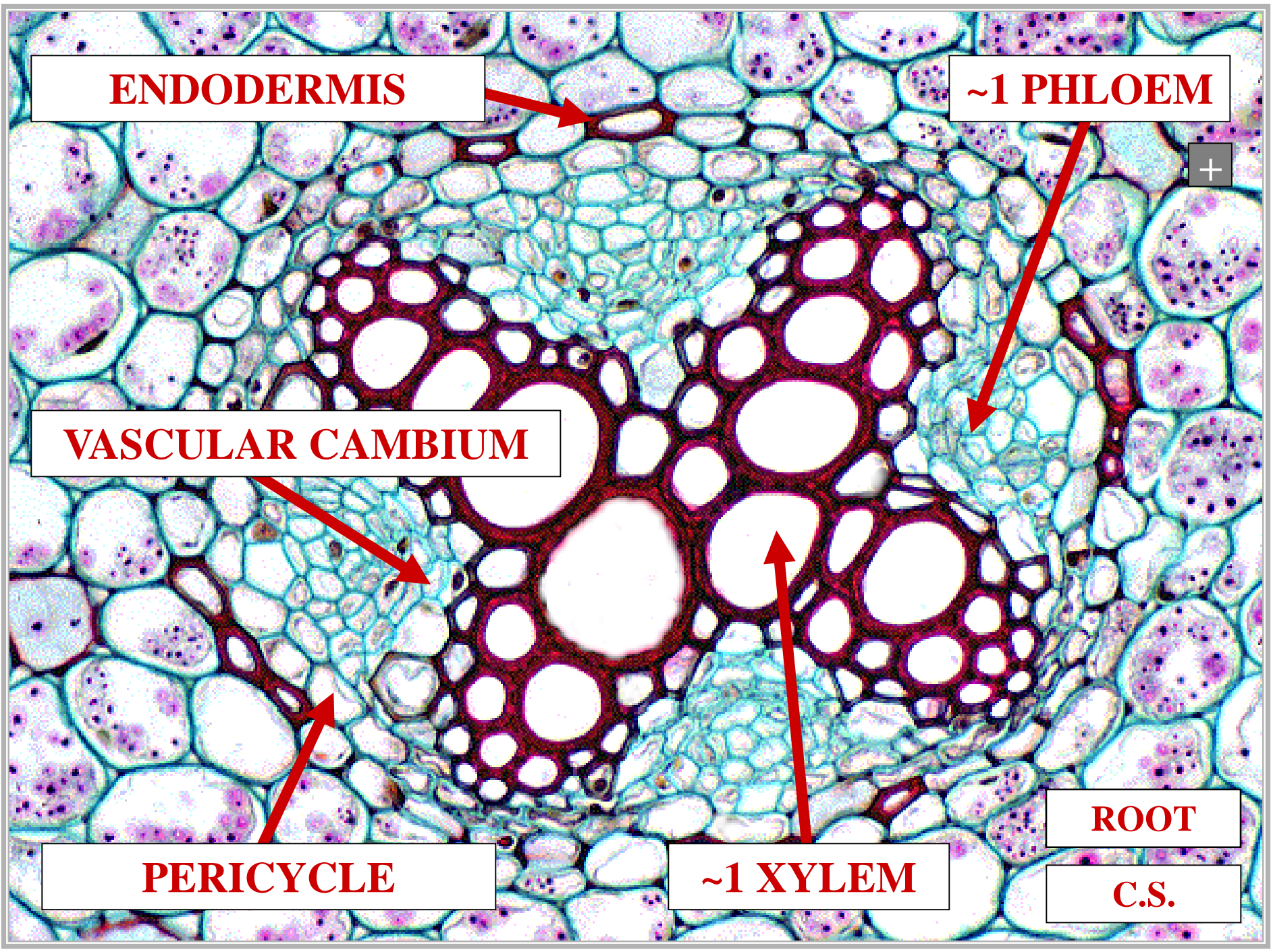
VASCULAR CAMBIUM

PERICYCLE

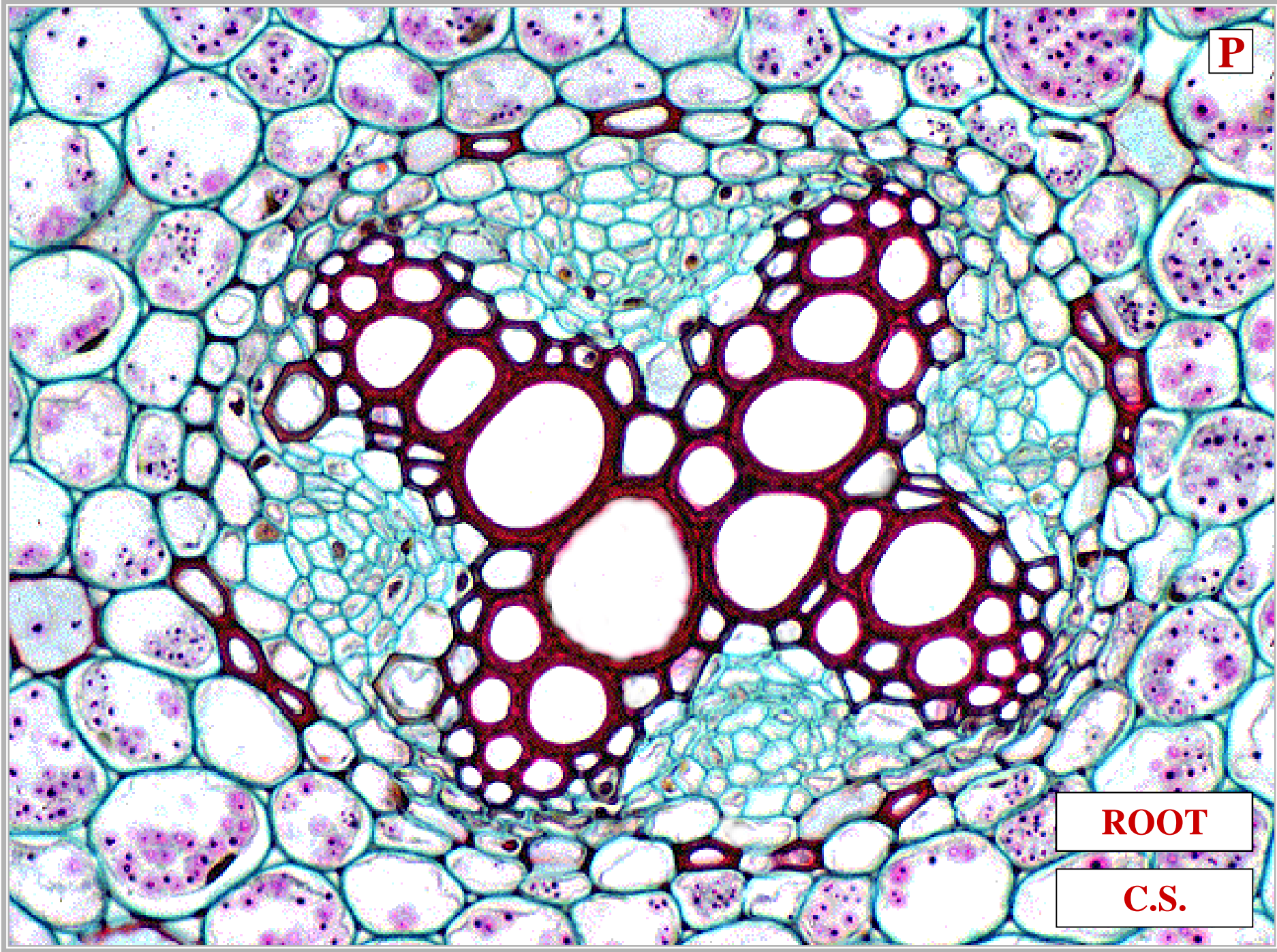
~1 XYLEM

ROOT

C.S.



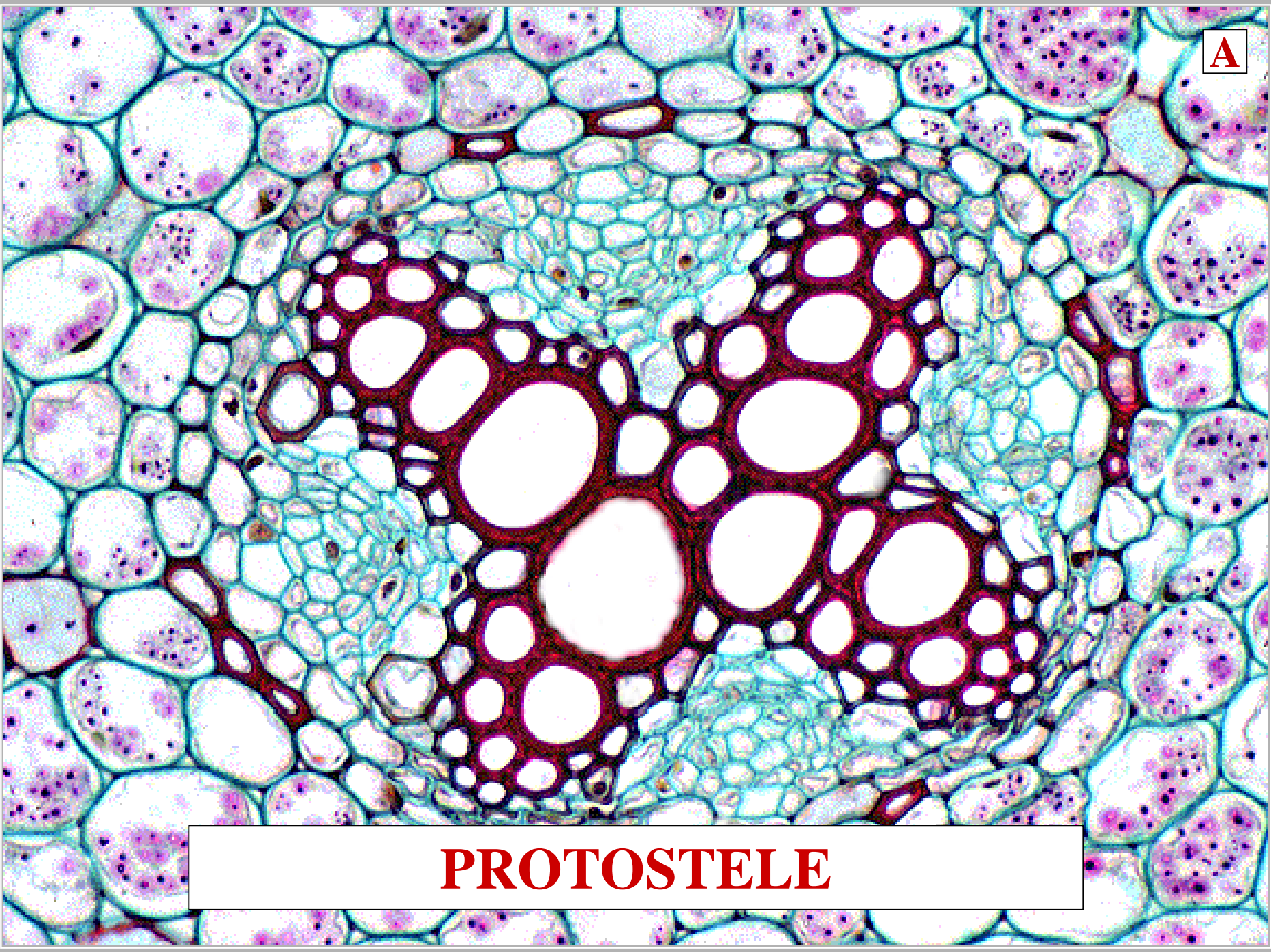
P



ROOT

C.S.

A



PROTOSTELE