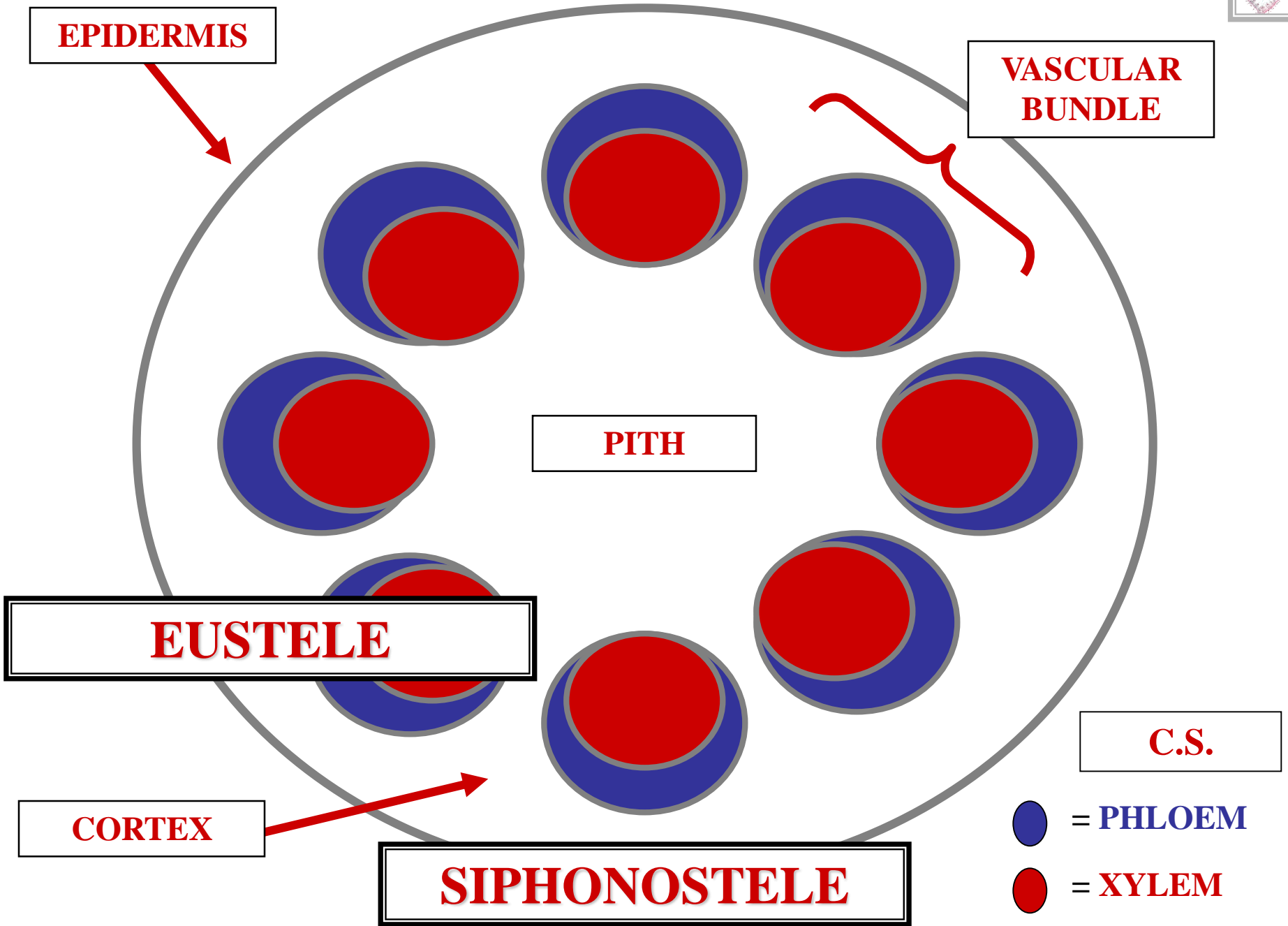


**SIPHONOSTELE  
EUSTELE**

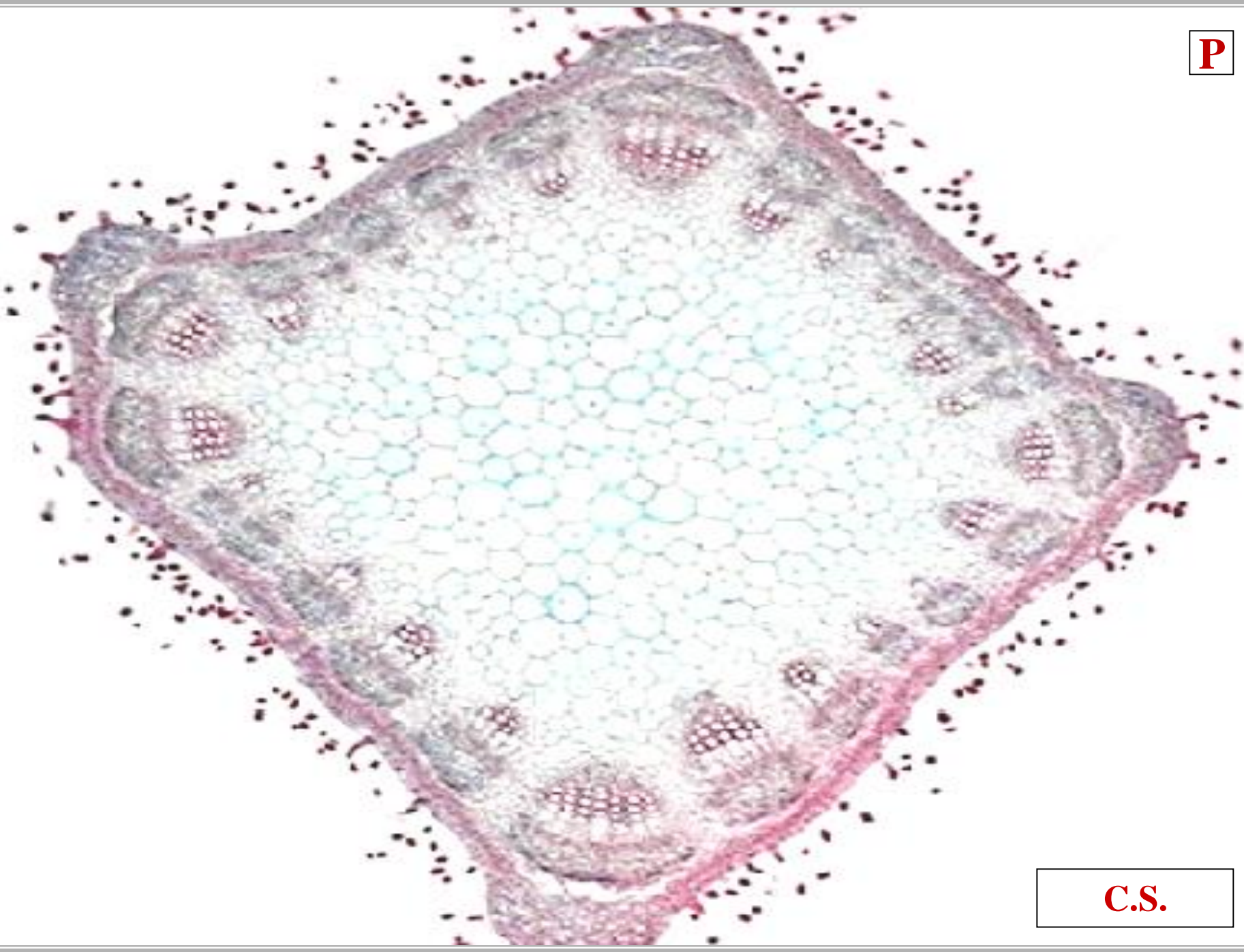


**CONCENTRIC  
VASCULAR BUNDLES**

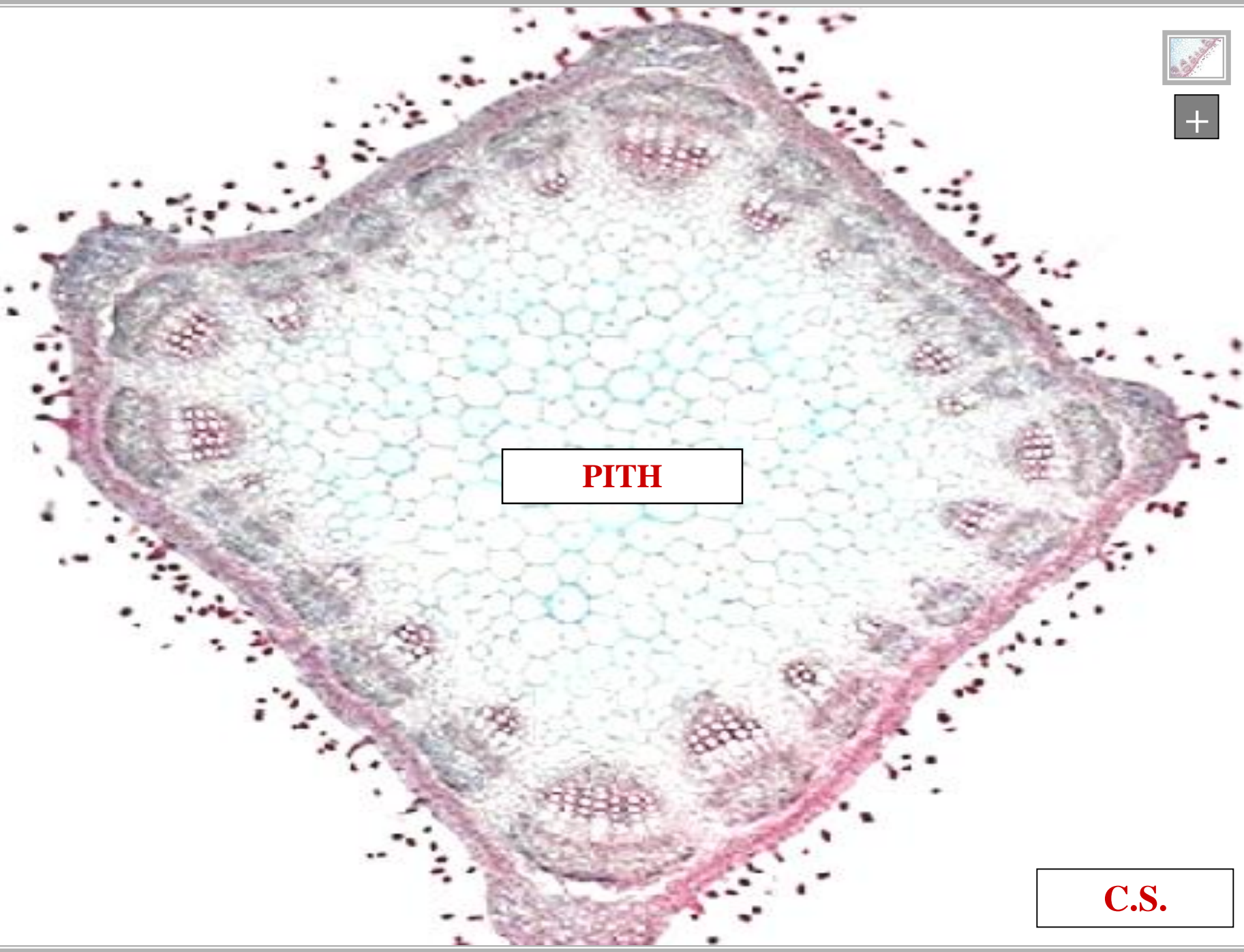
**SIPHONOSTELE  
EUSTELE**



P



C.S.



**PITH**

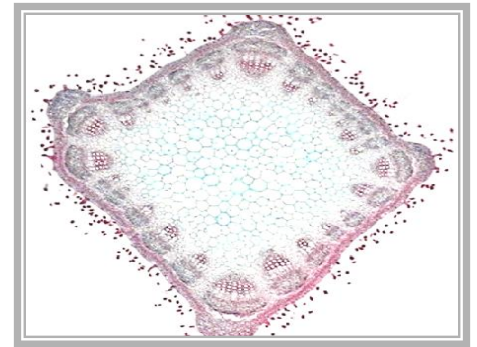
**C.S.**



**PITH**

This micrograph shows a cross-section of a plant stem. The pith is the central tissue, composed of large, thin-walled cells. Surrounding it are vascular bundles, each containing primary xylem, primary phloem, and a vascular cambium. The vascular cambium is a layer of cells that has formed a secondary vascular cambium, which is producing secondary xylem and secondary phloem. The secondary xylem is the innermost part of the vascular bundle, and the secondary phloem is the outermost part. The vascular cambium is a thin layer of cells that is producing secondary xylem and secondary phloem. The secondary xylem is the innermost part of the vascular bundle, and the secondary phloem is the outermost part. The vascular cambium is a thin layer of cells that is producing secondary xylem and secondary phloem.

**VB**



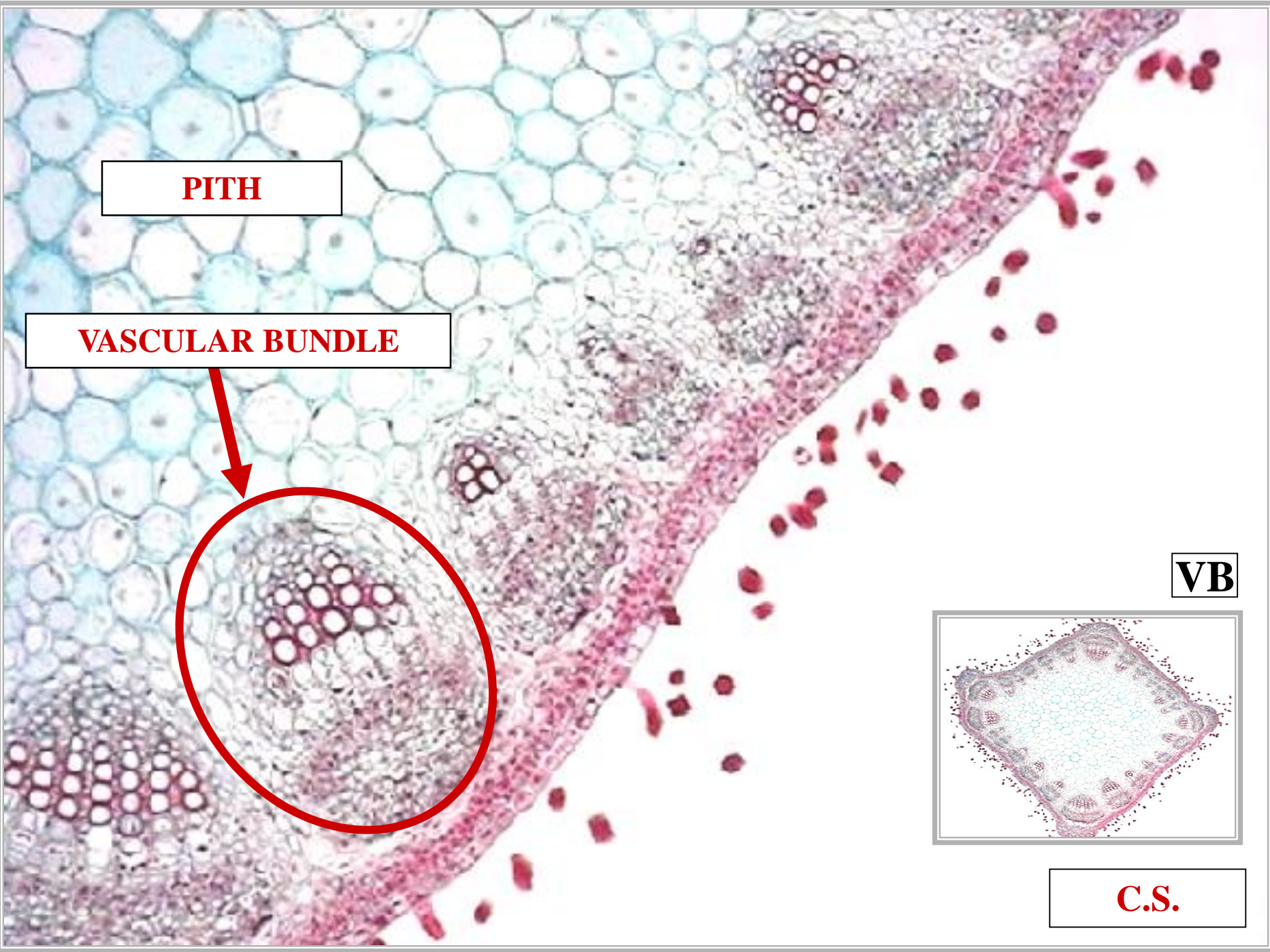
**C.S.**

**PITH**

**VASCULAR BUNDLE**

**VB**

**C.S.**



# **VASCULAR BUNDLE**



**SIPHONOSTELE**

**EUSTELE**

**VASCULAR BUNDLES**

**XYLEM & PHLOEM**

**STRAND**

**SIPHONOSTELE**

**EUSTELE**

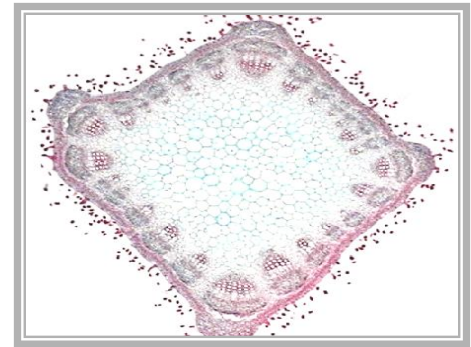
**VASCULAR BUNDLES**



**PITH**

**VASCULAR BUNDLE**

**X**



**C.S.**

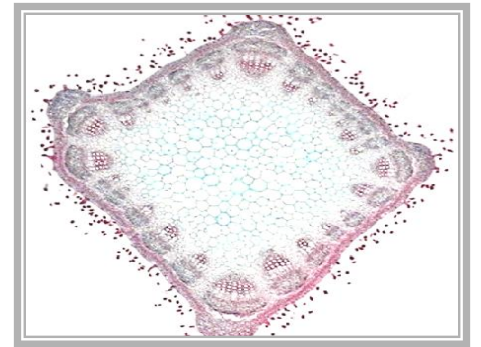


**PITH**

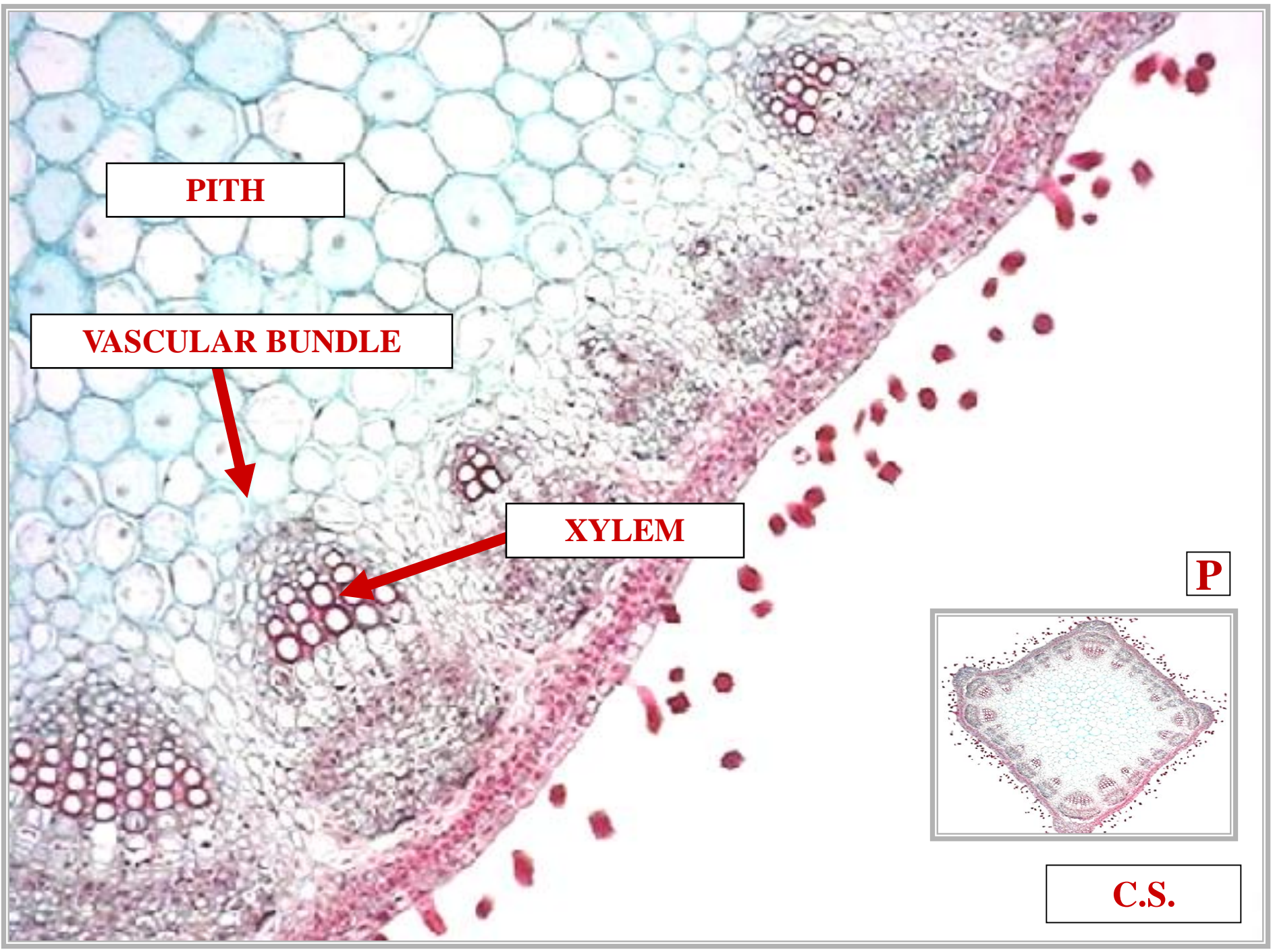
**VASCULAR BUNDLE**

**XYLEM**

**P**



**C.S.**



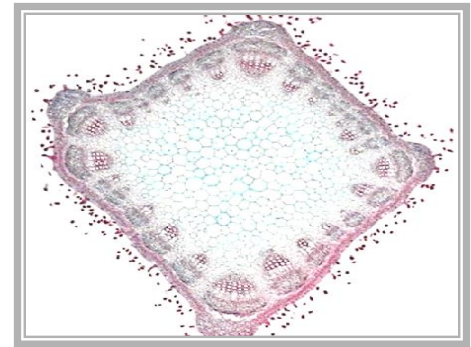
**PITH**

**VASCULAR BUNDLE**

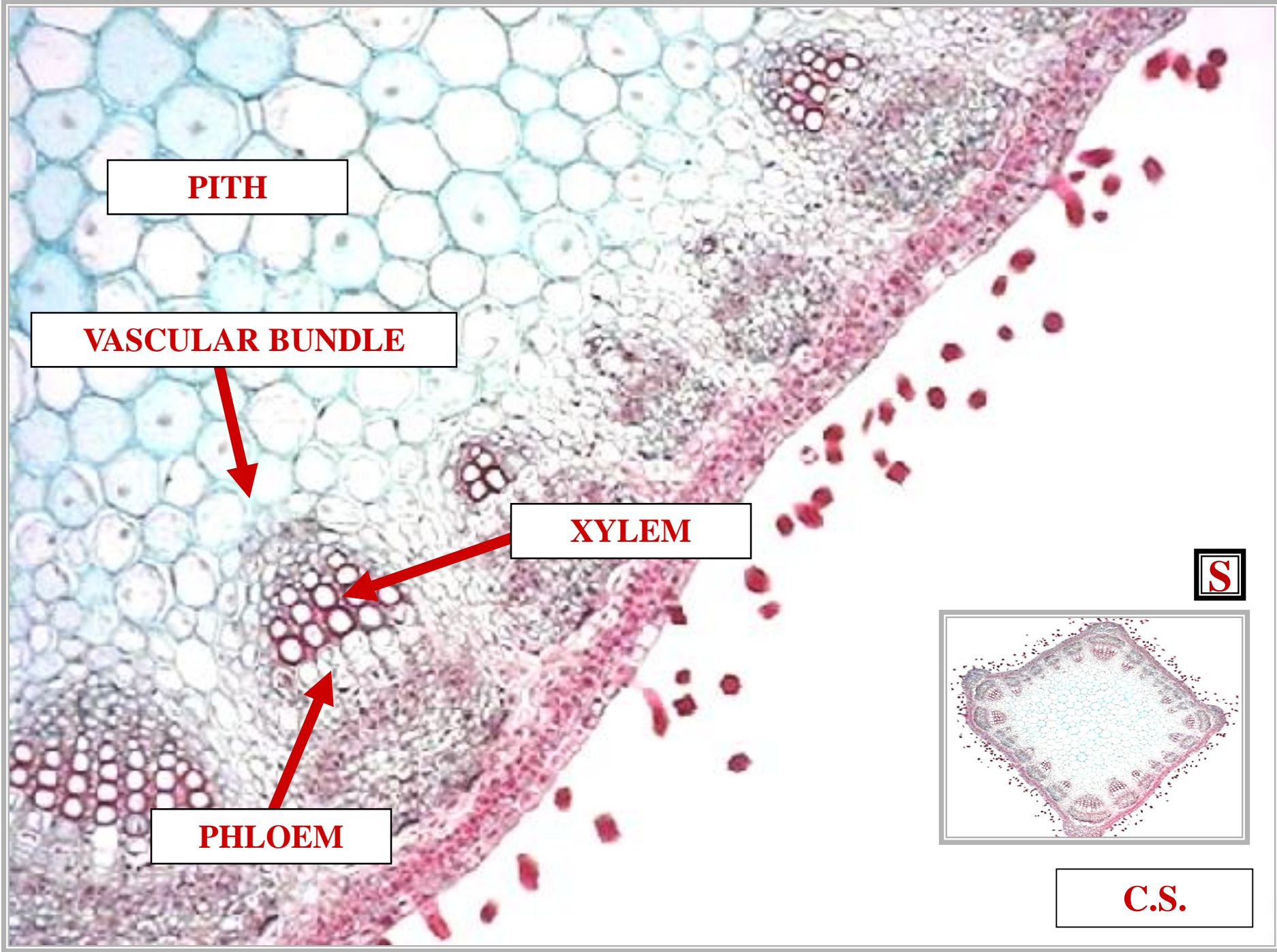
**XYLEM**

**PHLOEM**

**S**



**C.S.**



# SIPHONOSTELE

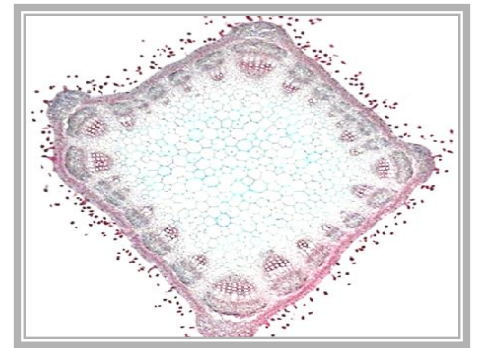
PITH

VASCULAR BUNDLE

XYLEM

PHLOEM

E



C.S.

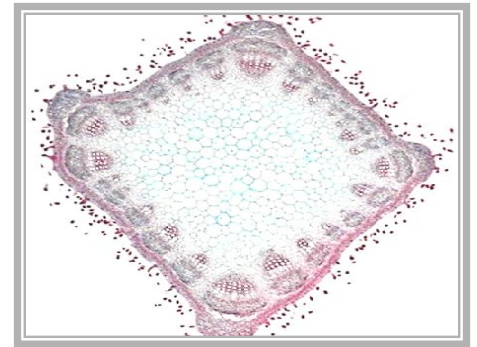
# SIPHONOSTELE / EUSTELE

PITH

VASCULAR BUNDLE

XYLEM

PHLOEM



C.S.

# ATACTOSTELE

**ATACTOSTELE**

**VASCULAR STELE  
ATACTOSTELE**

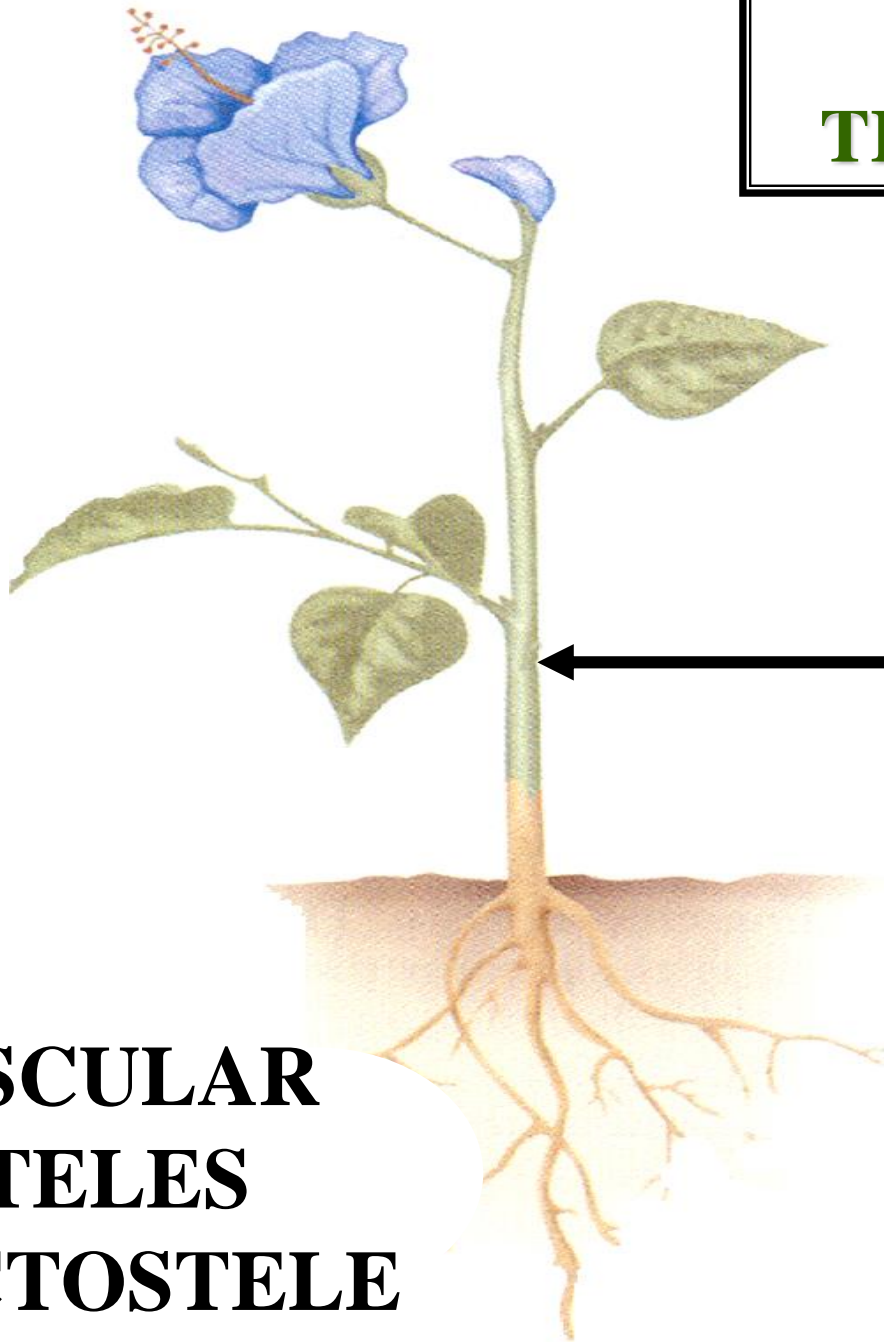


**SCATTERED  
VASCULAR BUNDLES**

**VASCULAR STELE  
ATACTOSTELE**

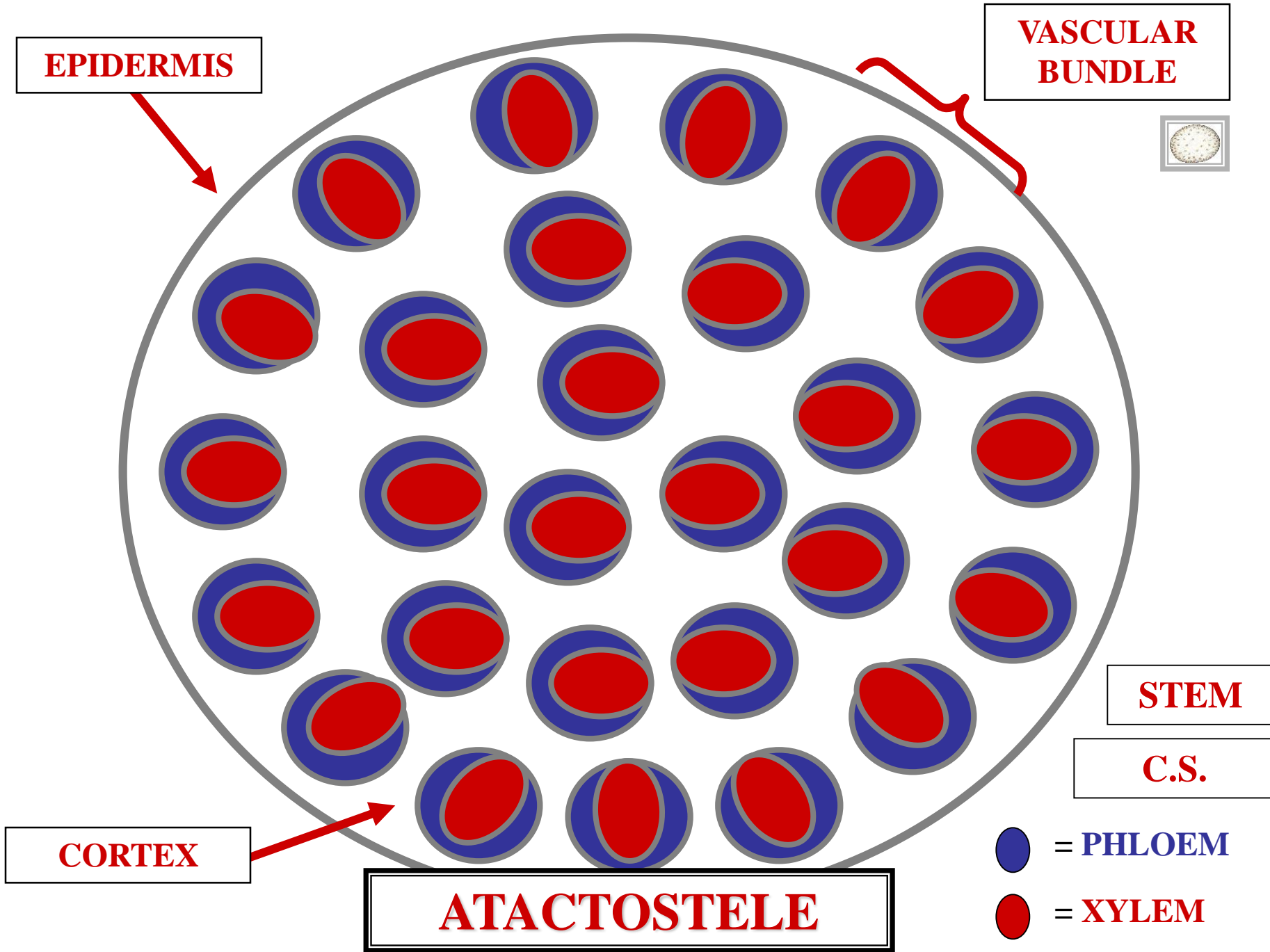


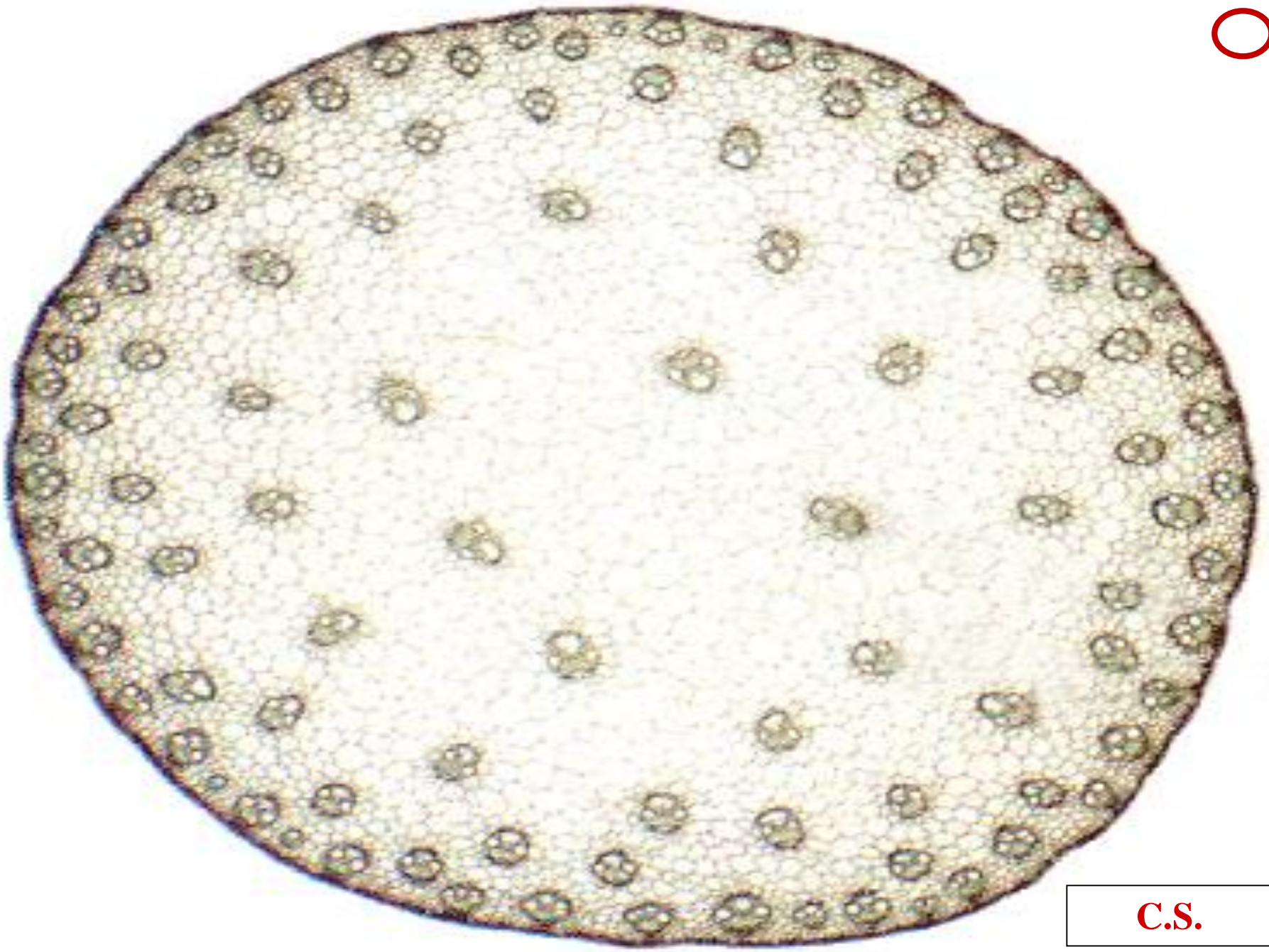
**TYPICAL  
TRACHEOPHYTE**



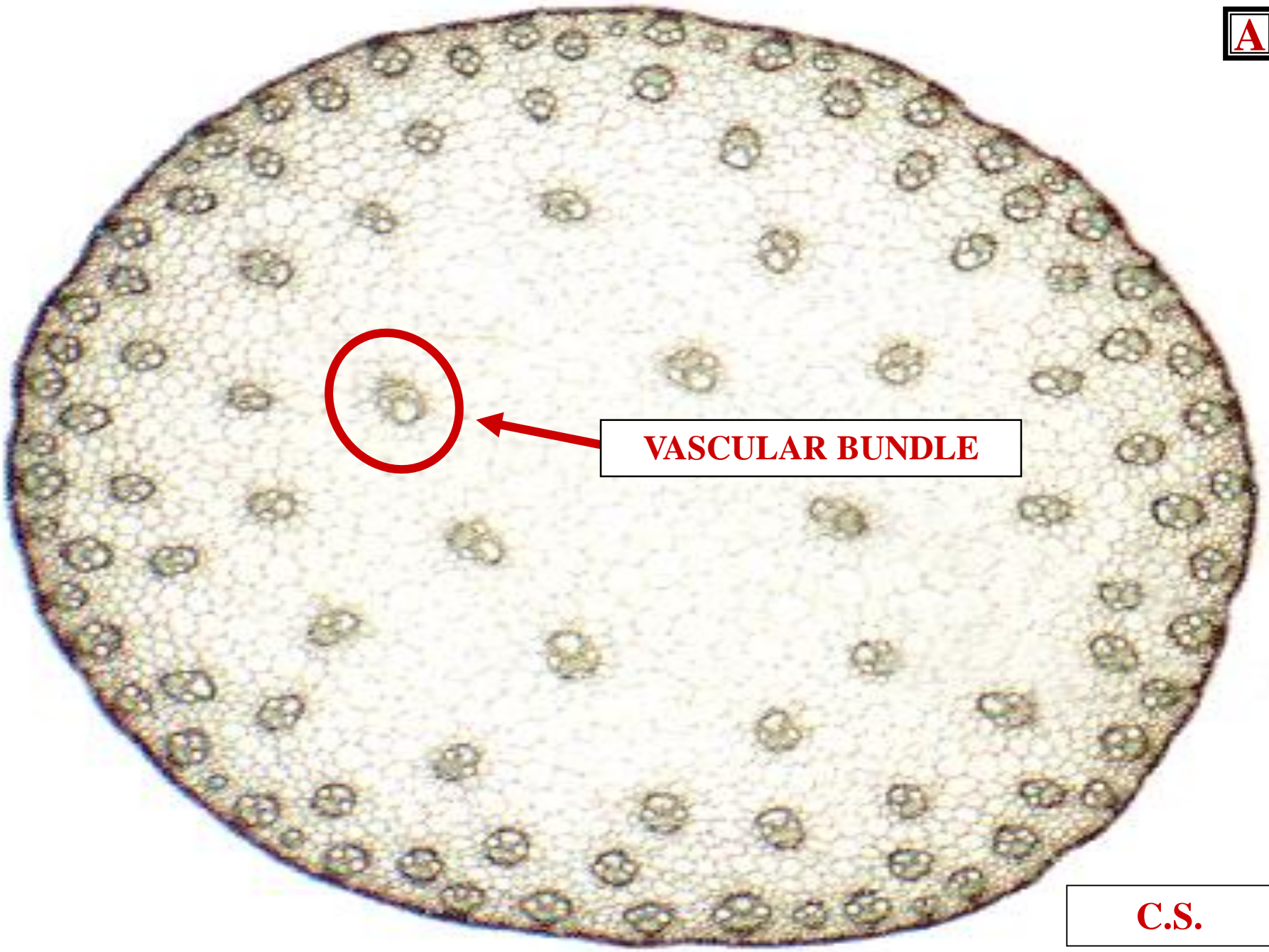
**STEM**

**VASCULAR  
STELES  
ATACTOSTELE**



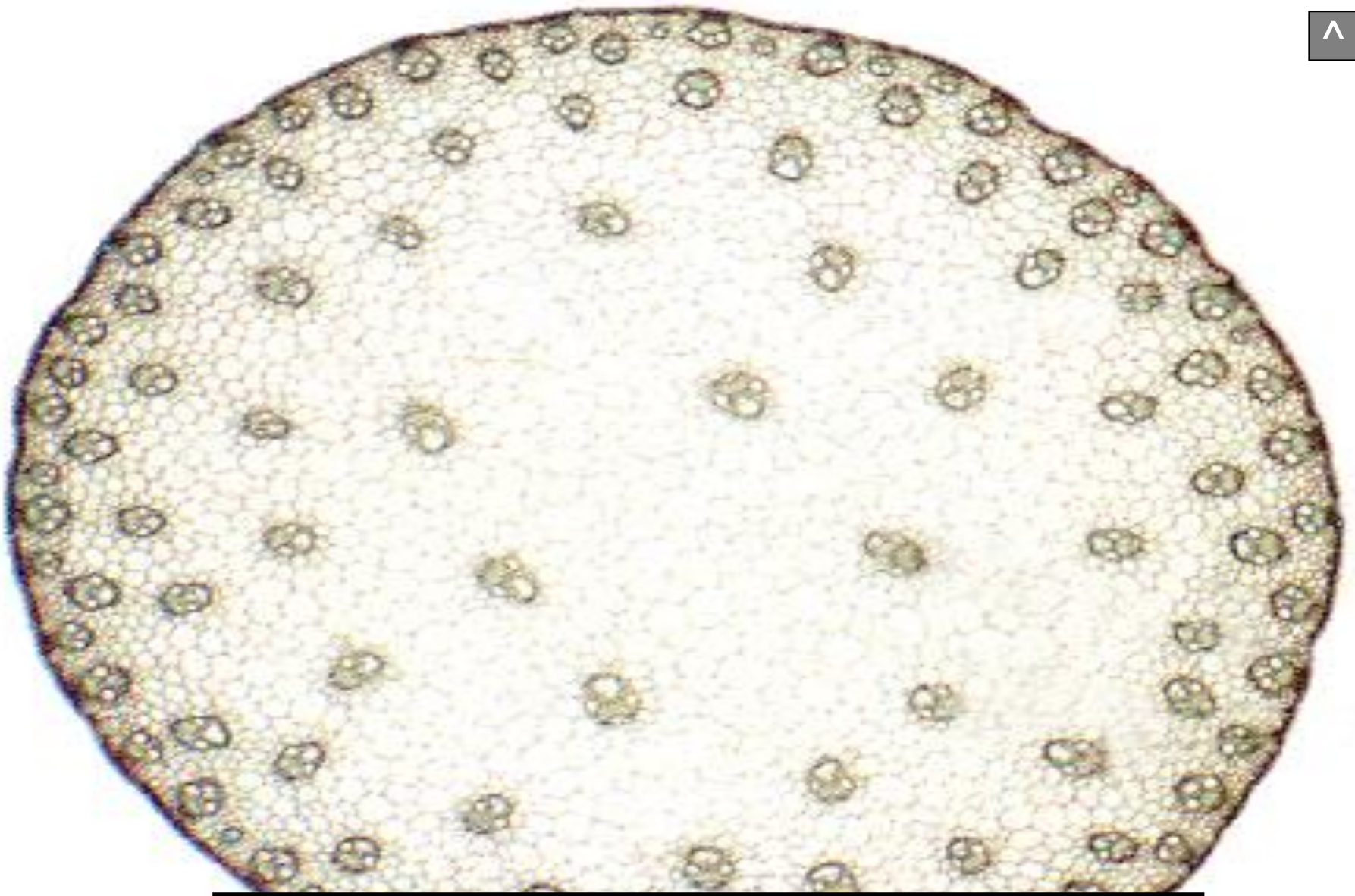


C.S.



**VASCULAR BUNDLE**

**C.S.**



**ATACTOSTELE**

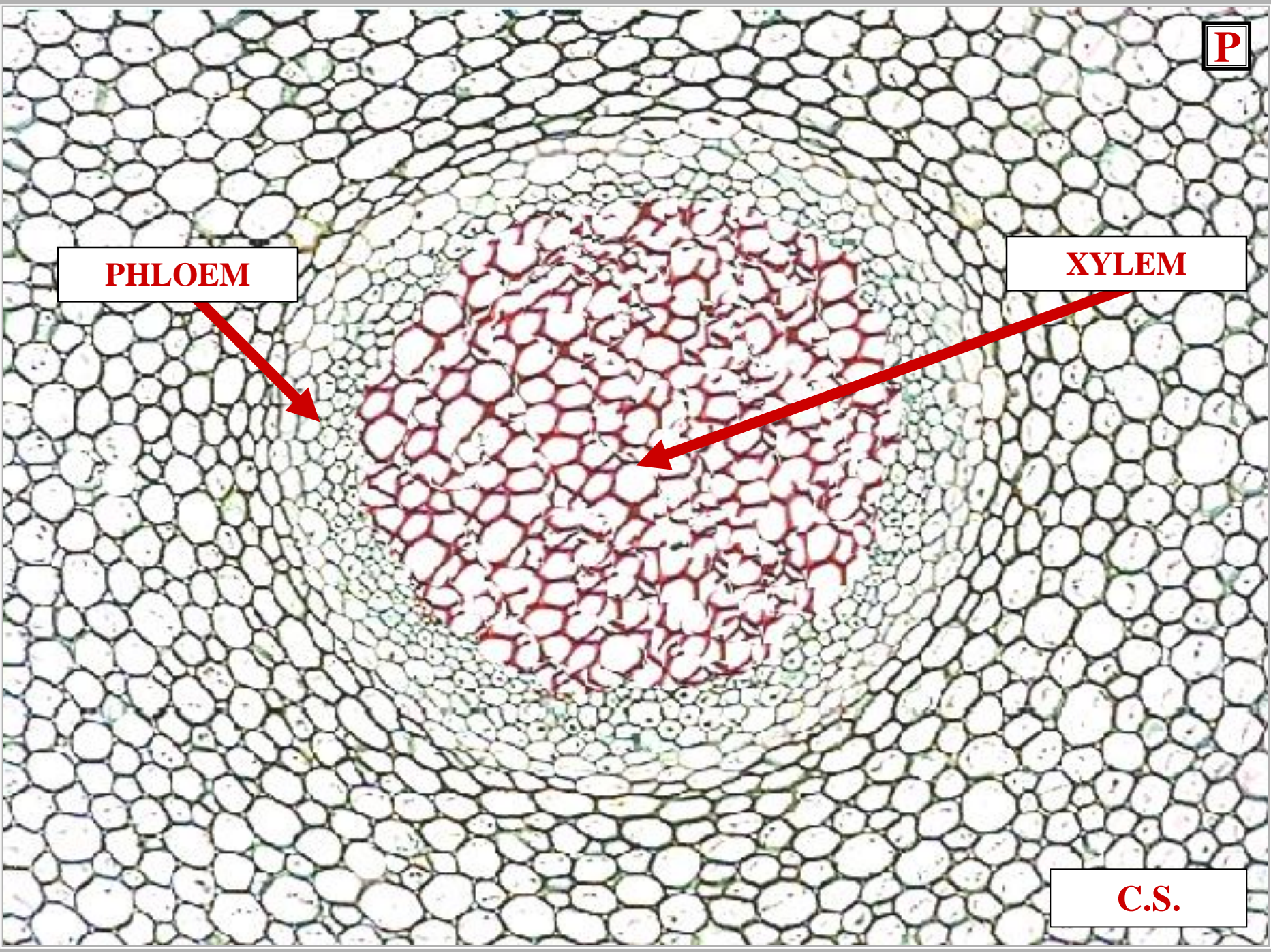
**TRACHEOPHYTE  
STELE TYPES  
SUMMARY**

**P**

**PHLOEM**

**XYLEM**

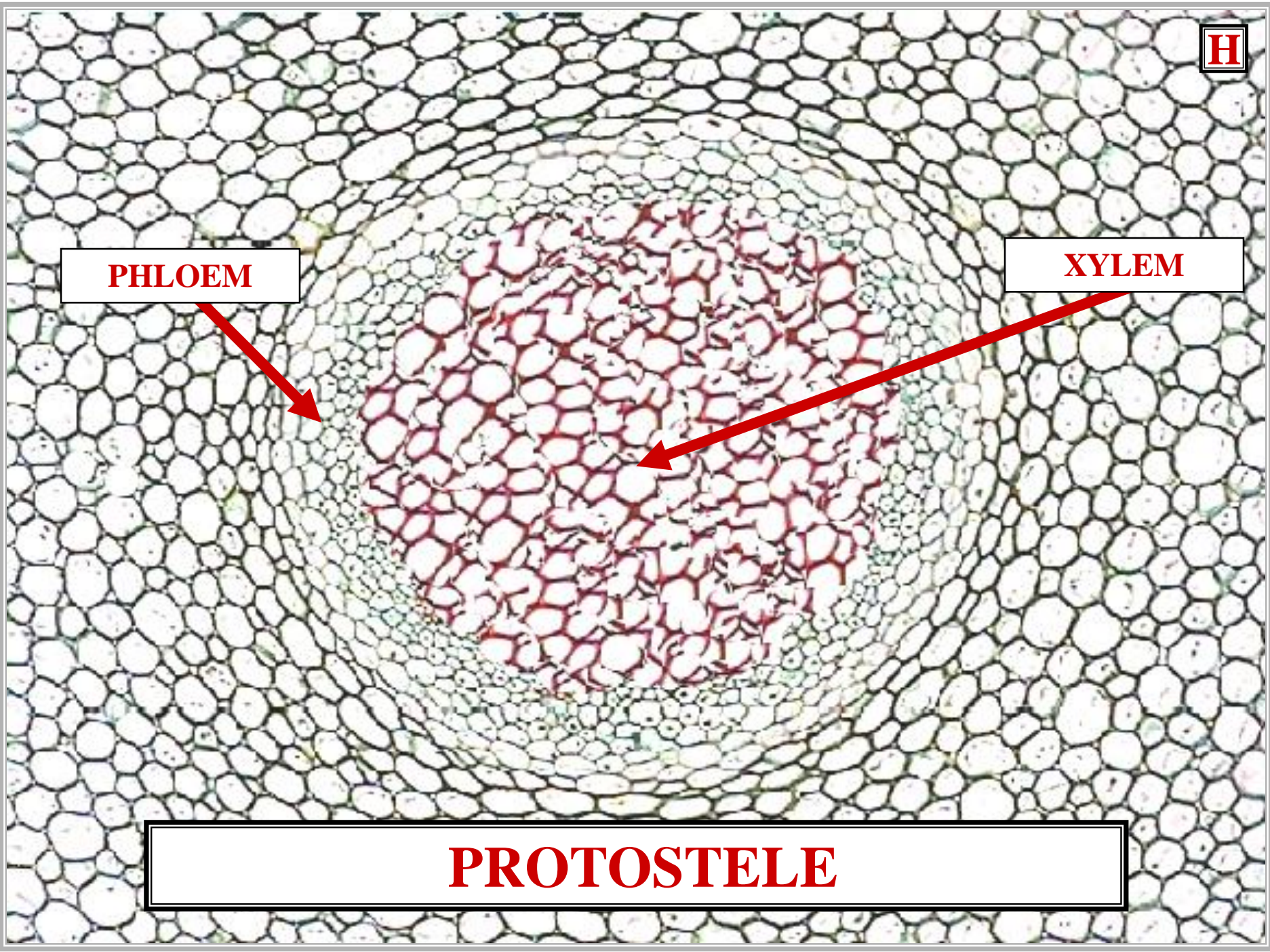
**C.S.**



**PHLOEM**

**XYLEM**

**PROTOSTELE**



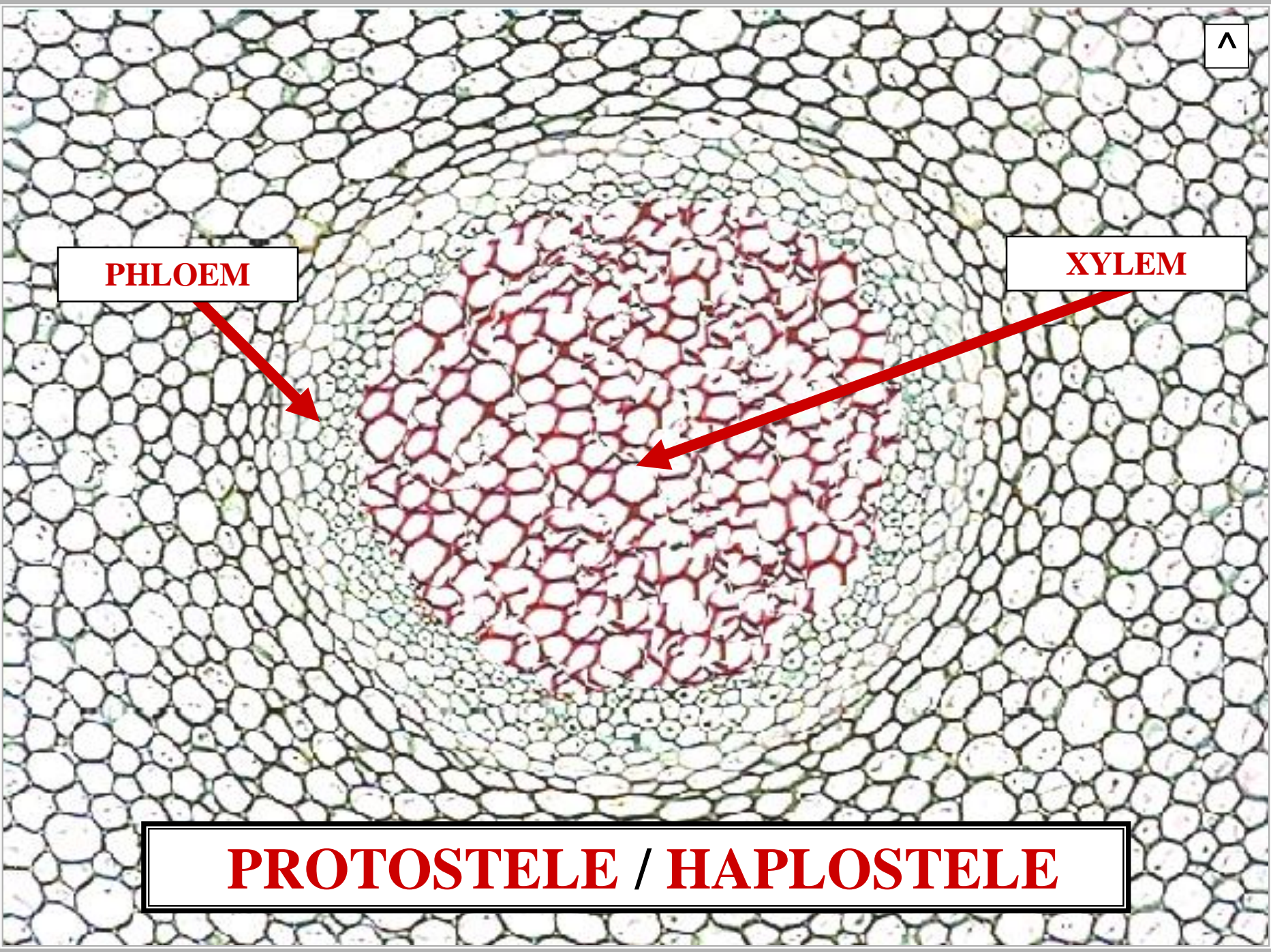




**PHLOEM**

**XYLEM**

**PROTOSTELE / HAPLOSTELE**

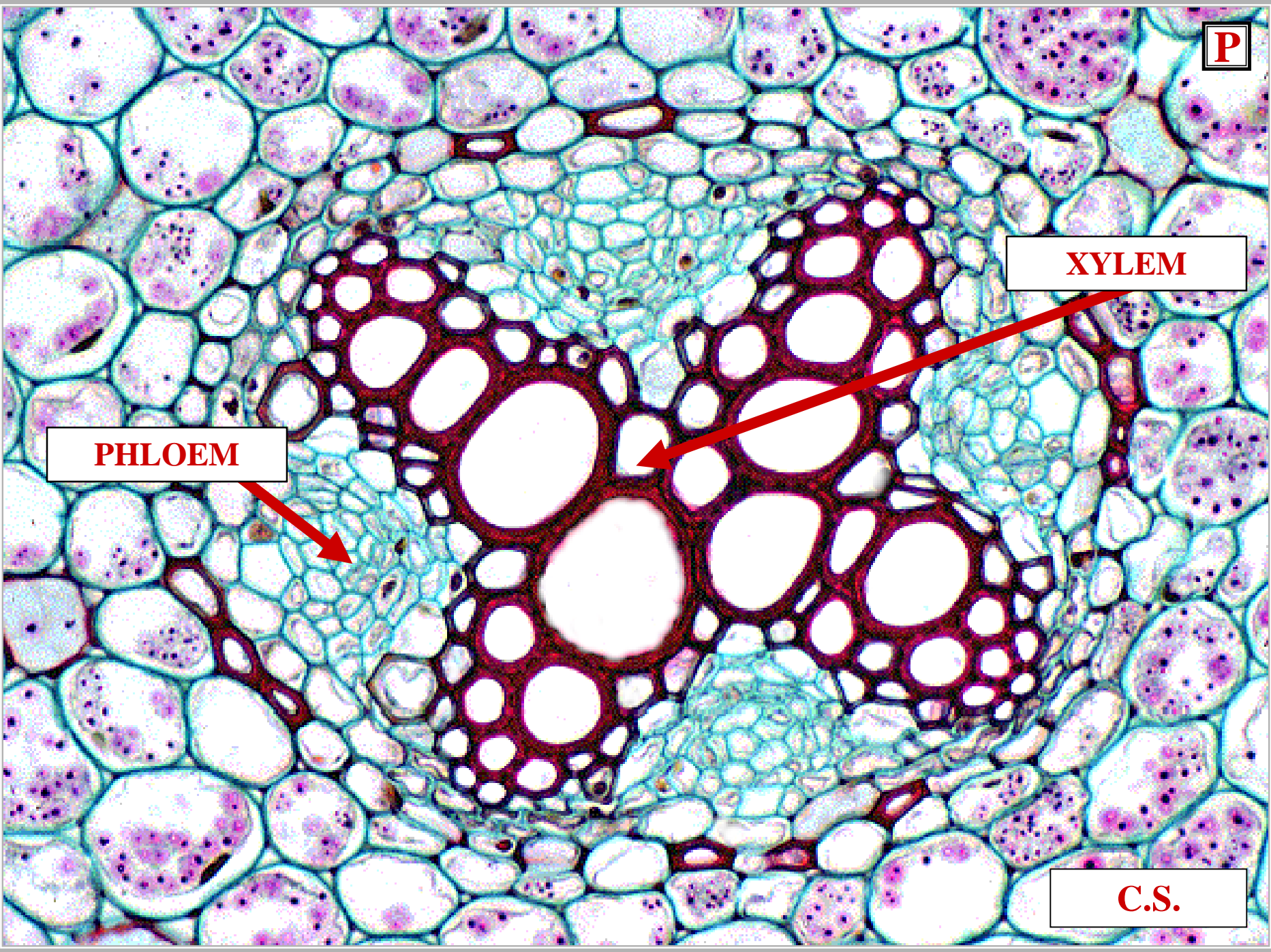


**P**

**XYLEM**

**PHLOEM**

**C.S.**

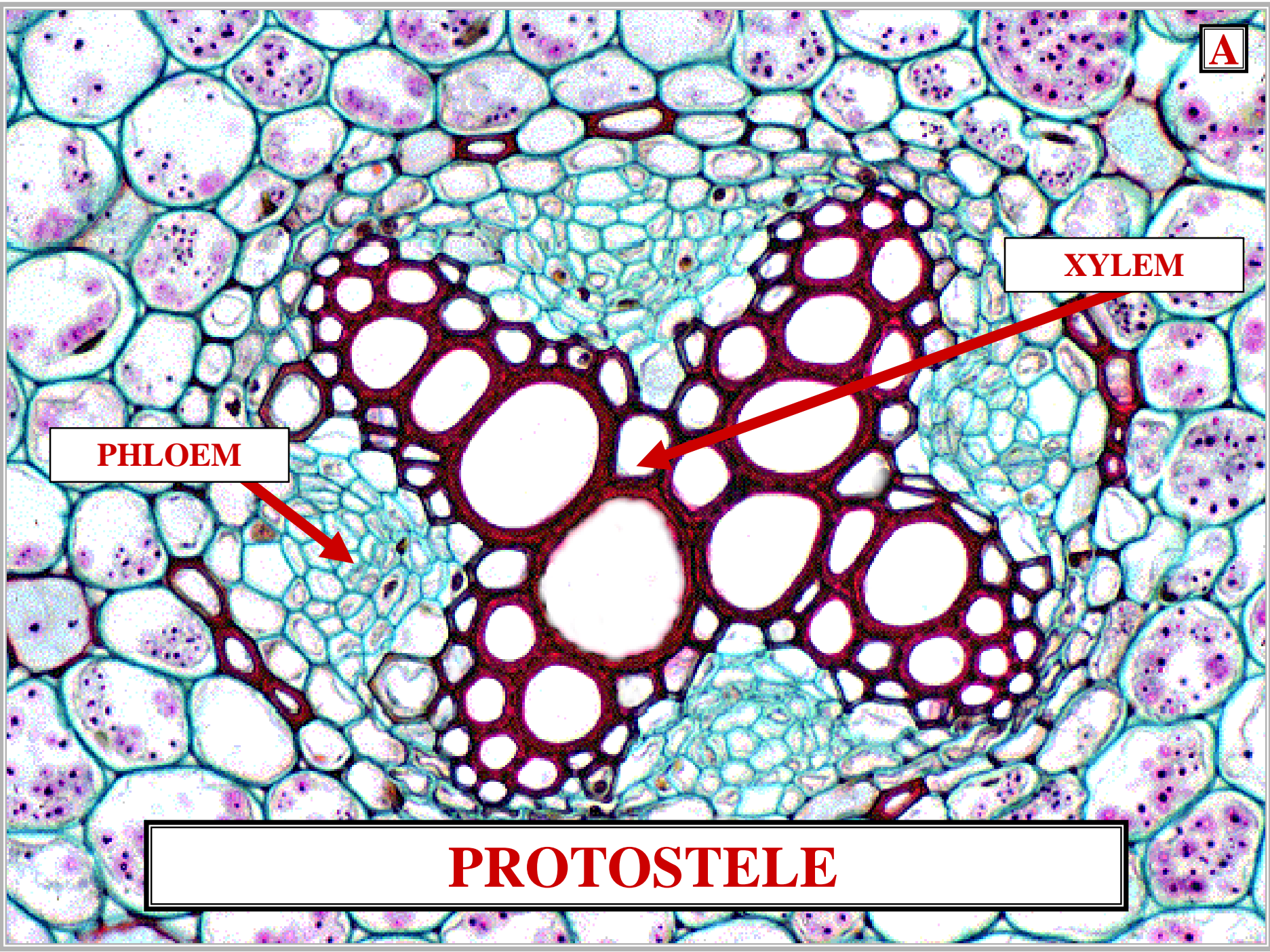


**A**

**XYLEM**

**PHLOEM**

**PROTOSTELE**

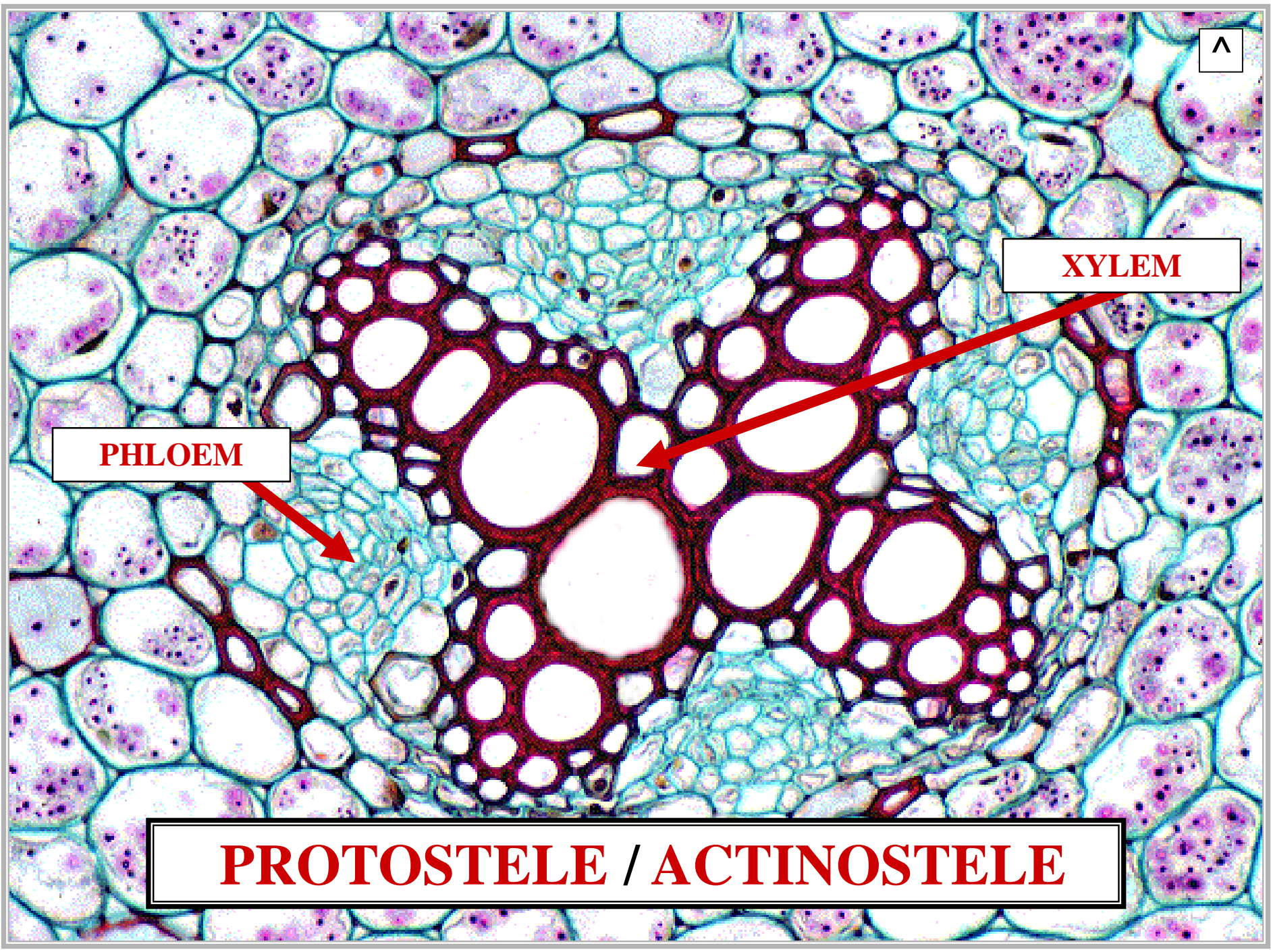




**XYLEM**

**PHLOEM**

**PROTOSTELE / ACTINOSTELE**

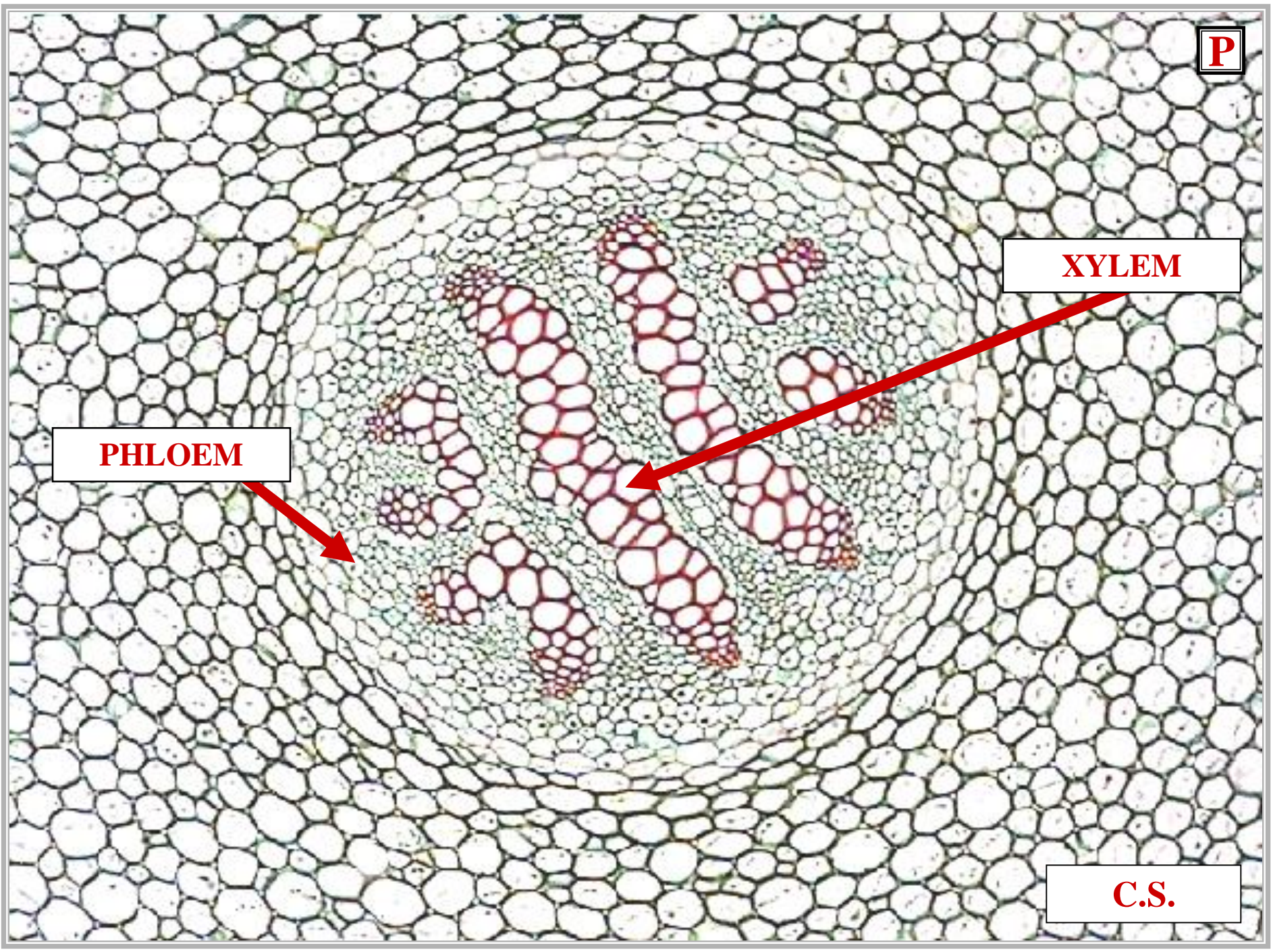


**P**

**XYLEM**

**PHLOEM**

**C.S.**

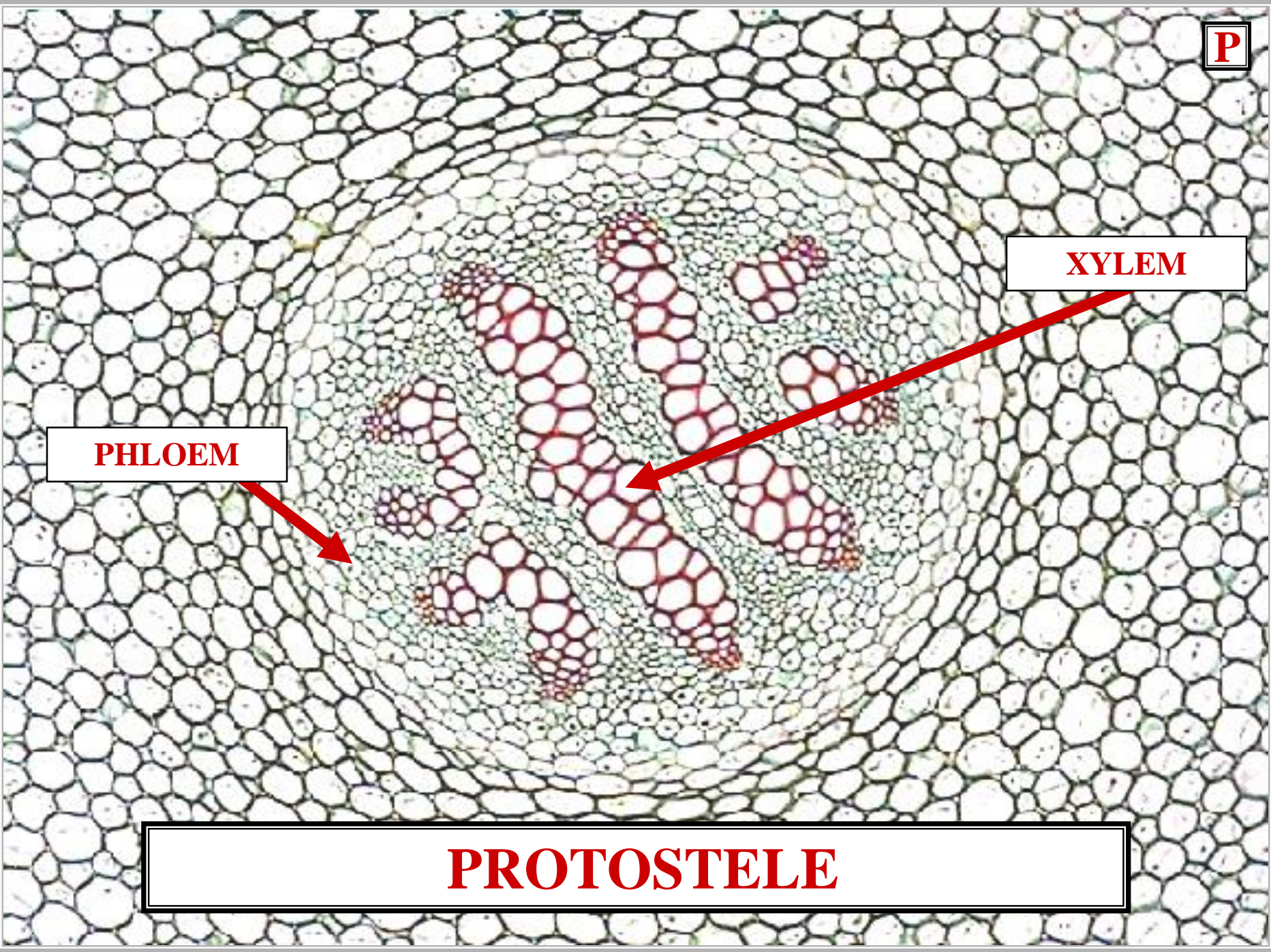


**P**

**XYLEM**

**PHLOEM**

**PROTOSTELE**

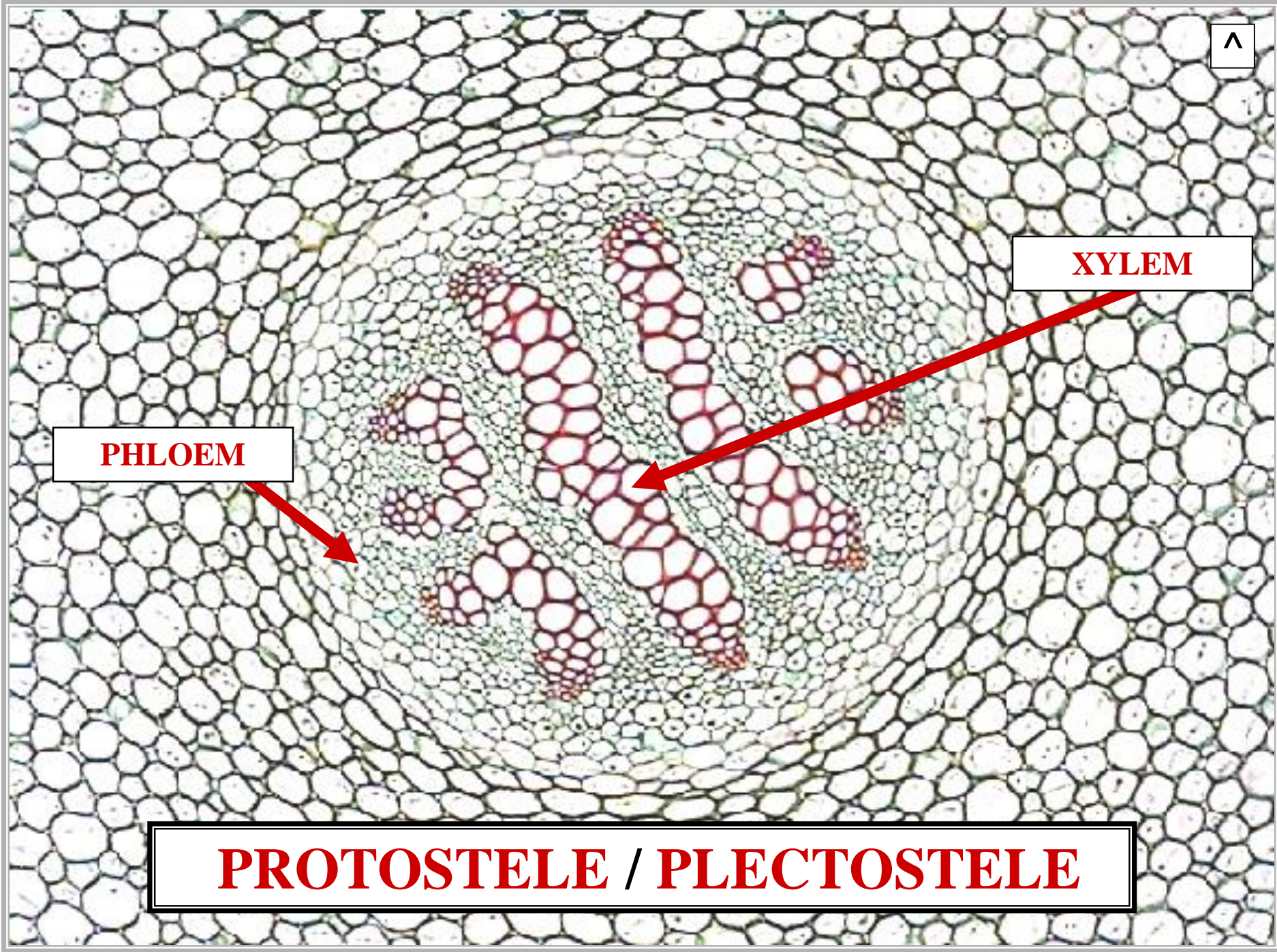




**XYLEM**

**PHLOEM**

**PROTOSTELE / PLECTOSTELE**



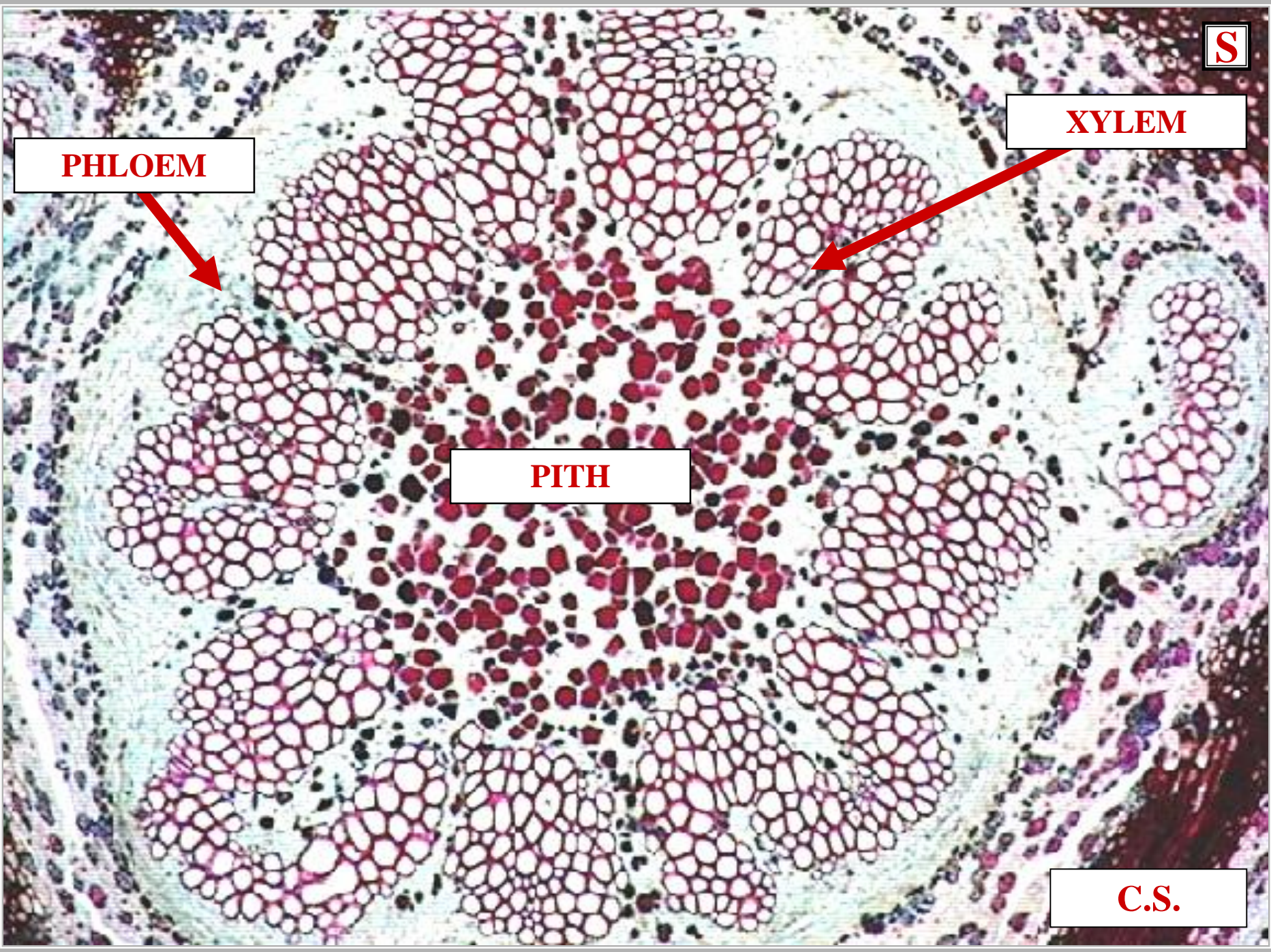
**S**

**PHLOEM**

**XYLEM**

**PITH**

**C.S.**





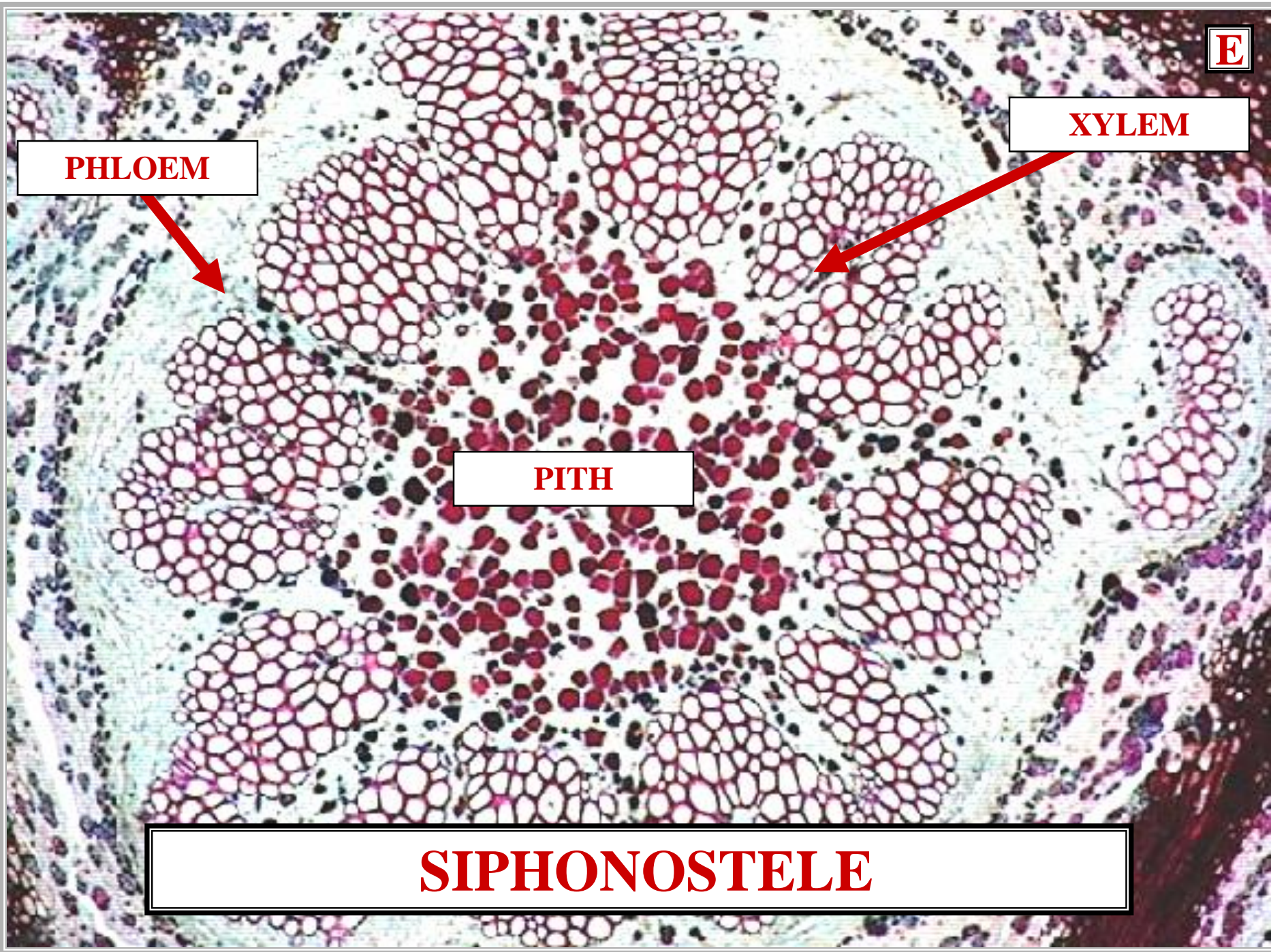
**E**

**PHLOEM**

**XYLEM**

**PITH**

**SIPHONOSTELE**

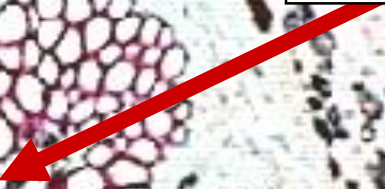




**PHLOEM**

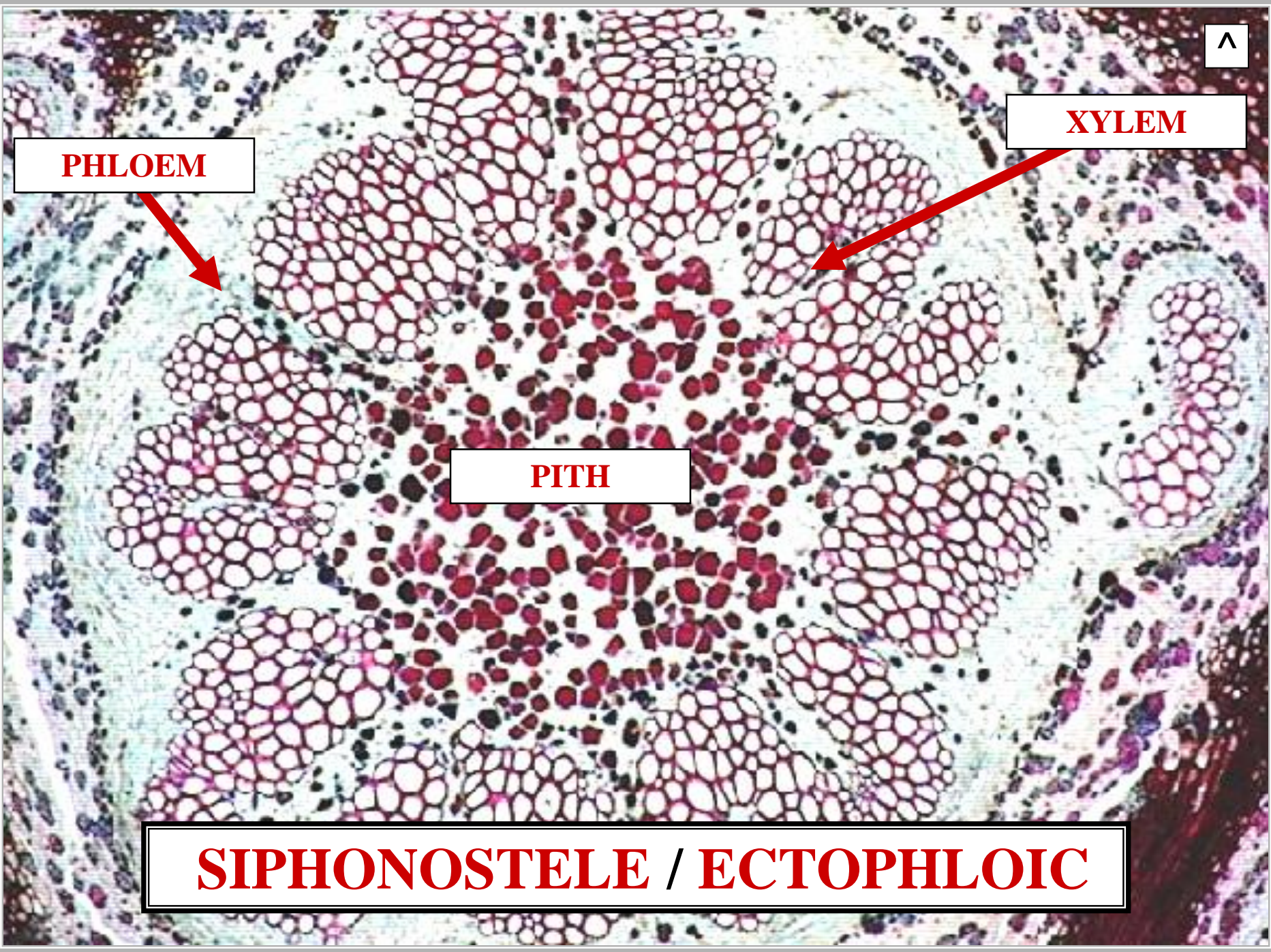


**XYLEM**



**PITH**

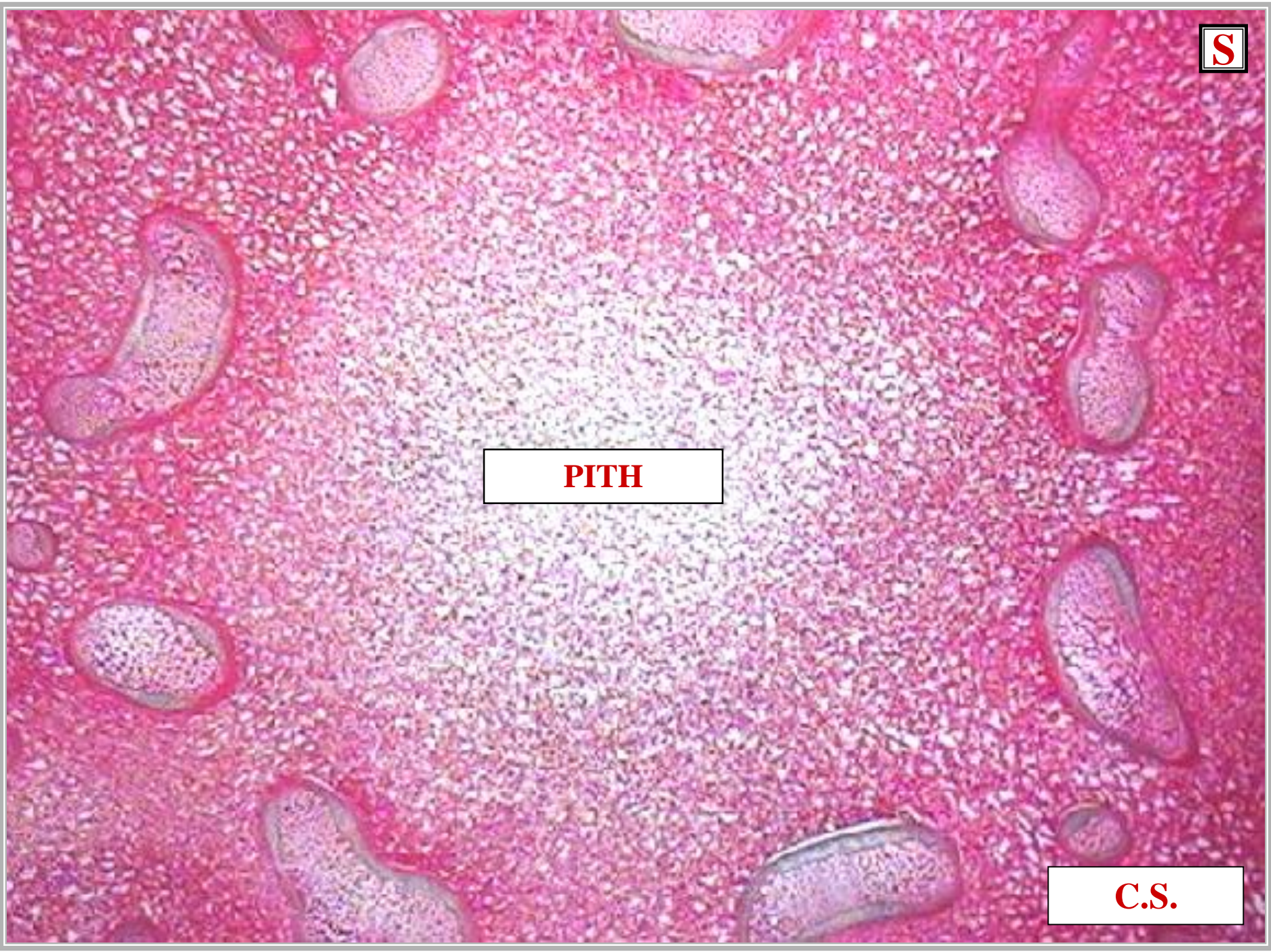
**SIPHONOSTELE / ECTOPHLOIC**



**S**

**PITH**

**C.S.**





**PITH**

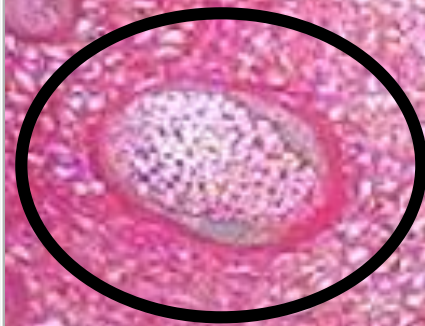
**SIPHONOSTELE**



**PITH**

**VASCULAR TISSUE**

**SIPHONOSTELE**



**A**

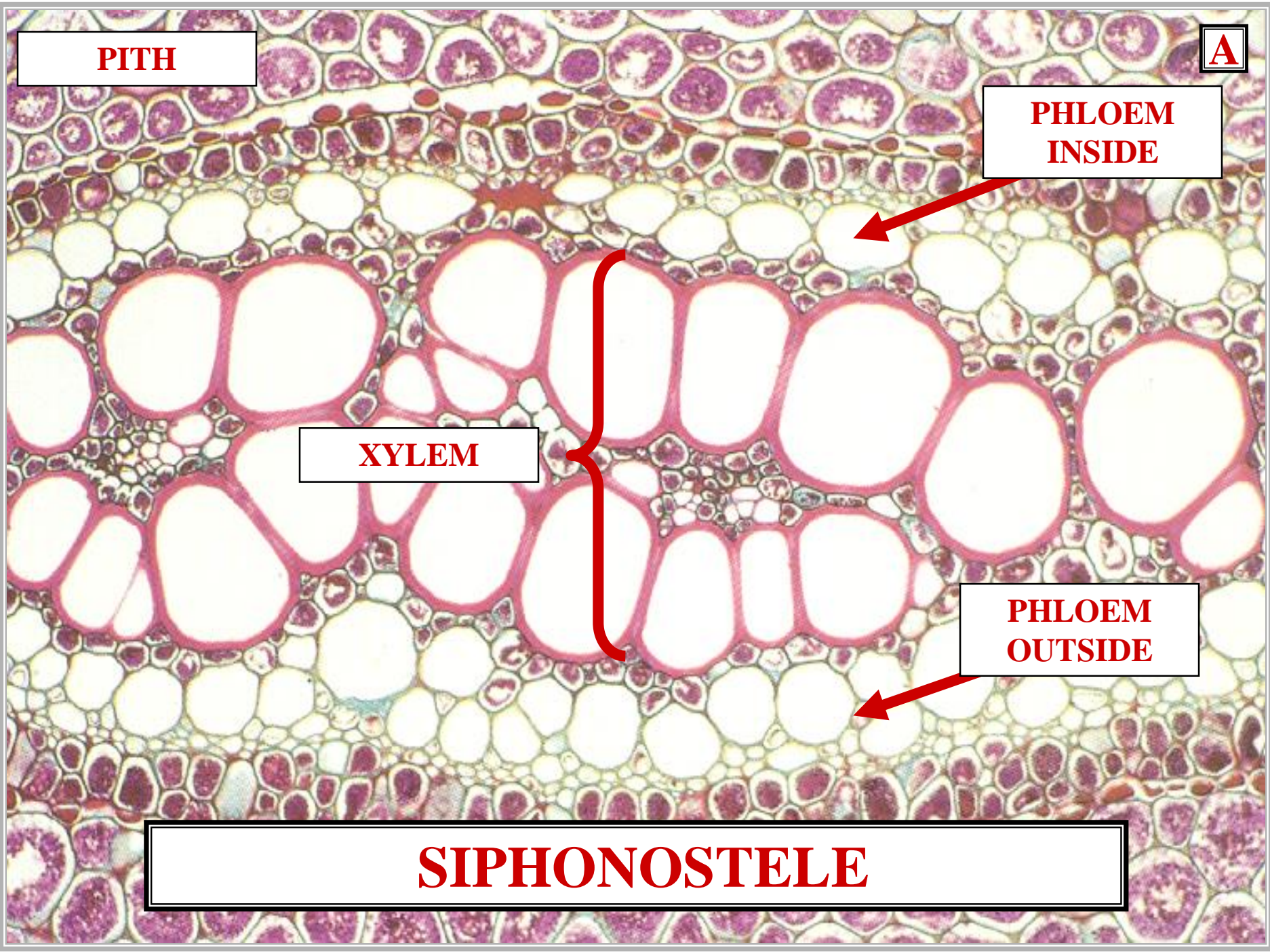
**PITH**

**PHLOEM  
INSIDE**

**XYLEM**

**PHLOEM  
OUTSIDE**

**SIPHONOSTELE**



**PITH**

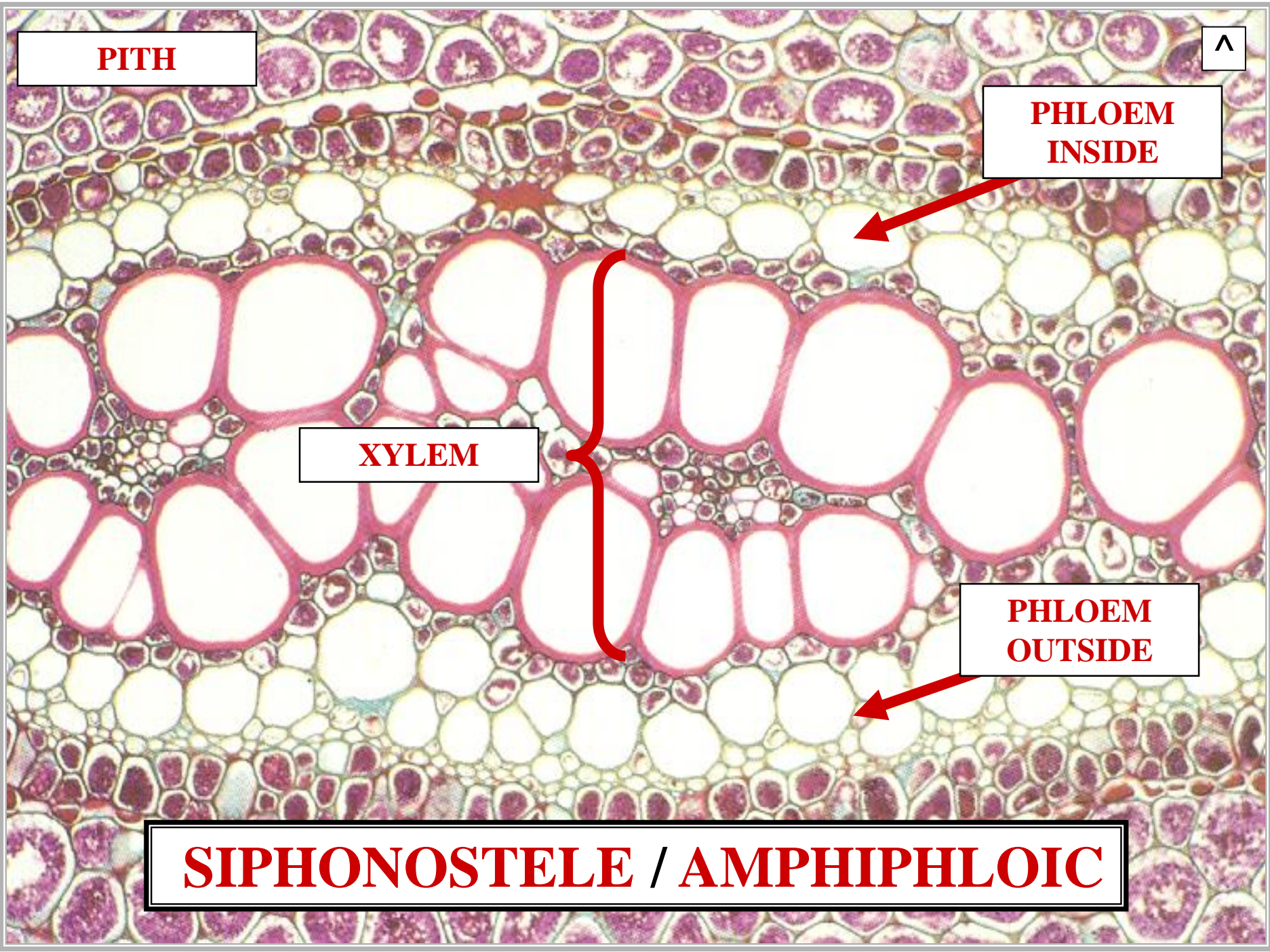
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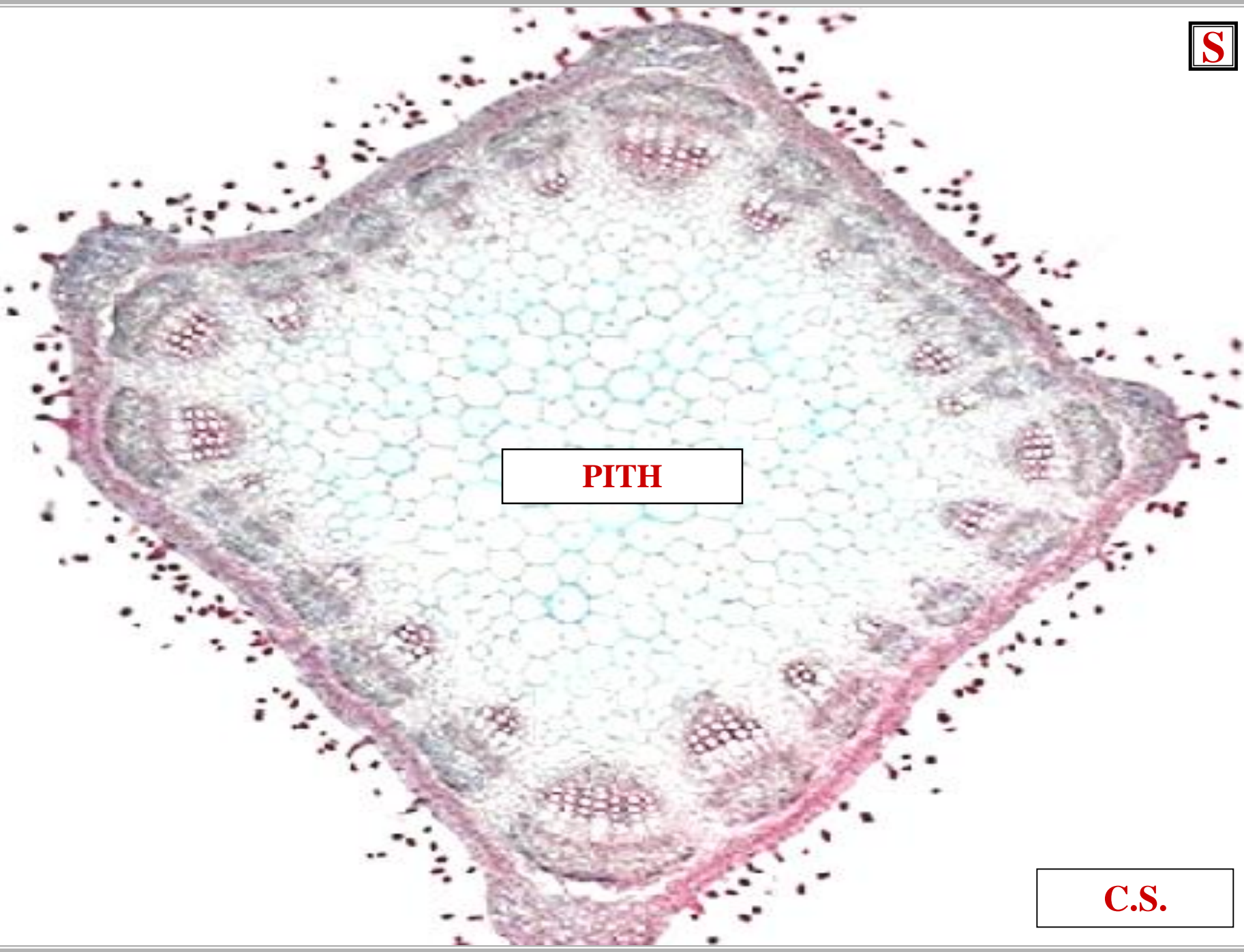
**PHLOEM  
INSIDE**

**XYLEM**

**PHLOEM  
OUTSIDE**

**SIPHONOSTELE / AMPHIPHLOIC**

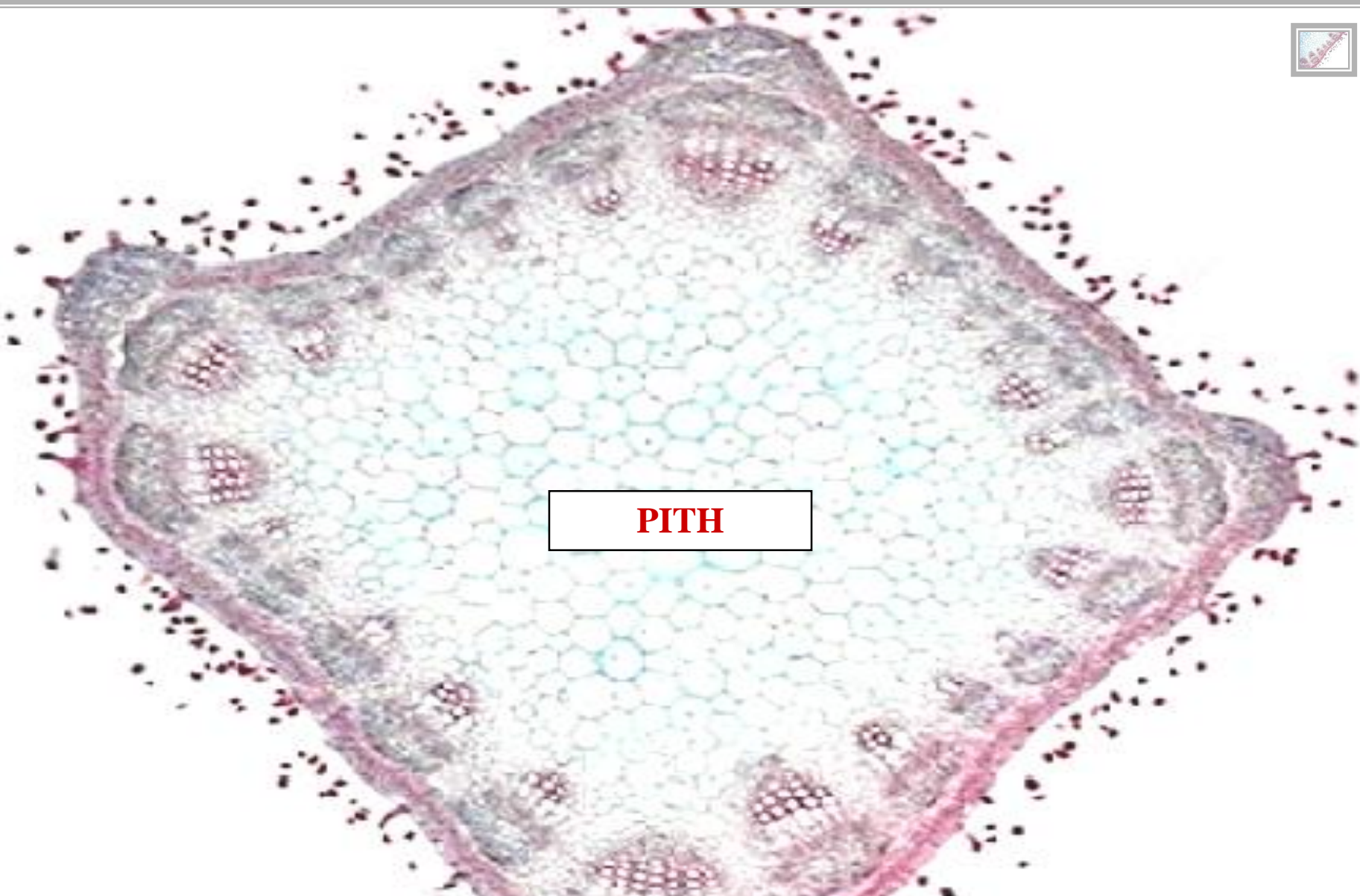




**PITH**

**C.S.**





**PITH**

**SIPHONOSTELE**

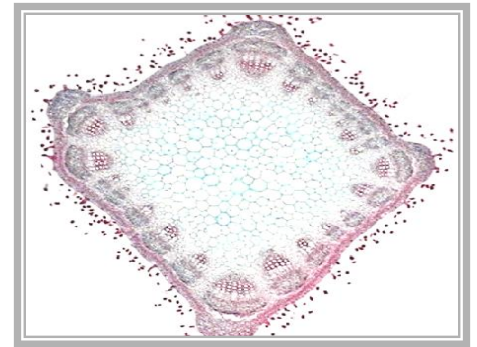
# SIPHONOSTELE

PITH

VASCULAR BUNDLE



**E**



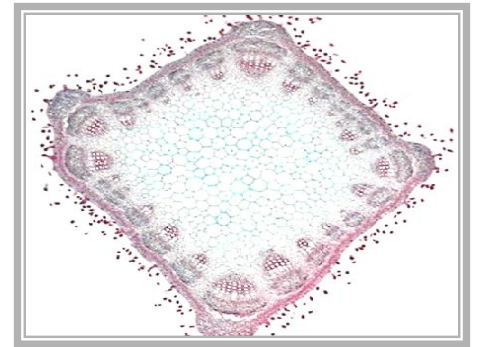
C.S.

# SIPHONOSTELE / EUSTELE

PITH

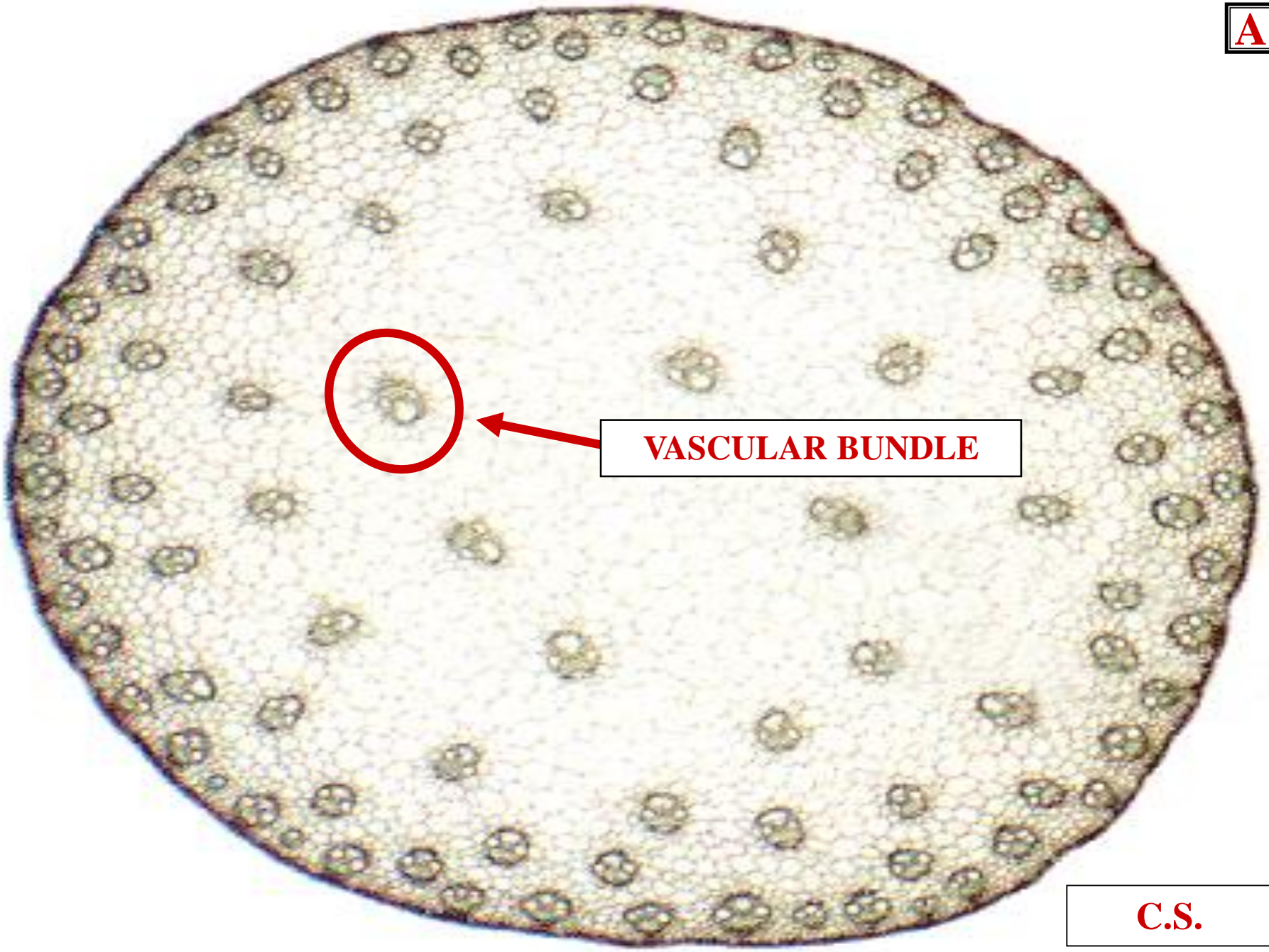
VASCULAR BUNDLE

^



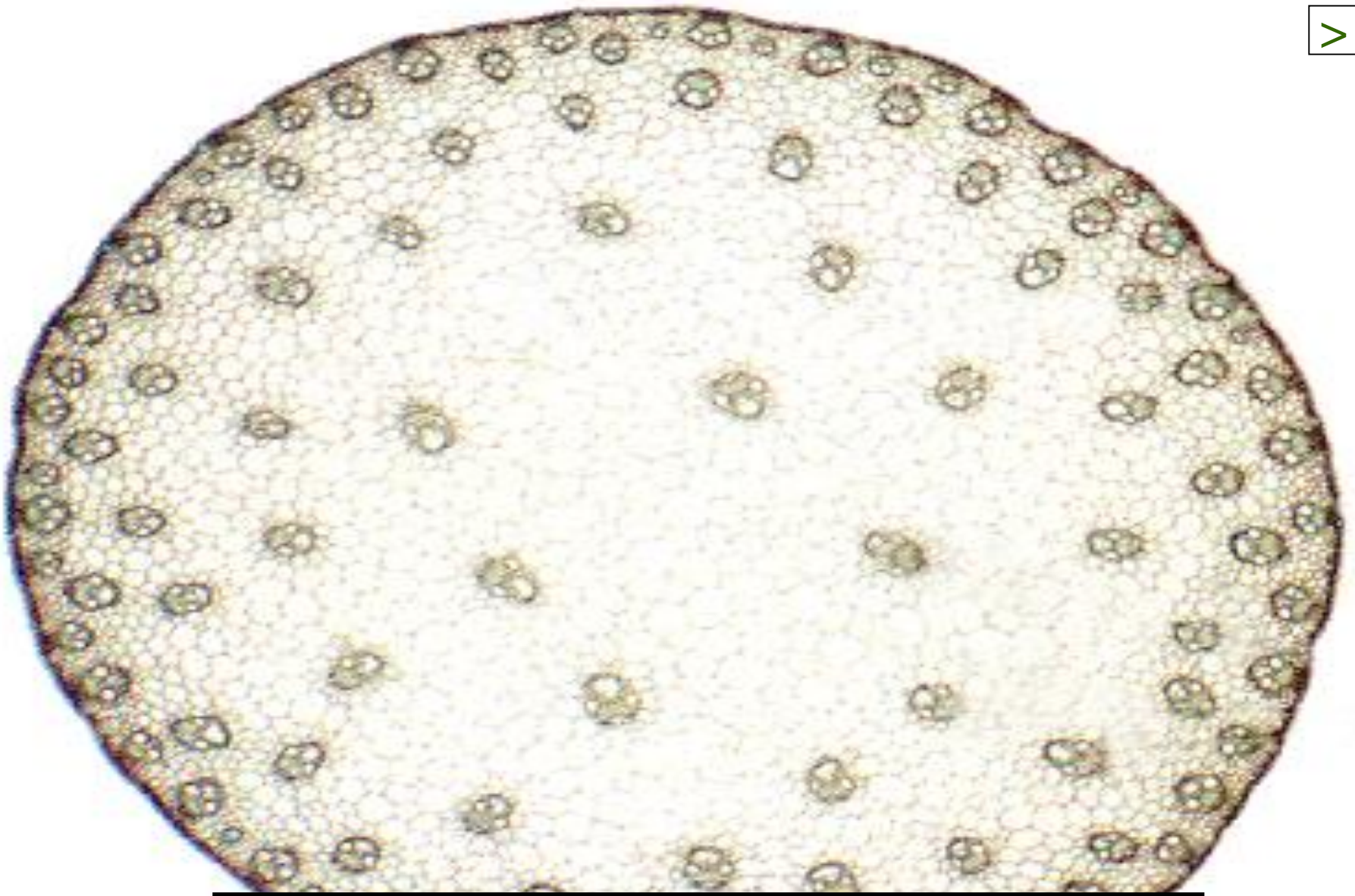
C.S.

**A**



**VASCULAR BUNDLE**

**C.S.**



**ATACTOSTELE**

A close-up photograph of a white magnolia flower with a prominent red stigma and yellow stamens, surrounded by green leaves. The background is dark and out of focus.

# RESPONSIBLE STELE TYPES LECTURE





**RESPONSIBLE  
STELE TYPES  
GENERAL  
&  
SPECIFIC**



# **LECTURE QUIZ**

**MONDAY  
13 FEBRUARY**





# **LECTURE QUIZ**

**TRACHEOPHYTE  
STELE TYPES**



# **LECTURE QUIZ**

**FORMAT  
FILL IN  
QUESTIONS**



# **LECTURE QUIZ**

**MUST  
SPELL CORRECTLY  
FOR FULL CREDIT**



# TRACHEOPHYTE MORPHOLOGY



# TRACHEOPHYTE ORGANS

# TRACHEOPHYTE ORGAN TYPES

# TRACHEOPHYTE ORGANS



ROOT

# TRACHEOPHYTE ORGANS

# TRACHEOPHYTE ORGANS



ROOT  
STEM

TRACHEOPHYTE  
ORGANS



# TRACHEOPHYTE ORGANS

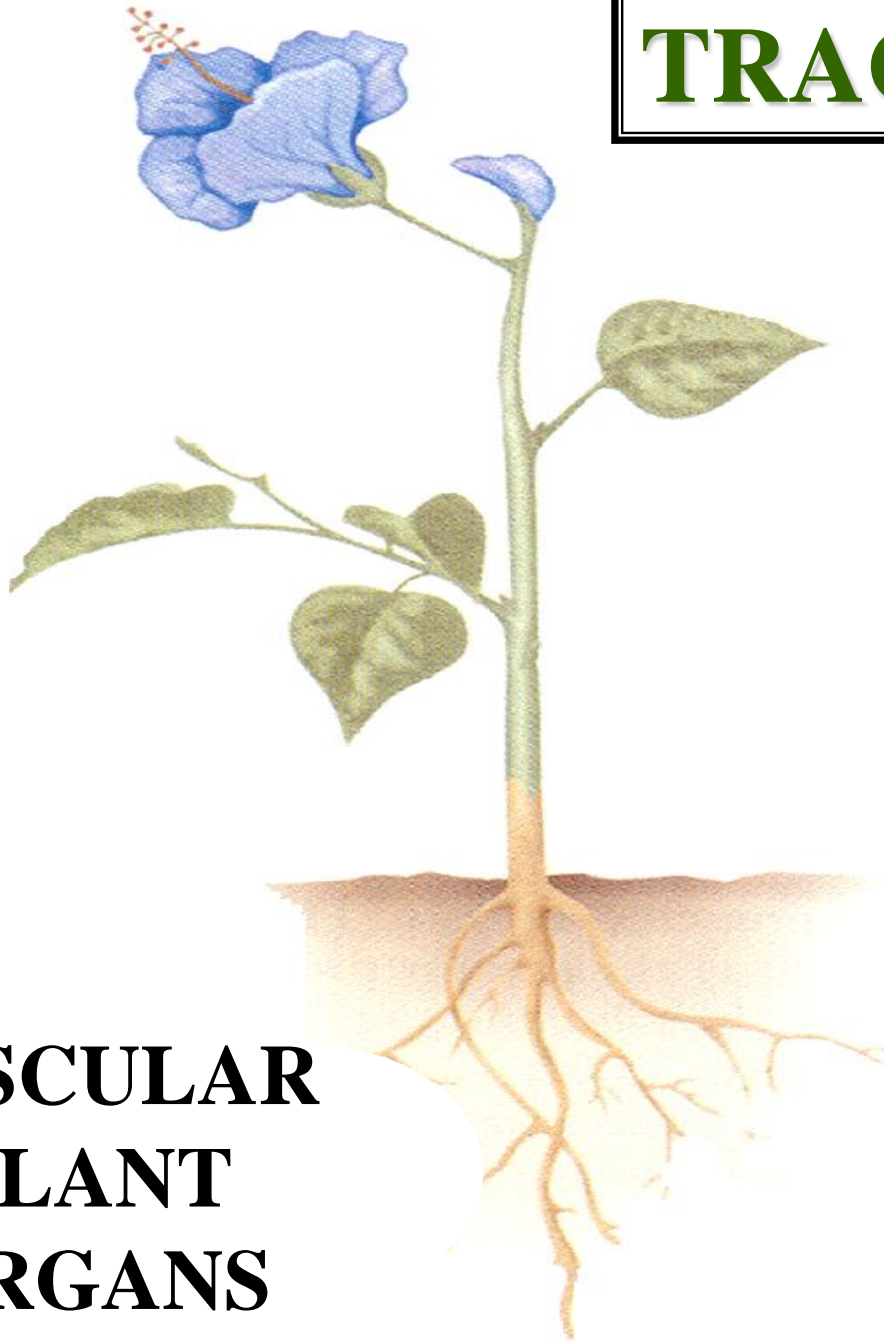


ROOT  
STEM  
LEAF

# TRACHEOPHYTE ORGANS

# TRACHEOPHYTE

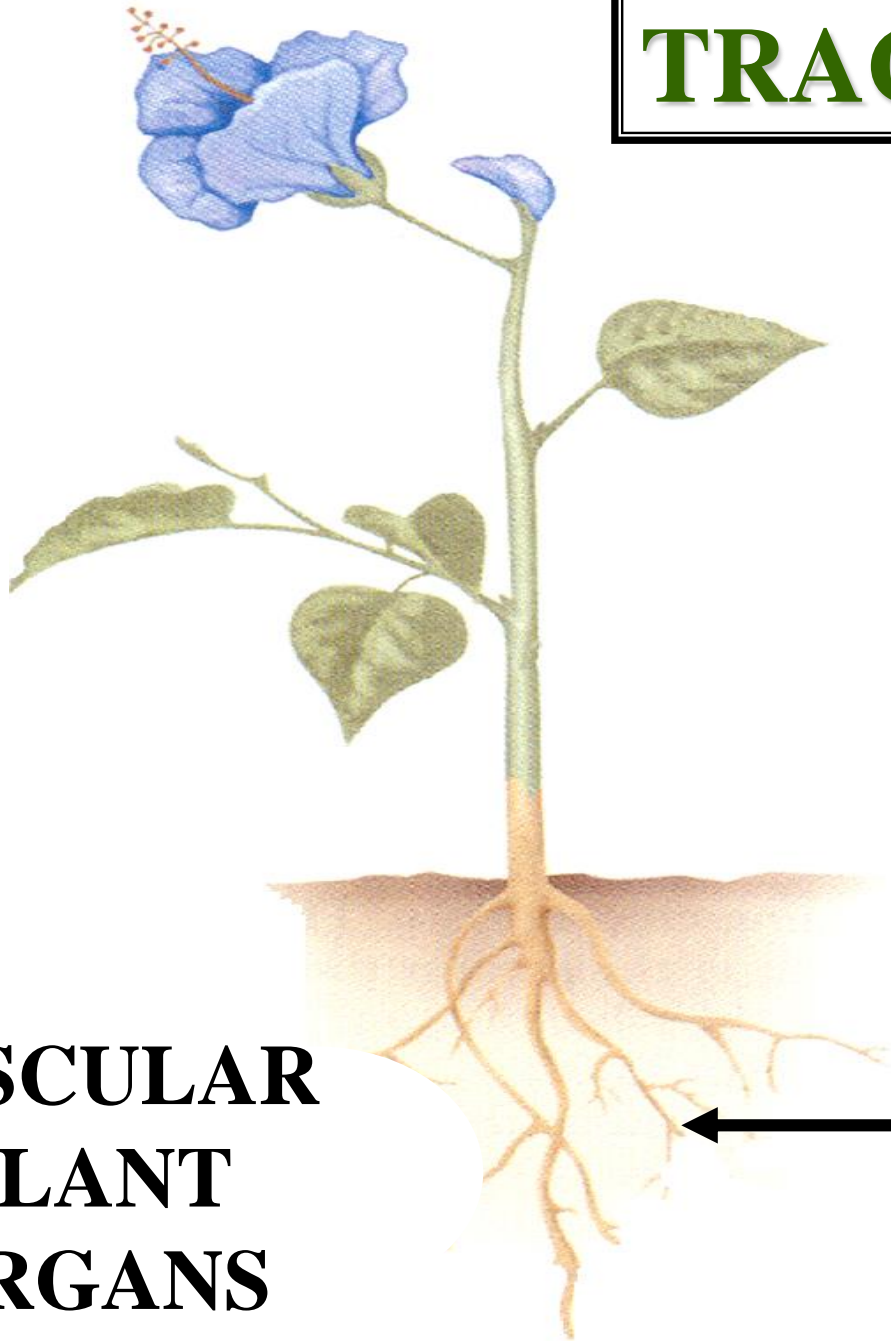
RT



**VASCULAR  
PLANT  
ORGANS**

# TRACHEOPHYTE

ST

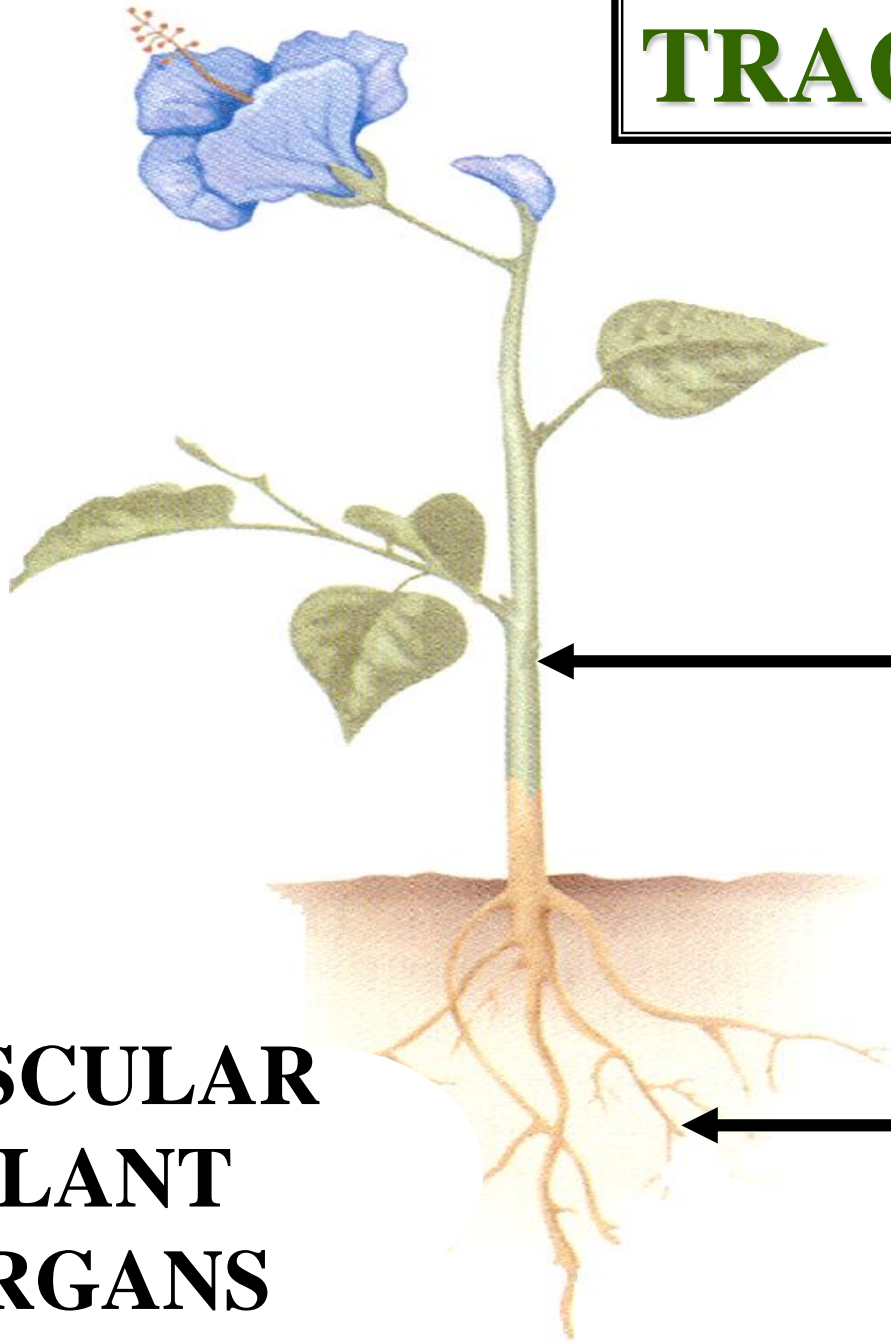


**VASCULAR  
PLANT  
ORGANS**

**ROOT**

# TRACHEOPHYTE

LF

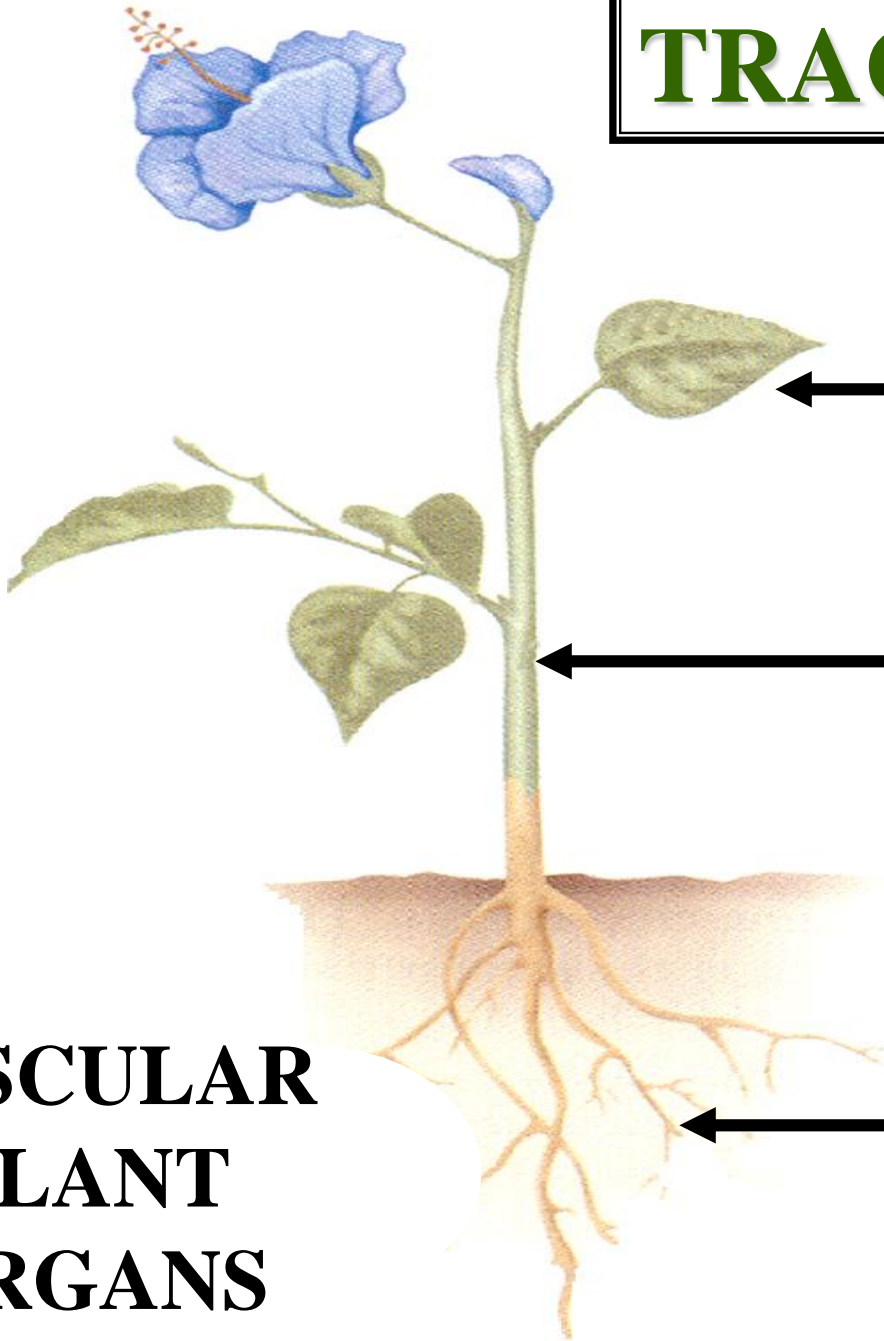


**STEM**

**ROOT**

**VASCULAR  
PLANT  
ORGANS**

# TRACHEOPHYTE



**LEAF**

**STEM**

**ROOT**

**VASCULAR  
PLANT  
ORGANS**

# ROOT

**ROOT**

**TRACHEOPHYTE  
ORGANS  
ROOT**



**DESCENDING PLANT AXIS**

**TRACHEOPHYTE  
ORGANS  
ROOT**





**TRACHEOPHYTE  
ORGANS  
ROOT**

**DESCENDING PLANT AXIS**

---

**ANCHORAGE**

**TRACHEOPHYTE  
ORGANS  
ROOT**



**TRACHEOPHYTE  
ORGANS  
ROOT**

**DESCENDING PLANT AXIS**

---

**ANCHORAGE - ABSORPTION**

**TRACHEOPHYTE  
ORGANS  
ROOT**

**TRACHEOPHYTE  
ORGANS  
ROOT**



**DESCENDING PLANT AXIS**

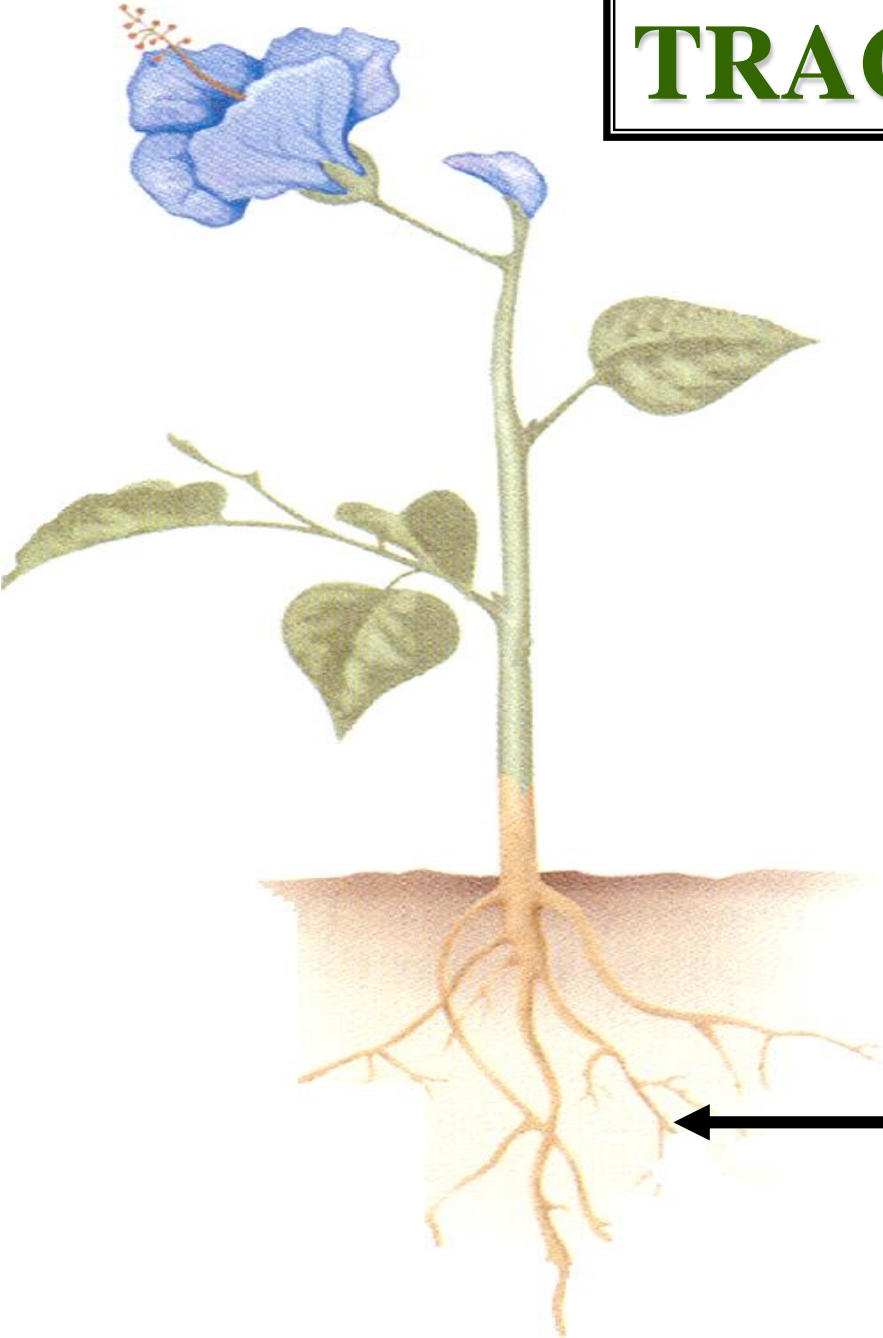
---

**ANCHORAGE - ABSORPTION - STORAGE**

**TRACHEOPHYTE  
ORGANS  
ROOT**

# TRACHEOPHYTE

D



**ROOT**

# TRACHEOPHYTE

A

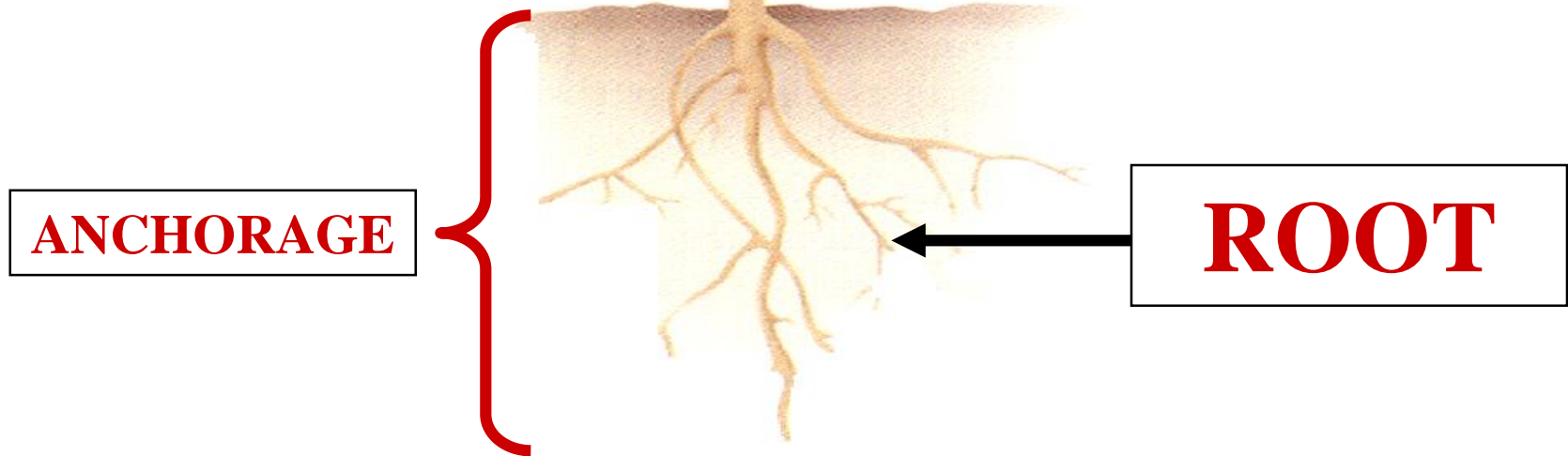
DESCENDING  
PLANT  
AXIS

ROOT



# TRACHEOPHYTE

A

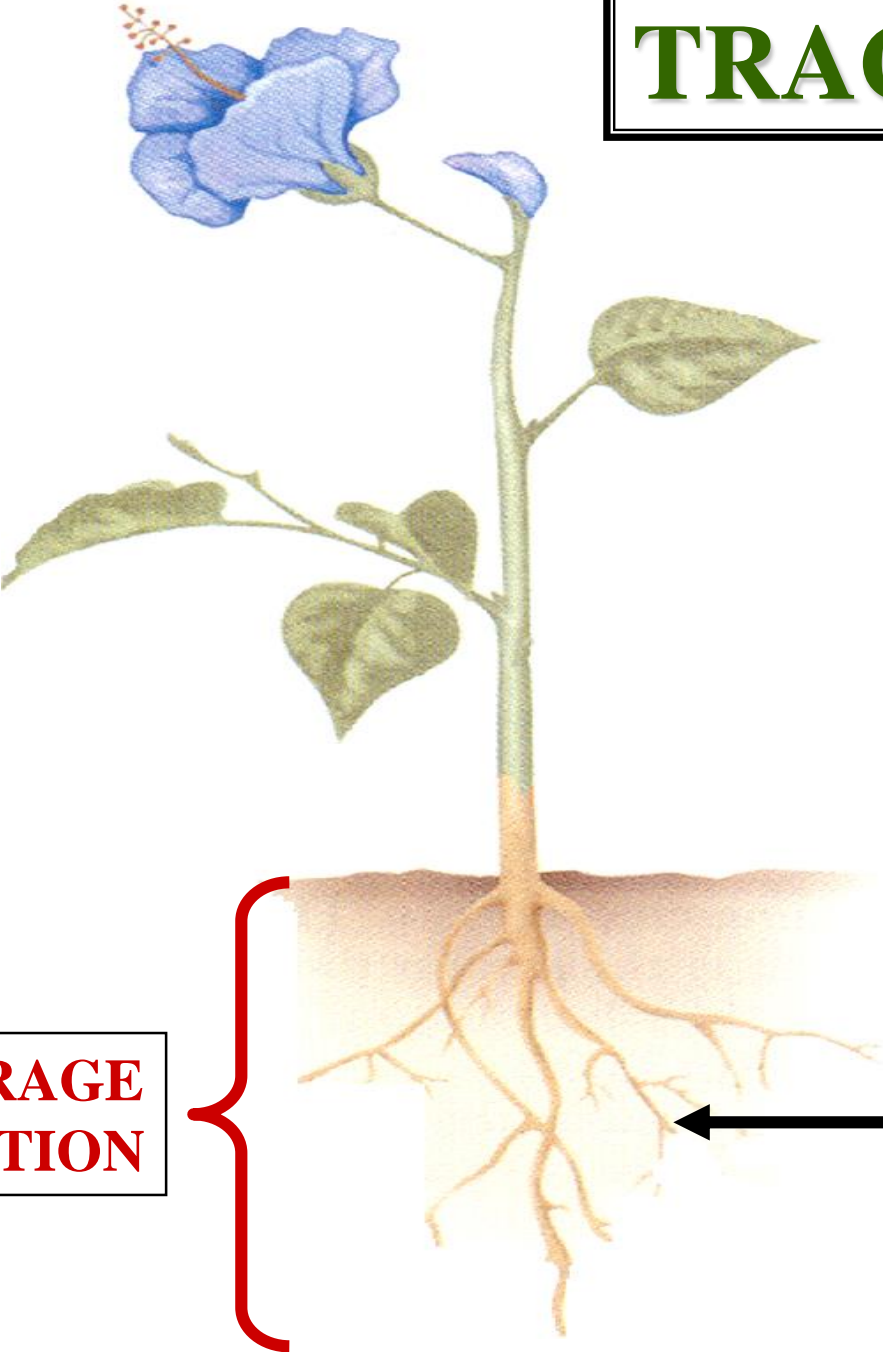


**ANCHORAGE**

**ROOT**

# TRACHEOPHYTE

S



**ANCHORAGE  
ABSORPTION**

**ROOT**

# TRACHEOPHYTE



**ANCHORAGE  
ABSORPTION  
STORAGE**



**ROOT**





**TAP ROOT  
SYSTEM  
VS  
FIBROUS ROOT  
SYSTEM**

# TAP ROOT SYSTEM

# **TAP ROOT SYSTEM**



**ROOT  
TAP ROOT SYSTEM**

**STOUT PRIMARY ROOT PRESENT**

**ROOT  
TAP ROOT SYSTEM**



# **ROOT TAP ROOT SYSTEM**

**STOUT PRIMARY ROOT PRESENT**

**---**

**STOUT LATERAL ROOTS PRESENT**

# **ROOT TAP ROOT SYSTEM**



# **ROOT TAP ROOT SYSTEM**

**STOUT PRIMARY ROOT PRESENT**

---

**STOUT LATERAL ROOTS PRESENT**

---

**DEEP SOIL PENETRATION**

# **ROOT TAP ROOT SYSTEM**

**ROOT**



**TAP ROOT SYSTEM**

**STOUT PRIMARY ROOT PRESENT**

---

**STOUT LATERAL ROOTS PRESENT**

---

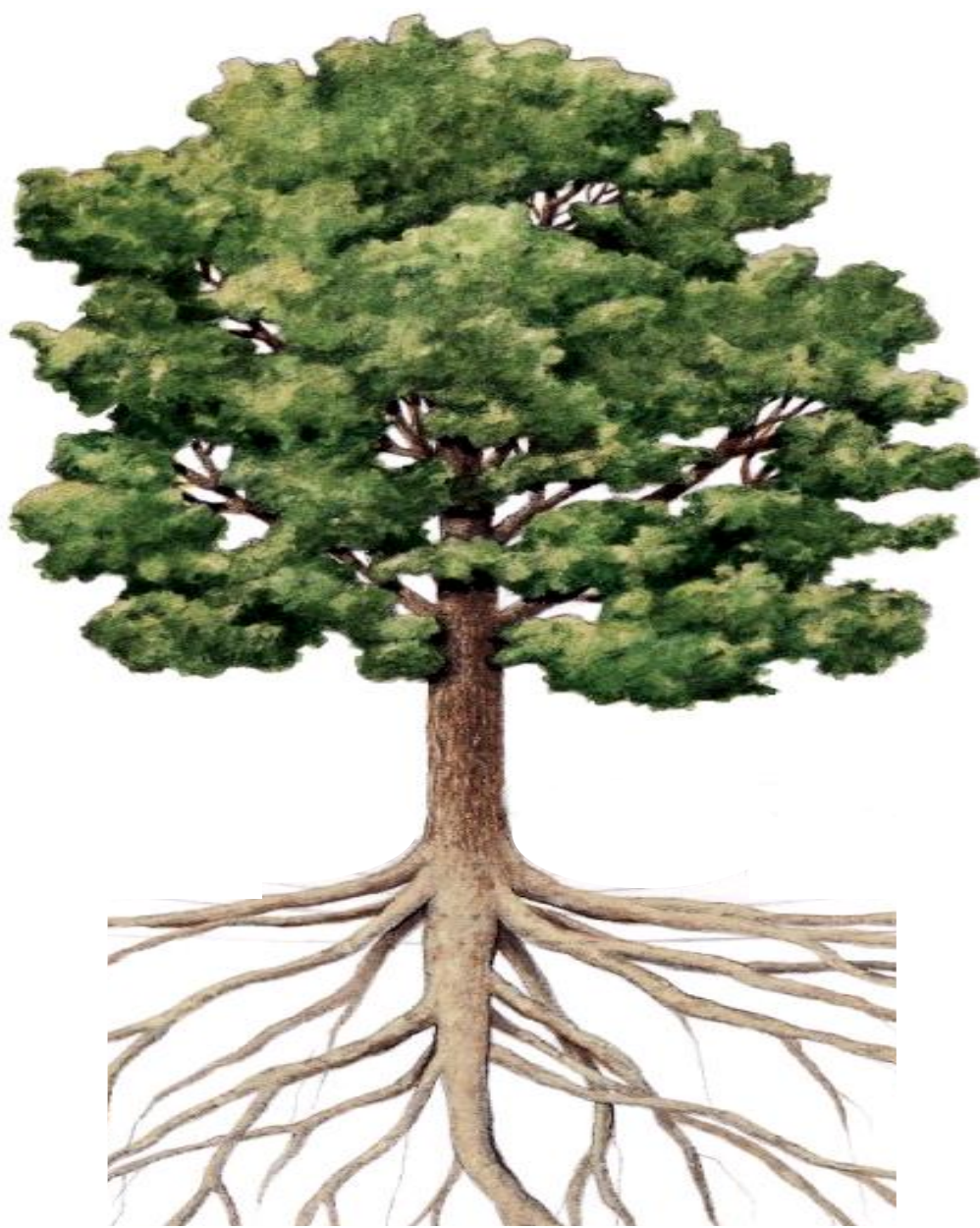
**DEEP SOIL PENETRATION**

---

**WOODY PLANTS**

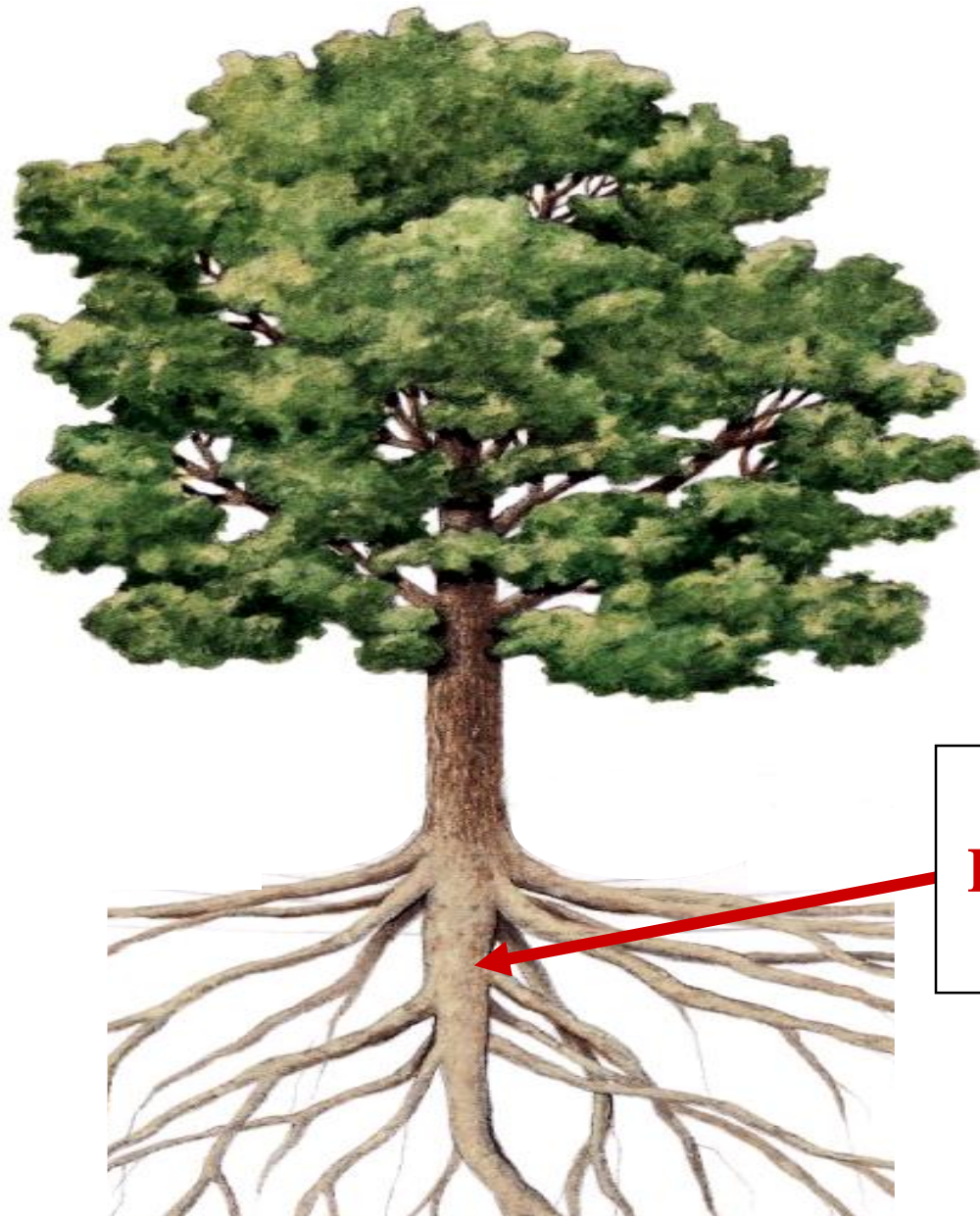
**ROOT**

**TAP ROOT SYSTEM**



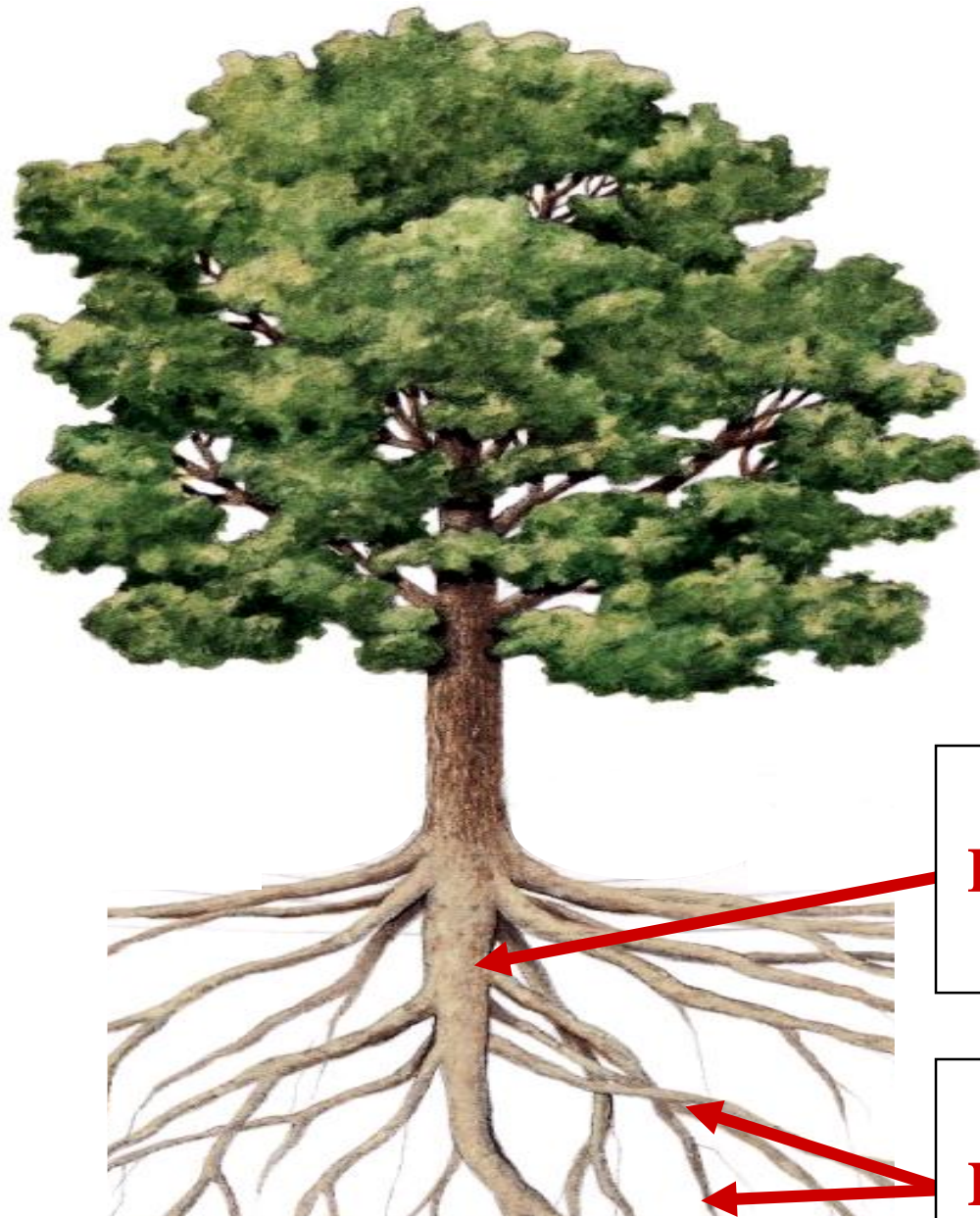
**TAP  
ROOT  
SYSTEM**





**TAP  
ROOT  
SYSTEM**

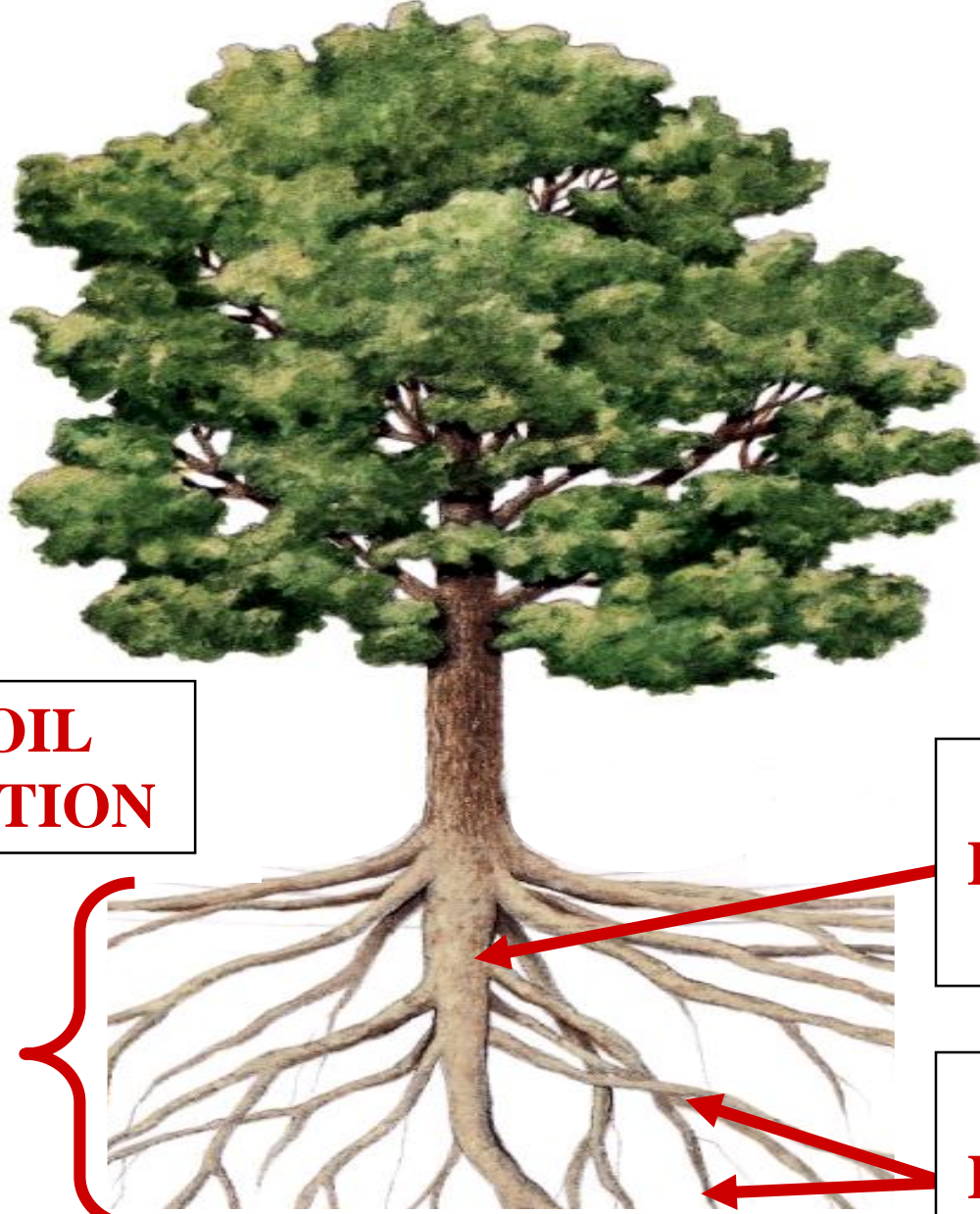
**STOUT  
PRIMARY  
ROOT**



**TAP  
ROOT  
SYSTEM**

**STOUT  
PRIMARY  
ROOT**

**STOUT  
LATERAL  
ROOTS**

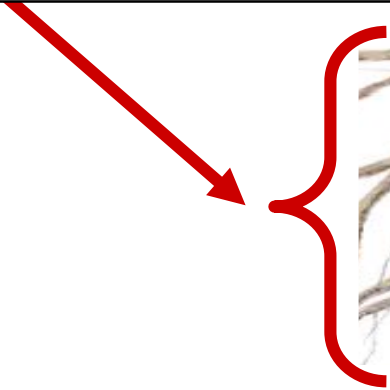


**TAP  
ROOT  
SYSTEM**

**DEEP SOIL  
PENETRATION**

**STOUT  
PRIMARY  
ROOT**

**STOUT  
LATERAL  
ROOTS**





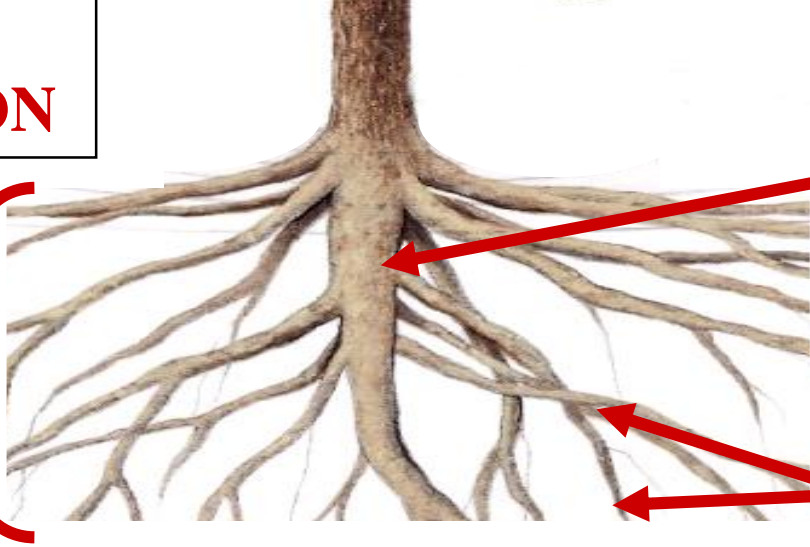
**TAP  
ROOT  
SYSTEM**

**DEEP SOIL  
PENETRATION**

**STOUT  
PRIMARY  
ROOT**

**STOUT  
LATERAL  
ROOTS**

**WOODY PLANT**





**MAGNOLIA**

# **FIBROUS ROOT SYSTEM**

# **FIBROUS ROOT SYSTEM**



**ROOT  
FIBROUS ROOT SYSTEM**

**STOUT PRIMARY ROOT ABSENT**

**ROOT  
FIBROUS ROOT SYSTEM**





**ROOT  
FIBROUS ROOT SYSTEM**

**STOUT PRIMARY ROOT ABSENT**

**---**

**STOUT LATERAL ROOTS ABSENT**

**ROOT  
FIBROUS ROOT SYSTEM**



**ROOT  
FIBROUS ROOT SYSTEM**

**STOUT PRIMARY ROOT ABSENT**

---

**STOUT LATERAL ROOTS ABSENT**

---

**SHALLOW SOIL PENETRATION**

**ROOT  
FIBROUS ROOT SYSTEM**

**ROOT**

**FIBROUS ROOT SYSTEM**

**STOUT PRIMARY ROOT ABSENT**

---

**STOUT LATERAL ROOTS ABSENT**

---

**SHALLOW SOIL PENETRATION**

---

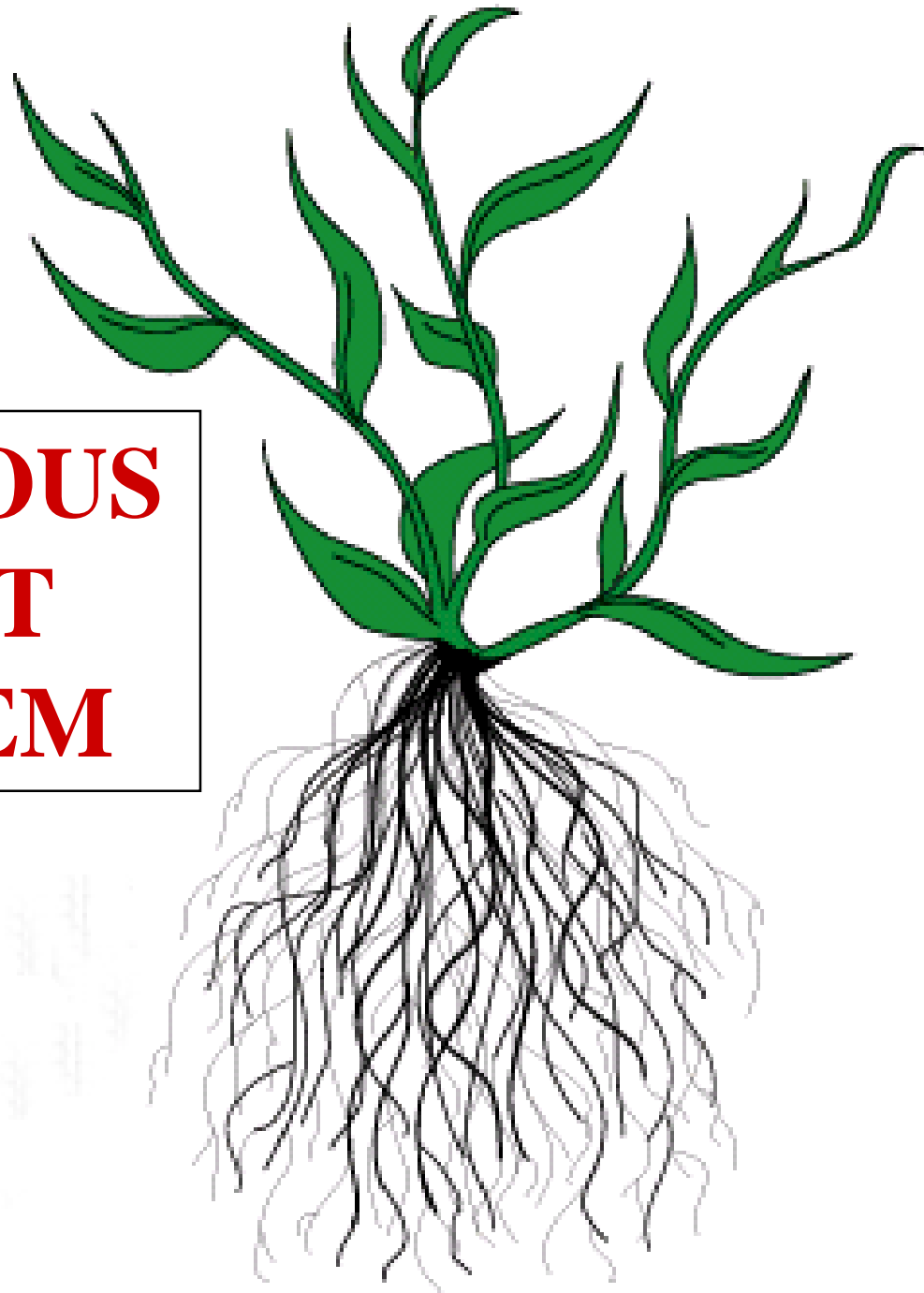
**HERBACEOUS PLANTS**

**ROOT**

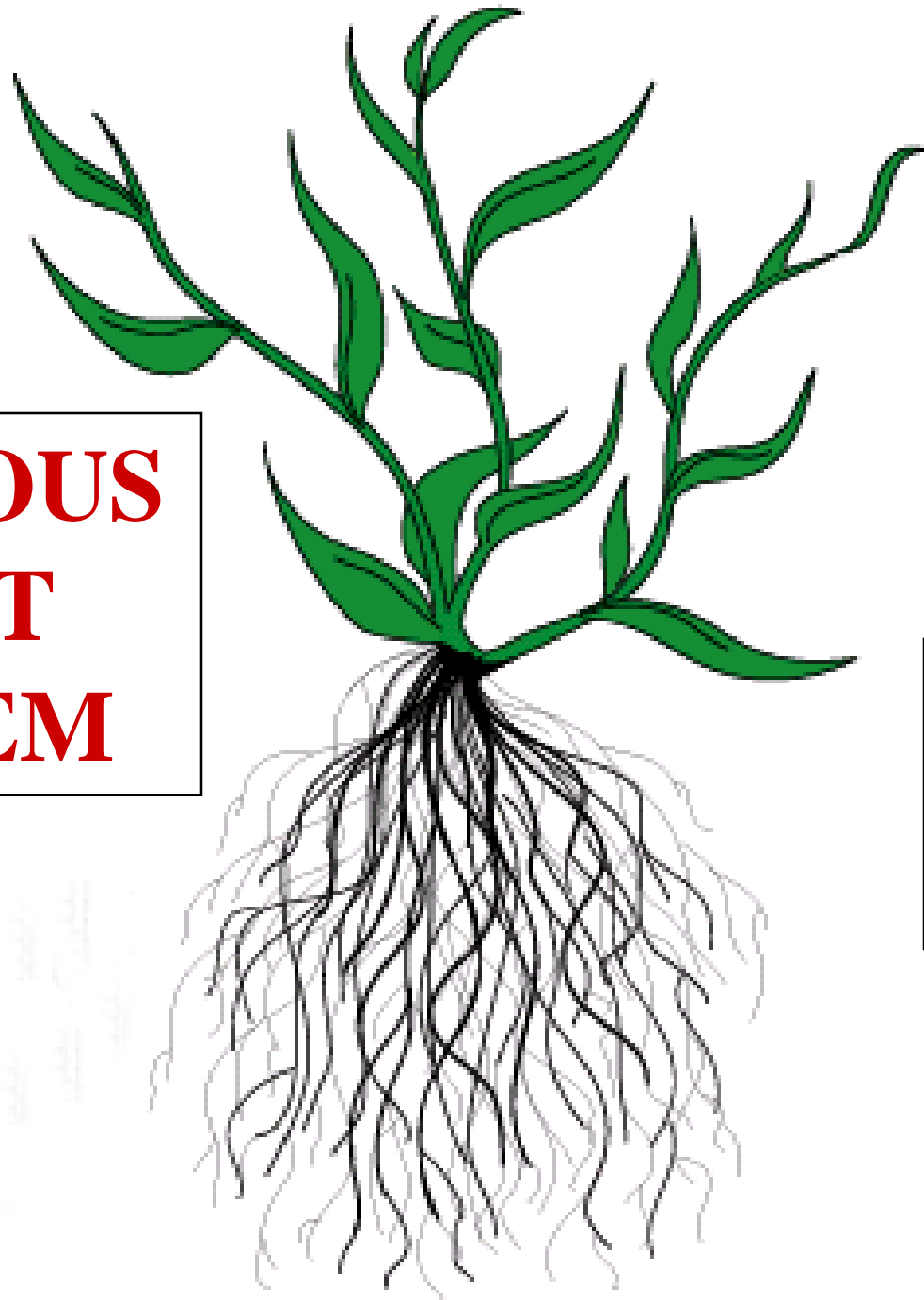
**FIBROUS ROOT SYSTEM**



**FIBEROUS  
ROOT  
SYSTEM**

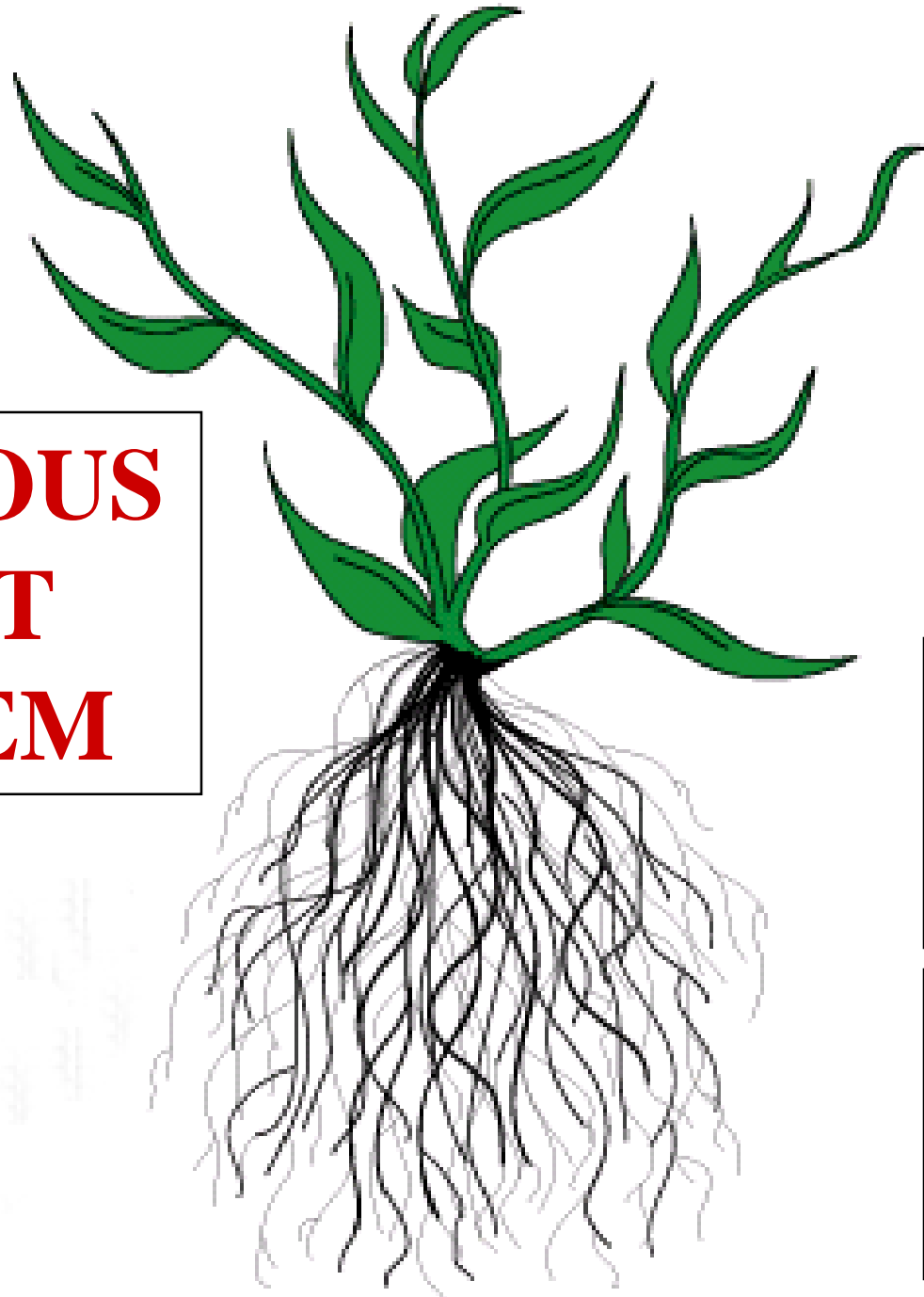


**FIBEROUS  
ROOT  
SYSTEM**



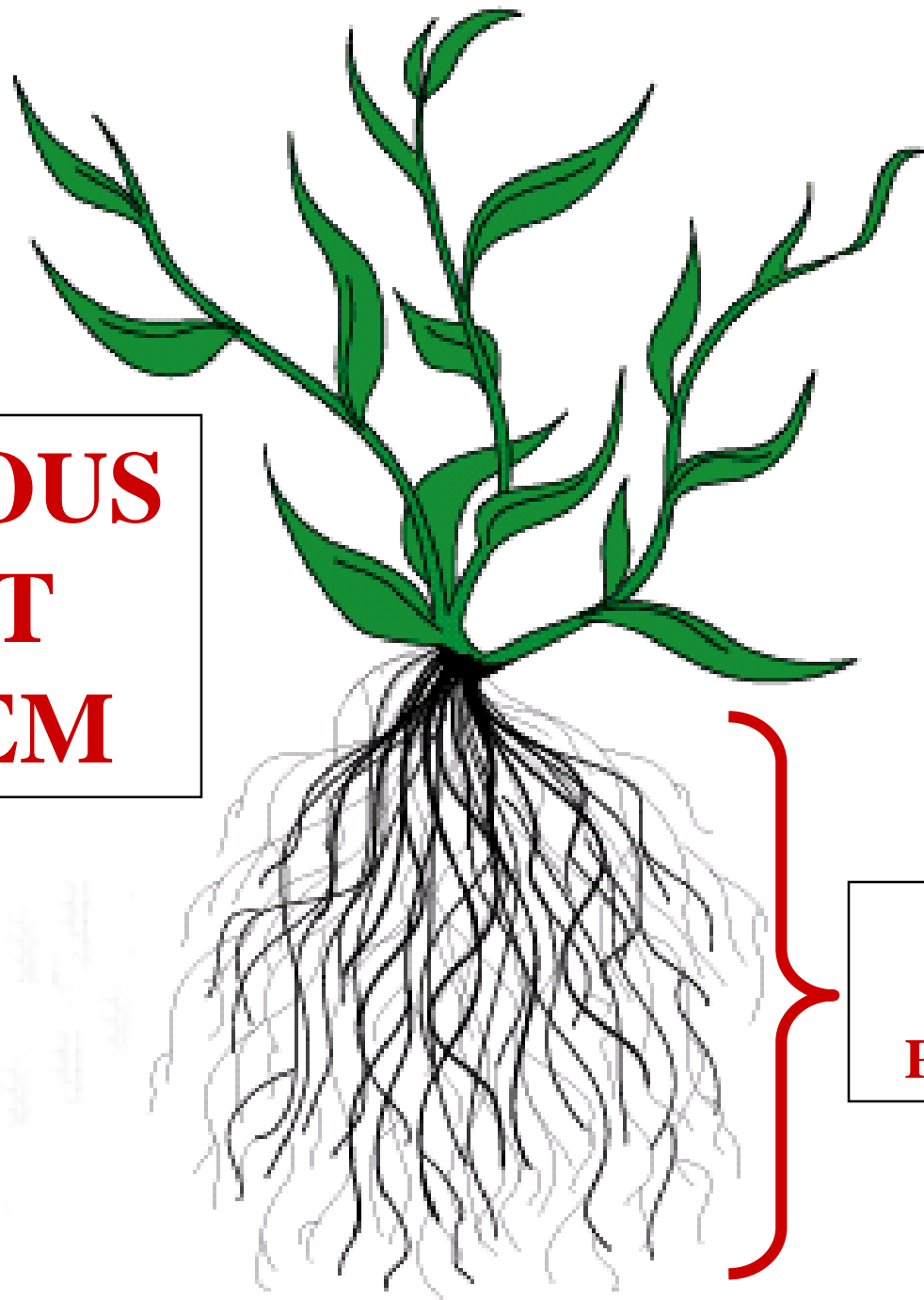
**STOUT  
PRIMARY  
ROOT  
ABSENT**

**FIBEROUS  
ROOT  
SYSTEM**



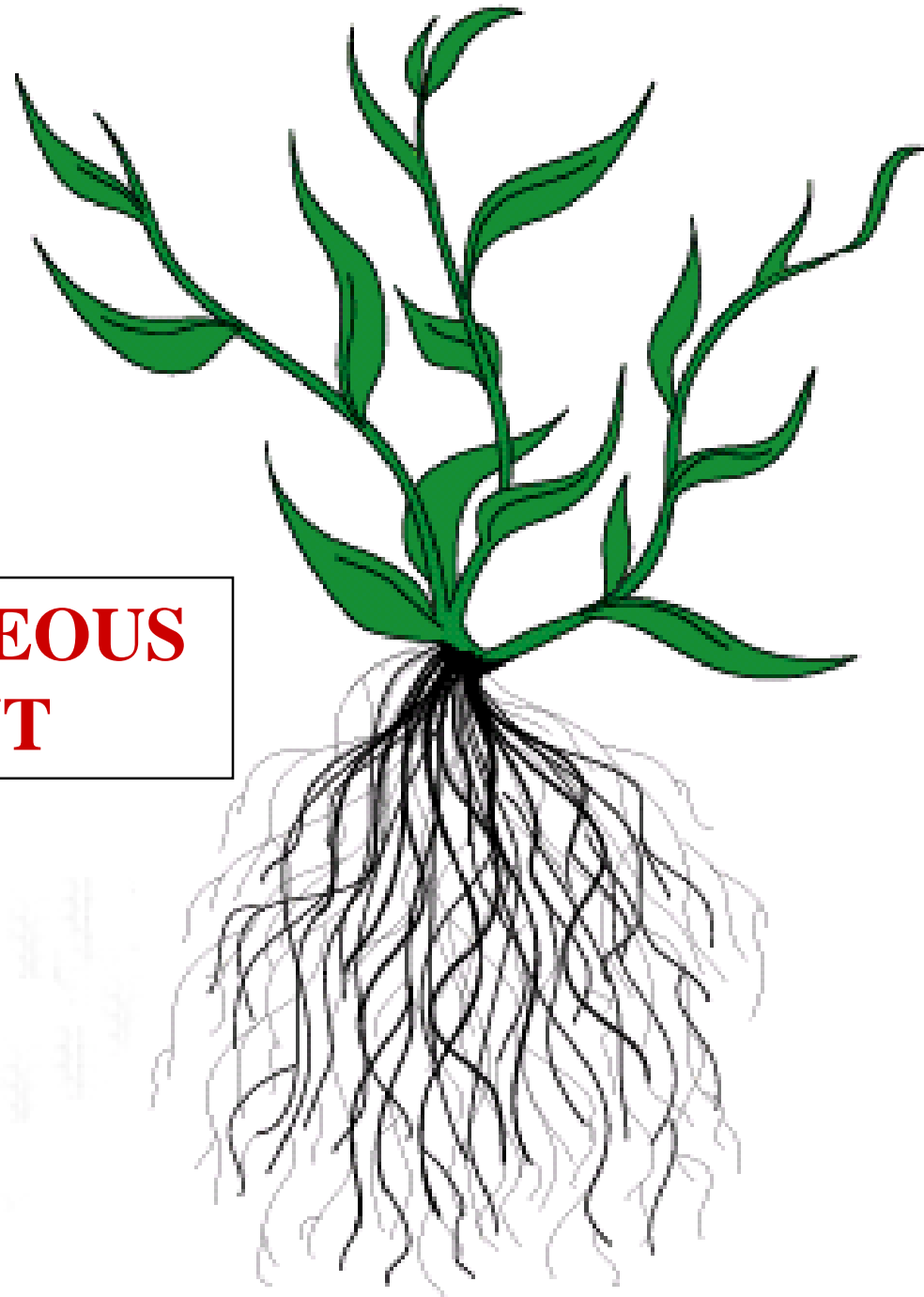
**STOUT  
PRIMARY  
ROOT  
ABSENT**

**STOUT  
LATERAL  
ROOTS  
ABSENT**



**FIBEROUS  
ROOT  
SYSTEM**

**SHALLOW  
SOIL  
PENETRATION**



**HERBACEOUS  
PLANT**





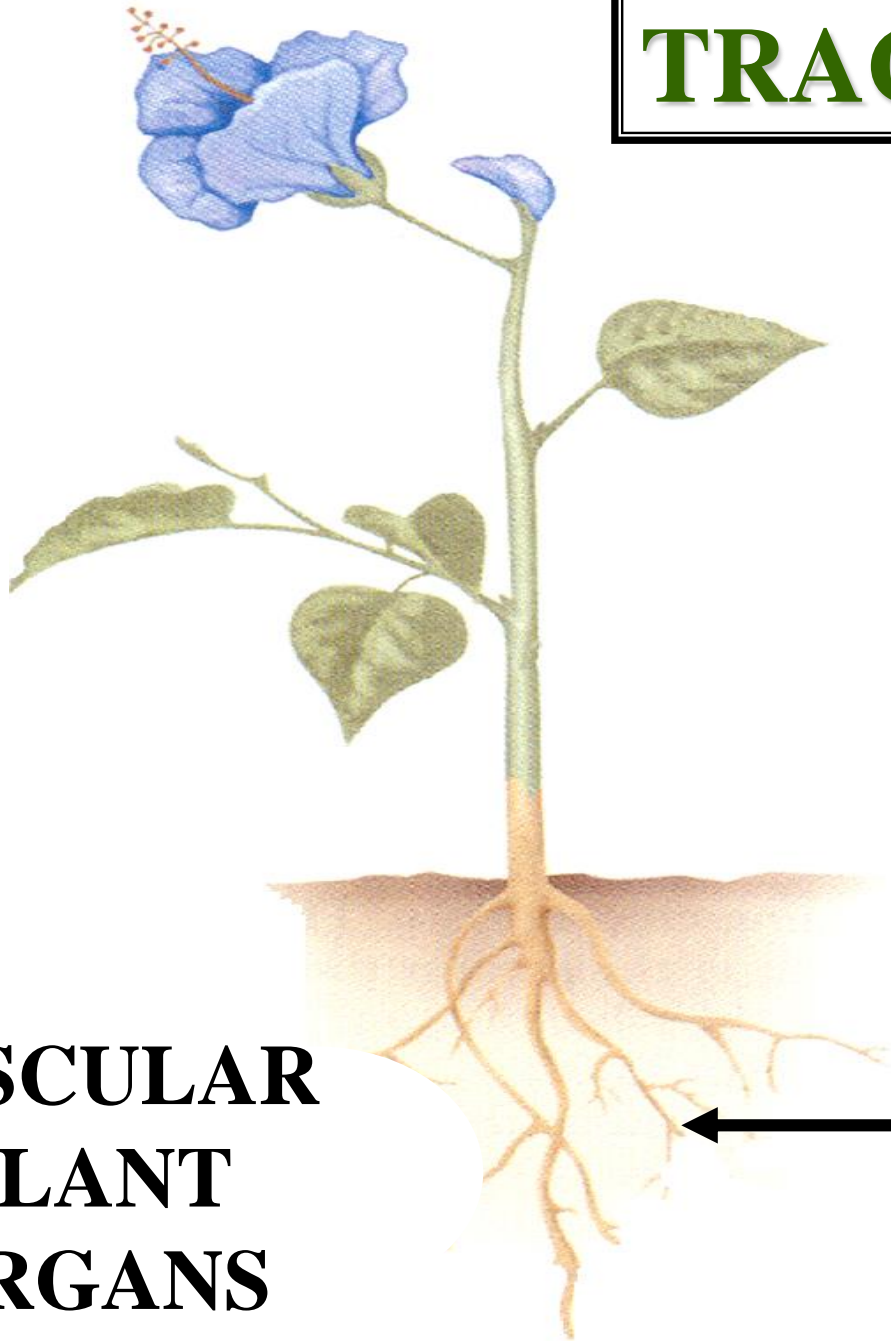
**CORN**



# **TRACHEOPHYTE ORGANS SUMMARY**

# TRACHEOPHYTE

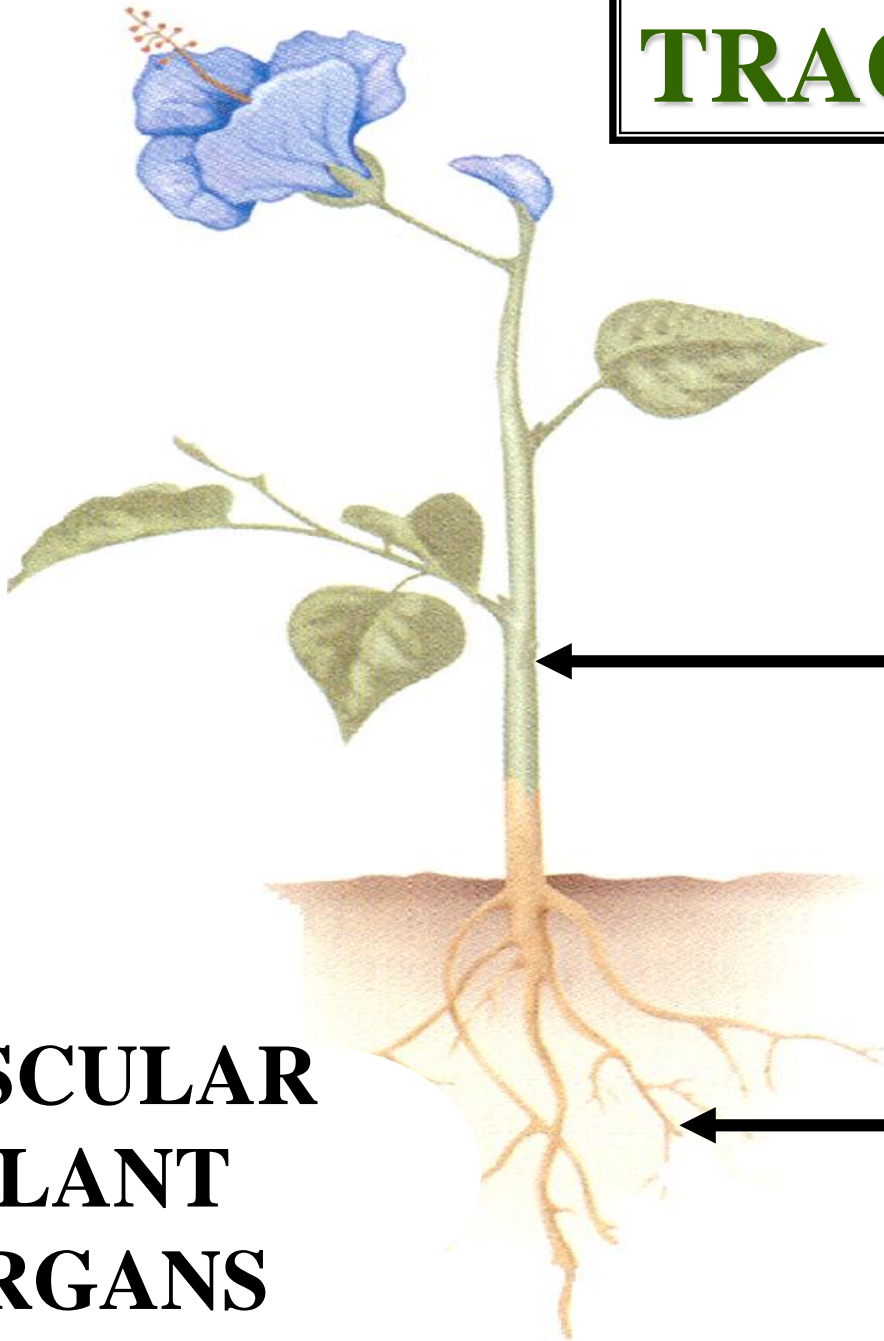
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**VASCULAR  
PLANT  
ORGANS**

**ROOT**

# TRACHEOPHYTE



**STEM**

**ROOT**

**VASCULAR  
PLANT  
ORGANS**