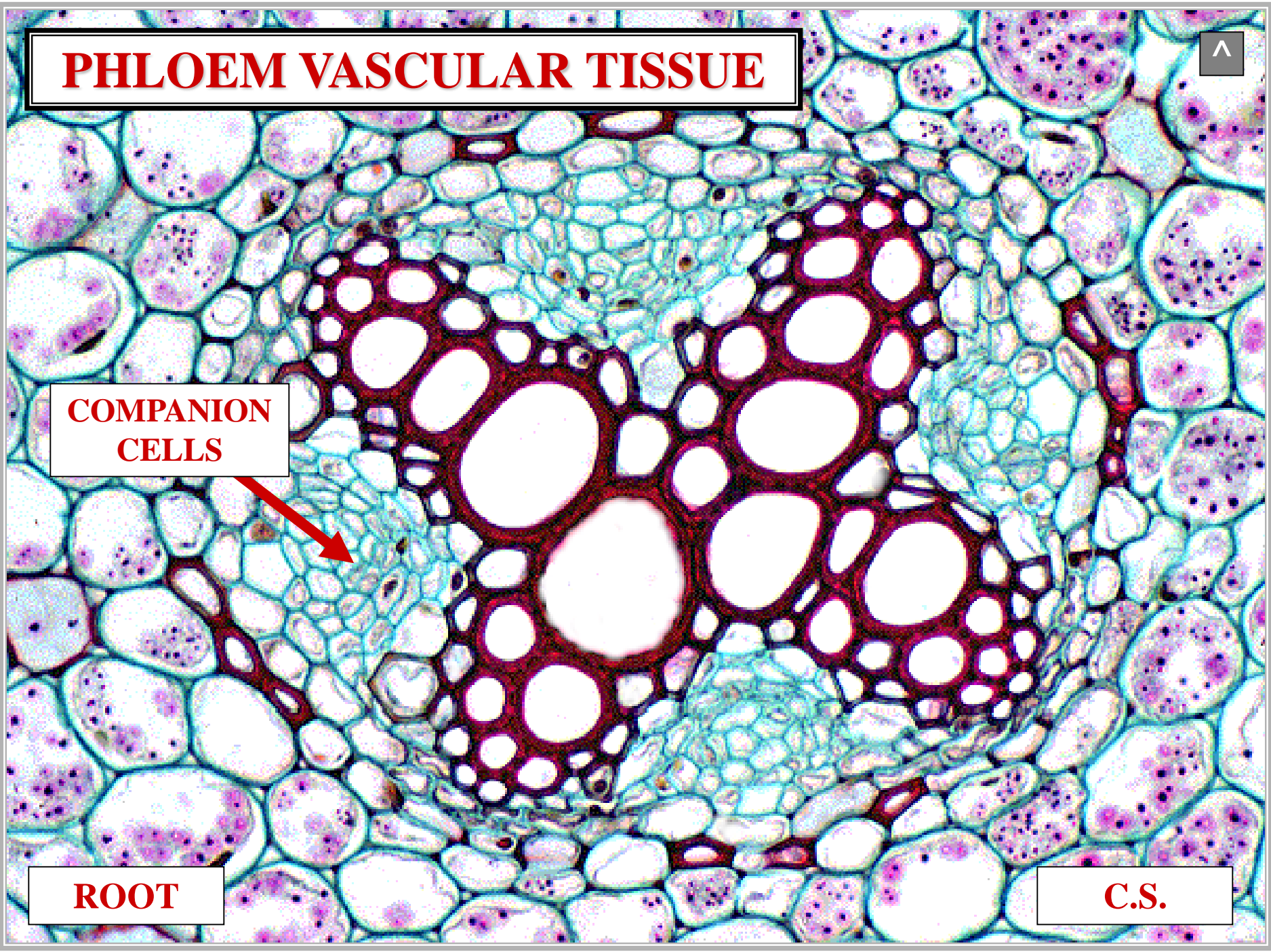
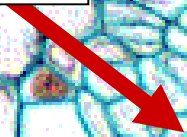


# PHLOEM VASCULAR TISSUE

COMPANION  
CELLS

ROOT

C.S.



# TRACHEOPHYTE VASCULAR STELES

**STELLE**



**STELE**

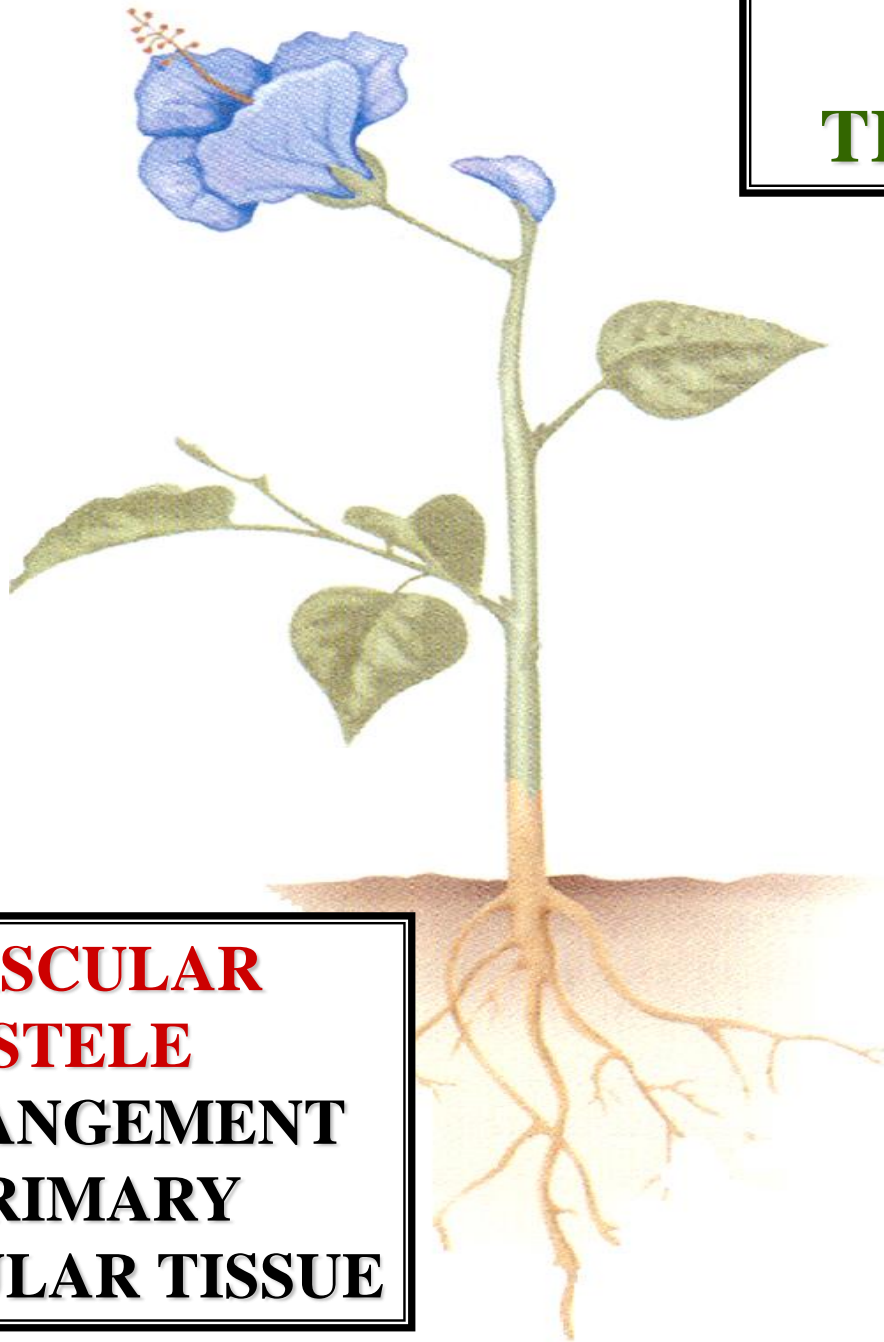
**ARRANGEMENT  
PRIMARY  
VASCULAR TISSUE**

**STELE**



# TYPICAL TRACHEOPHYTE

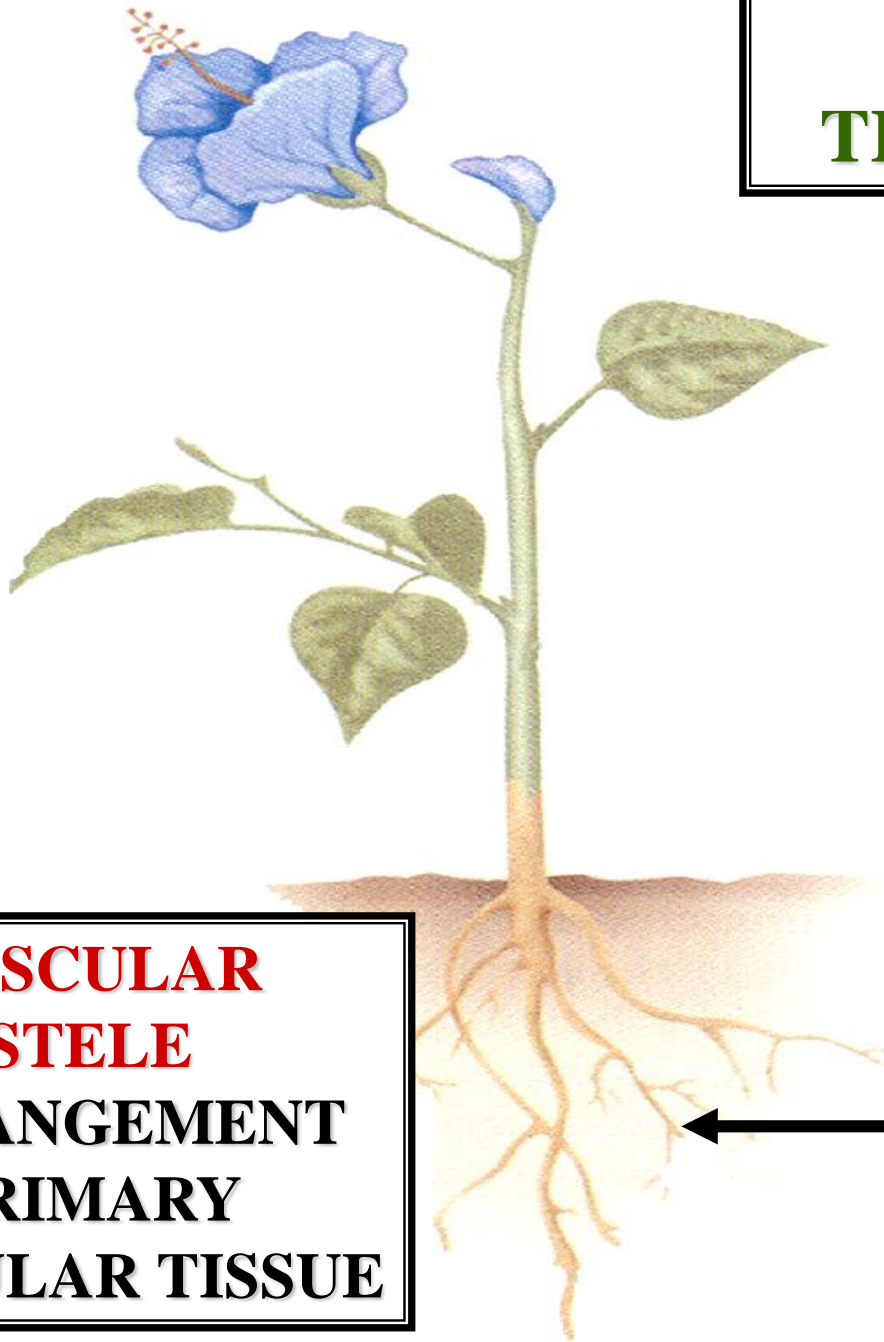
RT



**VASCULAR  
STELE  
ARRANGEMENT  
PRIMARY  
VASCULAR TISSUE**

# TYPICAL TRACHEOPHYTE

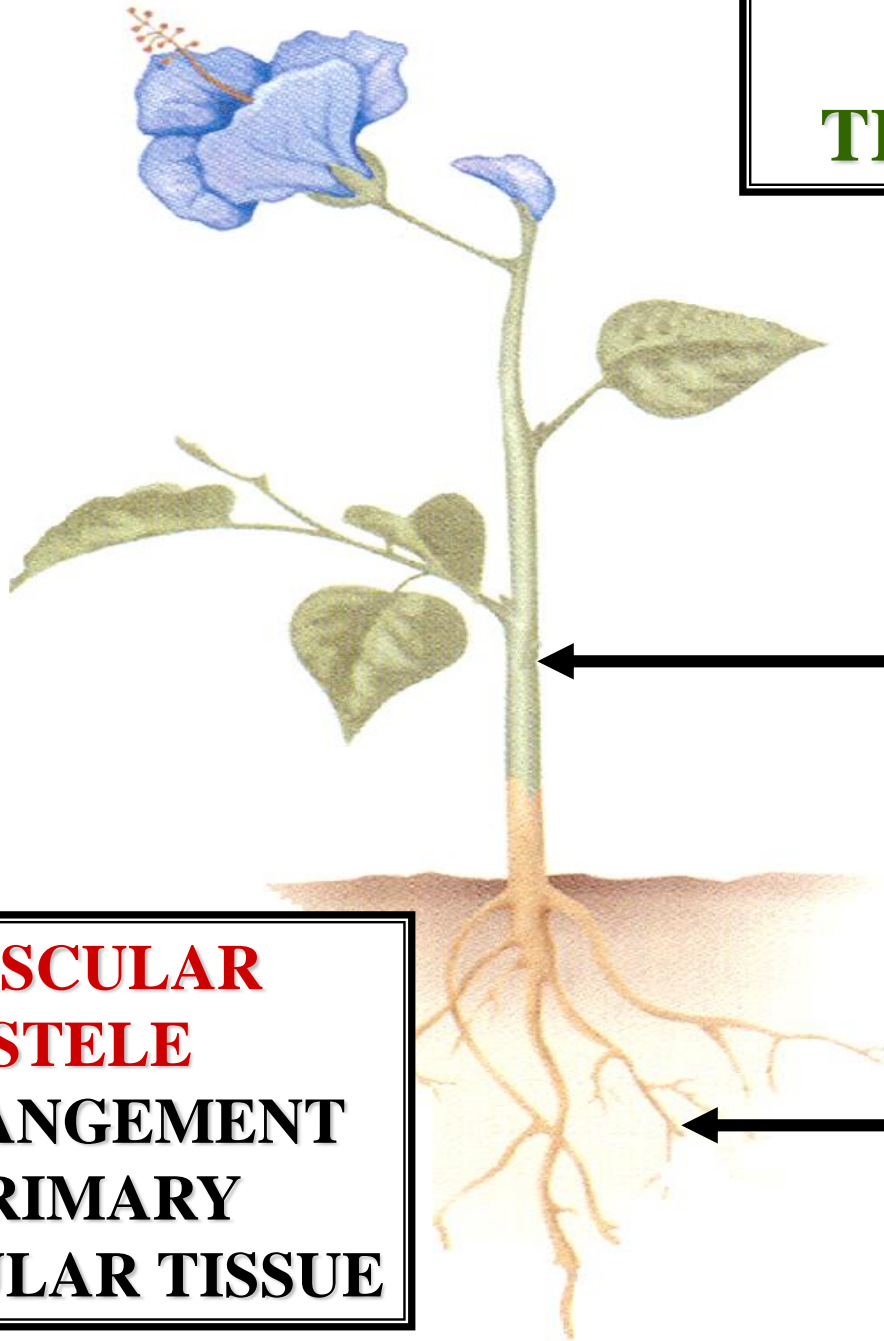
ST



**VASCULAR  
STELE  
ARRANGEMENT  
PRIMARY  
VASCULAR TISSUE**

**ROOT**

# TYPICAL TRACHEOPHYTE



**STEM**

**ROOT**

**VASCULAR  
STELE  
ARRANGEMENT  
PRIMARY  
VASCULAR TISSUE**



**EPIDERMIS**



**VASCULAR STELE**



**CORTEX**



**~1 XYLEM**

**~1 PHLOEM**

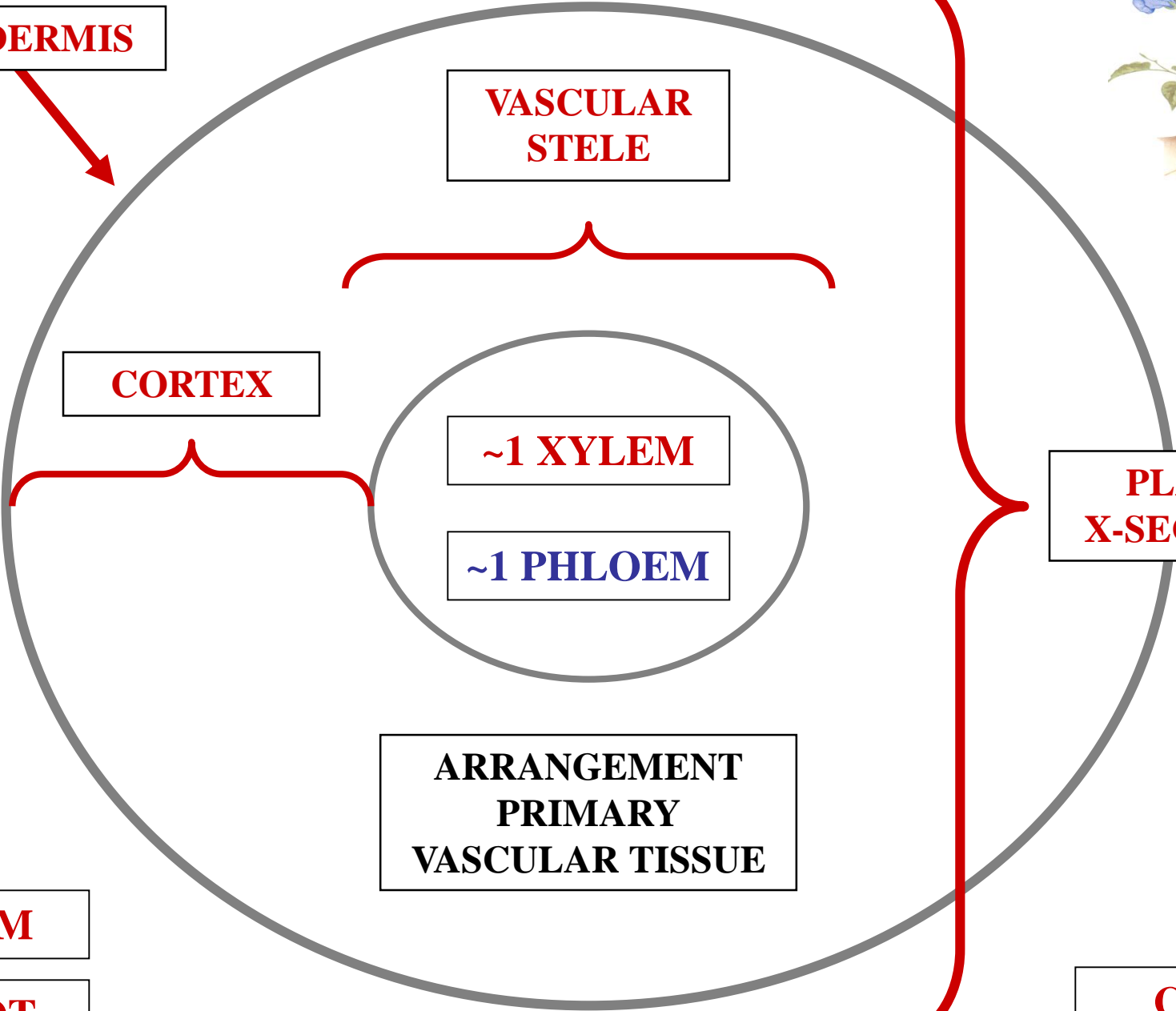
**PLANT X-SECTION**

**ARRANGEMENT  
PRIMARY  
VASCULAR TISSUE**

**STEM**

**ROOT**

**C.S.**



**TRACHEOPHYTE  
VASCULAR  
STELES  
TYPES**

# **VASCULAR STELE TYPES**

**PROTOSTELES**

# **VASCULAR STELE TYPES**

# **VASCULAR STELE TYPES**

**PROTOSTELES**

**SIPHONOSTELES**

# **VASCULAR STELE TYPES**

# VASCULAR STELE TYPES



PROTOSTELES

SIPHONOSTELES

ATACTOSTELE

# VASCULAR STELE TYPES



# PROTOSTELES

**PROTOSTELE**

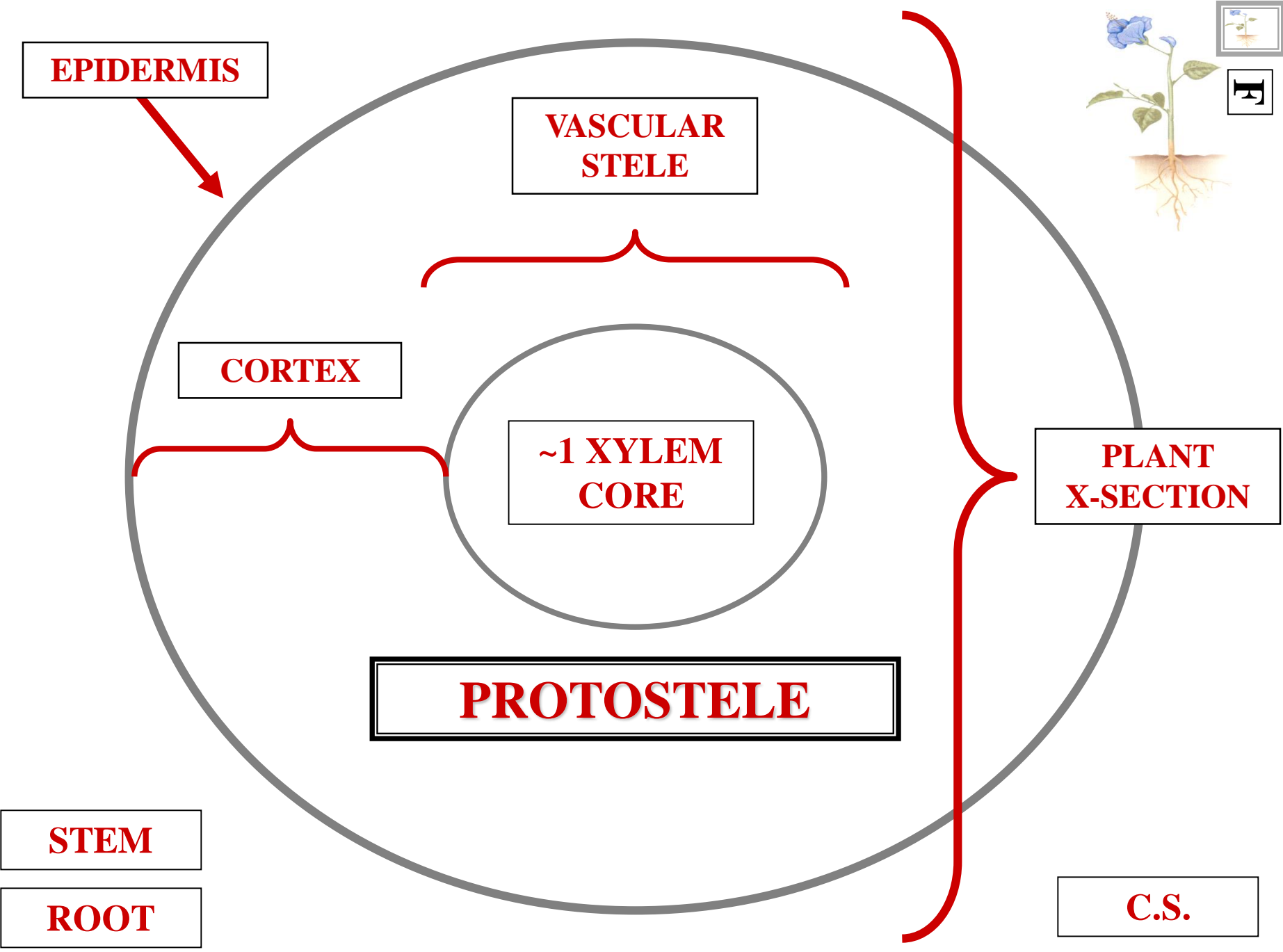
**VASCULAR STELE  
PROTOSTELE**



**XYLEM CORE  
WITH**

**PERIPHERAL PHLOEM**

**VASCULAR STELE  
PROTOSTELE**



**EPIDERMIS**

**VASCULAR STELE**

**CORTEX**

**~1 XYLEM CORE**

**PROTOSTELE**

**PLANT X-SECTION**

**STEM**

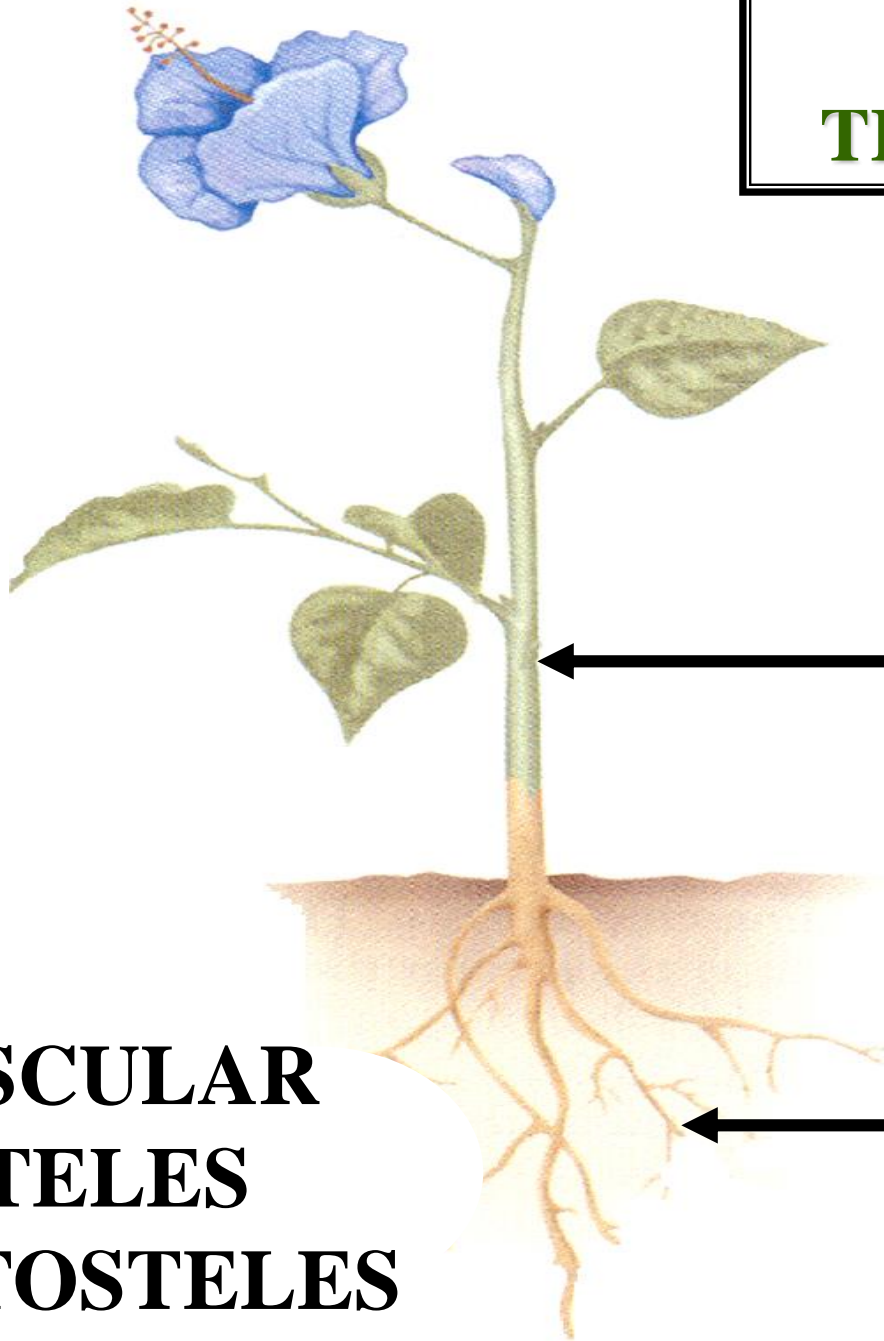
**ROOT**

**C.S.**



**F**

# TYPICAL TRACHEOPHYTE



**STEM**

**ROOT**

**VASCULAR  
STELES  
PROTOSTELES**

# PROTOSTELE TYPES

# **PROTOSTELE TYPES**

**HAPLOSTELE**

**PROTOSTELE  
TYPES**

# **PROTOSTELE TYPES**

**HAPLOSTELE**

**ACTINOSTELE**

# **PROTOSTELE TYPES**



# PROTOSTELE TYPES

HAPLOSTELE

ACTINOSTELE

PLECTOSTELE

# PROTOSTELE TYPES

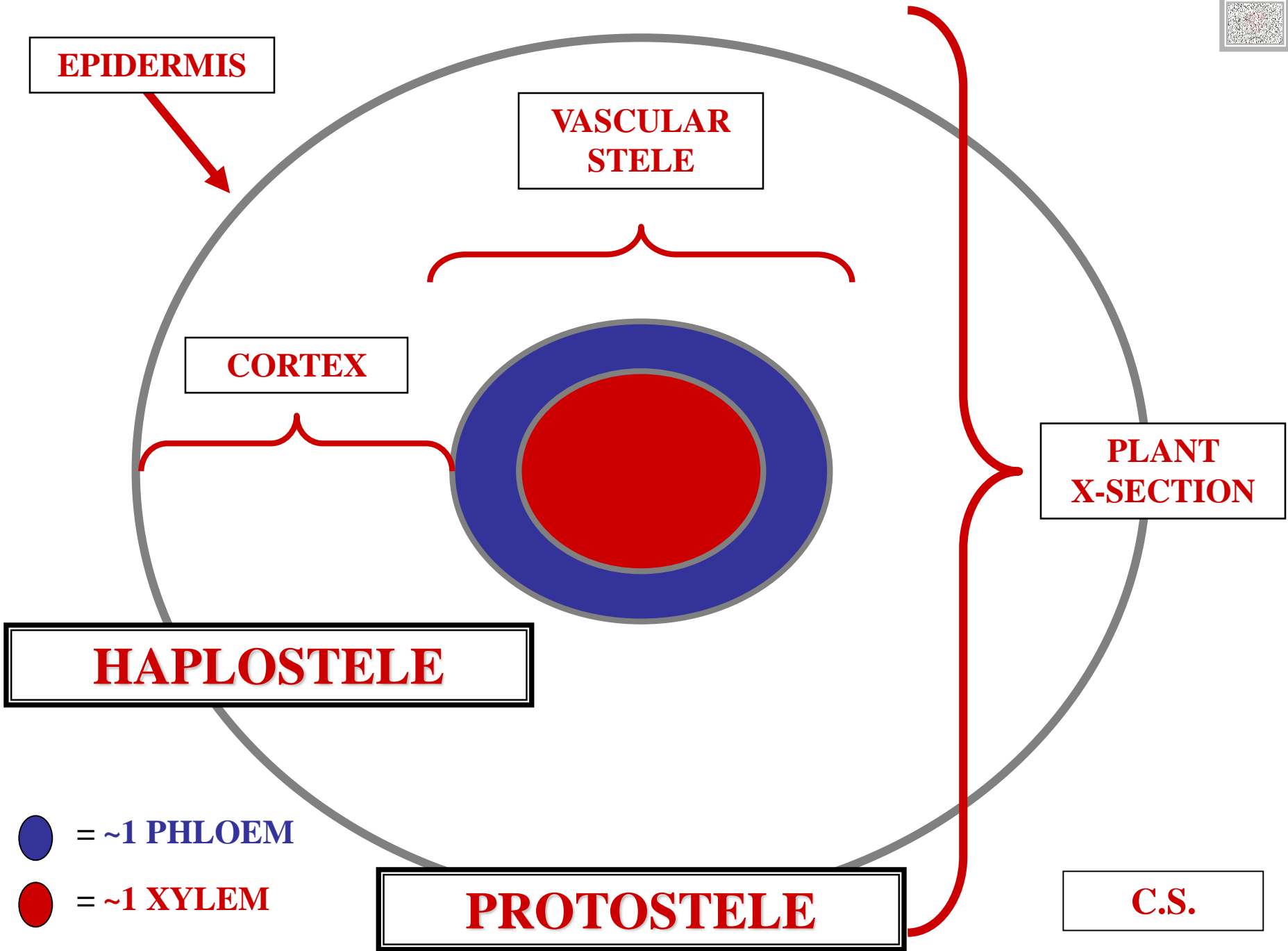
**HAPLOSTELE**

**PROTOSTELE  
HAPLOSTELE**



**XYLEM ROUND**

**PROTOSTELE  
TYPES**



**EPIDERMIS**

**VASCULAR STELE**

**CORTEX**

**PLANT X-SECTION**

**HAPLOSTELE**

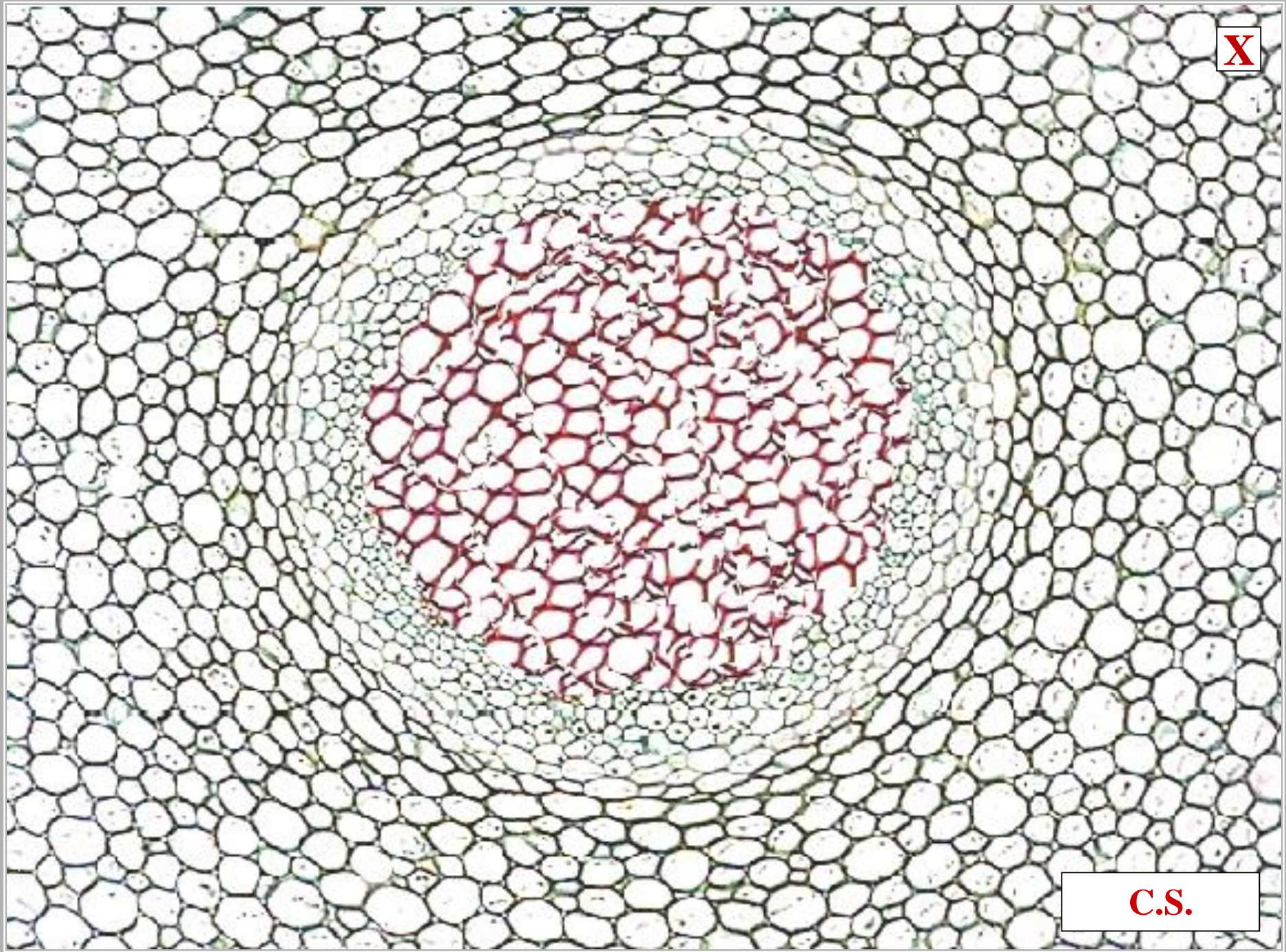
**PROTOSTELE**

**C.S.**

**= ~1 PHLOEM**

**= ~1 XYLEM**

X



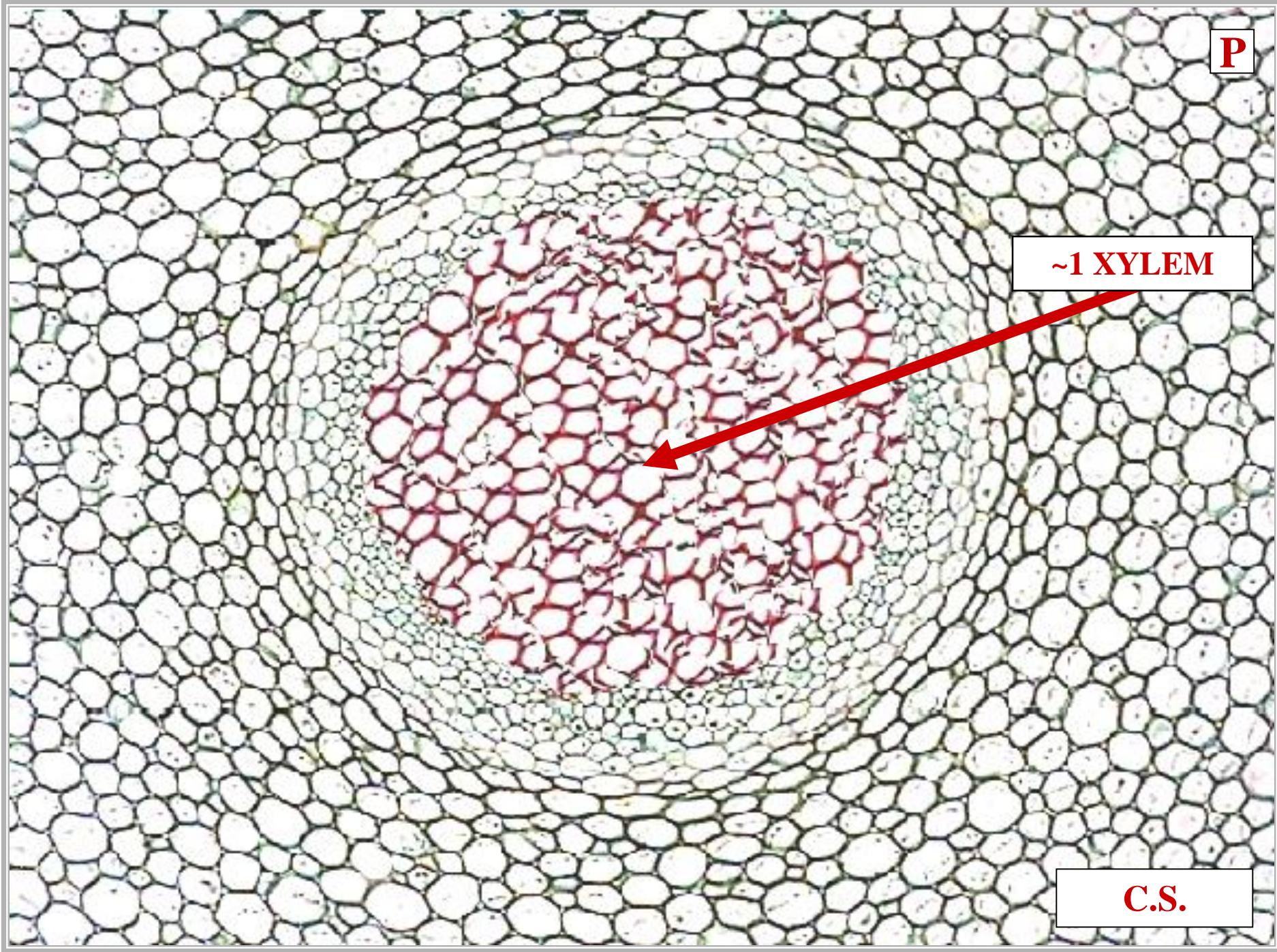
C.S.



**P**

**~1 XYLEM**

**C.S.**



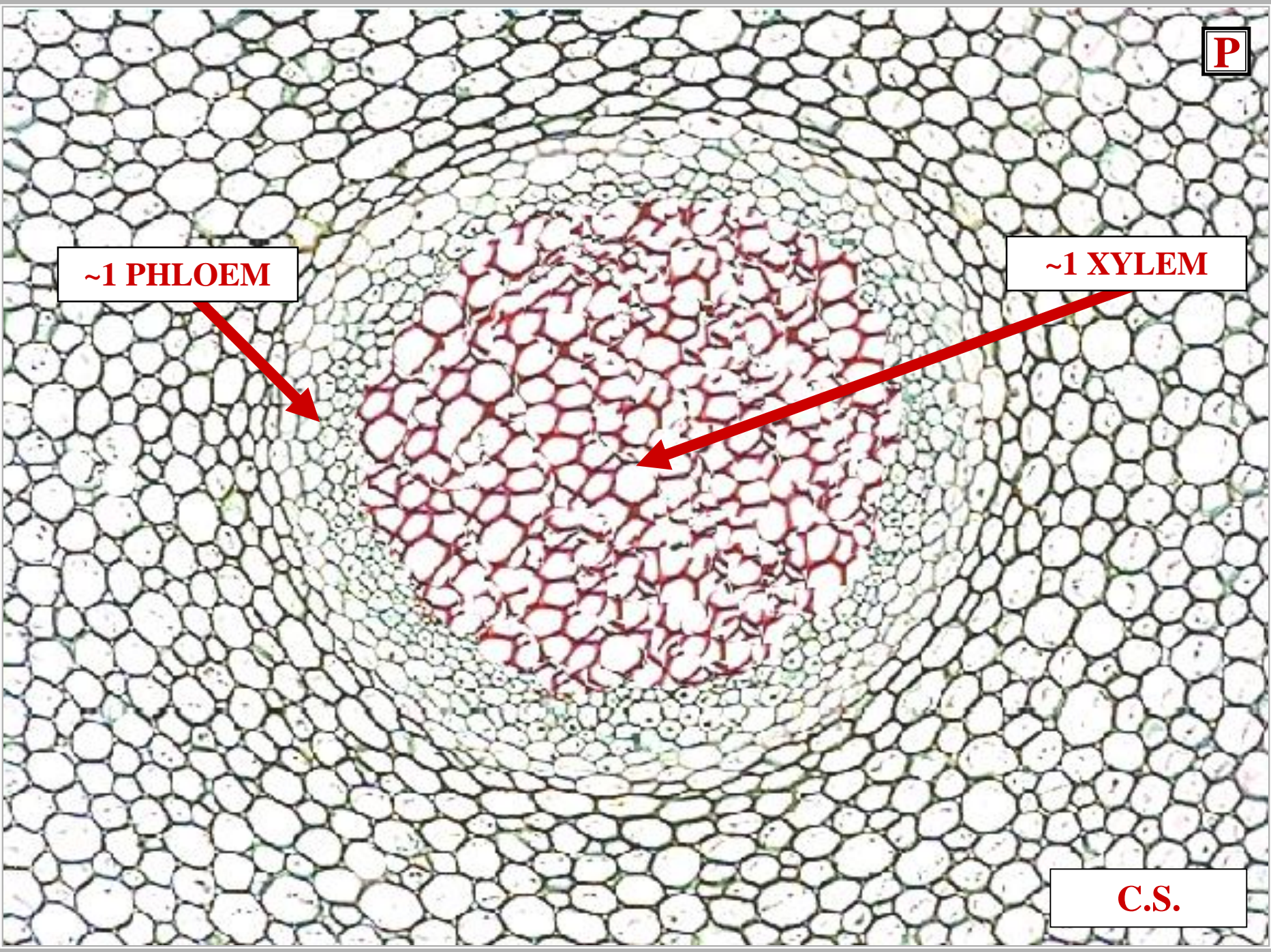


**P**

**~1 PHLOEM**

**~1 XYLEM**

**C.S.**



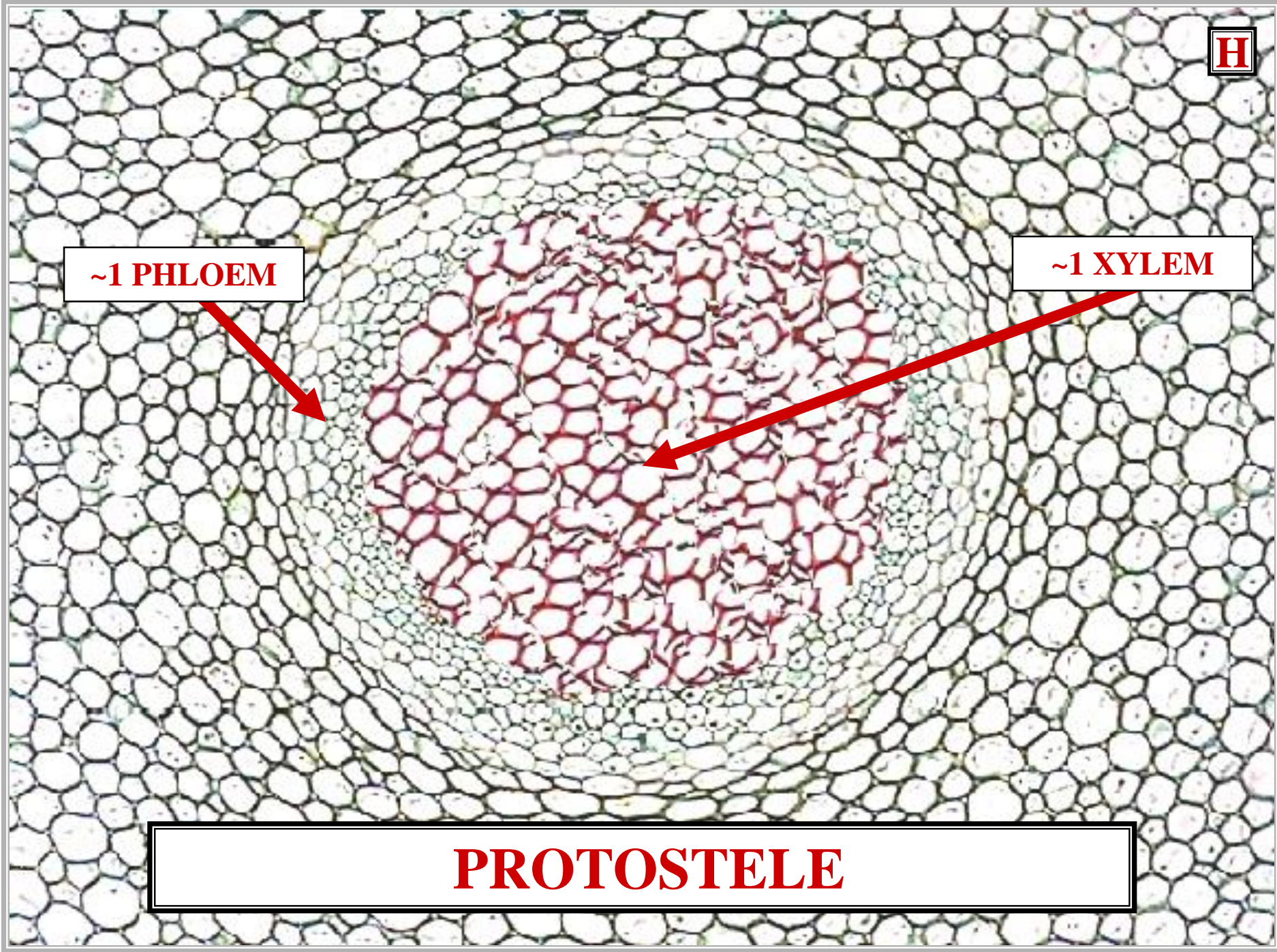


H

~1 PHLOEM

~1 XYLEM

**PROTOSTELE**





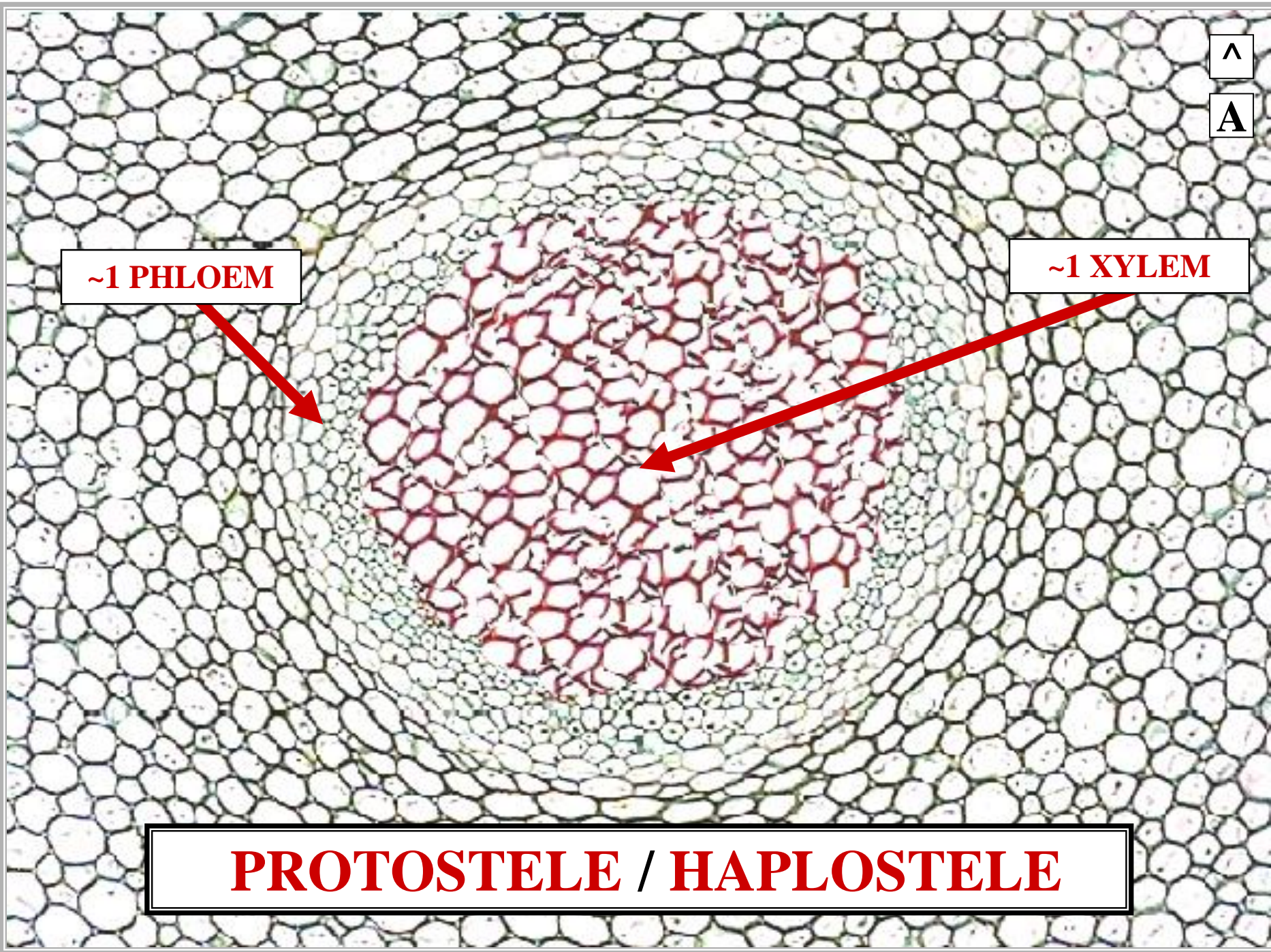
^

A

**~1 PHLOEM**

**~1 XYLEM**

**PROTOSTELE / HAPLOSTELE**



**ACTINOSTELE**

**PROTOSTELE  
ACTINOSTELE**



**XYLEM RIDGED**

**PROTOSTELE  
ACTINOSTELE**



**EPIDERMIS**

**VASCULAR STELE**

**CORTEX**

**PLANT X-SECTION**

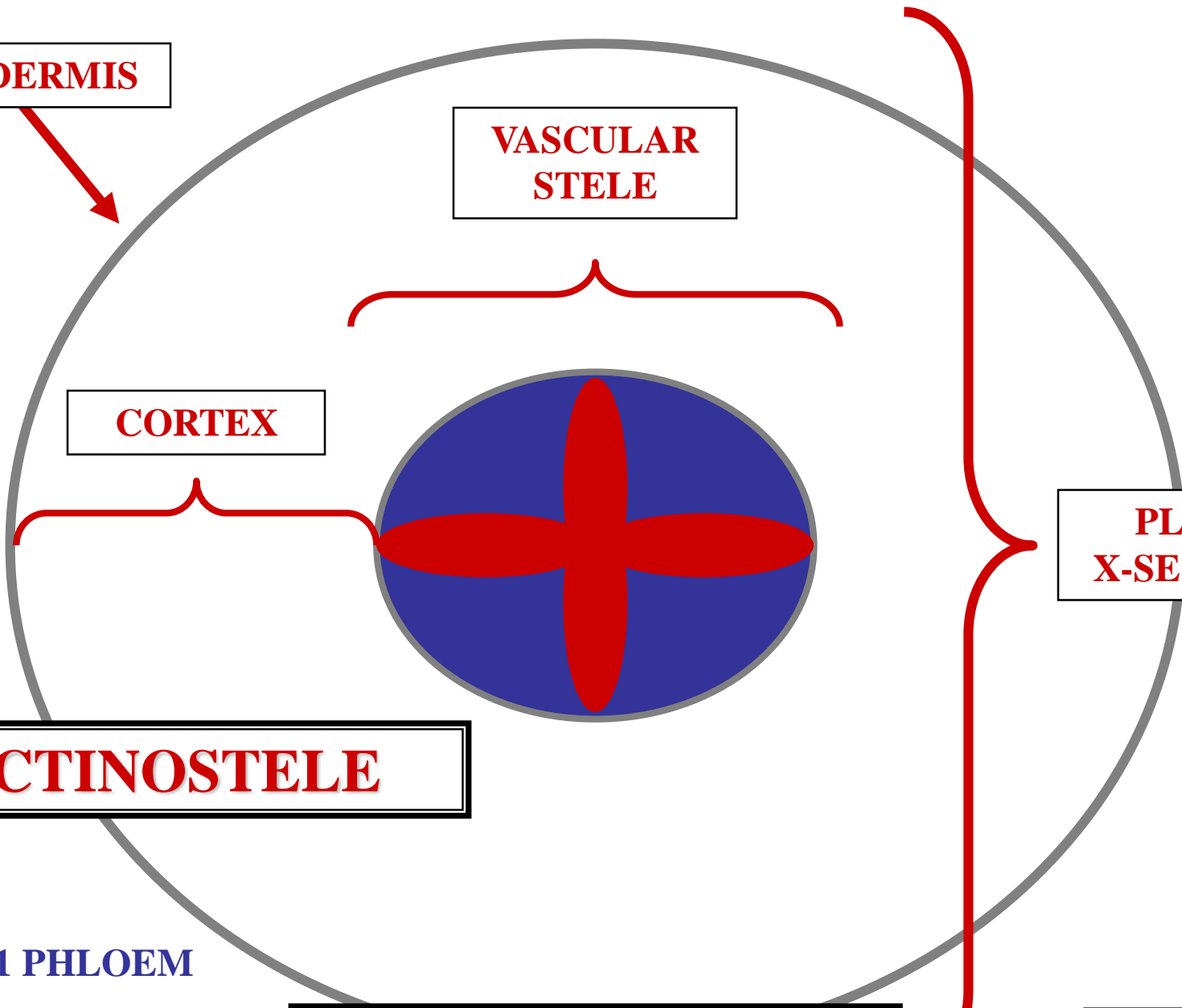
**ACTINOSTELE**

**PROTOSTELE**

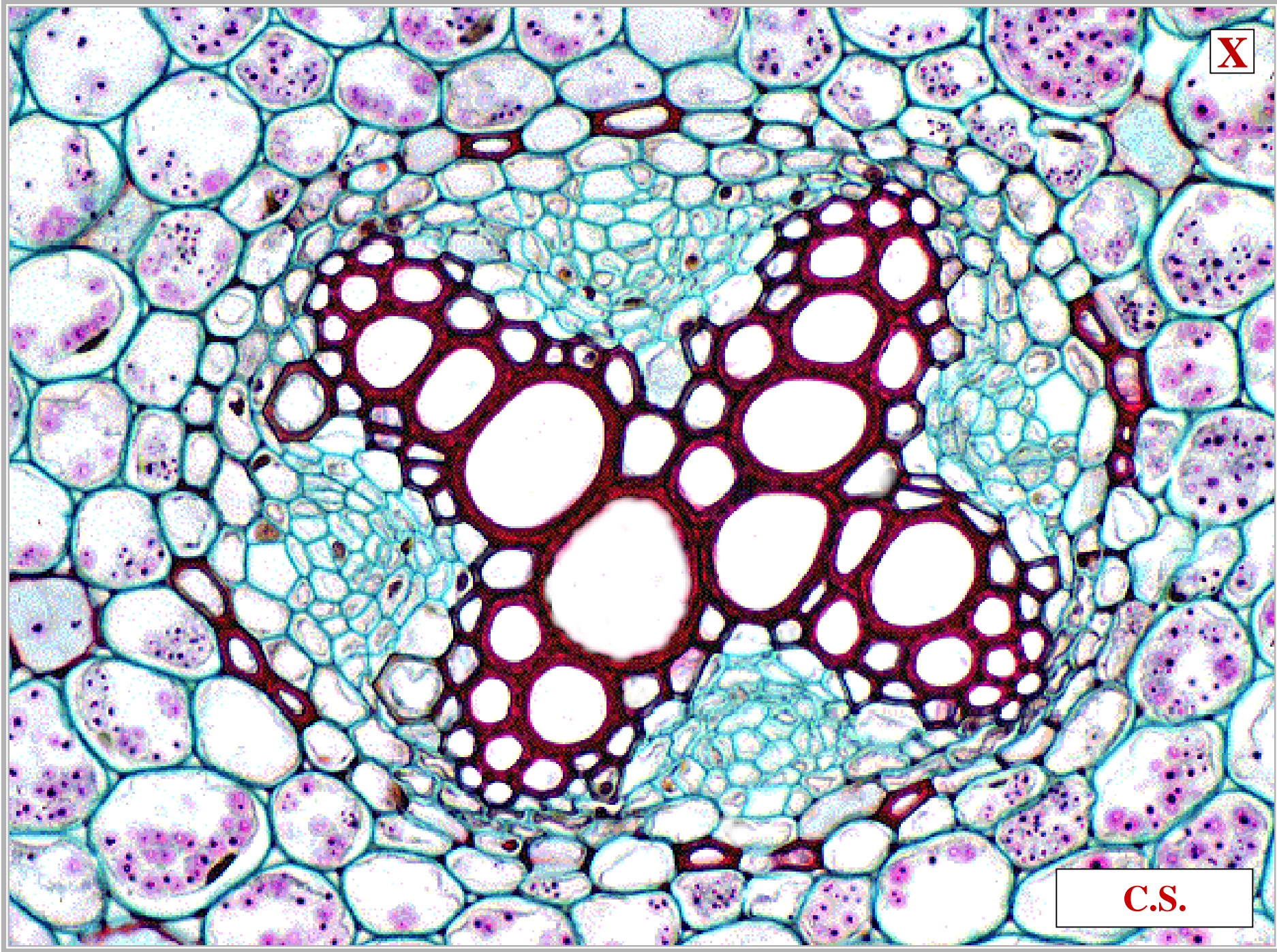
**C.S.**

**= ~1 PHLOEM**

**= ~1 XYLEM**



X



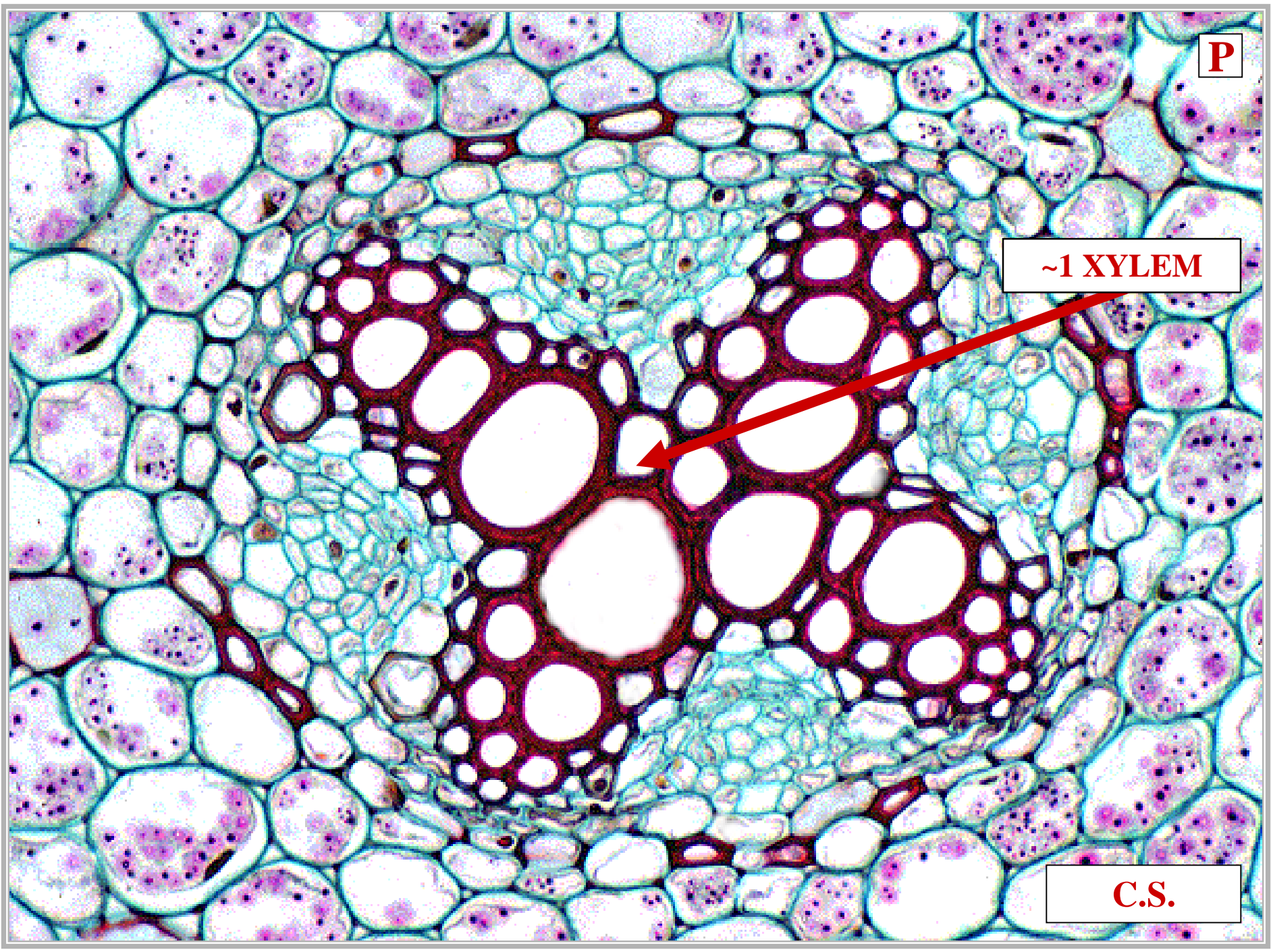
C.S.



**P**

**~1 XYLEM**

**C.S.**

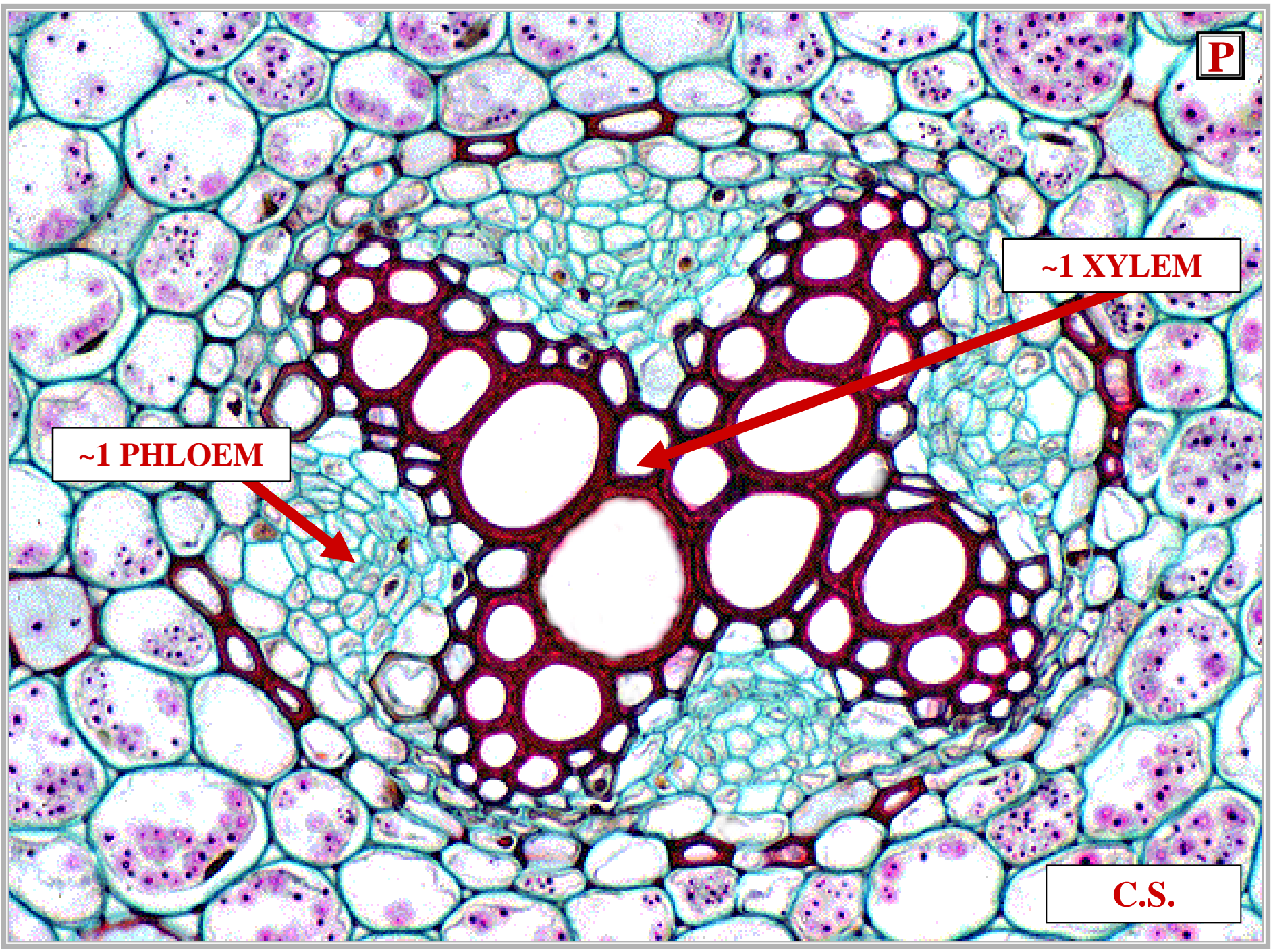


**P**

**~1 XYLEM**

**~1 PHLOEM**

**C.S.**

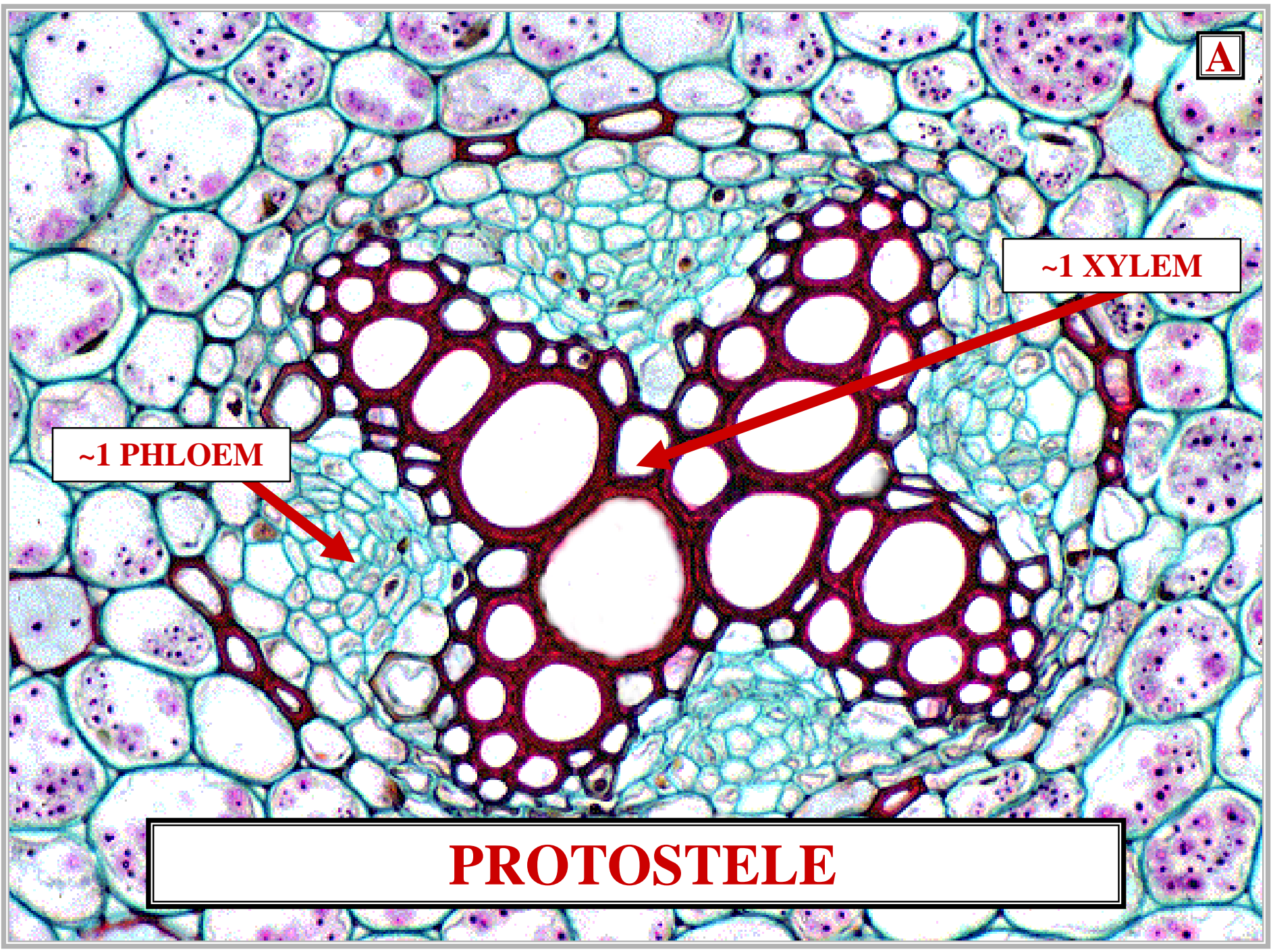


**A**

**~1 XYLEM**

**~1 PHLOEM**

**PROTOSTELE**





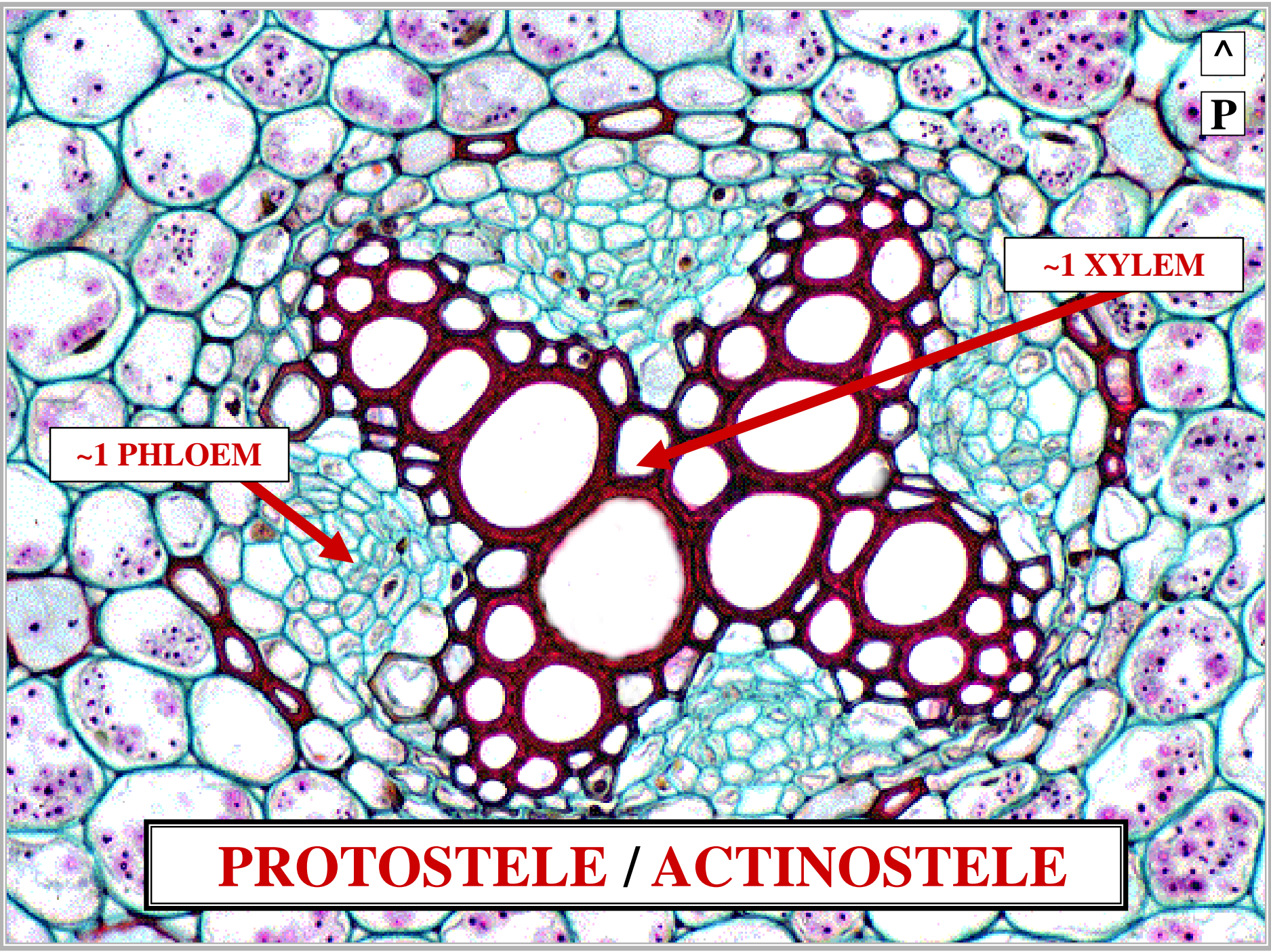
^

P

~1 XYLEM

~1 PHLOEM

**PROTOSTELE / ACTINOSTELE**



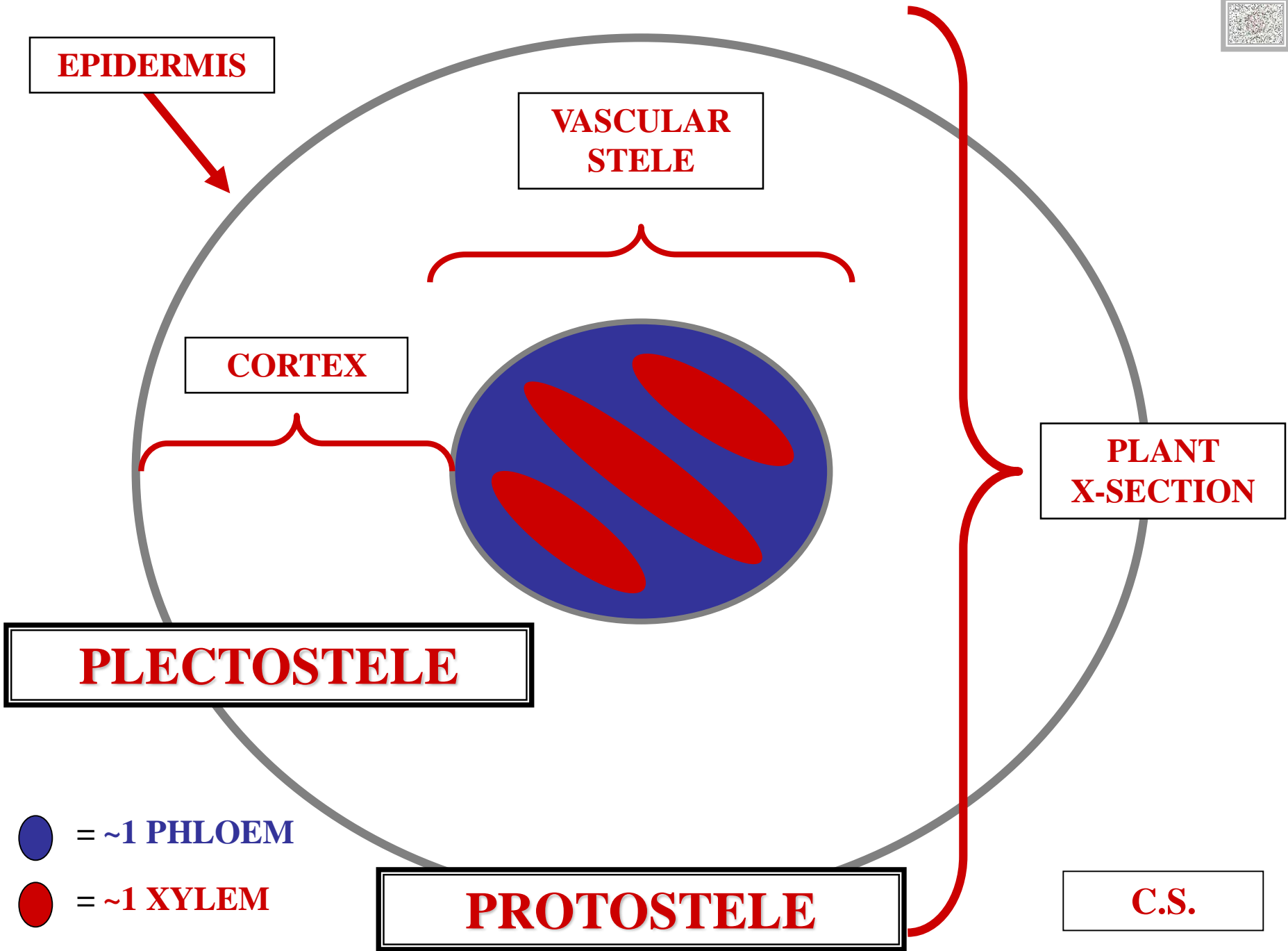
**PLECTOSTELE**

**PROTOSTELE**  
**PLECTOSTELE**



**XYLEM & PHLOEM**  
**INTERSPERSED**

**PROTOSTELE**  
**PLECTOSTELE**



**EPIDERMIS**

**VASCULAR STELE**

**CORTEX**

**PLANT X-SECTION**

**PLECTOSTELE**

**PROTOSTELE**

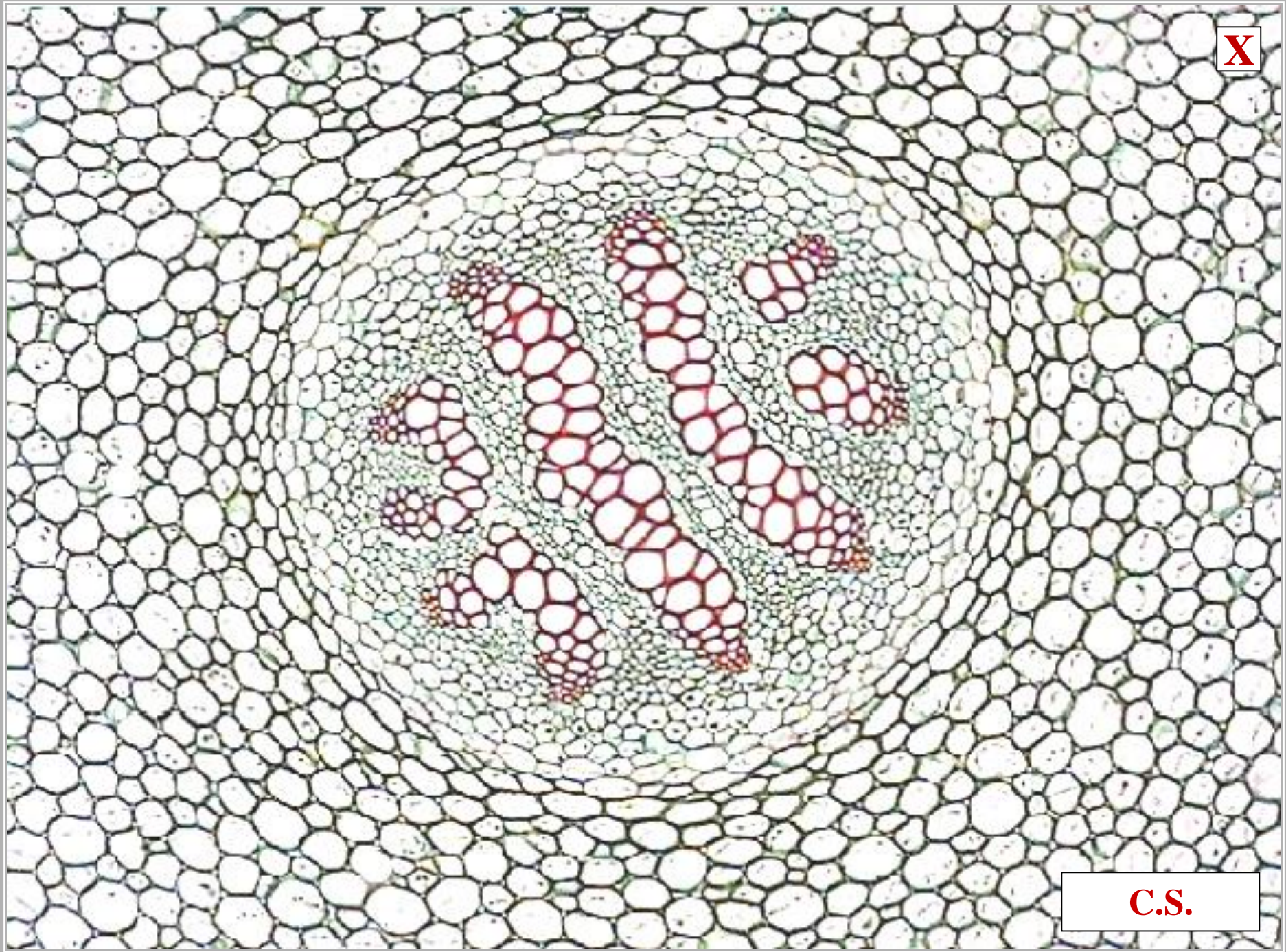
**C.S.**

**= ~1 PHLOEM**

**= ~1 XYLEM**



X

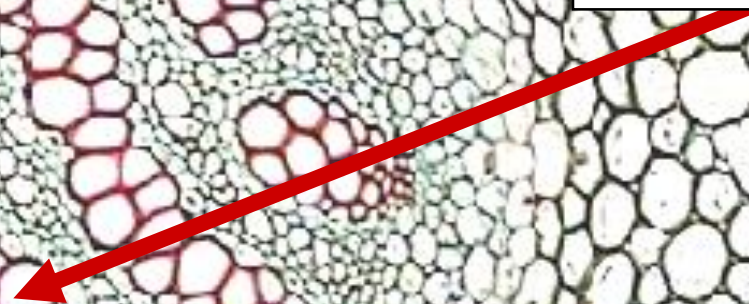


C.S.

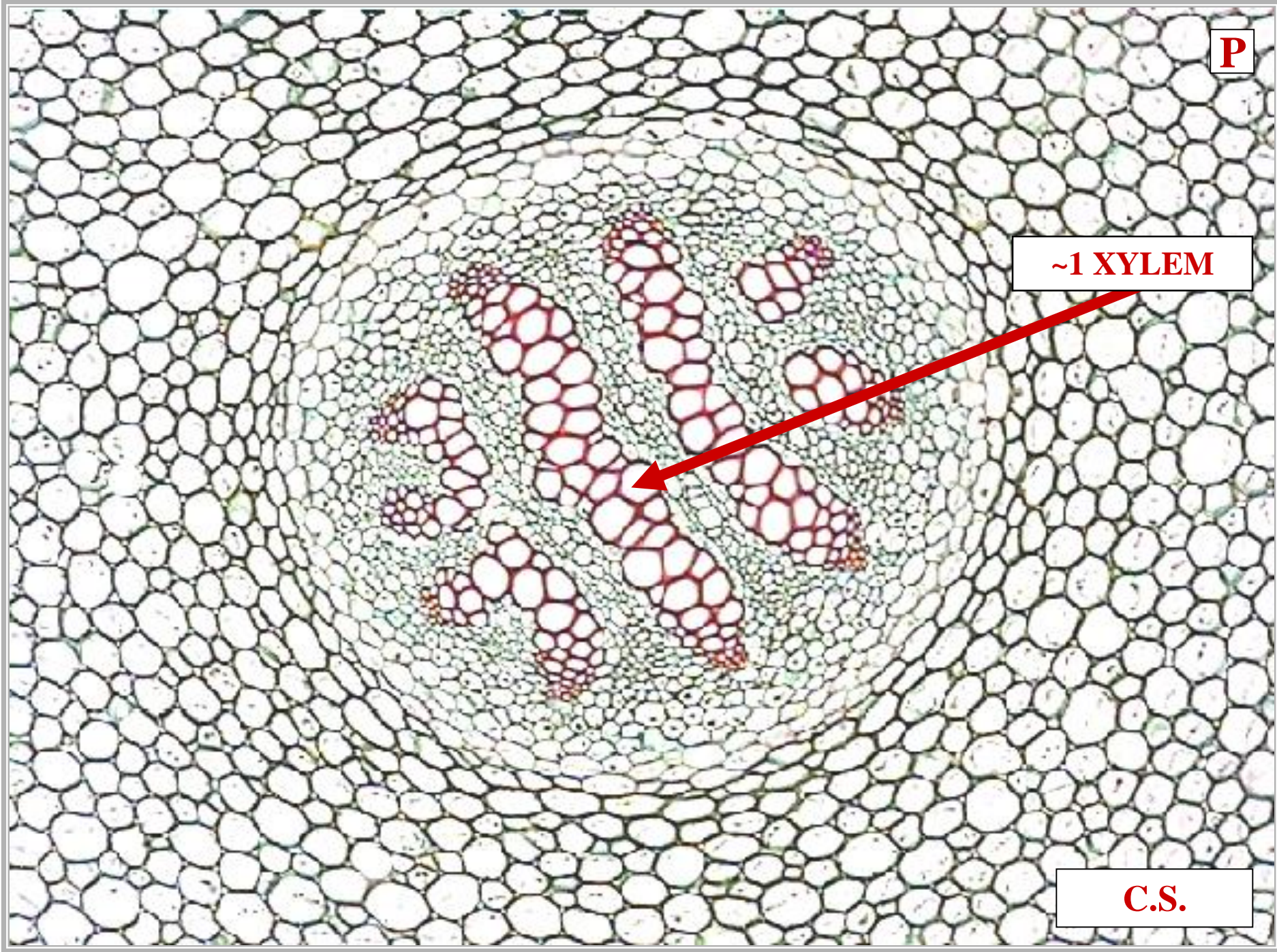


**P**

**~1 XYLEM**



**C.S.**



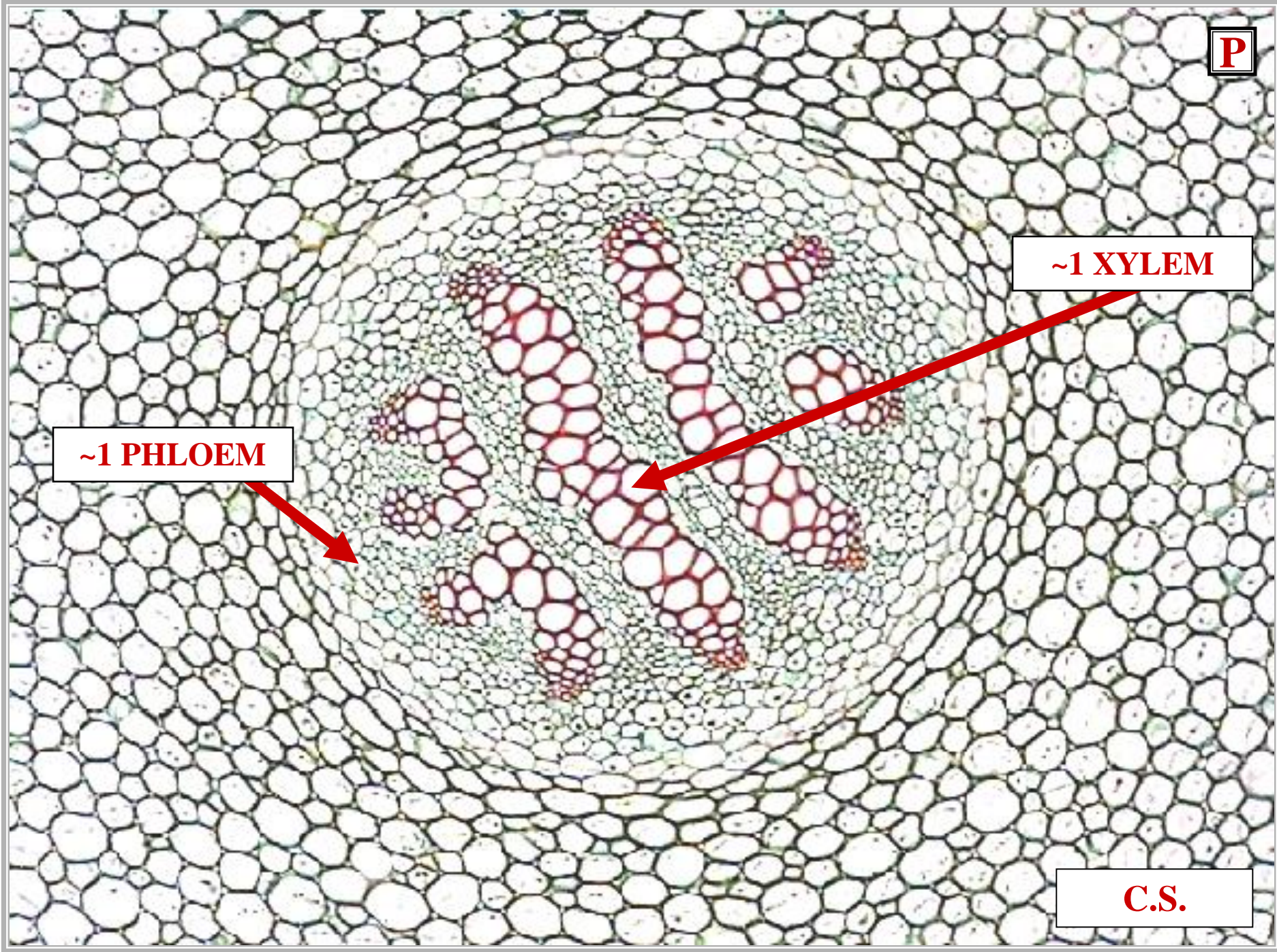


**P**

**~1 XYLEM**

**~1 PHLOEM**

**C.S.**



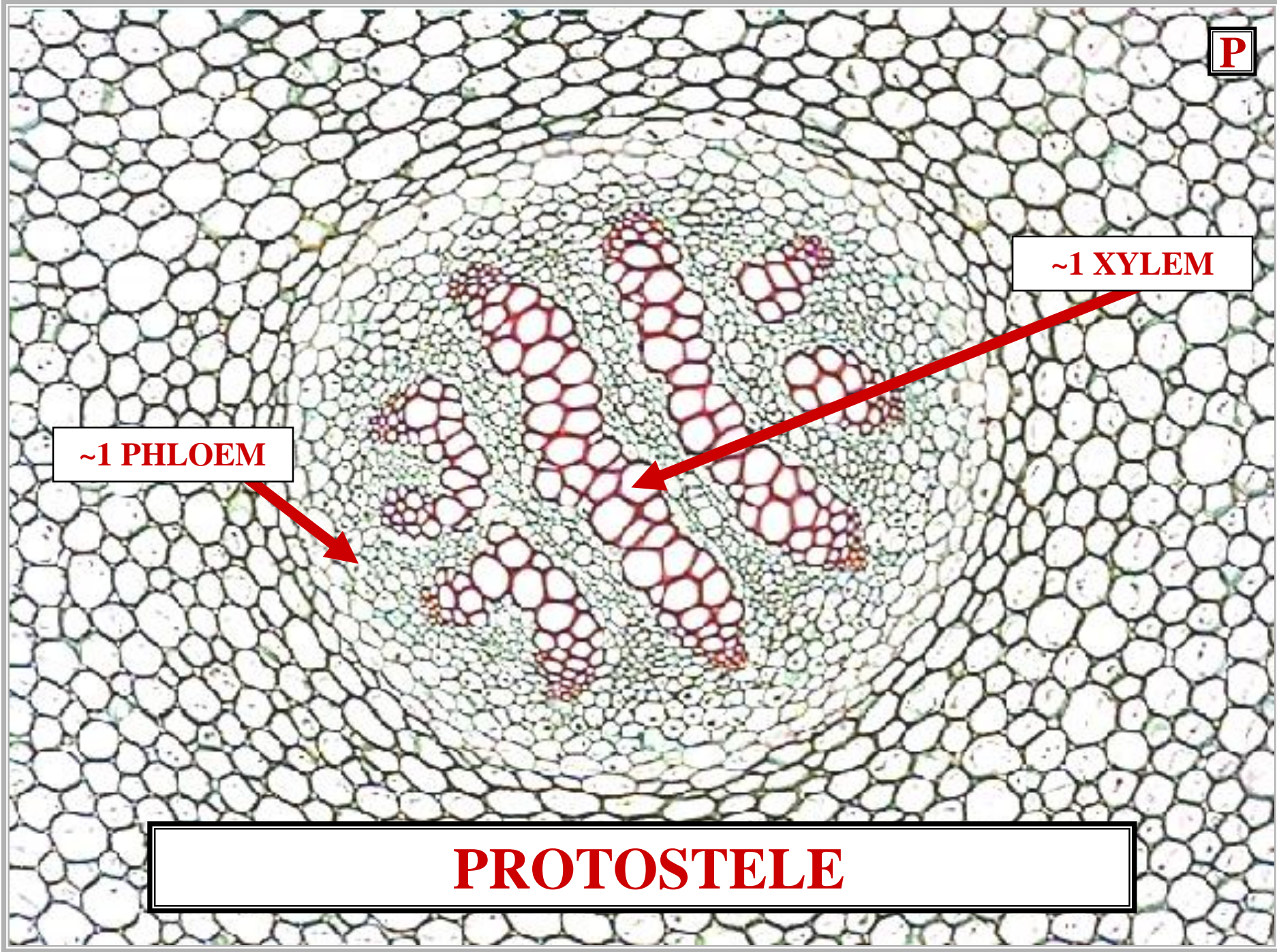


**P**

**~1 XYLEM**

**~1 PHLOEM**

**PROTOSTELE**



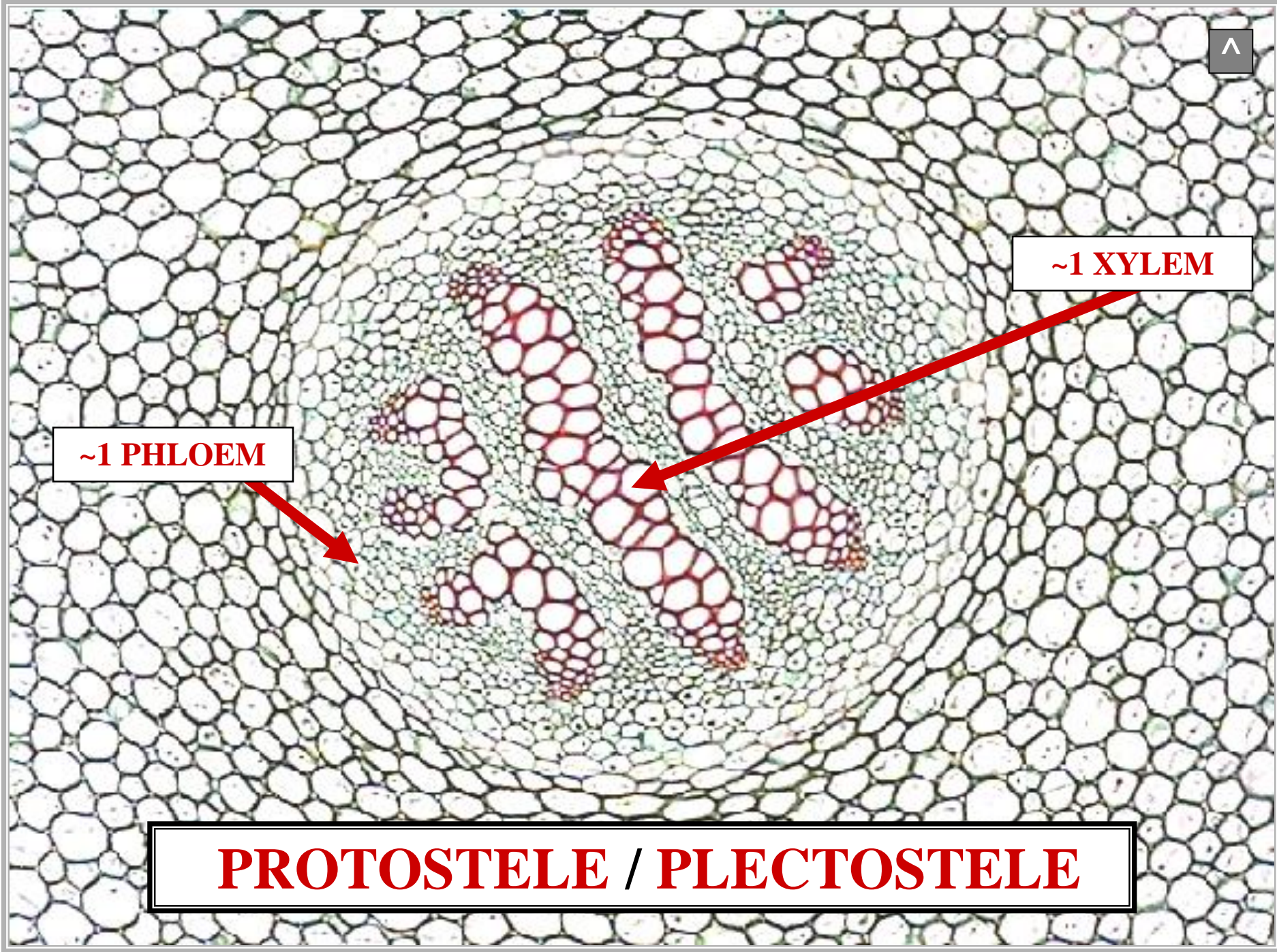




**~1 PHLOEM**

**~1 XYLEM**

**PROTOSTELE / PLECTOSTELE**



# SIPHONOSTELES

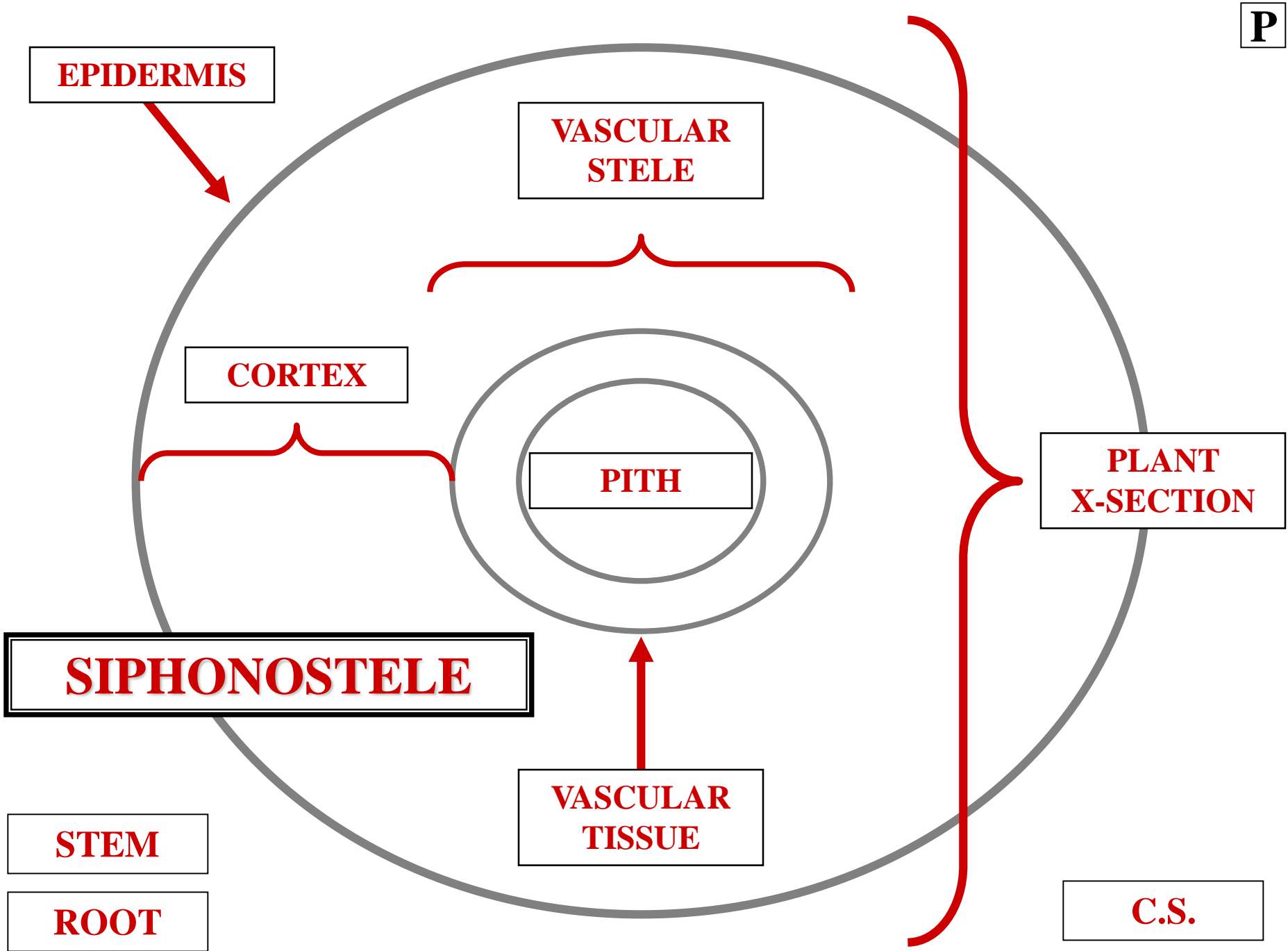
**SIPHONOSTELE**

# VASCULAR STELE SIPHONOSTELE



XYLEM & PHLOEM  
SURROUND PITH

VASCULAR STELE  
SIPHONOSTELE



**EPIDERMIS**

**VASCULAR STELE**

**CORTEX**

**PITH**

**PLANT X-SECTION**

**SIPHONOSTELE**

**VASCULAR TISSUE**

**STEM**

**ROOT**

**C.S.**

**PITH**

**VASCULAR STELE**  
**PITH**



**CENTER**  
**STEM OR ROOT**

**VASCULAR STELE**  
**PITH**

**VASCULAR STELE**

**PITH**

**CENTER**

**STEM OR ROOT**

**---**

**CONSIST PARENCHYMA**

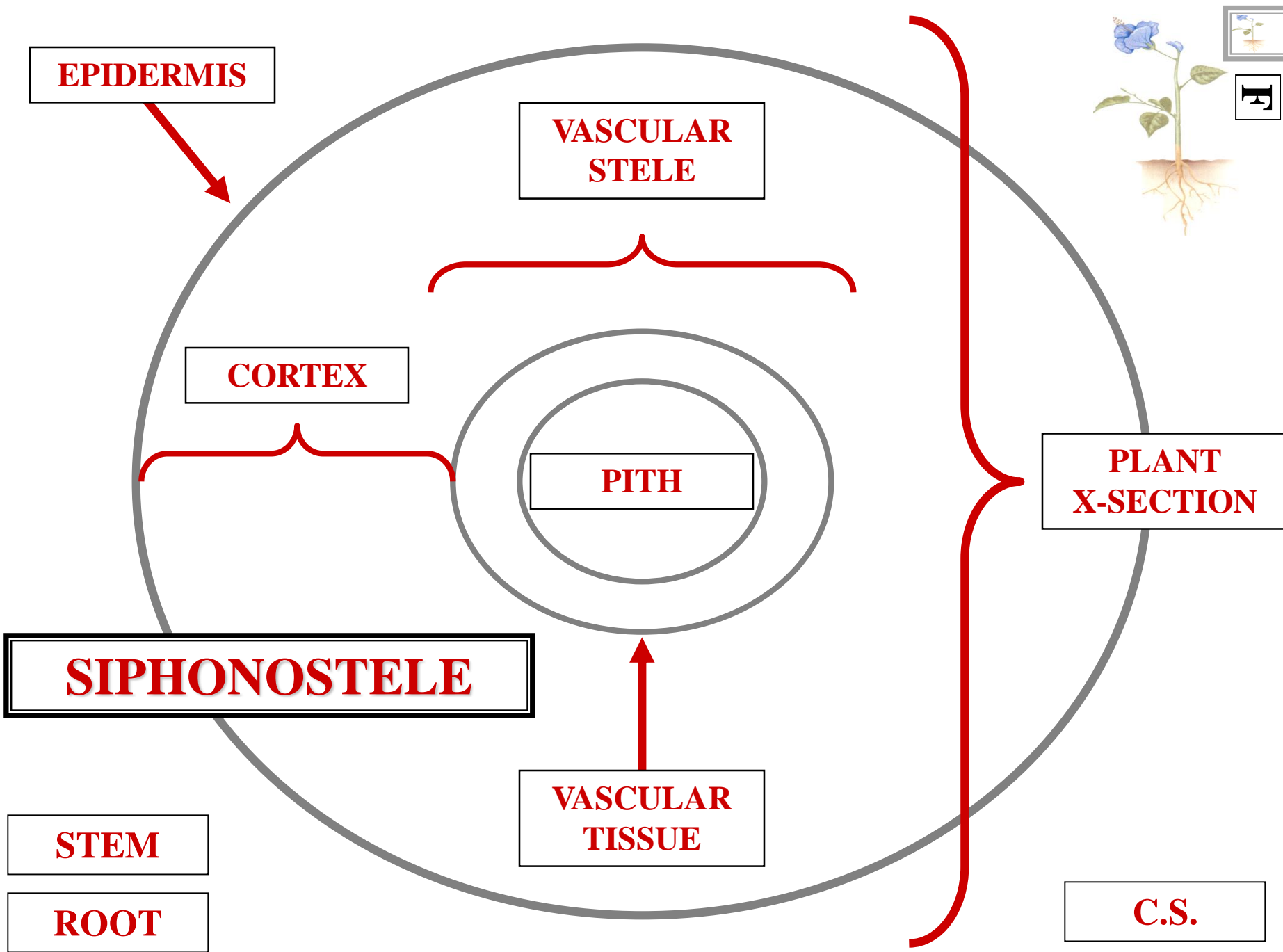
**CELLS**

**VASCULAR STELE**

**PITH**







**EPIDERMIS**

**VASCULAR STELE**

**CORTEX**

**PITH**

**PLANT X-SECTION**

**SIPHONOSTELE**

**VASCULAR TISSUE**

**STEM**

**ROOT**

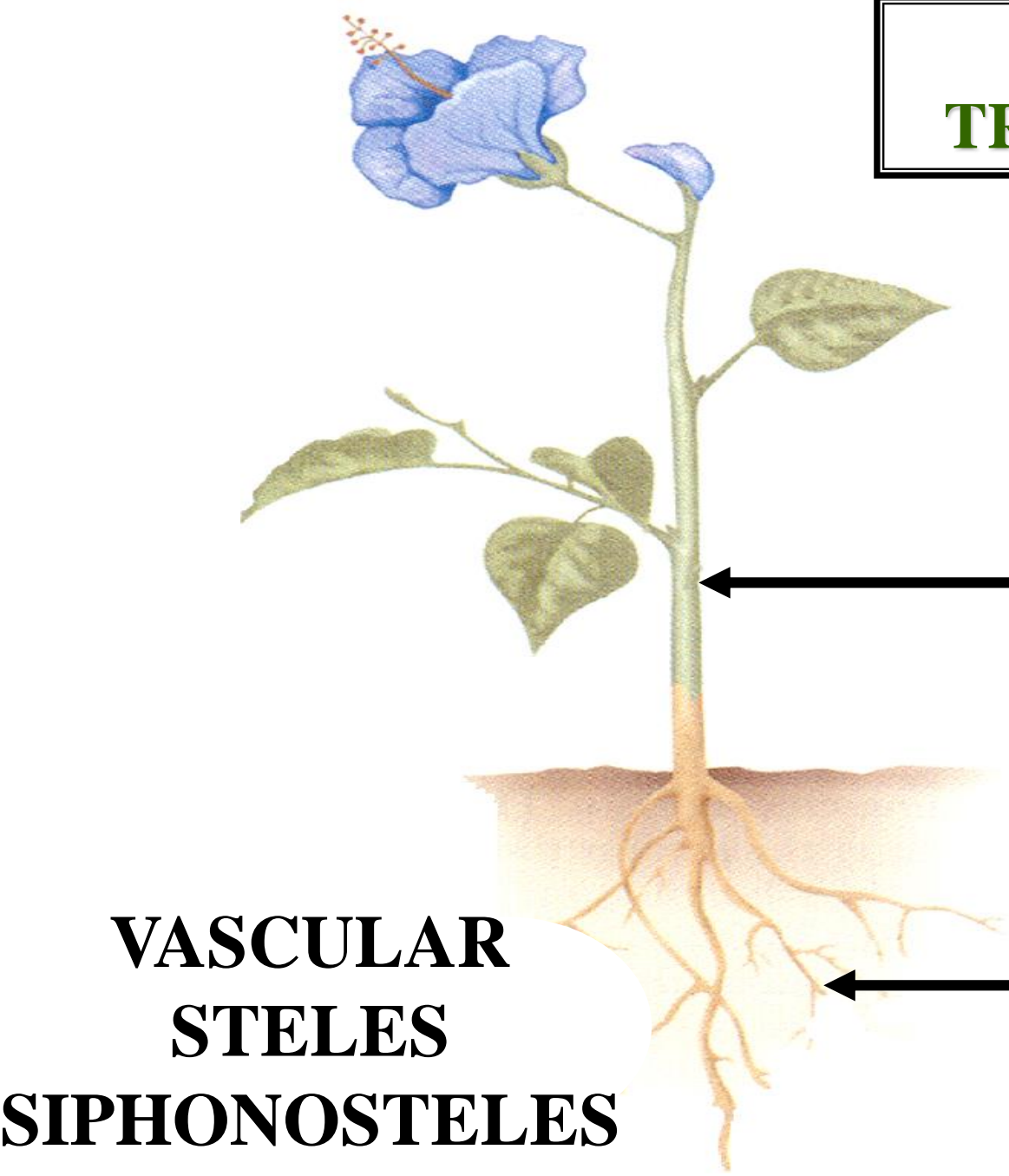
**C.S.**



**F**



# TYPICAL TRACHEOPHYTE



**STEM**

**ROOT**

**VASCULAR  
STELES**

**SIPHONOSTELES**

# SIPHONOSTELE TYPES

# **SIPHONOSTELE TYPES**

**ECTOPHLOIC**

# **SIPHONOSTELE TYPES**

# **SIPHONOSTELE TYPES**

**ECTOPHLOIC  
AMPHIPHOLIC**

**SIPHONOSTELE  
TYPES**

# **SIPHONOSTELE TYPES**

**ECTOPHLOIC  
AMPHIPHOLIC  
EUSTELE**

**SIPHONOSTELE  
TYPES**



**ECTOPHLOIC**

**SIPHONOSTELE  
ECTOPHOLIC**



**PHLOEM OUTSIDE XYLEM**

**SIPHONOSTELE  
ECTOPHOLIC**



**EPIDERMIS**

**VASCULAR STELE**

**CORTEX**

**PITH**

**PLANT X-SECTION**

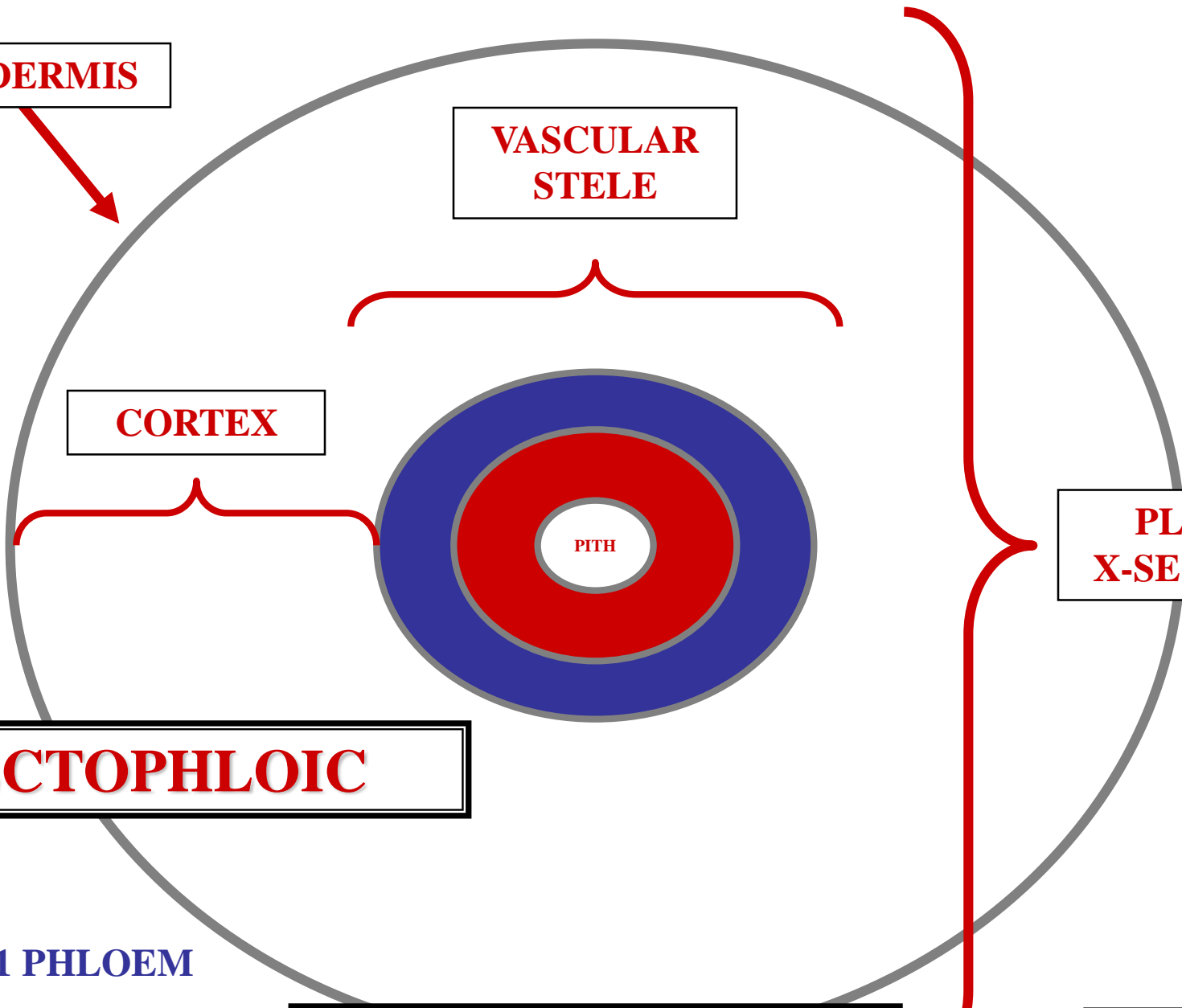
**ECTOPHLOIC**

**SIPHONOSTELE**

**C.S.**

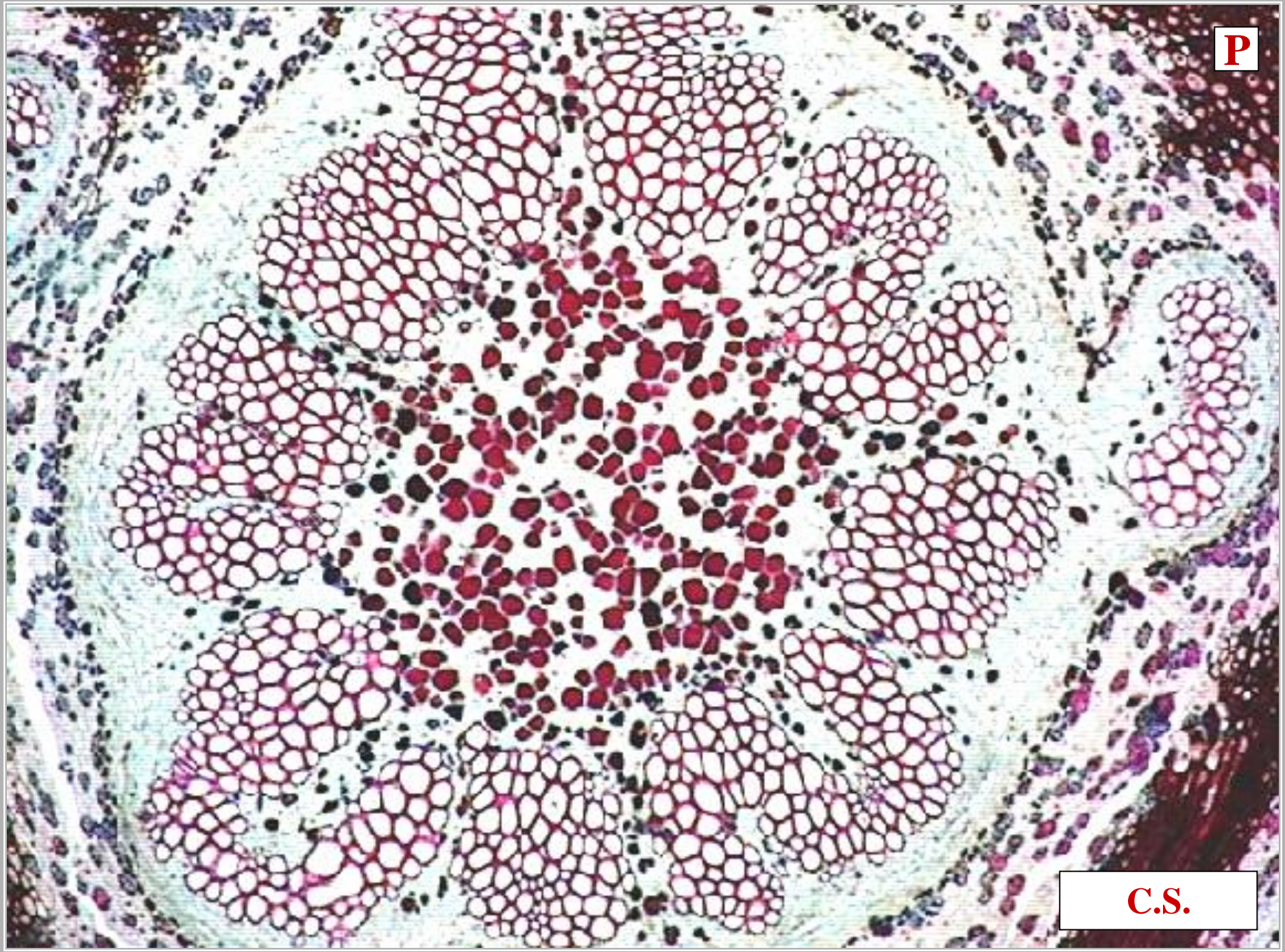
**= ~1 PHLOEM**

**= ~1 XYLEM**



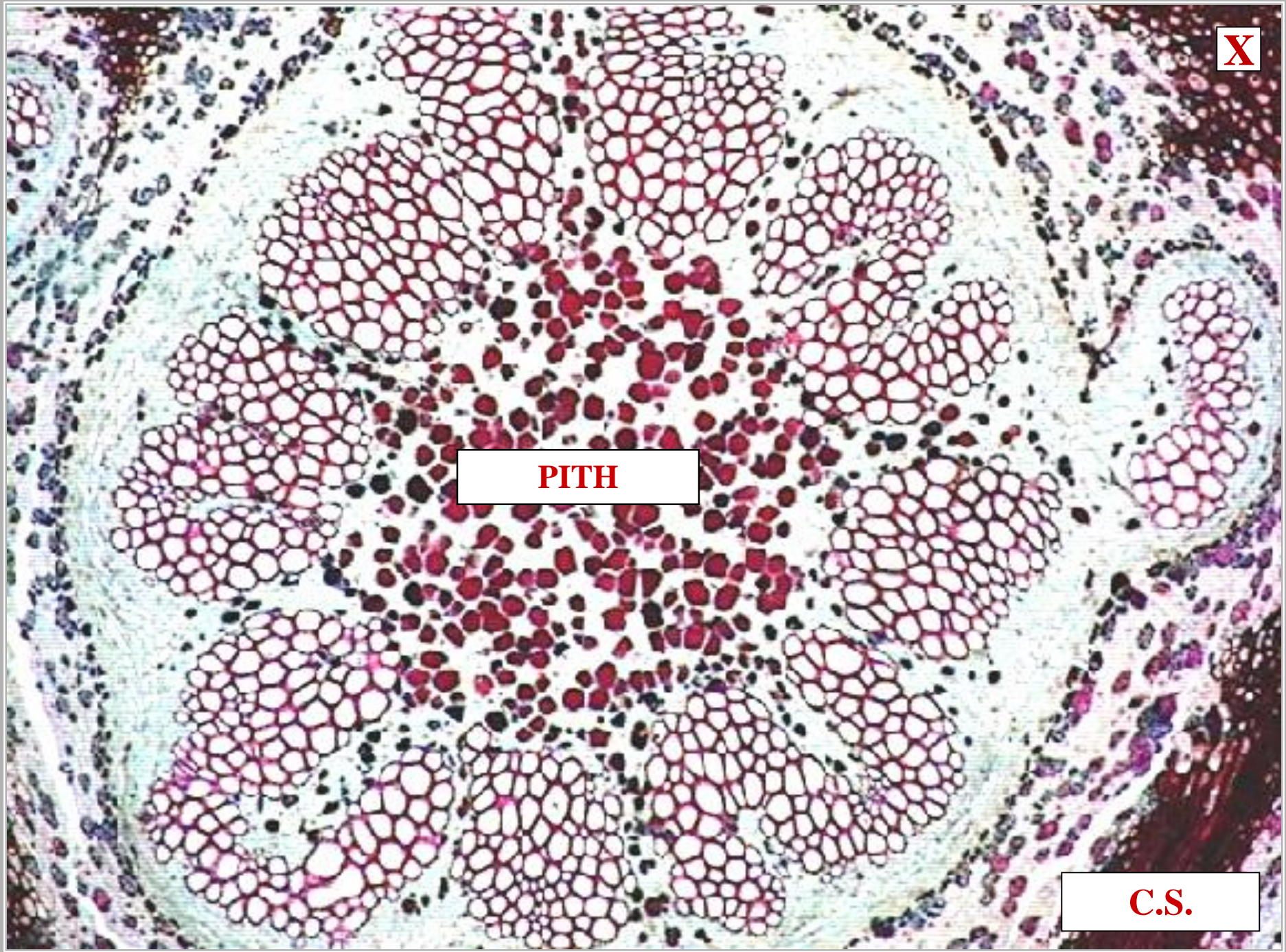


P



C.S.





**PITH**

**C.S.**

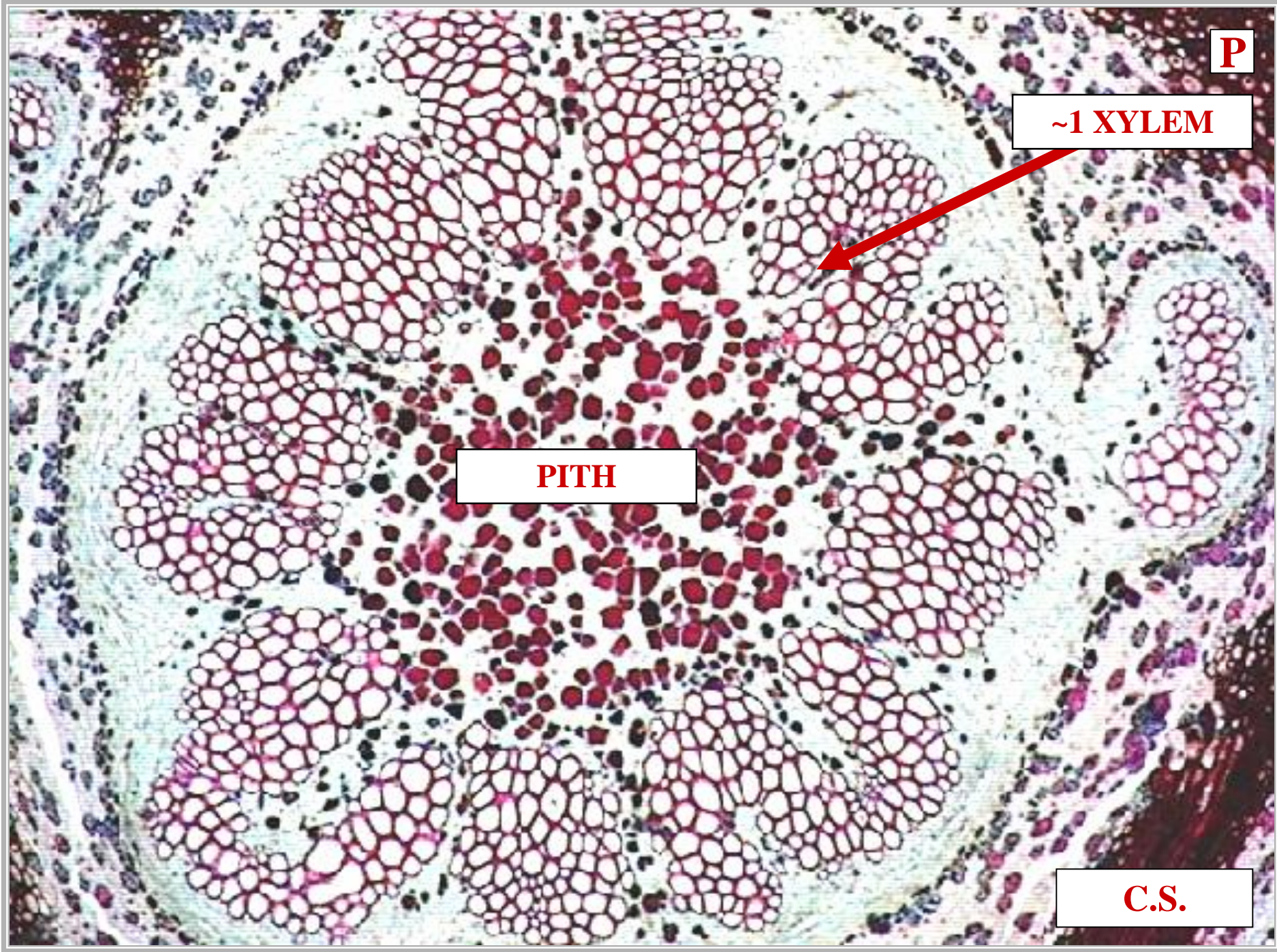


**P**

**~1 XYLEM**

**PITH**

**C.S.**



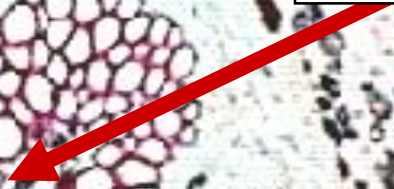


**S**

**~1 PHLOEM**

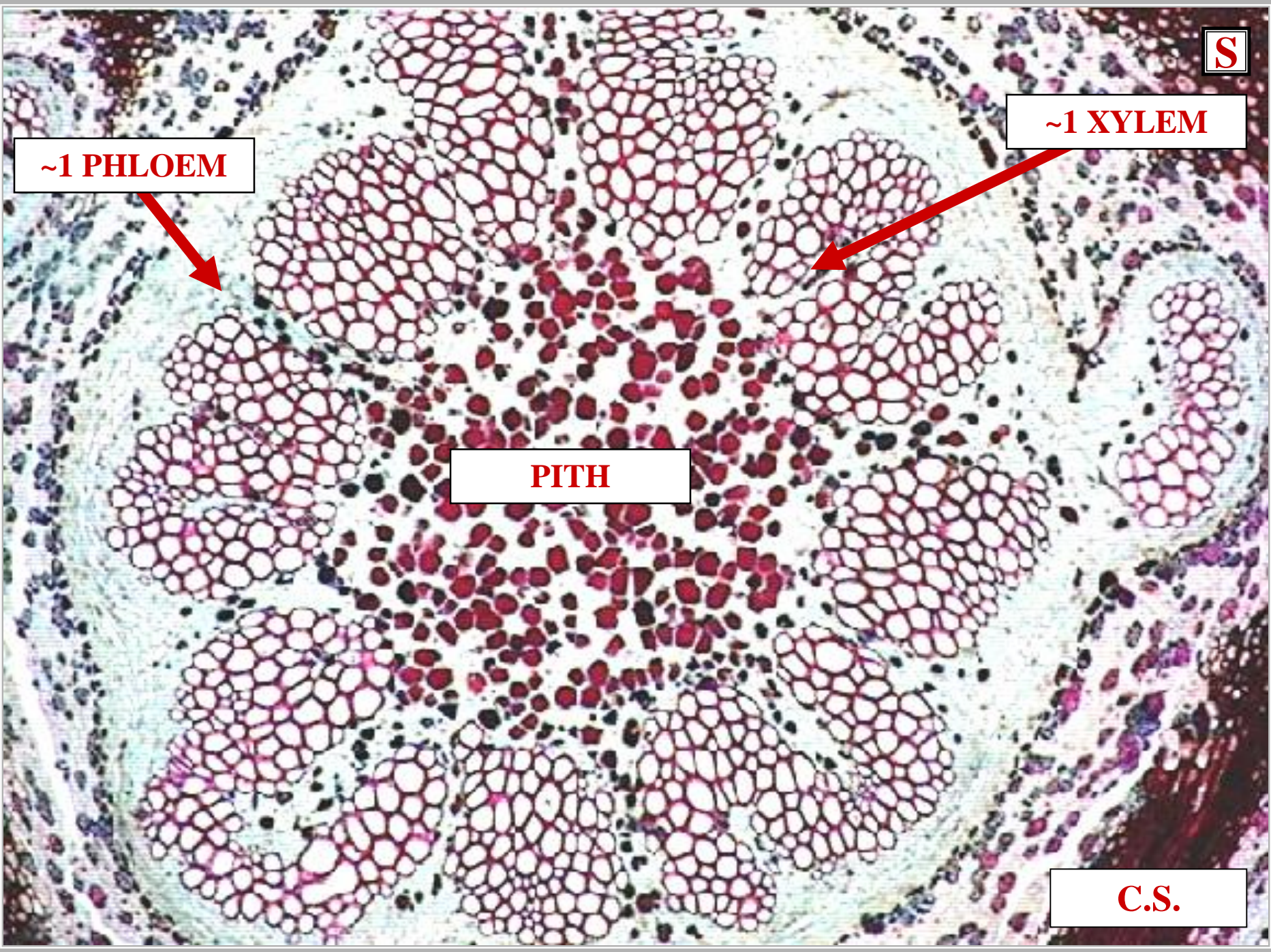


**~1 XYLEM**



**PITH**

**C.S.**



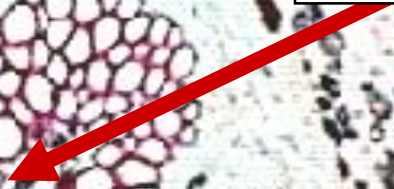


**E**

**~1 PHLOEM**

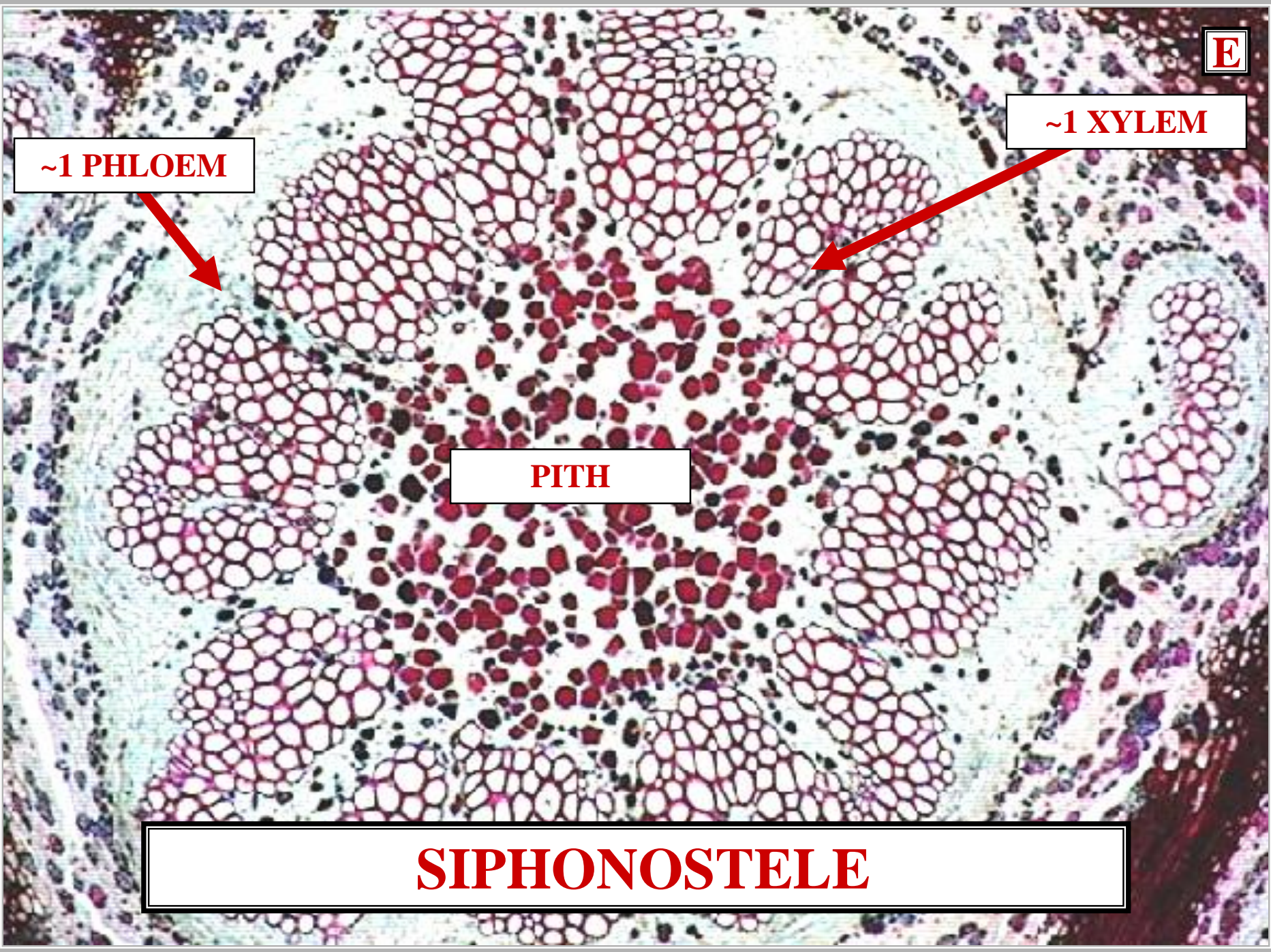


**~1 XYLEM**

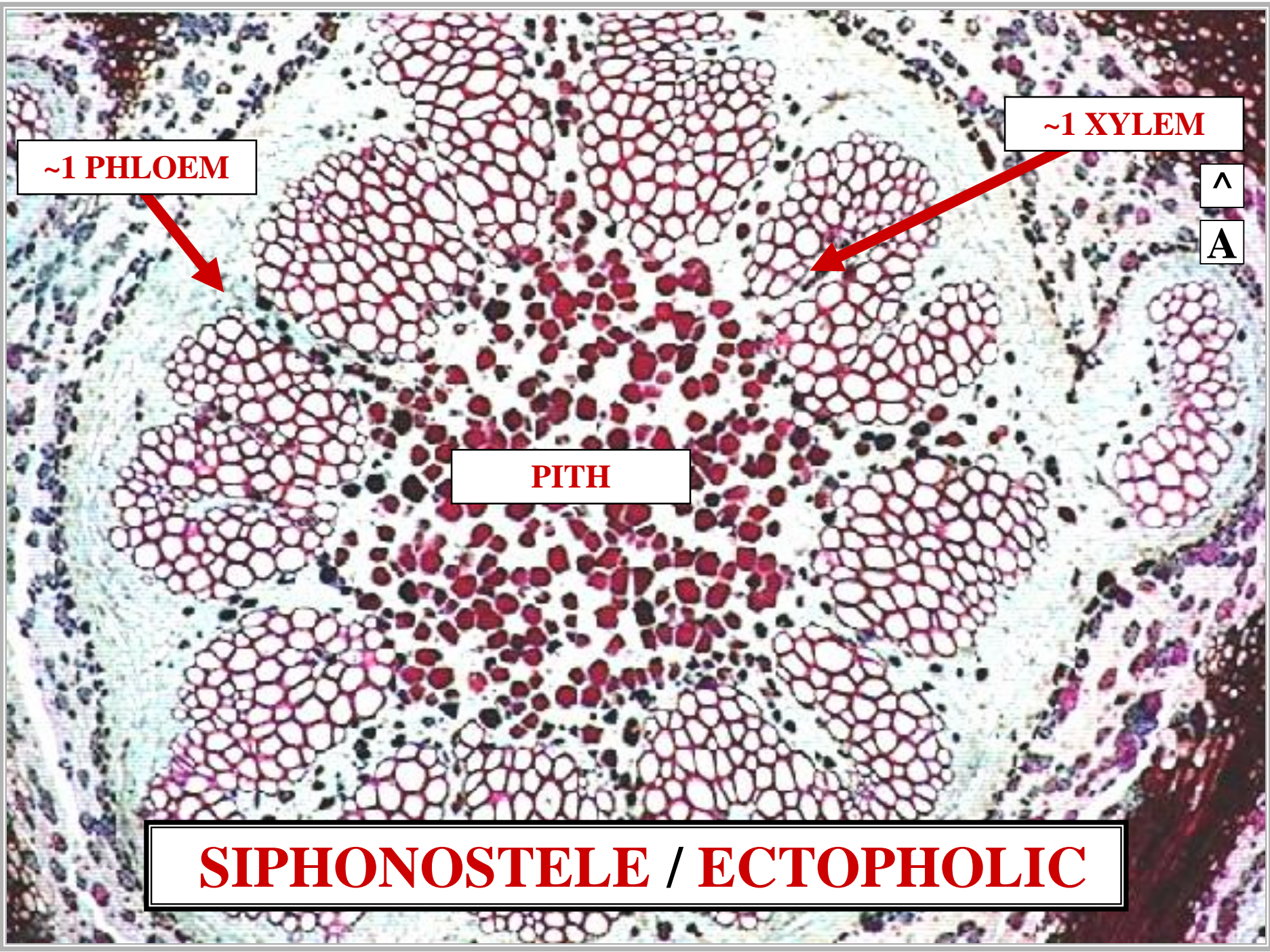


**PITH**

**SIPHONOSTELE**







**~1 PHLOEM**

**~1 XYLEM**

**PITH**

**SIPHONOSTELE / ECTOPHOLIC**

^  
A

**AMPHIPHOLIC**



**SIPHONOSTELE  
AMPHIPHLOIC**



**PHLOEM  
OUTSIDE AND INSIDE  
XYLEM**

**SIPHONOSTELE  
AMPHIPHLOIC**



**EPIDERMIS**



**VASCULAR STELE**



**CORTEX**



**PITH**

**PLANT X-SECTION**



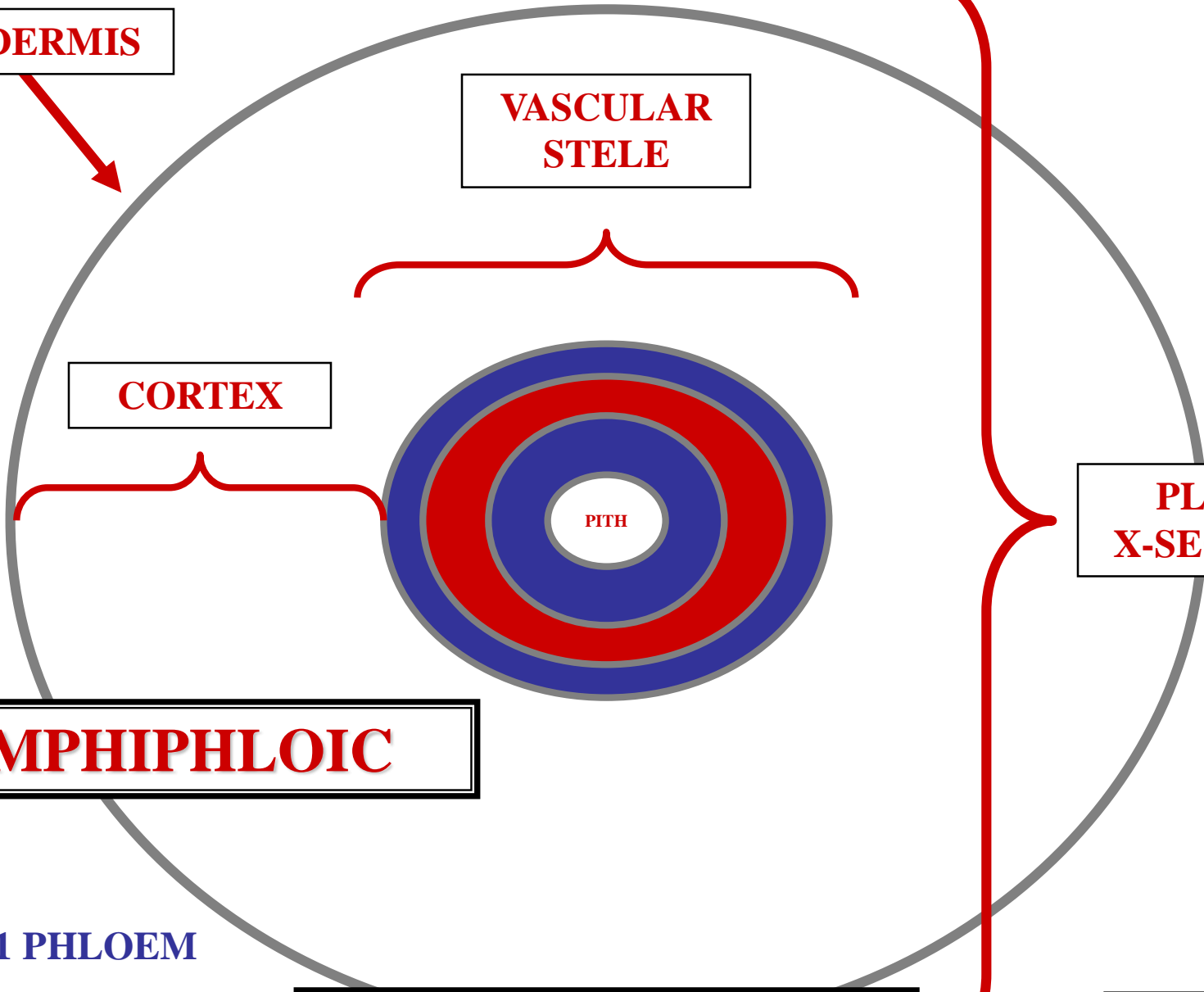
**AMPHIPHLOIC**

**= ~1 PHLOEM**

**= ~1 XYLEM**

**SIPHONOSTELE**

**C.S.**



**P**

**C.S.**

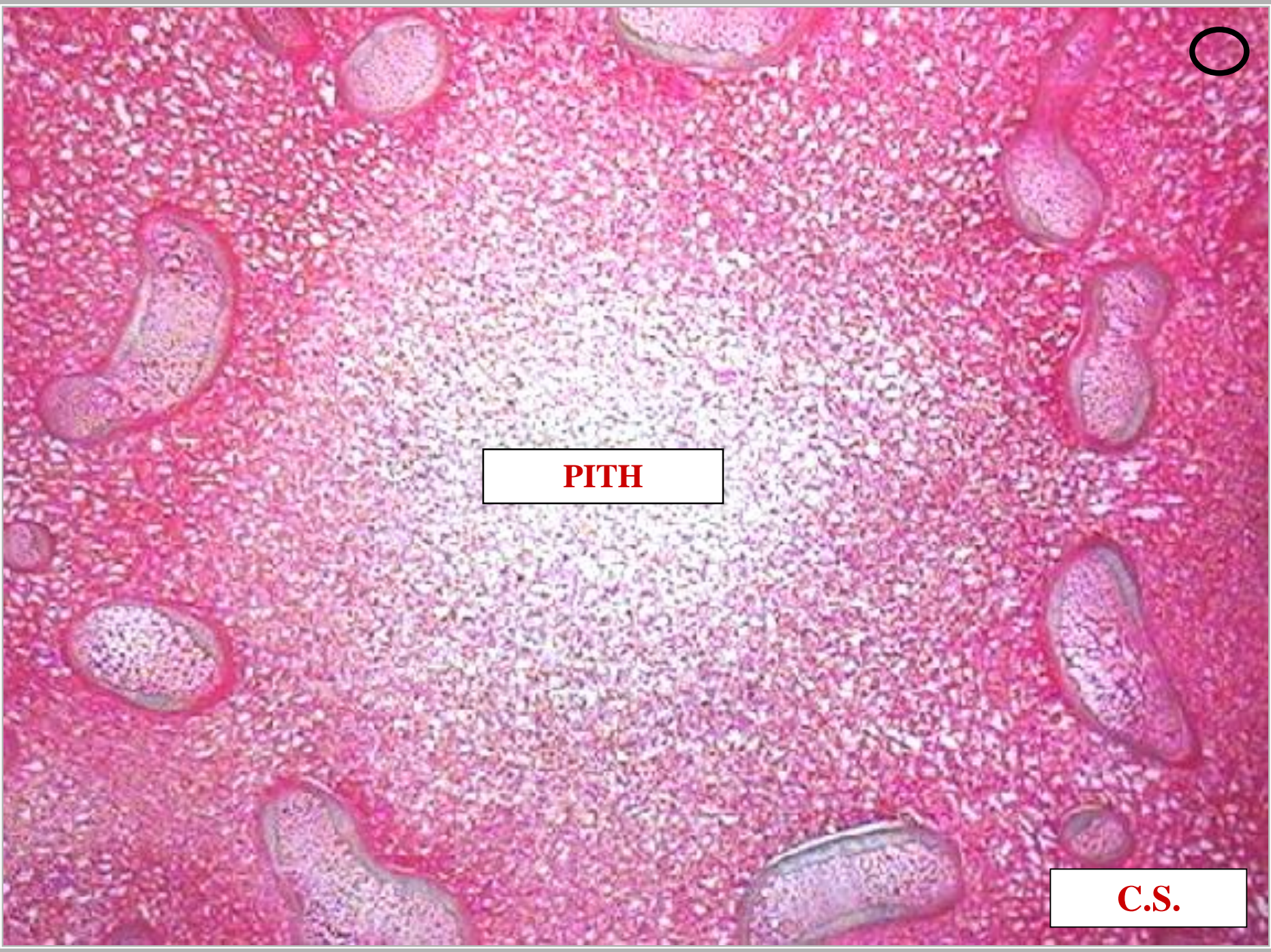






**PITH**

**C.S.**



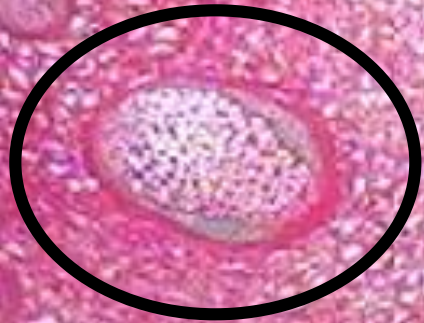




**PITH**

**VASCULAR TISSUE**

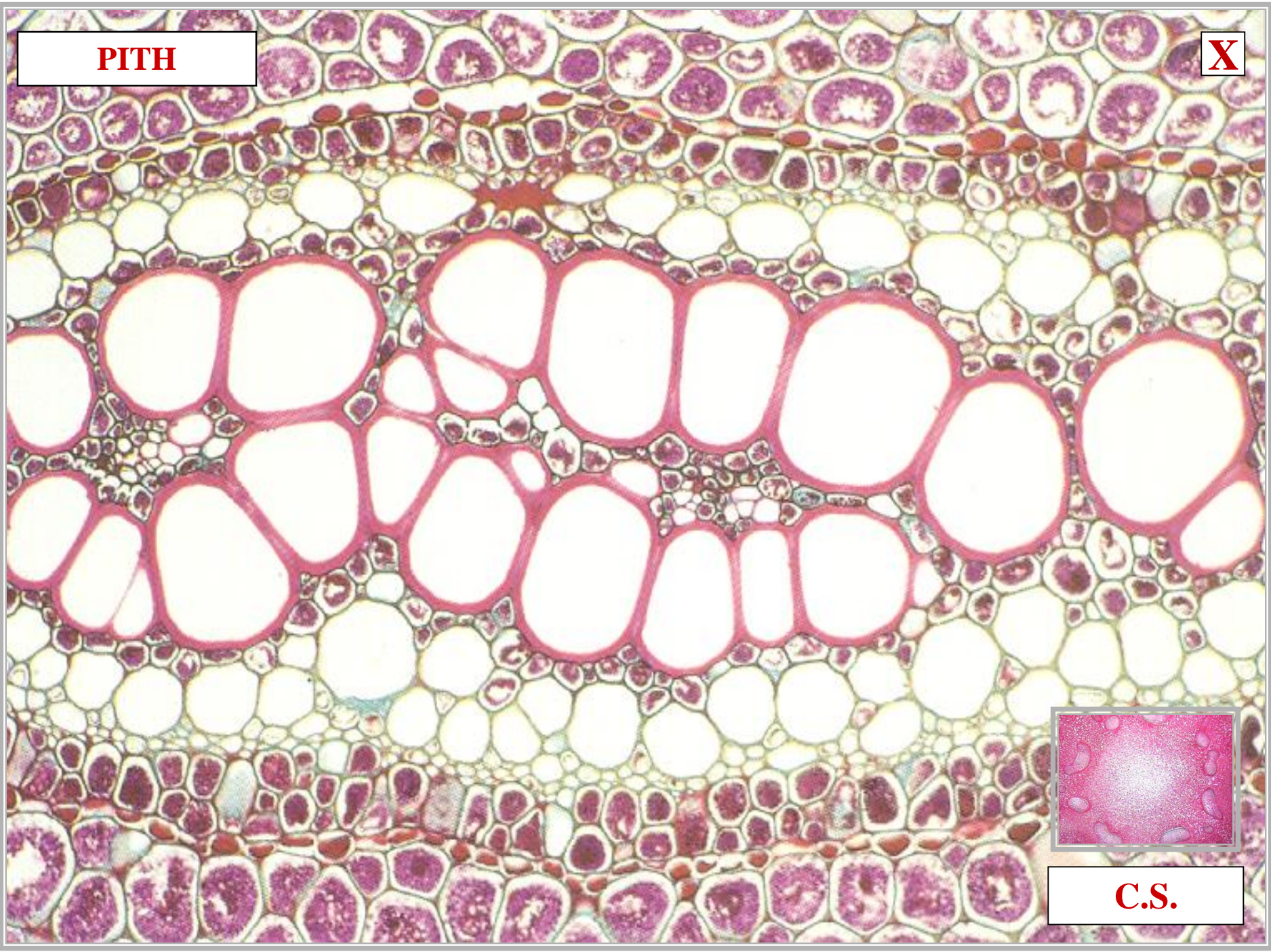
**C.S.**





**PITH**

**X**



**C.S.**



**PITH**

**P**

**~1 XYLEM**

**C.S.**





**PITH**

**S**

**~1 PHLOEM**

**~1 XYLEM**

**~1 PHLOEM**

**CORTEX**

**C.S.**





**A**

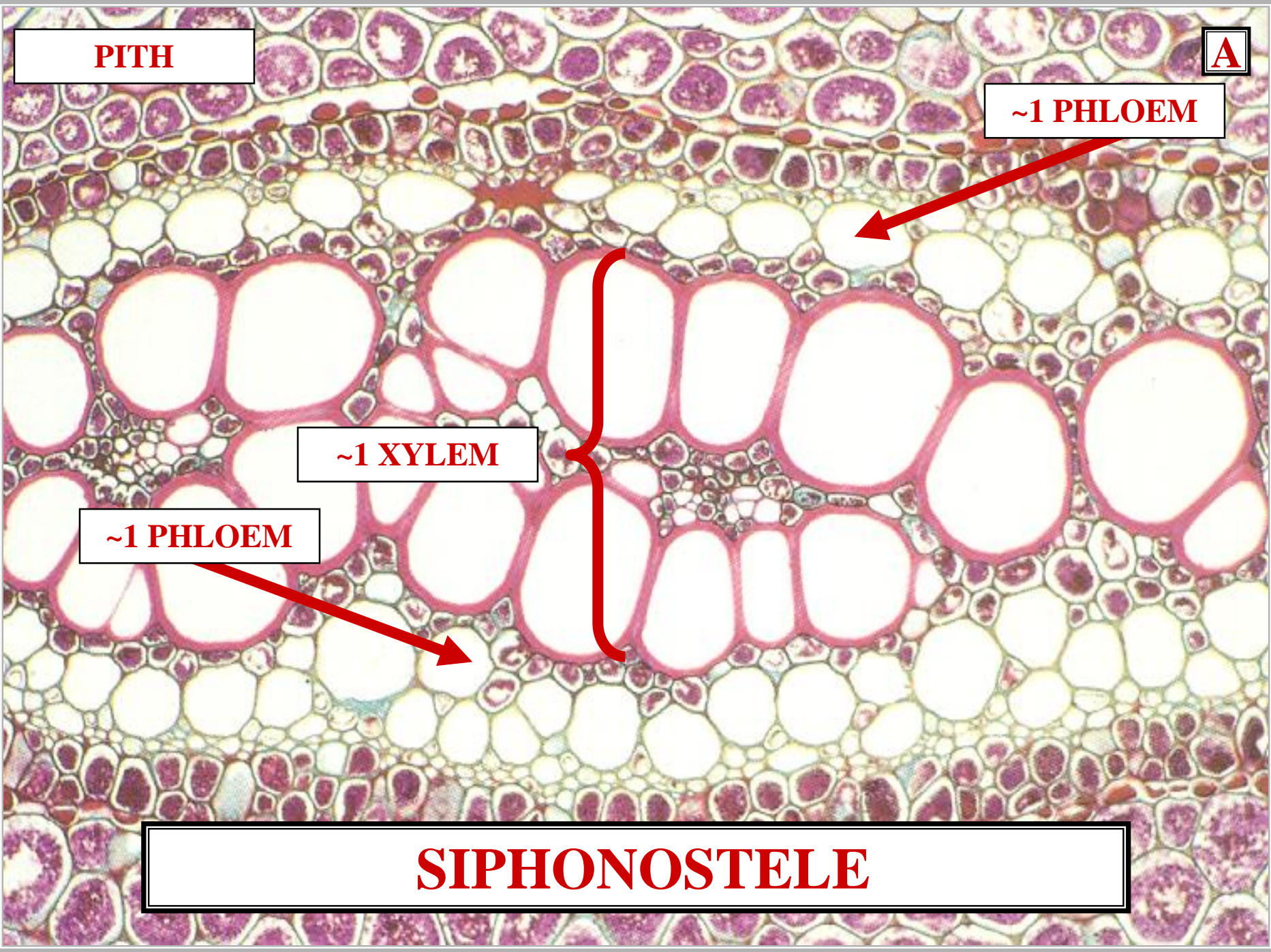
**PITH**

**~1 PHLOEM**

**~1 XYLEM**

**~1 PHLOEM**

**SIPHONOSTELE**





**PITH**

**~1 PHLOEM**

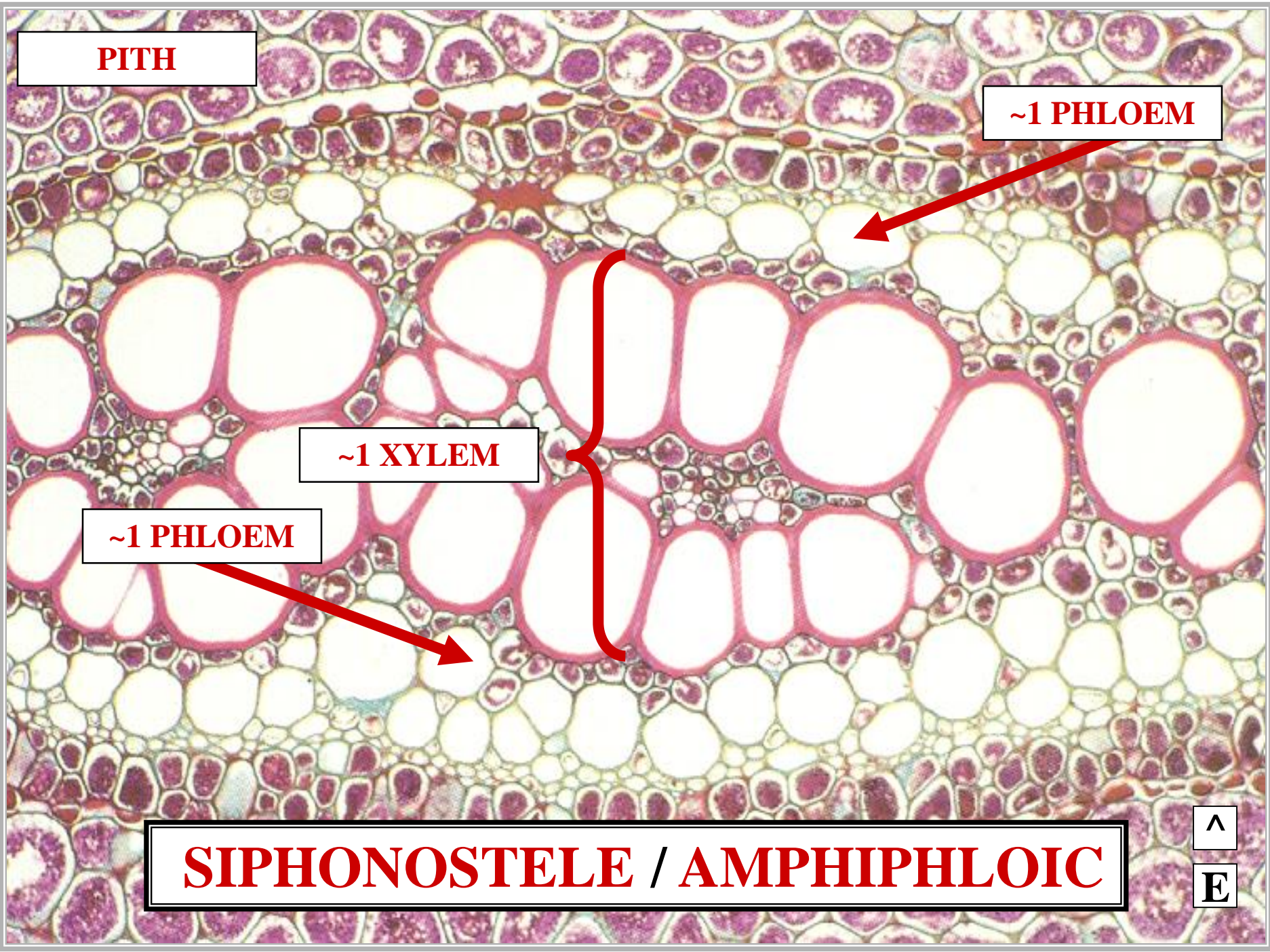
**~1 XYLEM**

**~1 PHLOEM**

**SIPHONOSTELE / AMPHIPHLOIC**

^

E



**EUSTELE**

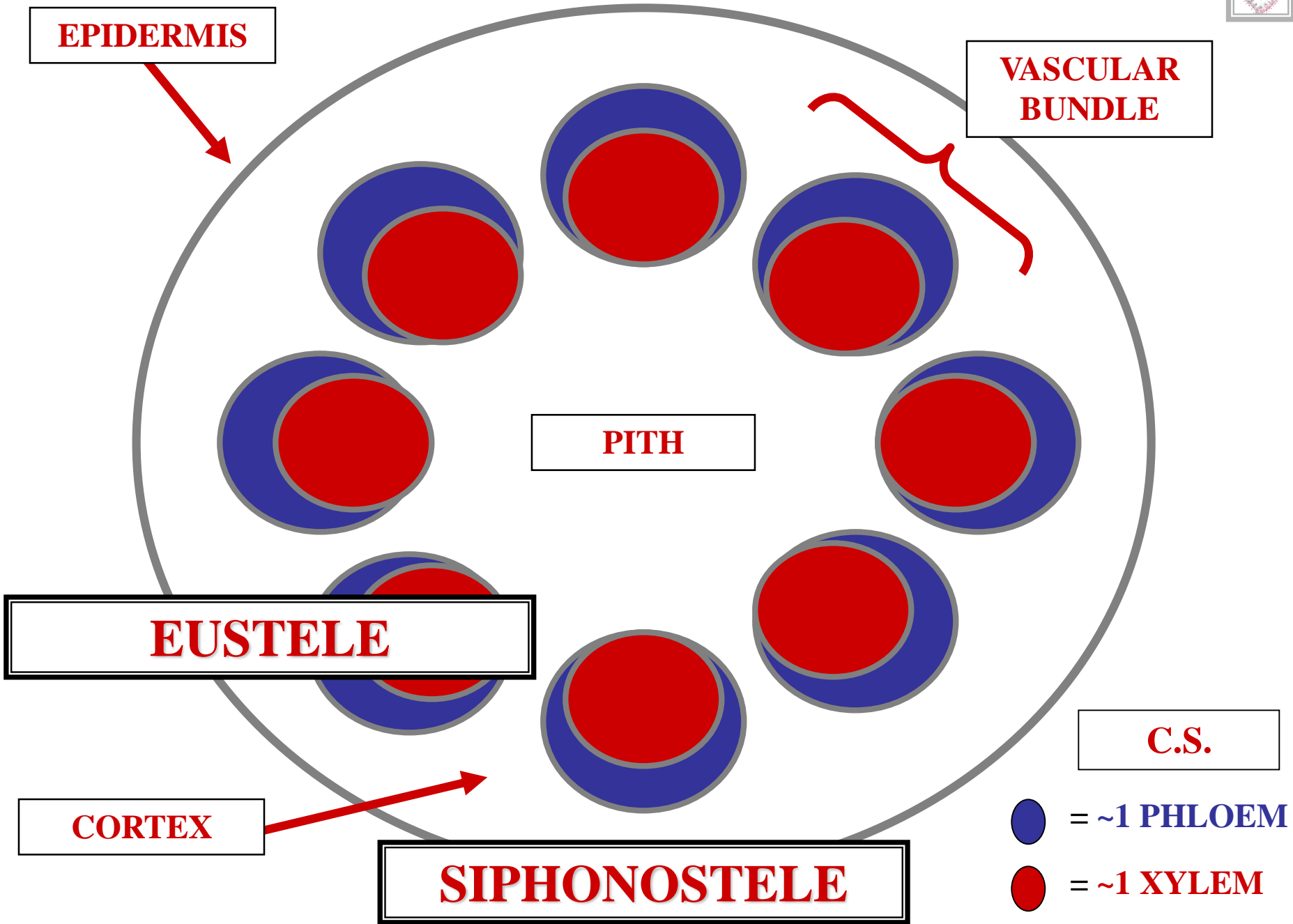
**SIPHONOSTELE  
EUSTELE**



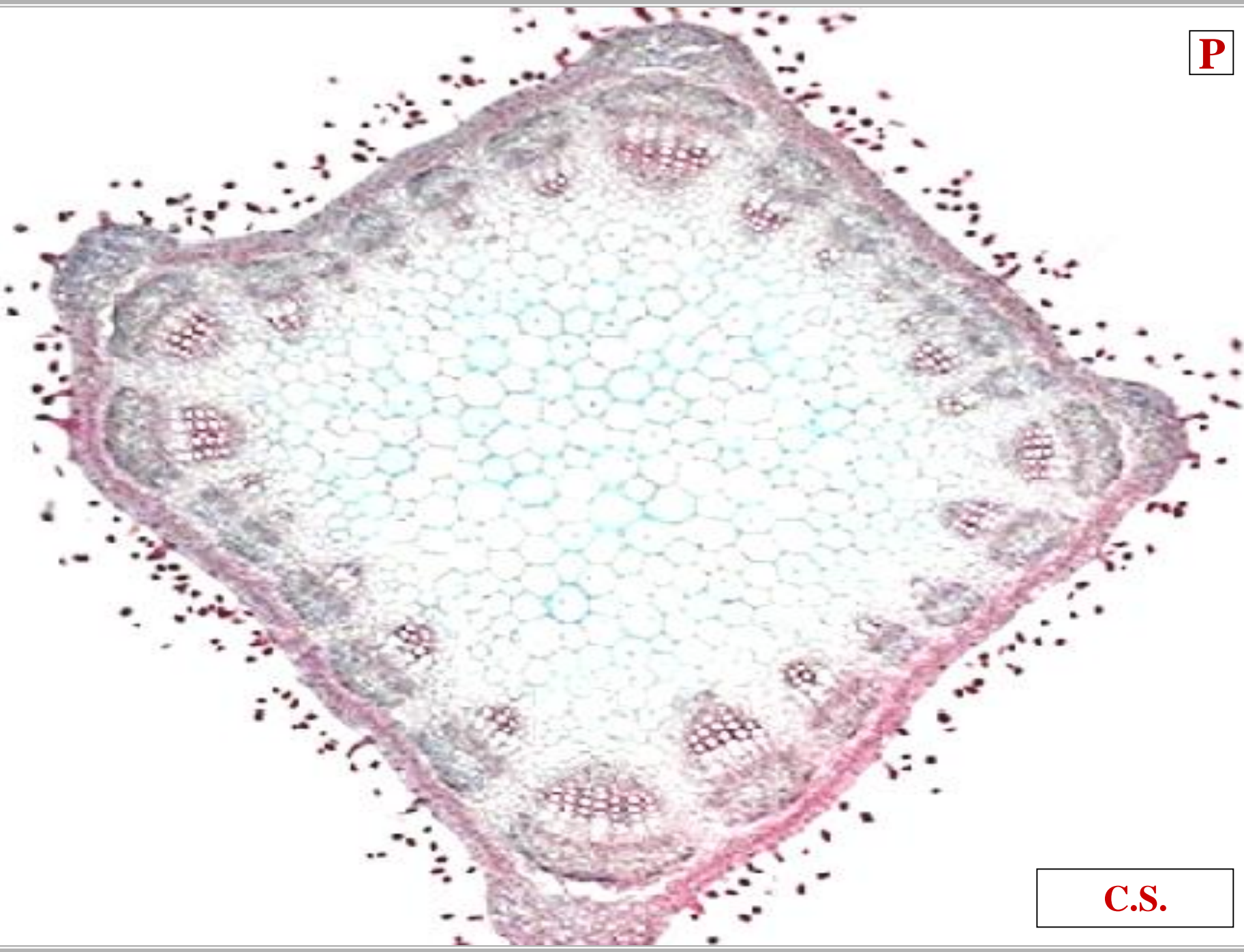
**CONCENTRIC  
VASCULAR BUNDLES**

**SIPHONOSTELE  
EUSTELE**

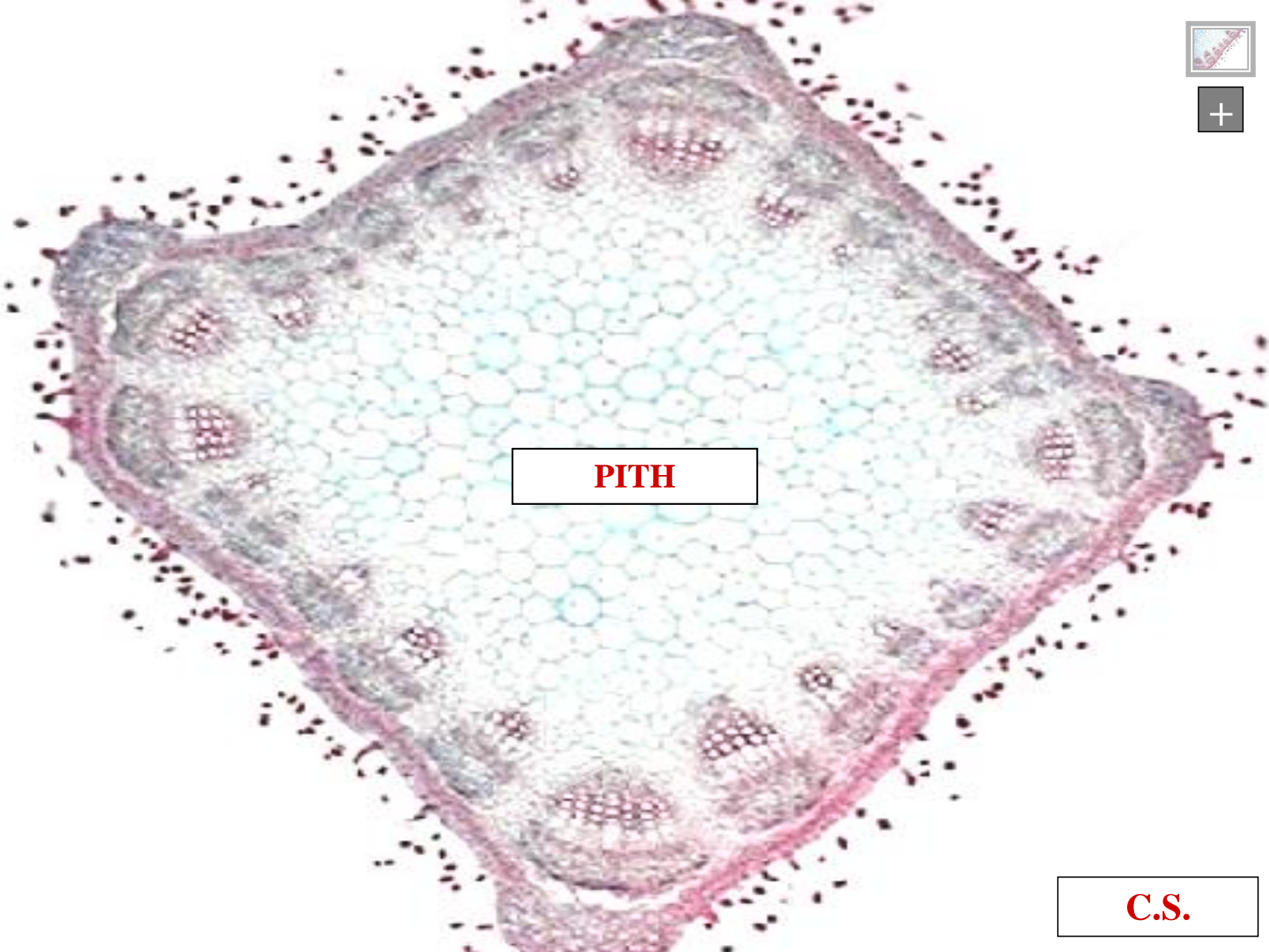




P



C.S.



**PITH**

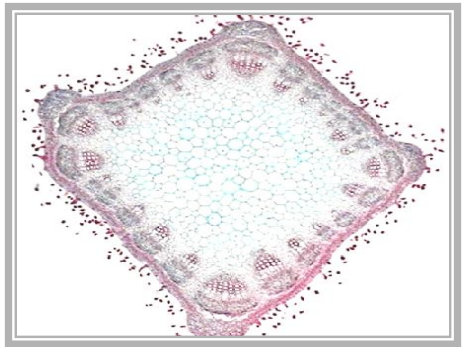
**C.S.**



**PITH**

**VB**

**C.S.**



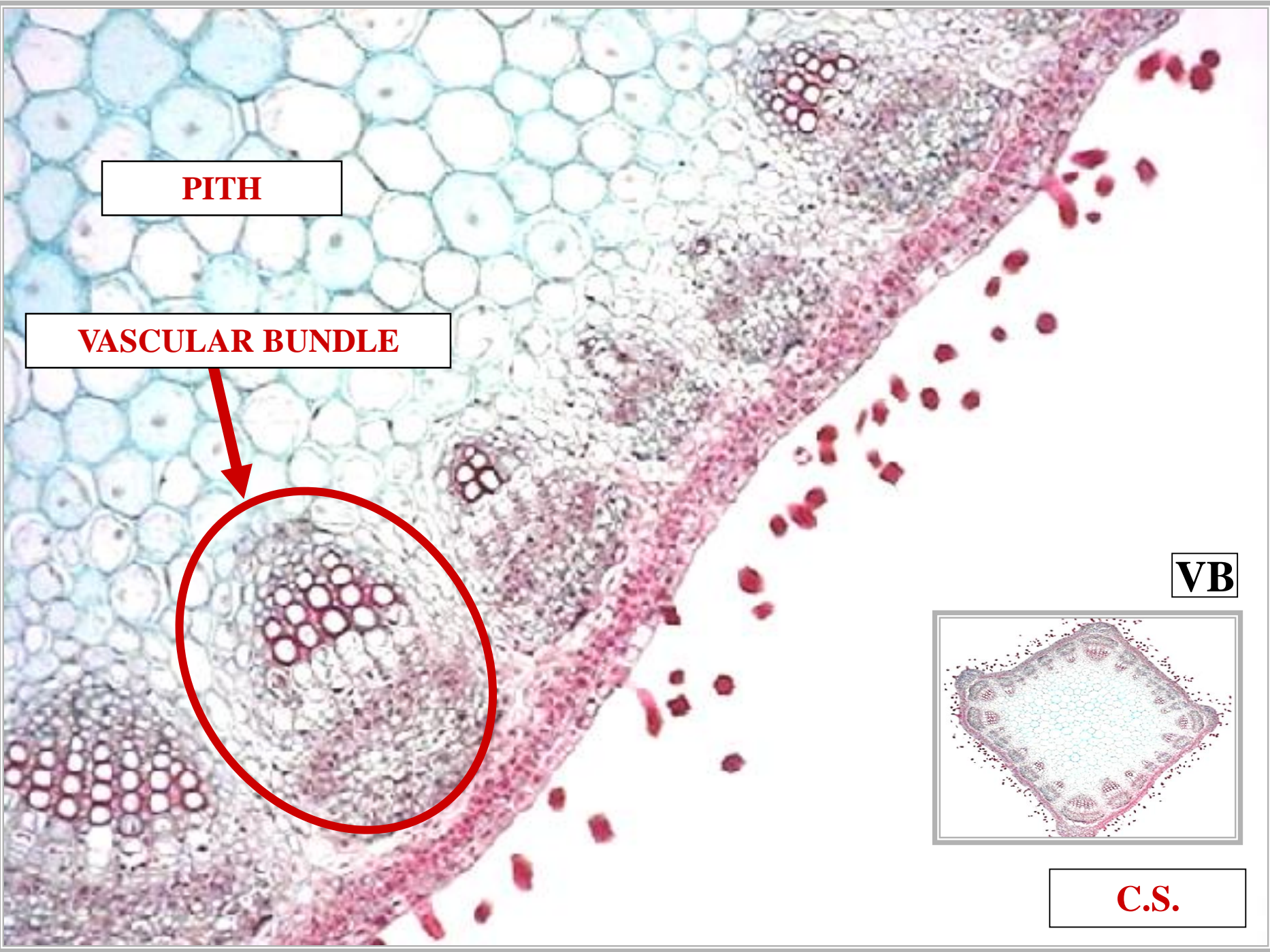


**PITH**

**VASCULAR BUNDLE**

**VB**

**C.S.**



# **VASCULAR BUNDLE**



**SIPHONOSTELE  
EUSTELE  
VASCULAR BUNDLES**

**XYLEM & PHLOEM  
STRAND**

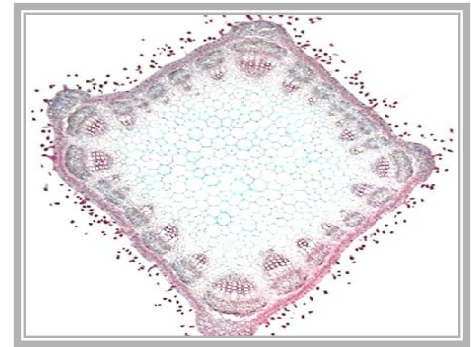
**SIPHONOSTELE  
EUSTELE  
VASCULAR BUNDLES**



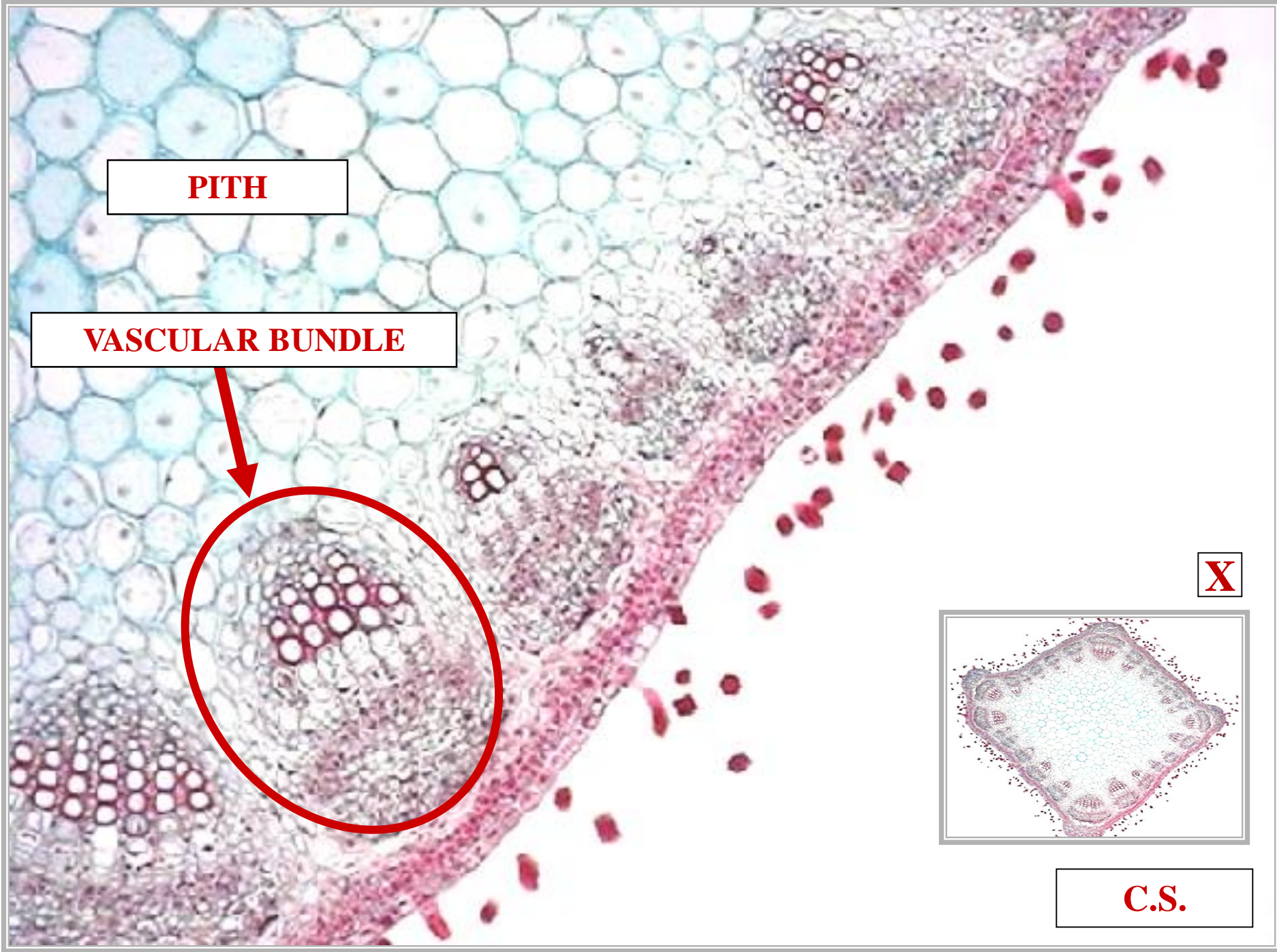
**PITH**

**VASCULAR BUNDLE**

**X**



**C.S.**



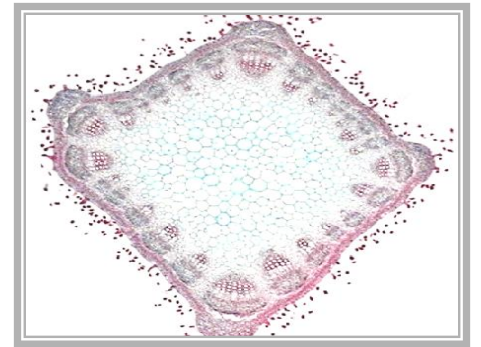


**PITH**

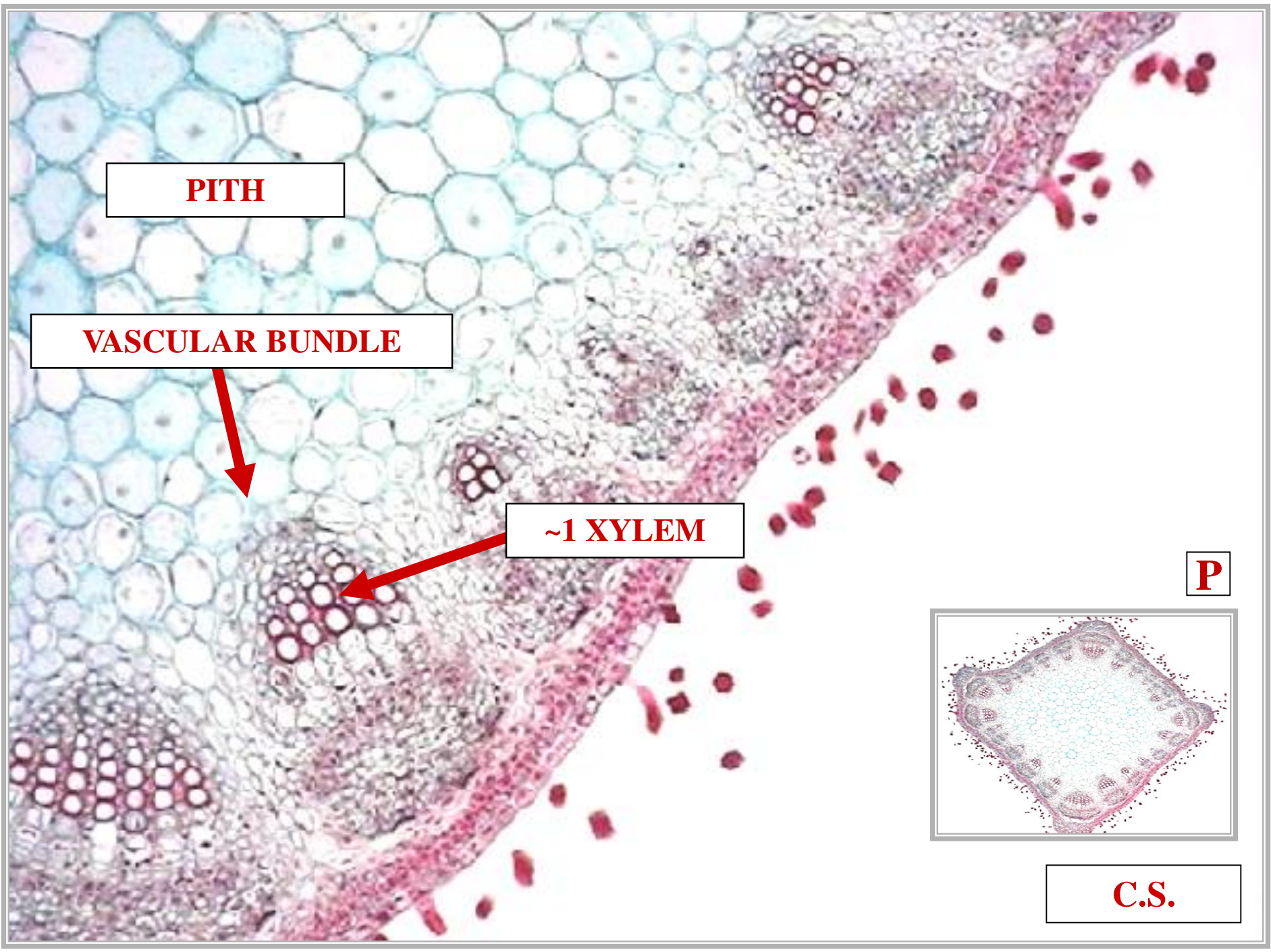
**VASCULAR BUNDLE**

**~1 XYLEM**

**P**



**C.S.**





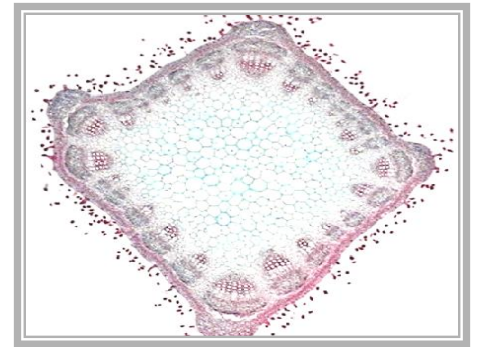
**PITH**

**VASCULAR BUNDLE**

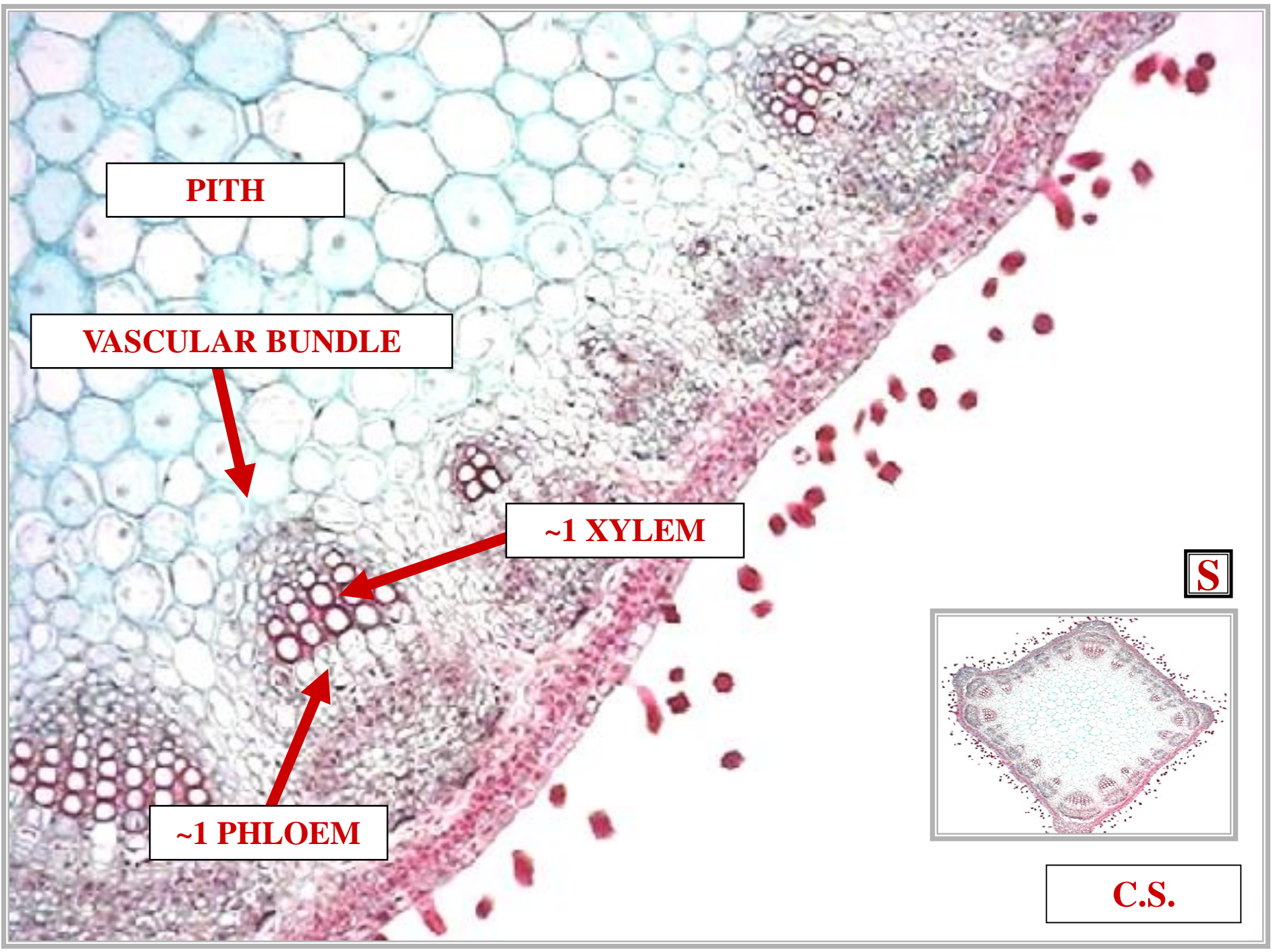
**~1 XYLEM**

**~1 PHLOEM**

**S**



**C.S.**



# SIPHONOSTELE

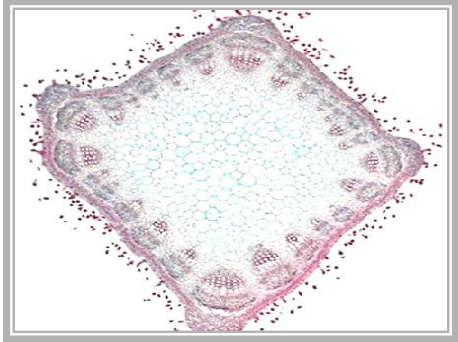
PITH

VASCULAR BUNDLE

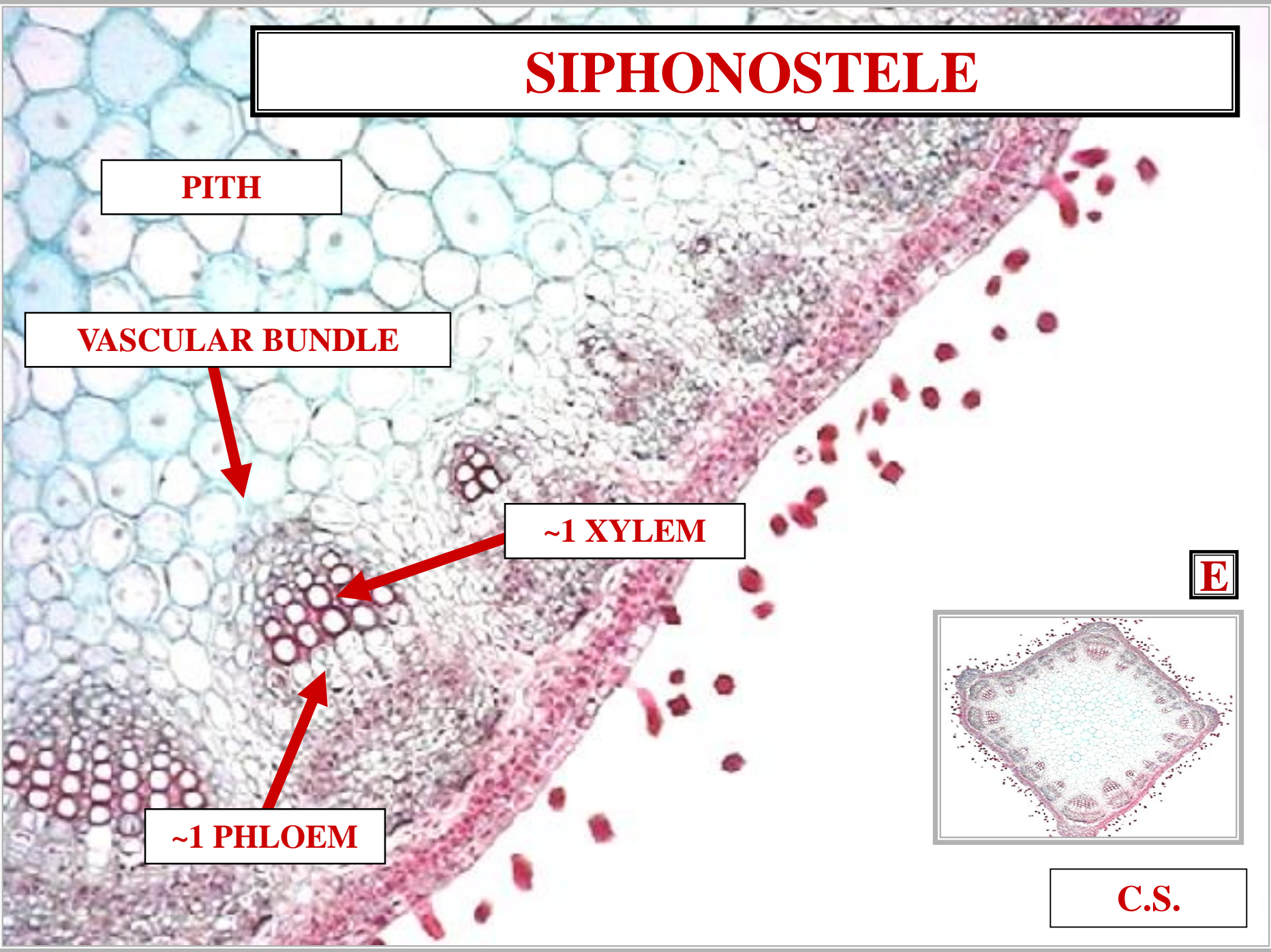
~1 XYLEM

~1 PHLOEM

E



C.S.





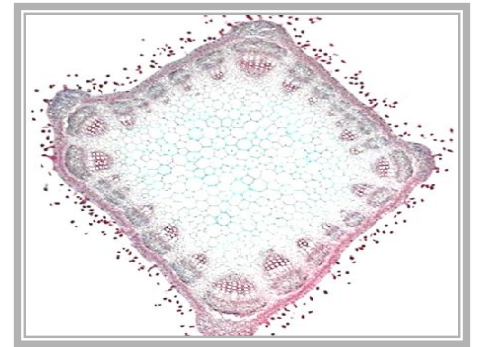
# SIPHONOSTELE / EUSTELE

PITH

VASCULAR BUNDLE

~1 XYLEM

~1 PHLOEM



C.S.



# ATACTOSTELE

**ATACTOSTELE**

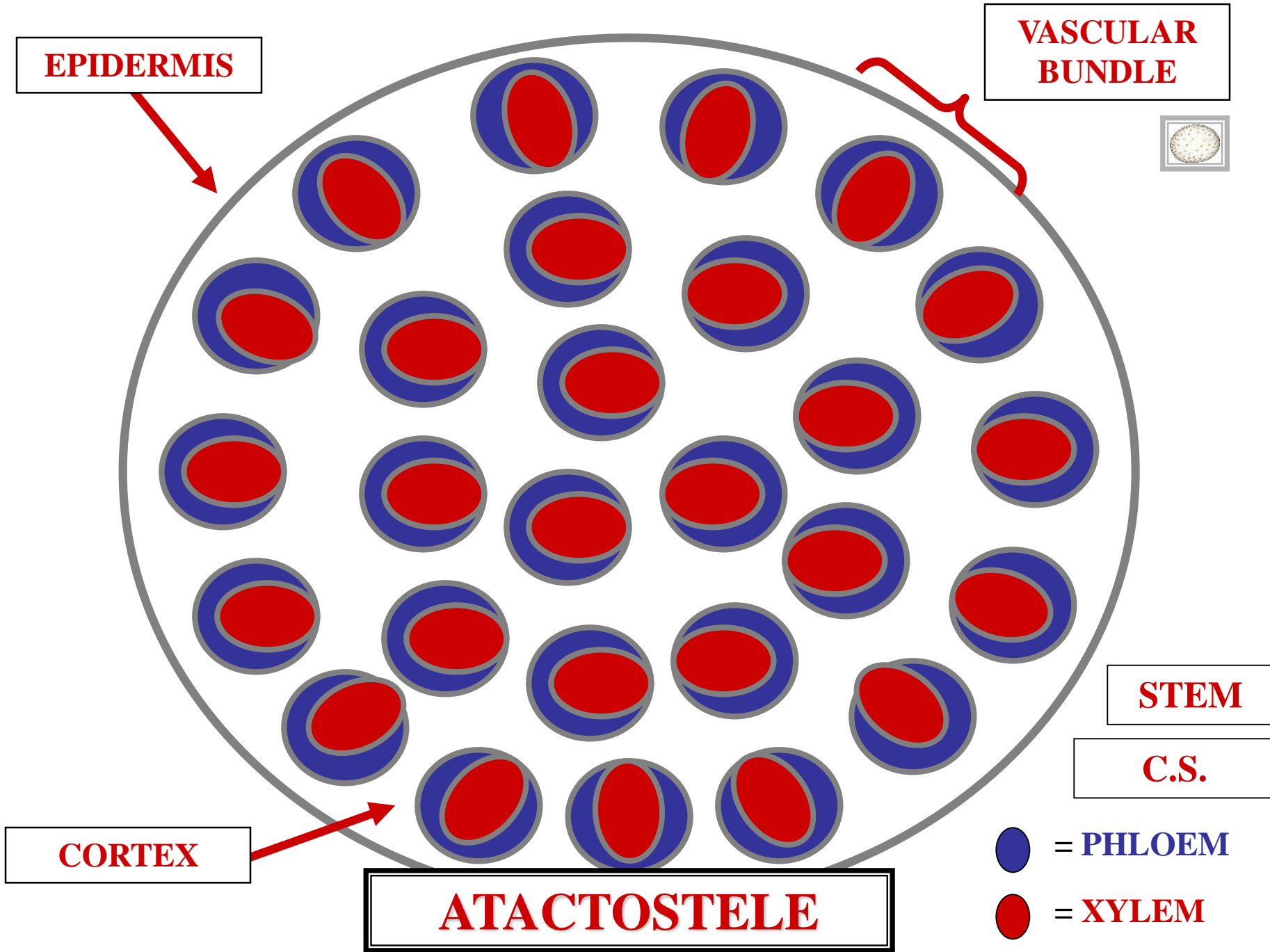
**VASCULAR STELE**  
**ATACTOSTELE**

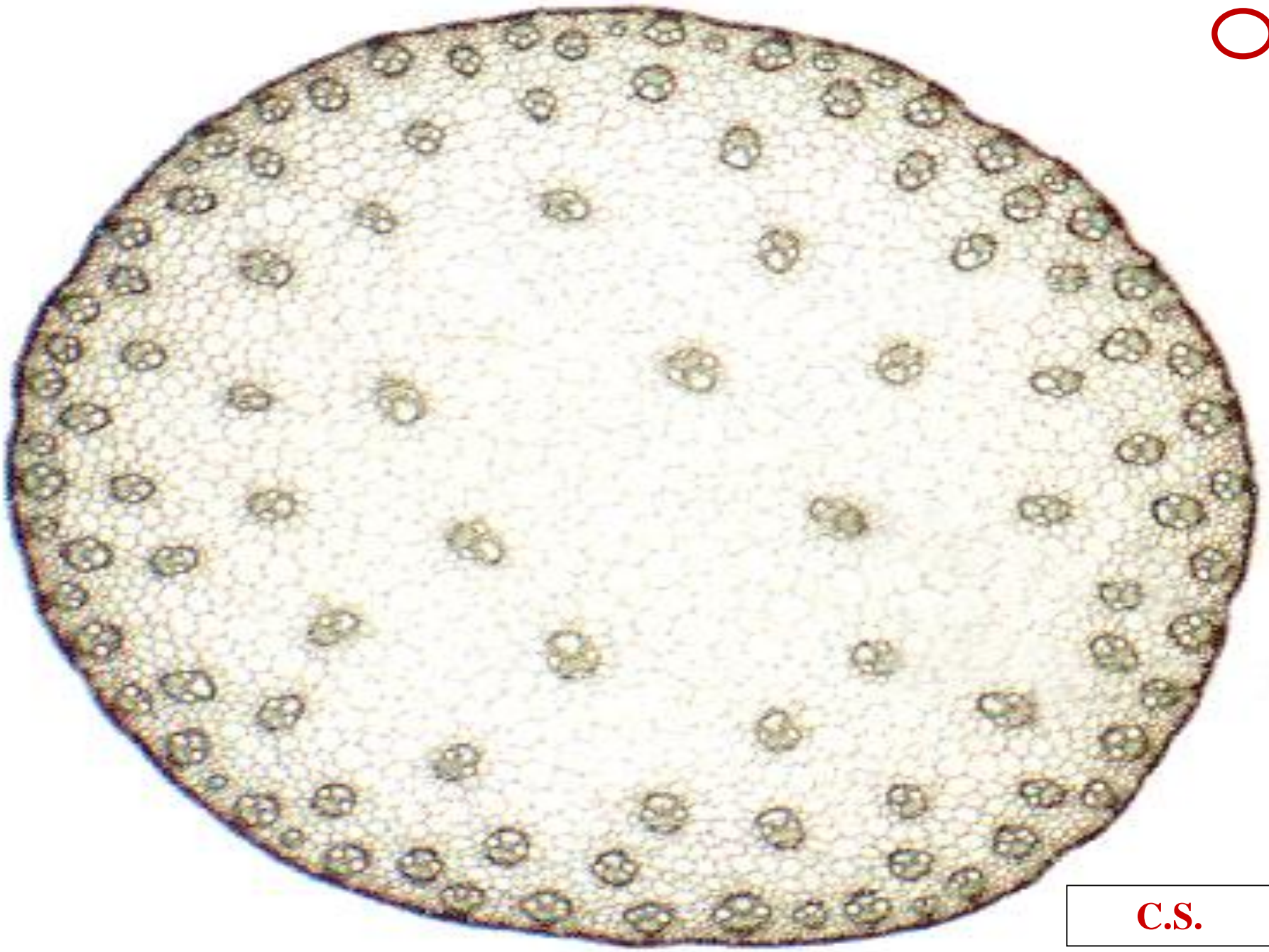


**SCATTERED**  
**VASCULAR BUNDLES**

**VASCULAR STELE**  
**ATACTOSTELE**



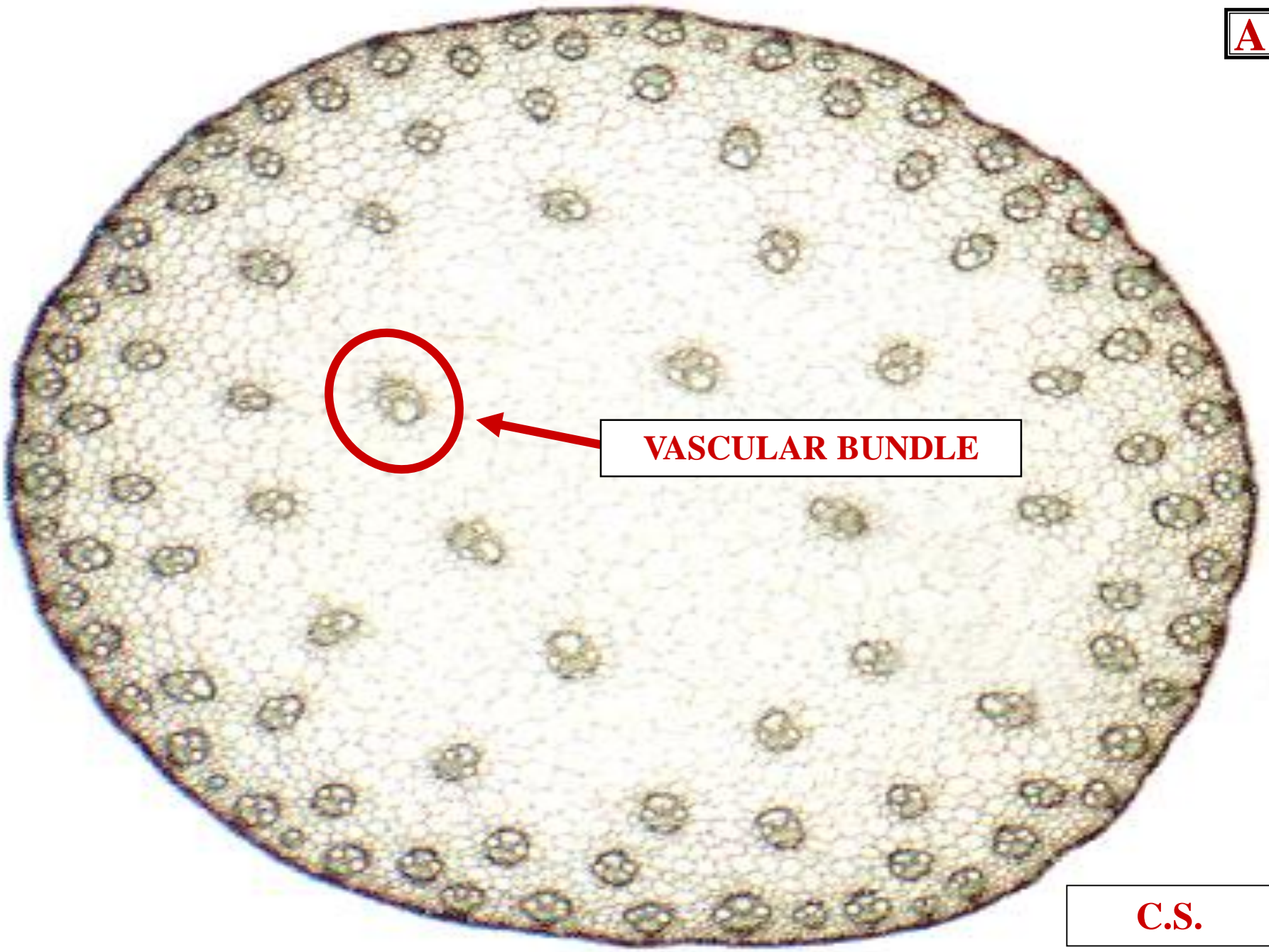




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**A**



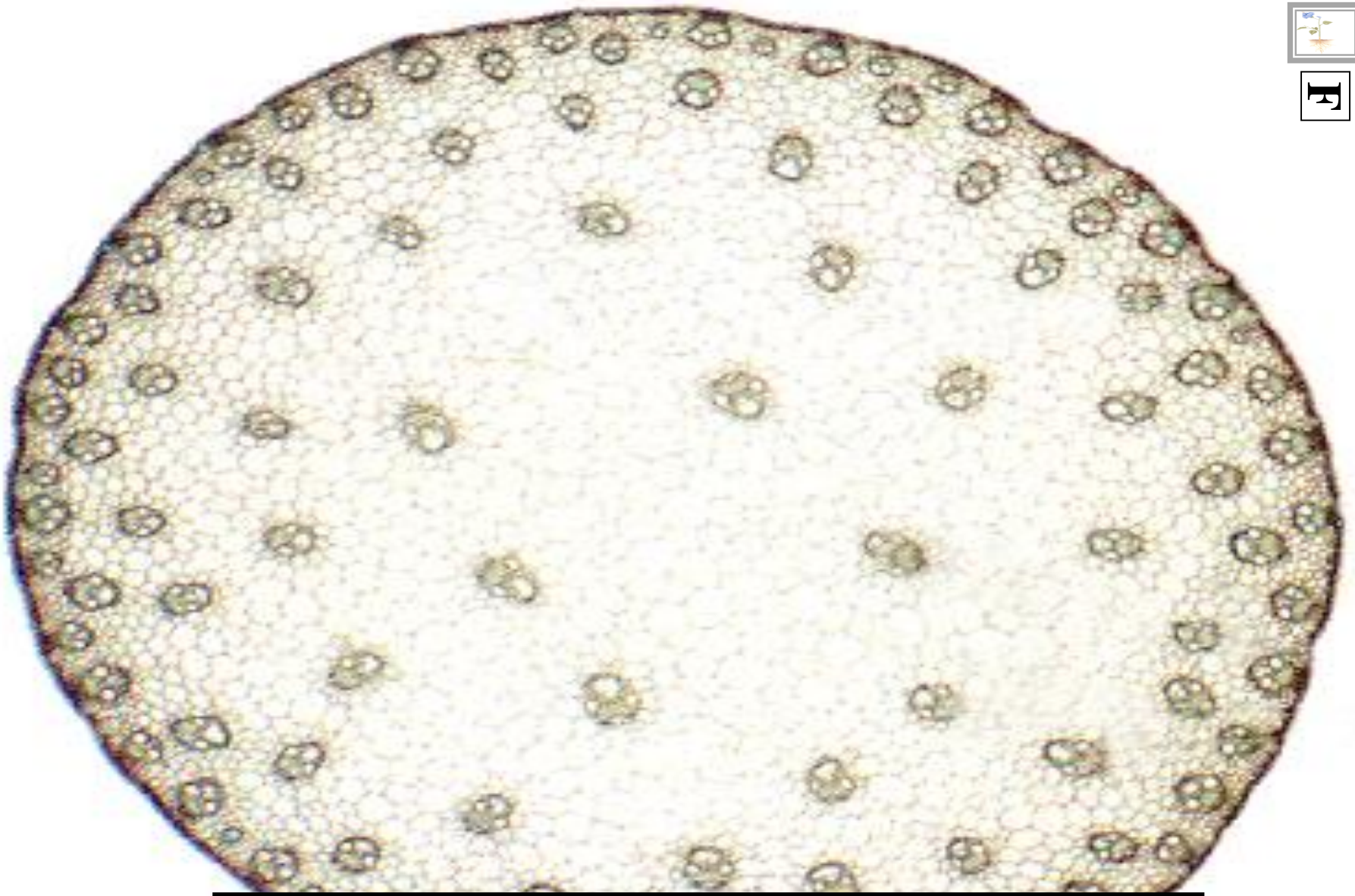
**VASCULAR BUNDLE**

**C.S.**





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**ATACTOSTELE**

# TYPICAL TRACHEOPHYTE

^  
S

**STEM**

**VASCULAR  
STELES  
ATACTOSTELE**

