

General

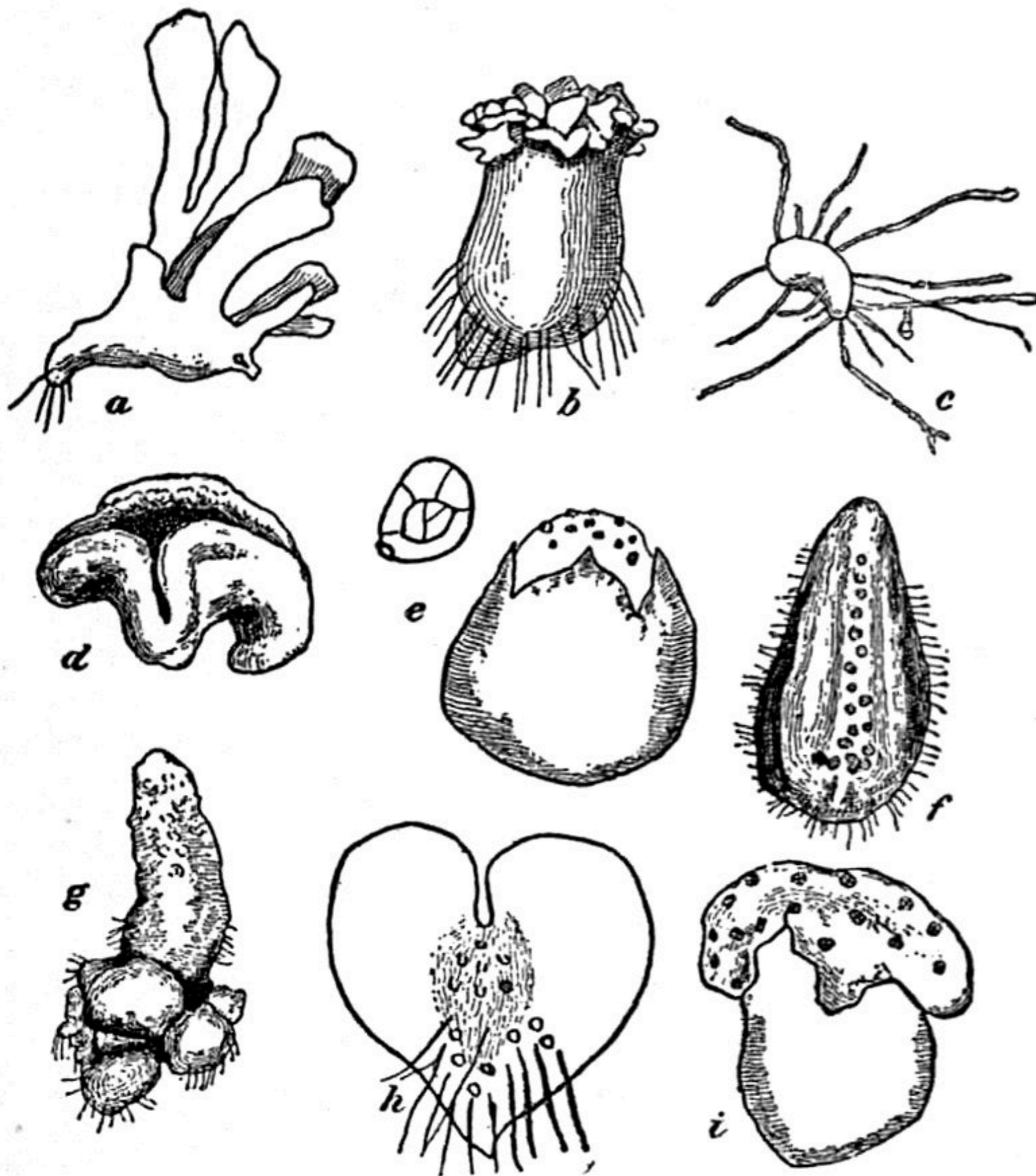


Fig. 1.—Diagrammatic sketches of prothalli of—

- a, Equisetum.**
- b, Lycopodium cernuum.**
- c, L. phlegmaria.**
- d, L. clavatum.**
- e, Selaginella.**
- f, Botrychium virginianum.**
- g, Helminthostachys.**
- h, A Fern.**
- i, Salvinia.**

Types of Stele in Plants

Protostele

(Stele without Pith)

- **Haplostele**
Smooth central xylem
Xylem surrounded by phloem
Eg. *Rhynia*, *Lygodium*
- **Actinosteale**
Star shaped xylem
Phloem between star arms
Eg. *Lycopodium serratum*
- **Plectosteale**
Xylem as plates
Phloem between xylem plates
Eg. *Lycopodium clavatum*
- **Mixex protosteale**
Xylem as patches in phloem
Eg. *Lycopodium seruum*
- **Mixed protosteale with pith**
With pith like parenchyma
Eg. *Hymenophyllum*

Siphonosteale

(Stele with Pith, no leaf gap)

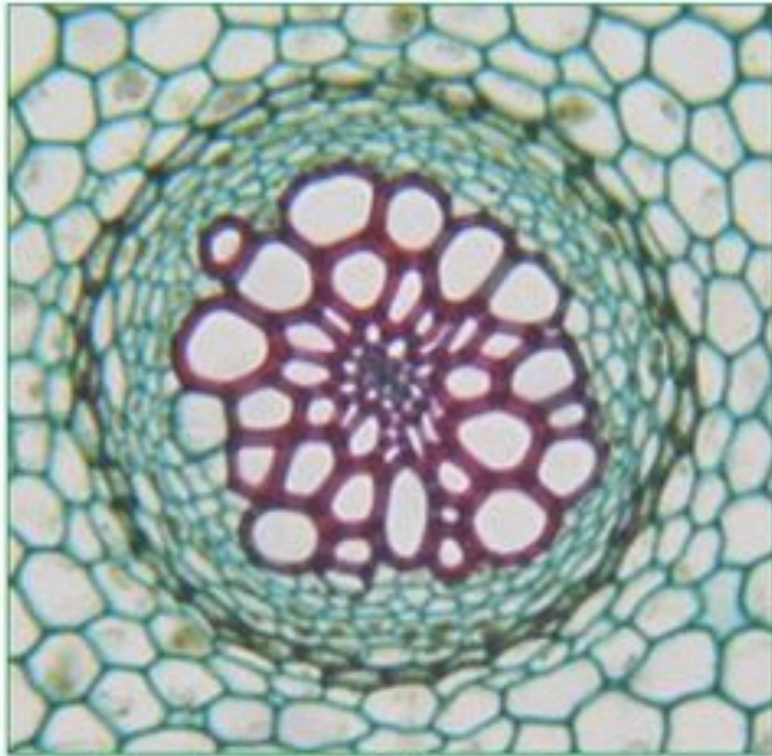
- **Cladosiphonic Siphonosteale**
Without leaf gap
Eg. *Selaginella*
- **Ectophloic siphonosteale**
Phloem external to xylem
Eg. *Osmunda*
- **Amphiphloic siphonosteale**
Phloem both sides of xylem
Eg. *Marsilea* rhizome

Solenosteale

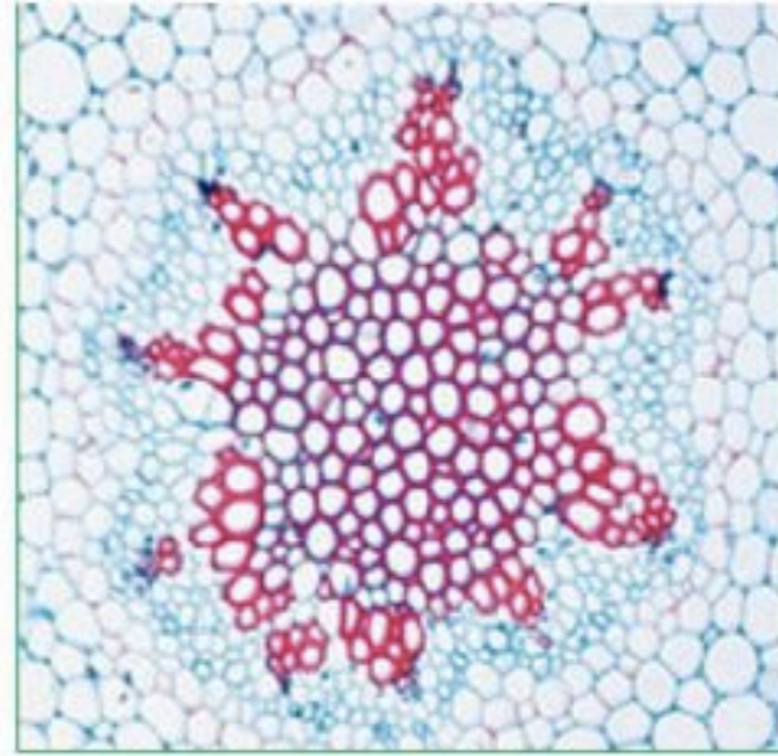
(Stele with pith and leaf gap)

- **Ectophloic Solenosteale**
Phloem external to xylem
- **Amphiphloic solenosteale**
Phloem both sides of xylem
Eg. *Adiantum pedatum*
- **Dictyosteale**
Many meristels
Eg. *Pteris*
- **Polycyclic stele**
Many circles of VB
Eg. *Pteridium aquilinum*
- **Eusteale**
VB arranged as a broken ring
Eg. *Dicot Stem*
- **Atactosteale**
Scattered arrangement of VB
Eg. *Monocot Stem*

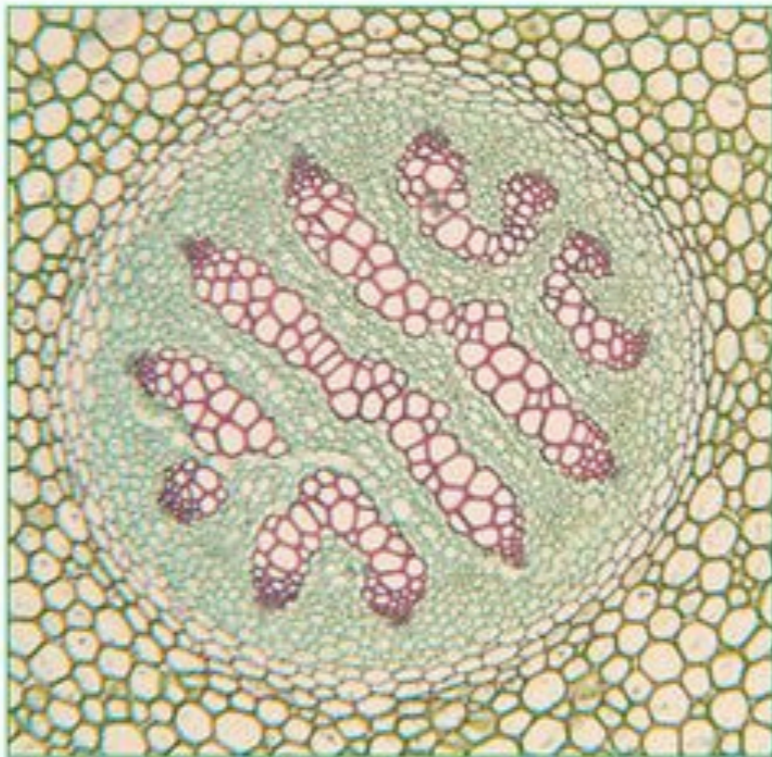
**Stelar System
Evolution**
(in Pteridophytes &
Higher Plants)



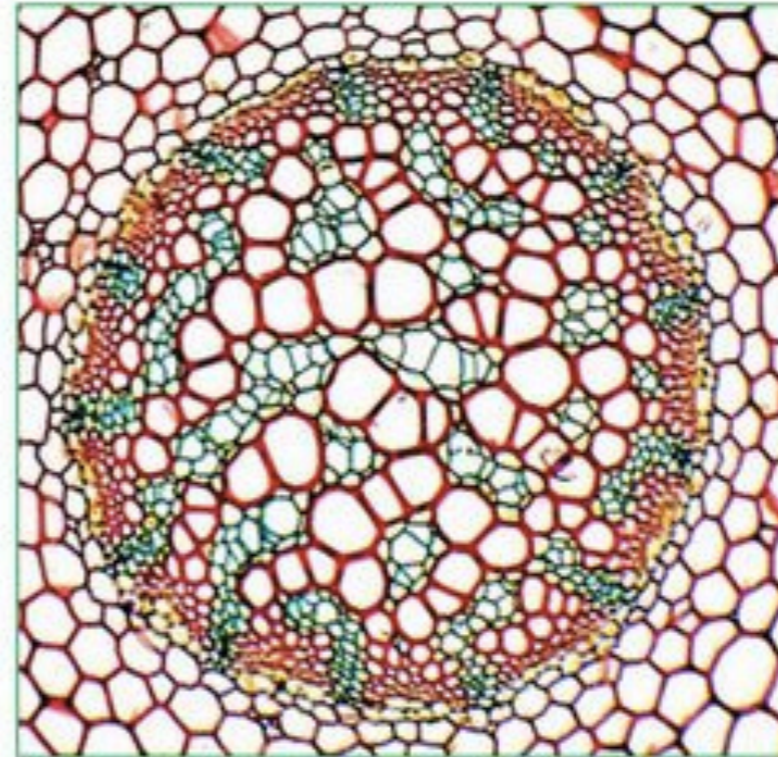
Haplostele (*Lygodium*)



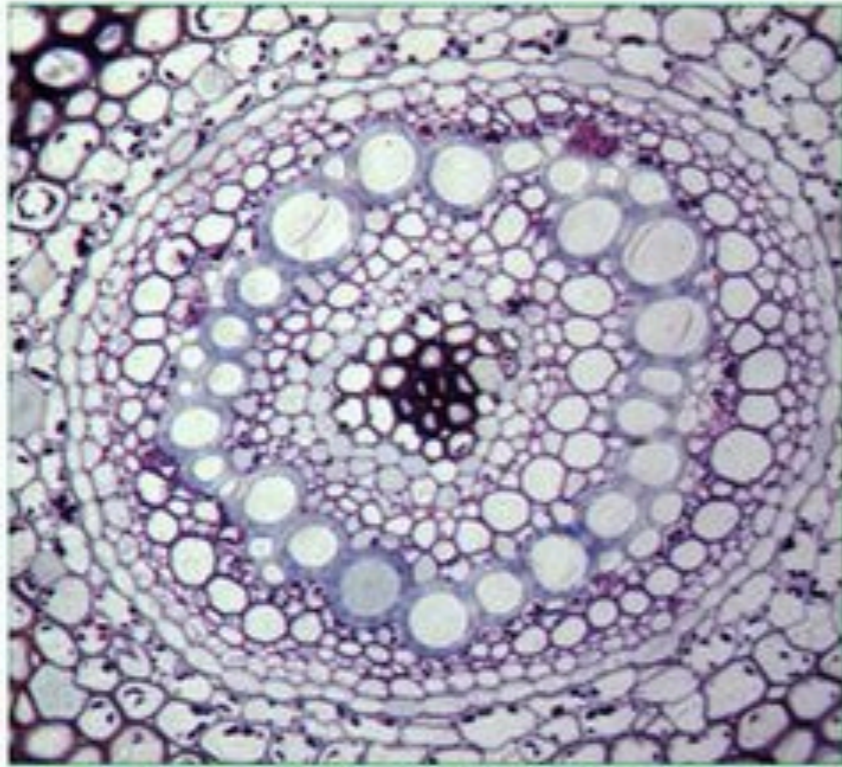
Actinosteles (*Psilotum*)



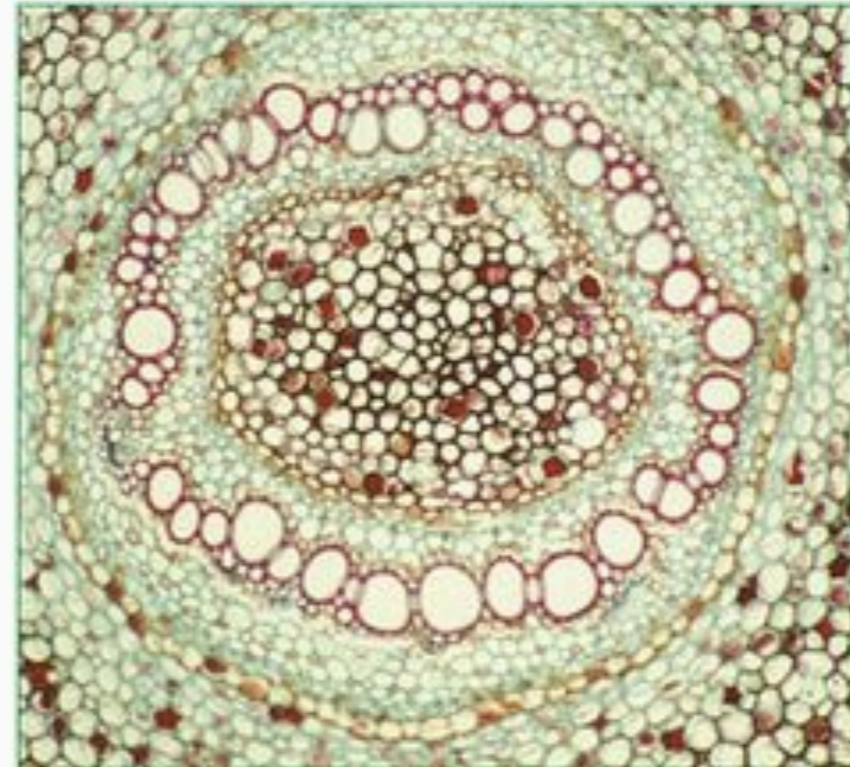
**Plectosteles
(*Lycopodium clavatum*)**



**Mixed Protosteles
(*Lycopodium cernuum*)**



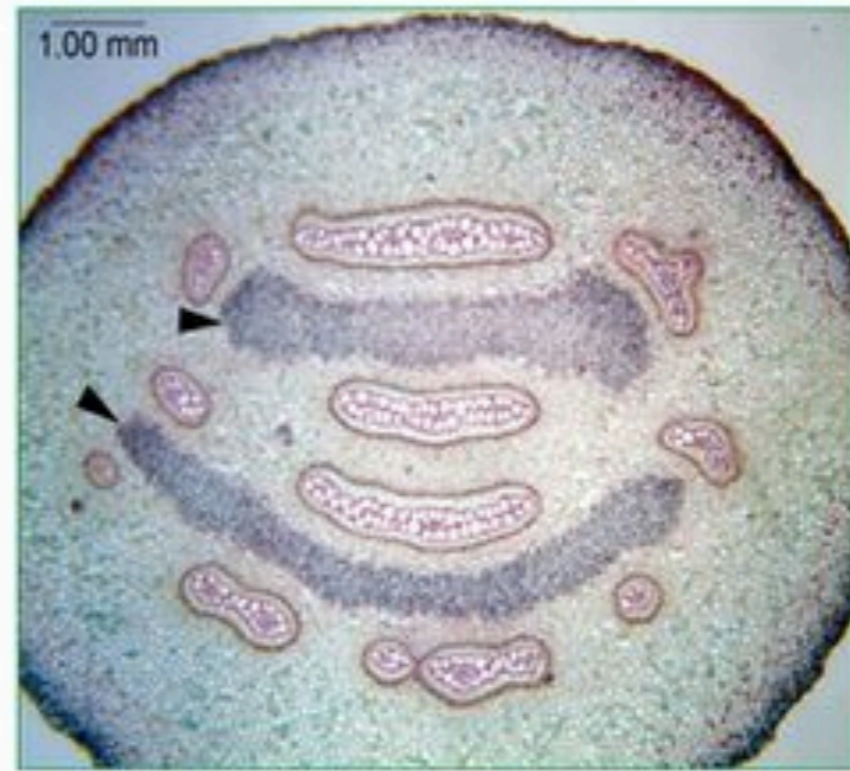
Ectophloic Siphonostele
(*Osmunda*)



Amphiphloic Siphonostele
(*Marsilea Rhizome*)



Amphiphloic Solenostele
(*Adiantum pedatum*)



Dictyostele
(*Pteris*)

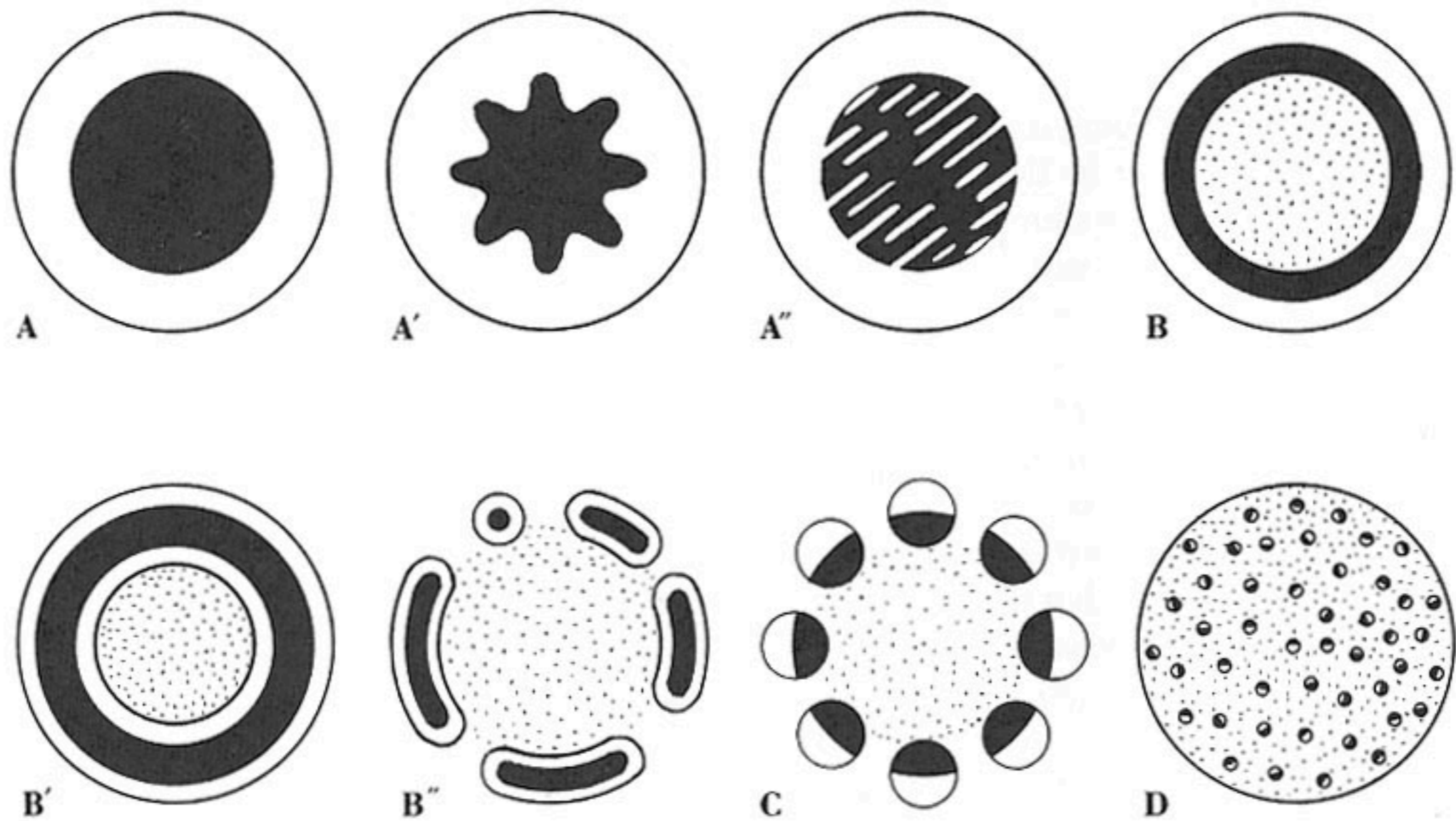


FIGURE 13-6

Types of stele, diagrammatic transections. A–A". Protosteles. A. Haplostele. A'. Actinosteles. A". Plectosteles. B. Ectophloic siphonosteles. B'. Amphiphloic siphonosteles or solenosteles. B". Dictyosteles. C. Eusteles. D. Atactosteles. Xylem, black; phloem, white; pith, stippled.