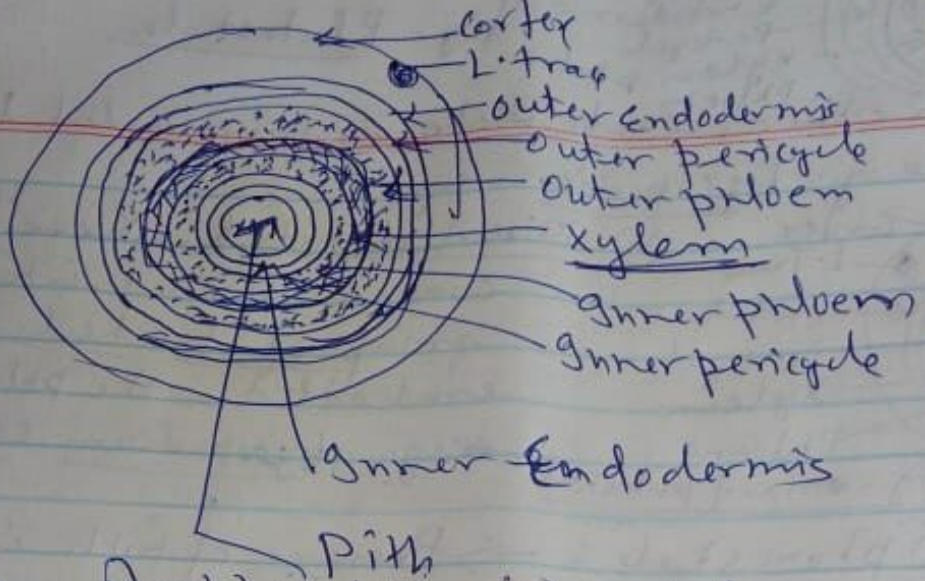

fig- Amphiphloic siphonostele

Here pith is surrounded inner Endodermis then inner pericycle, inner phloem then by Xyl-m. This xylem on outer side surrounded by outer phloem, outer pericycle, outer Endodermis i.e. xylem is surrounded by all three layers from outside and inside both. e.g. Marsilea etc.

Origin of Pith → There are two opinion about origin of pith in the centre of stele

(1) Intra stelar origin → According to this theory central part of the xylem core is transformed or metamorphosed into parenchymatous cells and this is Pith. i.e. origin of pith is totally intra-stelar e.g. Osmunda etc.

(2) Extra stelar origin → This theory is related with migration of cortical cell inside the stelar structure to form the structure Pith. This view is supported by the double layer of Endodermis pericycle & phloem in case of Amphiphloic stele. Migration of cortical cell is possible through the passage of leaf gap & Branch gap

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For T.D.C. Part Ist at 1:20 P.M. 28/7/20

Stelar System in Pteridophyta

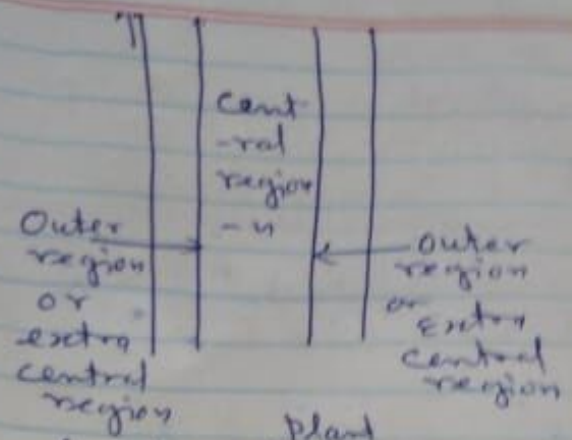


fig- L.S. of plant axis

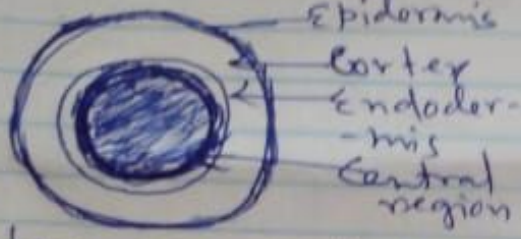


fig- T.S. of plant axis

(1) Externally plant axis can be divided into two parts one is the central region and other is outer region which surrounds the central region and this is called outer region or extra central region.

(2) Outer region includes ground tissue like Epidermis and Cortex whereas central region includes pericycle, xylem, phloem and pith (if present)

(3) Endodermis — the innermost layer of Cortex is limiting layer between outer region and central region.

(4) Stele is Greek word meaning column and this is used for central vascular region of the Pteridophytes. Related to stele — Stelar theory was proposed by Van Tieghem & Douliot in 1886.

According to this theory — Root and stem have same basic structure with two fundamental units the cortex and the central region. Endodermis is boundary between both layer.

Types of Stele → Schmid in 1982 recognised two main types of steles in Pteridophytes (1) Protostele and (2) Siphonostele.

(1) Protostele → Proto = primitive i.e. primitive type of stele is protostele. Here solid core of xylem is totally surrounded by phloem. In proto -stele pith is absent i.e. pith less simple stele is protostele. After phloem the next layer are pericycle, Endodermis then cortica -l region. Protostele is divided in to following types →

fig- Protostele

(A) Haplostele → Here in this type simple and solid xylem core have smooth and circular outline. e.g. Psilo- -tum, Rhynia (fossil), Lycopodium etc.

fig- Haplostele

(B) Actinostele →

fig- Actinostele

Actino = star i.e. Here in this type of stele solid core of xylem have star like outer line with many radiating arms. Phloem is present in the form of small patches in between the arms. e.g. Psilotum, Lycopodium etc.

(2) Plectostele → Here xylem core is divided into pla -te like structure and these plates lies parallel

fig - Plectostele.

to each other, each plate is surrounded by phlo-em e.g. Lycopodium sp.

(4) Mixed Protostele - Here solid xylem core is divided into small group of tracheids and are embedded in the phloem tissue e.g. Lycopodium carinum

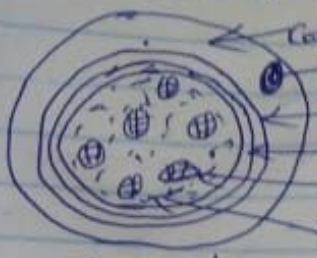


fig - mixed protostele

II Siphonostele → Presence of pith is important character of siphonostele. In other word Protostele with pith is siphonostele. Pith is ~~first~~ surrounded by xylem, phloem, pericycle, Endodermis then cortical tissue.

Siphonostele is divided into two.

(A) Ectophloic siphonostele ecto = outside.

In this type of stele pith is present in the centre which is surrounded by xylem then Phloem, pericycle, Endodermis. ~~These all layer tissue~~ All Phloem, Pericycle & Endodermis is present in single layer and all are present out side to the xylem tissue.

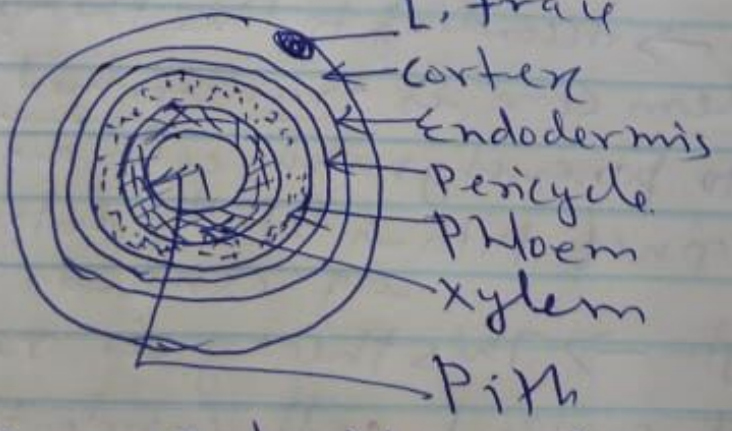
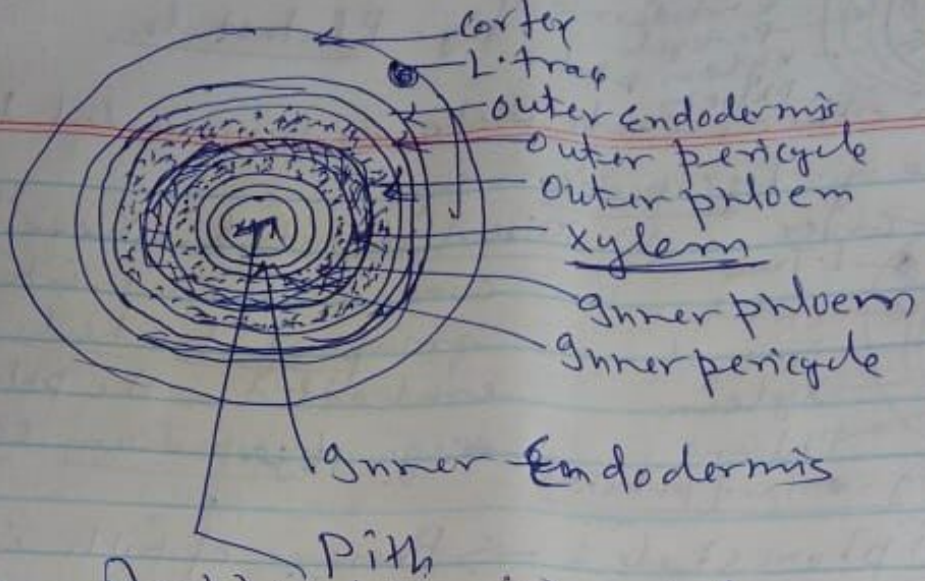


fig - Ectophloic siphonostele

e.g. Equisetum, Osmunda etc.

(B) Amphiphloic siphonostele → Amphi = Both side



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Continued

B.sc IInd part Paleobotany 13/7/20

(2) Plant or animal remains of past time is called as fossil. Actually fossil word is derived from the latin verb "fodere". Fodere means "to dig" i.e. any thing which is dug out from the rocks is fossil.

(3) Arnold in 1947 define fossil as The ~~relic~~ relic of some former living things (plant and animal) embedded in or ~~and~~ dug out from rocks deposited of Past geological time is fossil.

But now a days word fossil is not only used as animal or plant remains of past time it includes all things related with the existence of life of the Past time. Chemicals, trailmark of any organism on rocks are fossil.

(1) Paleobotany or Palaeobotany is study of plants of past time. It is the branch of Palae-ontology ~~of~~ which deals with both plants and animal remains.

(4) Nomenclature of fossils → Rules governing the nomencla-ture of living plants is also follow in the case of fossil plants. But here a complete plant is rarely preserved, plant parts ~~obtained~~ or fragments are obtained as fossil from different places at different times. and is given a different name ~~which is the~~ and acquires the status of a genus i.e. in fossil plant generic name is only for a plant part not concerning with character of the ~~whole~~ plant. actual plant.