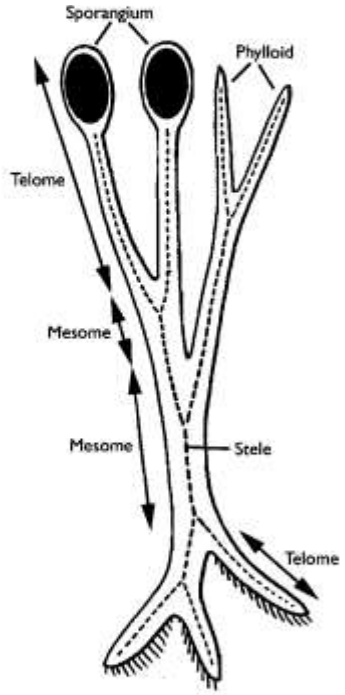
Telome Theory

- Given by Zimmermann
- Telome is simple ultimate terminal portions of dichotomously branched axis.
- Two telomes join at the base to form MESOME



- Types of telomes on the basis of their functions:
    1. Sterile or Vegetative telomes
    2. Fertile telomes
- The elementary processes involved in the development of vascular plants:
    1. Overtopping
    2. Planation
    3. Syngenesis
    4. Reduction
    5. Curvation

Table 18.1 Elementary processes in the formation and modification of telomes (Zimmermann, 1952)

	Process	*Result*
	Telome origin	
1	Connection of cells through common cell walls	Filamentous growth
2	Rotation of plane of cell division	Branched filaments
3	Apical meristem	Cylindrical multicellular body
4	Changes to isomorphic life cycle (ancestral isomorphic life cycle an assumption of the theory)	Elaboration of either sporophytic (vascular plants) or gametophytic (bryophytes) phases of life cycle at expense of other
5	Tissue differentiation	Elaboration of ground tissue system and vascular system
	Telome modification	
6	Overtopping	Stronger development of one branch in a dichotomy – distinction between main axis and lateral appendages
7	Planation	Switch from multidimensional to flattened branching
8	Syngenesis	Lateral fusion of telomes – implicated in webbing of leaves and development of complex vascular systems
9	Reduction	Loss of telomic units leading to loss of morphological complexity (e.g. bryophyte sporophyte)
10	Incurvation	Bending due to unequal growth of tissue on flanks of telome
11	Longitudinal differentiation	Development of serial homologues along an axis (e.g. leaves or pinnules)

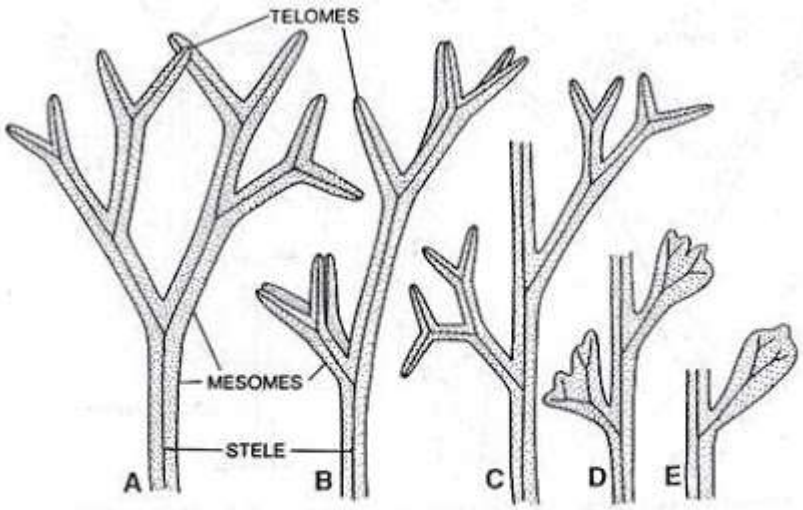


Fig. 32.9. Zimmermann's Telome concept. A, illustrates hypothesis of telomes and mesomes; B, overtopping-two sister branches of a dichotomy become unequal, the stronger one forms the axis, the weaker one is pushed aside and forms the leaf; C, *planation*-branching in more than one plane is being replaced by a dichotomy in a single plane, thus arranging the telomes and mesomes in a plane; D-E, *webbing* and *syngenesis*-the telomes and mesomes, become connected by the formation of parenchymatous tissue between them (parenchymatous webbing); this is accompanied by the fusion of their steles also.

Origin of Sporophylls:

1. Origin of Sporophylls in Lycopsida

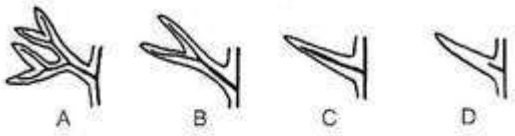


Fig. 7.142 : Telome concept : Stages in the origin of microphyll following overtopping and reduction. A. Dichotomising lateral branch, B. Bifurcated microphyll of Protolepidodendrales, C. Microphyll of Lycopsids, D. *Asteroxylon* enation

2. Origin of Sporophylls in Sphenopsida

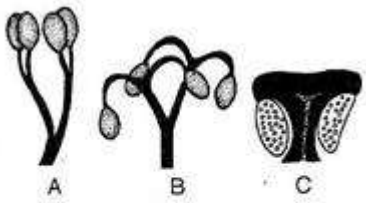


Fig. 7.141 : Telome concept : Stages in the evolution of the sporangiophore in Sphenopsida from primitive dichotomous fertile axis (A) following recurvation (B) and syngenesis (C)

3. Origin of Sporophylls in Pteropsida

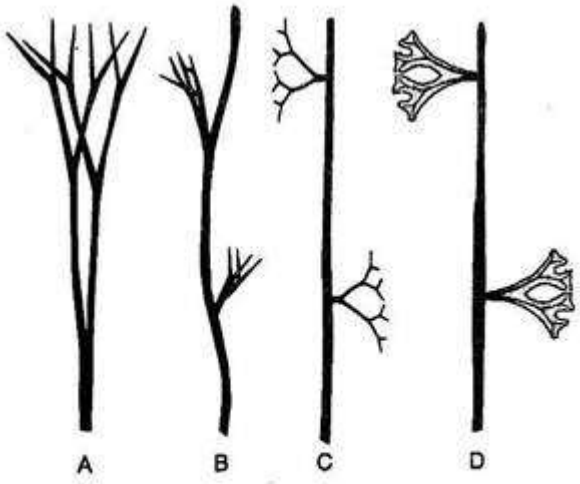


Fig. 7.140 : Telome concept : Stages in the evolution of the megaphyll of Pteropsida from primitive dichotomous axis (A) following overtopping (B), planation of axis (C) and syngenesis (D)

Suggested readings:
https://www.researchgate.net/publication/270476086_The_telome_theory/link/54ae927c0cf21670b3585cf6/download

I have also sent you the PDF of the paper.