enzyme in different tissues. This was studied by the reduction of triphenyltetrazolium chloride to a red water-insoluble formozan using sodium succinate as substrate.[2] All the experiments were performed at a temperature of 25° C. The resulting formozan at the end of one hour was extracted with acetone and read at 420 mμ in a Lumetron colorimeter. The optical density is directly proportional to the enzyme activity. The results are given in Table I.

TABLE I

Tissue	μg. of dye reduced / mg. of tissue / 60 min.				
	Mussel 1	Mussel 2	Mussel 3	Mussel 4	Mean
Heart	1·15	0·915	1·412	0·905	1·09
Gill	0·404	0·380	0·452	0·615	0·46
Foot	0·325	0·235	0·742	0·478	0·45
Adductor Muscle	0·381	0·331			0·36
Viscrae	0·298	0·205	0·272	0·187	0·23
Mantle	0·160	0·126	0·332	0·213	0·21

A perusal of Table I would clearly show that the heart tissue (including pericardium) shows maximum activity. The activity of the other tissues in decreasing order is as follows:

Heart > Gill > Foot > Adductor muscle > Viscera > Mantle. The results obtained in the present study when compared with values reported for heart of rat[2] using this method shows that the activity is very low in *Lamellidens*. In rats, the dehydrogenase activity of the heart tissue is nearly 3·6 times that of *Lamellidens*. This may be correlated perhaps with low metabolic rate in a more or less sedentary mussel compared to an active homeotherm like the rat. Further, the temperature may accelerate the activity in rat.[3] Among the various tissues, the kidney shows the maximum activity in the rat whereas it is the heart in *Lamellidens*. *Lamellidens* shows very little muscular activity except in the heart, gills and foot. Perhaps this is reflected in the succinic dehydrogenase activity also.

Department of Zoology, University of Madras, Madurai Centre, Madurai-2.
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S. KRISHNASWAMY.
AL. PAULPANDIAN.

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MULTICELLED TRABECULAE IN SOME SPECIES OF *SELAGINELLA*

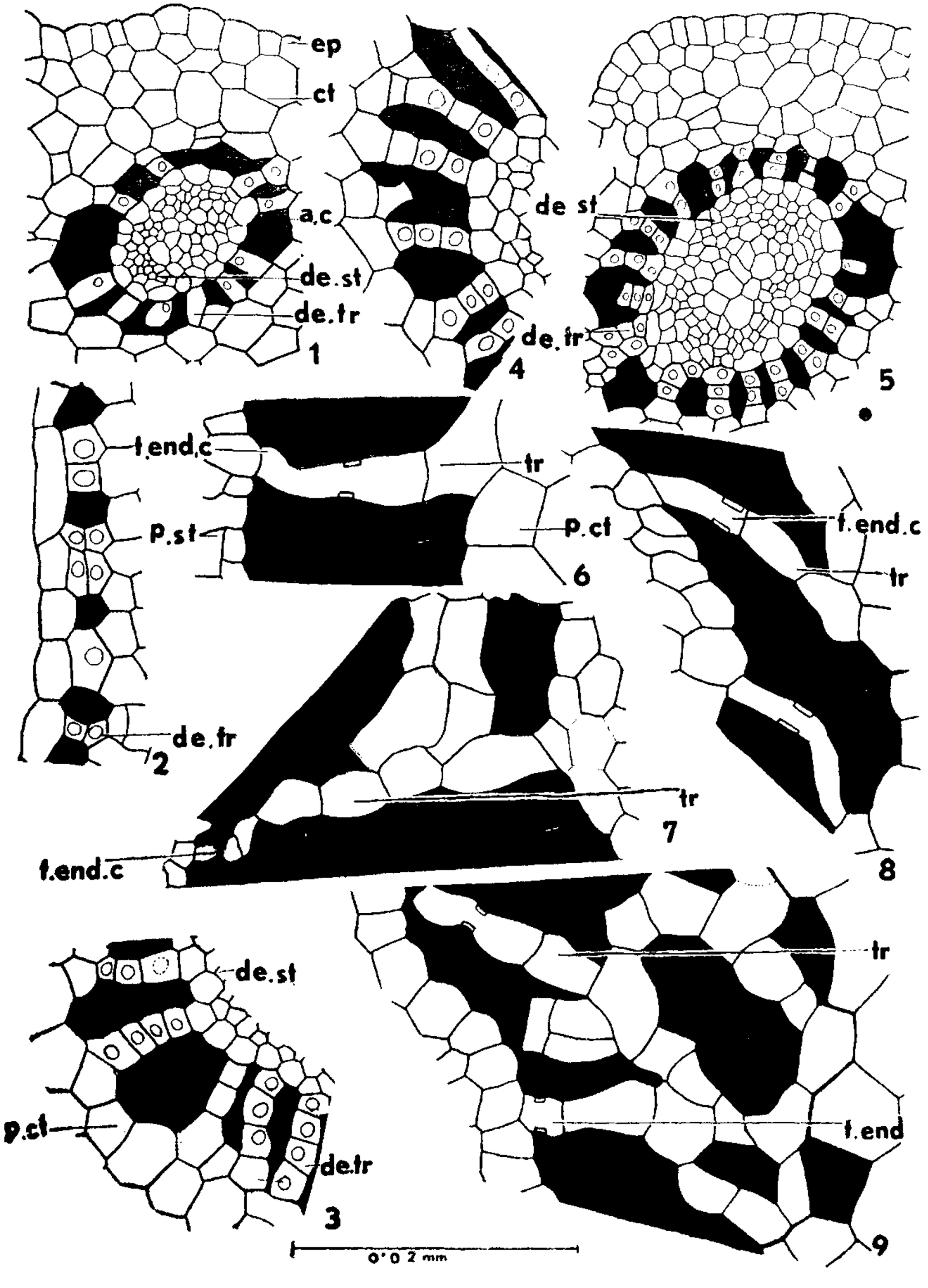
A TRABECULA in case of *Selaginella* stem has usually been described as unicellular structure (*see* Barclay,[1] Eames,[2] Smith[3]). Further, it is usually believed to represent the endodermal layer of *Selaginella* stem. Figures in literature show casparian strips in them. Webester's[4] dictionary has defined a trabecula, on the other hand, as 'a row of cells bridging an intercellular space'.

During the study of apical organization and differentiation[5] of tissue in some species of *Selaginella*, i.e., *S. tamariscina* (Beauv.) Spring; *S. remotifolia* Spring; *S. adunca* A. Br.; *S. monospora* Spring; *S. chrysorrhizos* Spring and *S. sp.*, trabeculæ were found consisting of more than one cell in young stem as well as in mature except in *S. chrysorrhizos* where they are unicellular from the very beginning. This necessitated a detailed study of the structure and developmental aspects of trabeculæ in all these species.

In *S. chrysorrhizos* during differentiation some cells of the inner tissue, surrounding the stele in the central apical region just below the apical meristem, begin to elongate in both fertile and sterile apices (Fig. 1). At a slightly lower level, these elongated cells of the procambial strand are further differentiated from the surrounding tissue of the cortex. It is due to the development of the several intercellular spaces surrounding the central core as observed in cross-sections (Fig. 1). The spaces are formed schizogenously. Each elongated intervening cell which is present in between the two spaces is one cell in width, height and length. It undergoes radial extension and forms a trabecula. Each trabecula later on develops a casparian strip in its central region.

In all other species, however, they are two to several cells in length though one cell in width and height from the very beginning (Figs. 3, 4 and 5). It is significant to note that such a situation has not been reported in any earlier work on this genus.

In mature stems the trabeculæ are not visible usually either due to their delicate nature or due to their complete rupture. Occasionally they have, however, been observed showing variation in structure in different species and even in the same from their initial condition during differentiation. It appears, therefore, worthwhile to study their structure in young as well as in old stems in some detail. In *S. tamariscina*, in the beginning they are four



FIGS. 1–9. Fig 1. A portion of a transverse section of young stem of *S. dimorphostegia* showing differentiating trabeculæ. **Fig. 2.** A portion of a longitudinal section of young stem of *S. tamariscina* showing differentiating trabeculæ and air spaces. **Figs. 3–5.** Portions of transverse sections of young stems of *S. tamariscina*, *S. remotifolia* and *S. monospora* respectively showing differentiating trabeculæ and air spaces. **Figs. 6–9.** Portions of transverse sections of mature stems of *S. sp.*, *S. remotifolia*, *S. monospora* and *S. tamariscina* respectively showing mature trabeculæ connecting stelar tissue with the cortex. Note the presence of casparian strips only in one cell which is adjacent to the pericycle. (*a. sp.*, air space; *ct.*, cortex; *de. st.*, differentiating stele. *de. tr.*, differentiating trabecula: *p. st.*, part of the stele; *p. ct.*, part of the cortex; *t. end. c.*, true endodermal cell; *tr.*, trabecula.)

to seven cells in length (Figs. 2 and 7) but as their course is followed further in cross-sections, the inner cortical cells which are just adjacent to the trabeculæ also develop intercellular spaces and thus an irregular mass of tissue is formed between the outer cortex and the stele of the stem (Fig. 9). In older stems of this species they are completely missing or when present are multicellular (Fig. 9). In case of *S. remotifolia* they are multicellular in young as well as in mature stems (Figs. 4 and 7). In *S. monospora* in one trabecular cell two degenerated nuclei have been observed without any trace of partition wall. It, therefore, indicates that unicellular condition in some species might have been attained by the dissolution of the partition walls between two trabecular cells (Fig. 8). In *S. sp* they sometimes give the appearance of a single cell connecting the cortex with one or two cells on one side and the stelar tissue on the other (Fig. 6). It must be pointed out here that whenever a multicellular trabecula has been observed in mature stems, the casparian strip has been found only in one cell which is adjacent to the pericycle (Figs. 6-9).

From the preceding account, it becomes clear that a trabecula may be unicellular or multicellular in young as well as in mature stems. However, if this turns out to be a usual condition (other species being investigated), we have to broaden our notion about the morphology of the trabeculæ. The usual concept that they are endodermal in nature would have to be modified, as true endodermis is rarely more than one layer thick; *Equisetum* and *Lygodium* root being only exception where it is two layers thick. Thus on the basis of the present work, it can be said that trabecula in case of *Selaginella* is partly endodermal, as the casparian strip develops only in one cell whenever a multicellular trabecula has been observed, and partly cortical in origin at least in those species where a multicelled condition is found in young as well as in mature stems. The multicelled condition of trabeculæ appears to be correlated with the nature of the air space system in the stem of *Selaginella*. If the air space system is large, a trabecula is made up of several cortical cells in addition to an endodermal cell.

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School of Plant Morphology, Meerut College, Meerut, *June* 25, 1965.

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IN VITRO CULTURE OF *UTRICULARIA*

THE insectivorous plants have curiously modified leaves to capture the prey. Whether the trapping of the prey is a mere consequence of the structural modifications or the plants depend on the prey for a part of their nutrition is a fundamental question. What morphogenetic factors control the development of the trapping structures is also worthy of inquiry. Such problems can best be studied by cultivating the plants on defined nutritive media under controlled environmental conditions.

The first report of the aseptic culture of an insectivorous plant concerns *Drosera* (Burger, 1961). Pringsheim and Pringsheim (1962) raised sterile cultures of *Utricularia exoleta* and got them to flower after the addition of peptone and beef extract to the medium. Harder (1963) obtained flowering in this species by including into the medium peptone extract from meat or infusions of *Daphnia*. Another recent study is that of Withner (1964) on *Darlingtonia*, *Dionœa* and two species of *Sarracenia*. Harder (1964) was able to make cultured plants of *Drosera pygmœa* flower, fruit and complete their life-cycle without the addition of animal proteins into the medium.

The present work consists of preliminary observations on the germination of the seed and the development of the adult plant of *Utricularia gibba* Linn. sub sp. *exoleta* (R.Br.) Taylor.* The formative effects of some growth-regulating substances have also been studied.

The fruits of *Utricularia*, collected from Bangalore in July 1964, were surface-sterilized with chlorine water. The seeds were dissected out aseptically and planted on White's basal medium (WB) with 2% sucrose. For later studies the medium was supplemented with one of the following: naphthaleneacetic acid (NAA, 1 and 5 ppm), 2, 3, 5-triodobenzoic acid (TIBA, 1 and 5 ppm); gibberellic acid (GA, 5 and 10 ppm); coconut milk (10% v/v), 2, 4-dichloro-