The development of microsporangium is normal with two to three hypodermal cells differentiating as archesporial cells. The tapetum in *Ophiorrhiza harrisiona*, *O.hirsutula*, *Canthium angustifolium* and *C.parviflorum* is single layered and is of secretory type as also reported by Raman (1954) in *Stephegyne parviflora*, Venkateswaralu and Rajeswara Rao (1954) in *Hamelia patens* and *Rubia cordifolia*, Ganapathy (1956 a) in *Hydrophyllax meritima*, Gopinath and Chennaveeraiah (1961) in *Ophiorrhiza harrisiona*, Shivaramaiah and Ganapathy (1961) in *Knoxia corymbosa*, Sundar Rajan et al (1974) in *Richardia scabra* and Maheswari Devi and Krishna Raju (1980) in *Dentella repens* and *D. servylilifolia*, but with 4-6 hypodermal archesporial cells. However, Raghavan and Rangaswamy (1941) have reported binucleate tapetal cells in *Dentella repens*.

Fibrous endothecium in the anther is found in *Ophiorrhiza harrisiona*, *O.hirsutula*, *Canthium angustifolium* and *C.parviflorum* as also in *Stephegyne parviflora* (Raman 1954), in *Rubia cordifolia* (Venkateswaralu and Rajeswara Rao 1958), in *Ophiorrhiza harrisiona* (Gopinath and Chennaveeraiah 1961). However, Ganapathy (1956 a) reported the absence
of fibrous thickenings in the endothecium in *Hydrophylax maritima* and a similar condition has been noticed by Raghavan and Srinivasan (1941) in *Spermatoce hispida*.

Pollen grains of angiosperms are classified into binucleate or trinucleate ones depending on the number of nuclei at the time of anthesis. The essential difference between the two revolves round the time of the division of generative nucleus, which may occur in the pollen grain itself or in the pollen tube. About 66% of the angiosperm families are with binucleate pollen grains. The remaining are either exclusively trinucleate or both bi- and trinucleate. However, uninucleate pollen grains at the time of shedding were reported in *Ophiorrhiza mungos* (Omana Philip and Mathew 1975). There are certain other exceptions. For example, in *Suaeda fruticosa*, *Kochia scoparia*, *Chenopodium ambrosioides*, *Arthrocnemum indicum*, *Chenopodium murale* some of the pollen grains were with two vegetative nuclei and two cells apart from the normal 3-nucleate pollen grains (Mahable and Solanky 1953 a, 1953 b, 1954 c). In *Atriplex hymenlytra*, 4-nucleate pollen grains are reported (Billings 1934). According to him the fourth cell is the prothallial cell. Bhargava (1936) has reported many pollen grains with four nuclei in *Chenopodium*
album and the two vegetative nuclei are formed as a result of amitotic division. In *Musa* erran some of the microspores before dehiscence possess two to seven tube nuclei of varying sizes with a single generative nucleus (Juliano and Alcala 1933). The presence of extra tube nuclei do not have any morphological significance and they may be due to the fragmentation of the tube nucleus. In *Lilium tigrinum* and *L. quatum* hundreds of pollen grains have shown the division of tube nuclei. One pollen grain was found to contain eight nuclei, six of which are vegetative and two generative. This is due to direct or amitotic division (Chamberlain 1897). Many early workers are of the opinion that the vegetative nucleus had an important role in the life of the pollen tube (Maheswari 1950). Recent reports have revealed that the vegetative nucleus in the course of the microspore development is in a sort of degeneration and disintegration. In mature pollen grains of *Chenopodium hybridum*, *C. album* and *Atriplex patula* var. *hastata* the vegetative nucleus is in an advanced stage of disintegration and appears to be diffusing into the surrounding cytoplasm (Cooper 1935). Suita (1936) by Feulgen method has shown that the vegetative nucleus begins to increase in size and loses its chromaticity in *Crinum*. The chromatin substance seems to have dissolved and diffused into the nuclear sap.
In Secale, Senecio and Crepis the vegetative nucleus degenerates before the pollen grain begins to germinate (Poddubnja-Arnoldi 1936). The vegetative nucleus is therefore regarded as a vestigial structure without any important function in the life of the pollen tube.

In Persoonia virgata, P.ferruginea, P.oxycoccoides and P.microcarpa the intine protrudes through the germ pores to form knob like swellings and pollen grains are 2-celled at the time of shedding (Venkata Rao 1960). In Hakea amplexicaulis and H.lauria the aperture of the pollen grains is covered by conspicuously protruding membranes, (Erdtman 1957). Their roots are found just inside the exine aperture rims, between nexine and intine.

In the taxa of the present investigation the spherical protrusious (pollen buds) are formed in the region of pores after the first division of microspore nucleus. The vegetative nucleus moves into one of the pollen buds, where it undergoes degeneration. In some of the pollen grains, the vegetative nucleus undergoes fragmentation into irregular sized nuclear bits and these fragments enter into one or two or all the three buds, where they ultimately degenerate. In case of Ophiorrhiza harrisiana
and *O. hirsutula* the pollen buds later detach from the region of pores. Detached buds containing nuclear fragments are also observed. The detached buds also degenerate and disintegrate. However, at the time of anthesis the pollen grains are uninculate and are devoid of pollen buds. Whereas, in *Canthium angustifolium* and *C. parviflorum* the pollen buds persist and the generative nucleus divides before shedding of pollen grains. Thus, the pollen grains are binucleate with intact or persistent pollen buds at the time of anthesis.

The results of the present investigation clearly indicate, and adds to the opinion of the earlier reports, that the vegetative nucleus has no role in the life of the pollen tube. It appears clearly that the intine forms the pollen buds and such protrusions have been reported in some members of Proteaceae (Venkata Rao 1960 and Erdtman 1952). In species of *Hakea* the "root" of knob like swellings is found between the nexine and intine. If any membrane other than intine had formed the buds, the vegetative nucleus or the fragments of it would not have found their way into pollen buds. It seems from the observations that the buds are formed for the elimination of vegetative nucleus and it has no role in the life of the pollen tube. But the only
factor that is not yet clearly understood is the function of the vegetative nucleus. It must have some role otherwise vegetative nucleus would not have been formed. This still remains as a mystery and gives scope for further investigation.