Letters to the Editor.

A Preliminary Note on the Embryosac Development of *Callistemon linearis*.

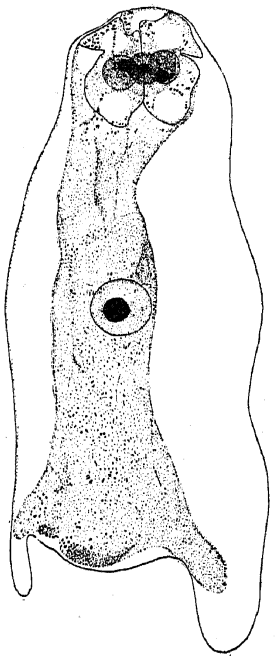
A SEARCH through the literature reveals the rather surprising fact that the family *Myrtaceæ* has been almost entirely neglected so far as their embryological development is concerned.

In spite of its richness, however, the only investigated cases so far recorded as cited by Schnarf[1] in his recently published admirable book are by Braun,[2] Cook,[3] Tiwary,[4] and Greco.[5] More recently Pijl[6] has published an account of his investigations on a few species of *Eugenia* from Java.

In *Callistemon*, the archesporium is hypodermal. It is not always restricted to a single cell, accessory archesporial cells being found in many ovules. Only one, however, pursues its development further. These accessory archesporial cells sometimes increase by multiplication, the daughter cells continuing to show the prominent archesporial features. The primary archesporial divides into the primary parietal and the primary sporogenous cell, the former undergoing further divisions to give rise to a parietal tissue. This results in the sporogenous cell becoming sunk about three or four cells deep in the nucellus.

The primary sporogenous cell becomes the megaspore mother-cell directly. In megasporogenesis a T-shaped tetrad is formed by two successive nuclear divisions. These divisions may or may not be simultaneous. When not simultaneous, it is the division in the cell on the micropylar side that is delayed. There is evidence also of a tendency towards the elimination of the wall-formation between the daughter nuclei. This may proceed so far as even to eliminate altogether the nuclear division in this cell.

The chalazal megaspore functions, developing into an 8-nucleate embryosac. The antipodals, however, seem to degenerate mostly quite early, since only degenerating ones are found in many ovules. The egg is as big as the synergids. In most cases it may even be smaller. The evidence so far indicates that the two polar nuclei fuse somewhere near the middle of the sac producing quite a prominent secondary nucleus (*vide* figure). Travelling to the micropylar side this nucleus later takes up its position close to the egg.



Almost mature embryosac of *Callistemon*.

The synergids during their development produce prominent beaks. The absence of these in some well-developed synergids indicates that this feature is lost at a later stage. Such hooked synergids have also been reported for other plants.[7,8,9] Their discovery in *Callistemon* adds one more name to the list.

The present investigation forms the first of a series of papers which it is intended to publish on the comparative embryology of the *Myrtaceæ*. The material has already

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[1] Schnarf, K. "Vergleichende Embryologie der Angiospermen." Berlin, 1932.

[2] Braun, A. "Uber Parthenogenesis bei Pflanzen." (*Abh. Ak.*, Berlin, *phys. Kl.* 1856.) 1857.

[3] Cook, M. T. "Notes on Polyembryony," *Torreya*, **7**, 113-117, 1907.

[4] Tiwary, N. K. (*a*) "On a peculiar mode of Germination of the seed in *Eugenia Jambolana*." *Proc. Ind. Sci. Congr., Calcutta*, 1921.

(*b*) "A preliminary note on the structure of the embryosac and the origin of the embryos in *Eugenia Jambolana*." *Proc. Ind. Sci. Congr., Benares*, 1925.

(*c*) "Development of the Embryosac in *Eugenia Jambolana*." *Proc. Ind. Sci. Congr., Bombay*, 1926.

(*d*) "On the occurrence of Polyembryony in the genus *Eugenia*." *Journ. Ind. Bot. Soc.*, **5**, 1926.

(*e*) "Further observations on the seeds and seedlings of *Eugenia Jambolana*." *Journ. Ind. Bot. Soc.*, **8**, 1929.

[5] Greco, R. (*a*) "Notizie preliminari sull'embryologia e la cariologia del *Myrtus communis*." *Nuovo giorn. bot. Ital.*, **36**, 1929.

(*b*) "Embryologia del *Myrtus communis*," *Ibid.*, **38**, 1930.

[6] Pijl, L. van Der. "Uber die Polyembryonie bei *Eugenia*." *Rec. des. Trav. bot.*, neerlandai, **31**, 1934.

[7] Rocên, Th. "Zur Embryologie d. Centrospermen. Diss." Uppsala, 1927.

[8] Maheshwari, P. "Contribution to the Morphology of *Boerhaavia diffusa*." *Journ. Ind. Bot. Soc.*, **8**, 1929.

[9] Bhargava, H. R. "Contribution to the Morphology of *Boerhaavia rependa*." *Journ. Ind. Bot. Soc.*, **11**, 1932.

been accumulating. The detailed account will appear elsewhere.

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Benares Hindu University,
January 25, 1934.

Density of Propicnic Acid Solutions in Water.

IN an experiment for the observation of the Faraday rotation of fatty acid solutions in water the density of the solution of propionic acid for different concentrations was determined as no detailed result for this is given in the *I.C.T.*[1] Some previous works, however, are referred to in those tables, but as far as the old literature could be consulted no systematic and exhaustive work seems to have been done in this direction. Thus Wilsdon and Sidgwick[2] give experimental values for only three low concentrations (from 1·945 to 10·28% of acid by volume) together with three other interpolated values for about the same range. Drucker[3] has also given results for eight different concentrations low and high, of which only two are for concentrations beyond 50%. Thus, it was necessary to make some fresh and systematic determinations.

All measurements were made at 25°C. and the variation of temperature was about ± ·02. A specific gravity bottle of 50 c.c. capacity was employed for density determination. The results are given in the table below (Table I) and also plotted in the graph. It is found that the density of the solution goes on increasing with the addition of the acid, but after reaching a maximum for about 51·2% of the acid (by volume), it decreases gradually. It is to be noted that the maximum density occurs at about a concentration when the acid and the water are mixed in equal quantities by weight. The phenomenon is also supported by the fact that in observing the Faraday rotation, the intensity of the light passing through the solution considerably diminishes at this concentration in comparison with concentrations higher and lower.

In the graph dots give the results of the present experiment and the small circles the Drucker's values. Of the latter, the value of the density for 74·01% of the acid (by volume) is rather high.

The Faraday rotation of the solution, however, does not show any maximum but goes on increasing with increase in the percentage of water, although it does not conform to the Schonrock-verdet mixture rule.

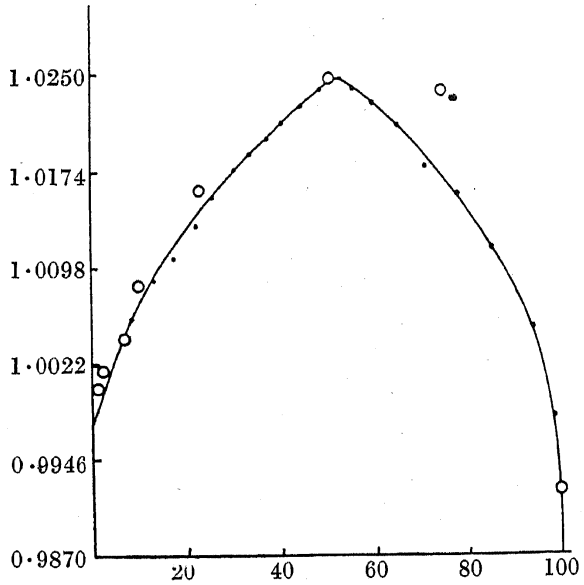

TABLE I.

Concentration % by volume	d_4^{25}	Concentration % by volume	d_4^{25}
7·098	1·0060	48·08	1·0244
11·36	1·00862	52·91	1·0250
15·91	1·01094	58·21	1·02370
20·69	1·01354	64·04	1·0222
24·84	1·01584	70·47	1·0186
29·85	1·01784	76·95	1·01624
32·84	1·01921	83·97	1·01204
36·11	1·02046	92·39	1·0058
39·73	1·02190	98·01	0·9882
43·70	1·02310		

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Calcutta,
January 31, 1934.

The Number of Microsporangia in each Stamen in *Asclepiadaceæ*.

THE available literature on the family, *Asclepiadaceæ*, discloses the fact that this family is characterised by the presence of only two microsporangia in each stamen. Frye,[1] however, expresses his doubt on this fact and appears to hint at the possibility of the existence of four microsporangia

[1] *I.C.T.*, 3.

[2] Wilsdon and Sidgwick, *J. Chem. Soc.*, **103**, 1959.

[3] Drucker, *Zeits. f. Phys. Chemie*, **52**, 641.