beyond $\frac{1}{4}$" there is a rapid fall in the strength of the pier—The economical proportion of cement mortar that could be used with wire cut bricks—The different ways of failure of the pier under direct compression.

(3) *Lean Cement Mortar.*—Tensile and compressive strengths against period of setting from neat cement to mortars of 1 to 10 proportions—Investigations of lime mortars of the proportions commonly used in practice.

A graph showing comparative strengths of wire-cut brick, wire-cut brick piers with varying thicknesses of joints and 1 to 6 cement mortar is given (Fig. 1).

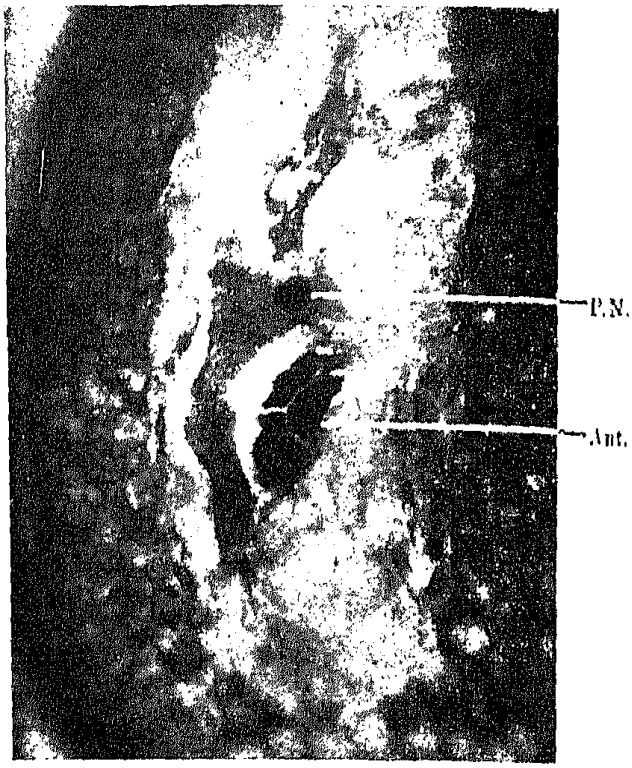
Detailed investigations and the results are being published elsewhere.

D. S. Venkanna.
R. Srinivasan.

Testing Laboratory,
University College of Engineering,
Bangalore,
November 10, 1937.

The Antipodals of *Pupalia lappacea* Juss.

In all members of the Amarantaceæ so far investigated, the antipodals have been reported to be three in number. The same condition has been observed by the writer in *Celosia argentea* Linn., *Cyathula tomentosa* Moq. and *Aerua lanata* Forsk.[1] In *Pupalia lappacea* Juss., however, the situation is different. Here the antipodals are three in the beginning, but soon they begin to multiply. All of them divide to form a small mass of cells as shown in the accompanying photograph. Their total number is variable, but up to 30 to 40 cells can be commonly counted in the later stages. The cells of this antipodal mass are generally small, full of cytoplasm and without vacuoles, but among them a few larger cells are also found and these show prominent vacuoles. The multiplication of the antipodal cells takes place before the division of the primary endosperm nucleus, which lies somewhere near the mass of the antipodals. During the secondary elongation of the embryo-sac the antipodals are pushed laterally, and persist after fertilisation upto the early stages of embryo development on one side



Pupalia lappacea. Photograph of the middle portion of the embryo-sac showing the primary endosperm nucleus and the laterally pushed antipodals. × 300.
P.N., Primary endosperm nucleus. Ant., Antipodals.

of the embryo-sac, as in *Digera*,[2] *Alternanthera*,[3] and *Achyranthes*.[4]

L. B. Kajale.

Department of Botany,
Benares Hindu University,
September 28, 1937.

[1] Kajale, L. B., Unpublished observation.
[2] Joshi, A. C., *Curr. Sci.*, 1936, **4**, 741.
[3] Kajale, L. B., *Proc. Ind. Acad. Sci.*, (B), 1935 **1**, 476–80.
[4] Kajale, L. B., *ibid.*, 1937, **4**, 195–205.

Martynia Pollen Germination on the Sesamum Stigma.

The genera Martynia and Sesamum belong to the family Pedaliaceæ. With a view to evolve disease and pest resistant Sesamum plants with high oil contents, etc., attempts are being made to cross *Sesamum indicum* L. (♀) with *Martynia diandra* Glox. (♂).

Pollination was done at different hours of the day and night and at definite intervals the pistils were removed and fixed in a mixture of 70 per cent. alcohol (10 c.c.) and formalin (1 c.c. of 40 per cent.). Longitudinal free-hand sections were cut and stained in lacto-phenol—cotton blue-safranin for about one minute.[1] Destaining was

Fig. 1.

A portion of the longitudinal section of the stigma of *Sesamum indicum*, showing Martynia pollen germination. The pollen tubes (PT) are distinctly seen.

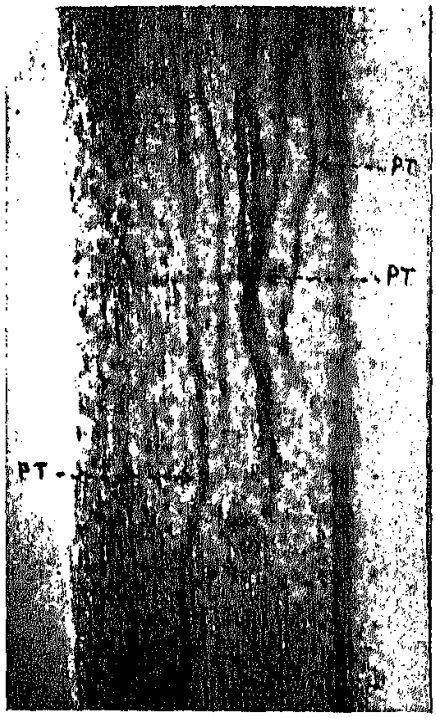


Fig. 2.

A portion of the longitudinal section of style of *Sesamum indicum*, showing Martynia pollen tube growth (PT).

done by warming in lacto-phenol for about two minutes. The sections were then mounted in lacto-phenol. The pollen on the stigma takes deep blue staining. Those pollen grains which germinated, could be distinctly seen with their pollen tubes which could also be sometimes traced through the style. The condition after fourteen hours is shown in the accompanying microphotographs which were taken from the same section. The germination of pollen was first noticed nearly four hours after pollination.

It appears probable that the cross between Martynia and Sesamum may be announced some day. If successful, it may produce results of great economic value.

I am greatly indebted to Prof. Moghe and Dr. Ganeshan, College of Science, Nagpur, for the microphotographs.

Thanks are due to the Imperial Council of Agricultural Research for financing this Oil Seed Research Scheme.

R. H. Richharia.

Oil Seeds Research Laboratory,
Nagpur,
October 6, 1937.

---

[1] Morris, *J. of Genetics*, 1936, **33**, 435.

Technique of the Mural Paintings in the Brihadesvara Temple at Tanjore.

Dr. A. K. Coomaraswamy, after a careful study of the Sanskrit texts on painting, came to the conclusion that the Indian technique of wall painting was tempera and not fresco. The numerous references in ancient Indian literature also leave no doubt that there is a continuity of the classical technique of painting in India, 'at least from the Gupta period until about the present day'.[1] However, S. Paramasivan after studying the technique of the Mural paintings in the Brihadesvara temple at Tanjore, has recently come to the conclusion that the earlier (eleventh–twelfth century) or Chola paintings have been executed in the true fresco and the latter (seventeenth century) or Nayak ones, in the fresco-secco style. He has elaborated these views even further in order to prove that a close similarity exists between these and the mediæval Roman frescoes.[2] Paramasivan has also examined the seventh century paintings in the cave temple at Sittannavasal which, in his opinion, are also done by the fresco-secco process.[3]

This fresco theory is untenable for various reasons. At the outset, it may be pointed out that the plaster of the Tanjore paintings is too thin (about 1/10″ on the average[4]) to have served the purpose as this could not have remained sufficiently moist long enough for the fresco process