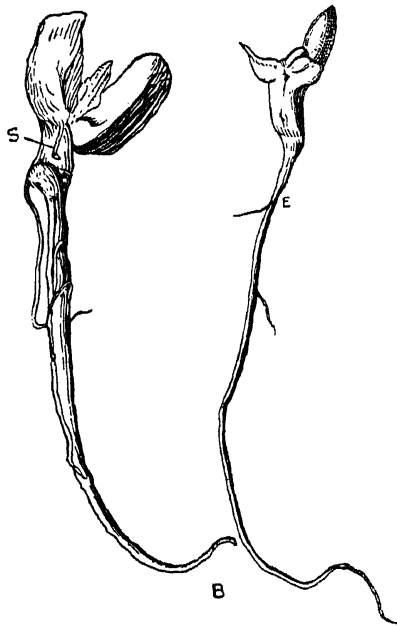


While germinating a number of varieties of groundnut for root-tips, the authors observed that one seed of the variety "Bassi" was found to produce two radicals (Fig. A). Dissection of the seed revealed two seedlings. The bigger one was quite normal and the smaller had two thin, unequal cotyledons and a normal plumule. In the seed, the cotyledons of the smaller seedling were enclosed in between those of the bigger



B. Two seedlings separated. E. Extra seedling.  $\times 2$   
S. Stalk by which the additional seedling is attached.  $\times 2$

one. At the top of the hypocotyl where the two cotyledons meet, there was a funicle-like structure connecting the hypocotyl of the extra seedling (Fig. B). Besides this, no other structure connecting the two seedlings was found.

The sources of the additional embryo or embryos are many and the correct origin could be determined best in the embryo-sac stage, which, in this instance, was not available.

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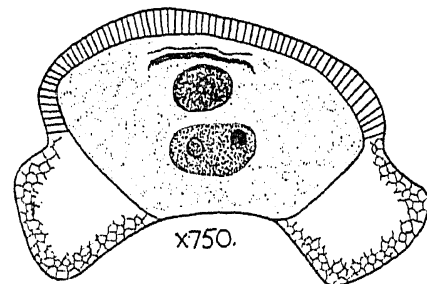
#### A Note on the Shedding Condition of the Pollen Grains of *Pinus longifolia* Roxb.

POLLEN grains of all the species of *Pinus* so far investigated show two prothallial cells, one generative cell and one tube nucleus at the time of shedding (Schnarf,<sup>1</sup> p. 25). The only exception so far recorded is that of *Pinus longifolia* where Sethi<sup>2</sup> (see

p. 133) reports that "Two prothallial cells are cut off while the pollen grain is still within the sporangium. These cells are more evanescent perhaps than in the other species of *Pinus* because they disorganise very soon and the pollen at the time of shedding stage shows no indications of them."

From this statement one would conclude that the development to form the tube and generative nuclei does not occur in the male cones. On further enquiry Dr. Sethi wrote that the mature pollen is only three-nucleate at the time of shedding and that the division to form the tube and generative nuclei occurred on the nucellus. As there are several cultivated trees of *P. longifolia* at Agra, it was suggested by Dr. P. Maheshwari that I should section some material to ascertain this point more definitely.

The first two divisions of the microspore nucleus result in the cutting off of two prothallial cells. As stated by Sethi these become flattened and disorganised very early. *The nucleus of the pollen grain divides*



A mature pollen grain of *P. longifolia*.

once again producing the tube and generative nuclei. The generative nucleus is smaller than the tube nucleus and takes a very dark stain with hæmatoxylin. It organises into a definite cell by gathering some cytoplasm around it. In spite of the ephemeral nature of the prothallial cells I could still find some favourable preparations in which all four nuclei were clearly distinguishable (see Fig.). I feel inclined to think that the material sectioned by Dr. Sethi was a little too young. The tube nucleus assumes an irregular shape at maturity.

I am indebted to Dr. P. Maheshwari for his kindly examining my preparations and confirming these observations.

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May, 1935.

<sup>1</sup> *Embryologie der Gymnospermen*, 1933, Berlin.

<sup>2</sup> *Jour. Indian Bot. Soc.*, 1928, 7, 105.