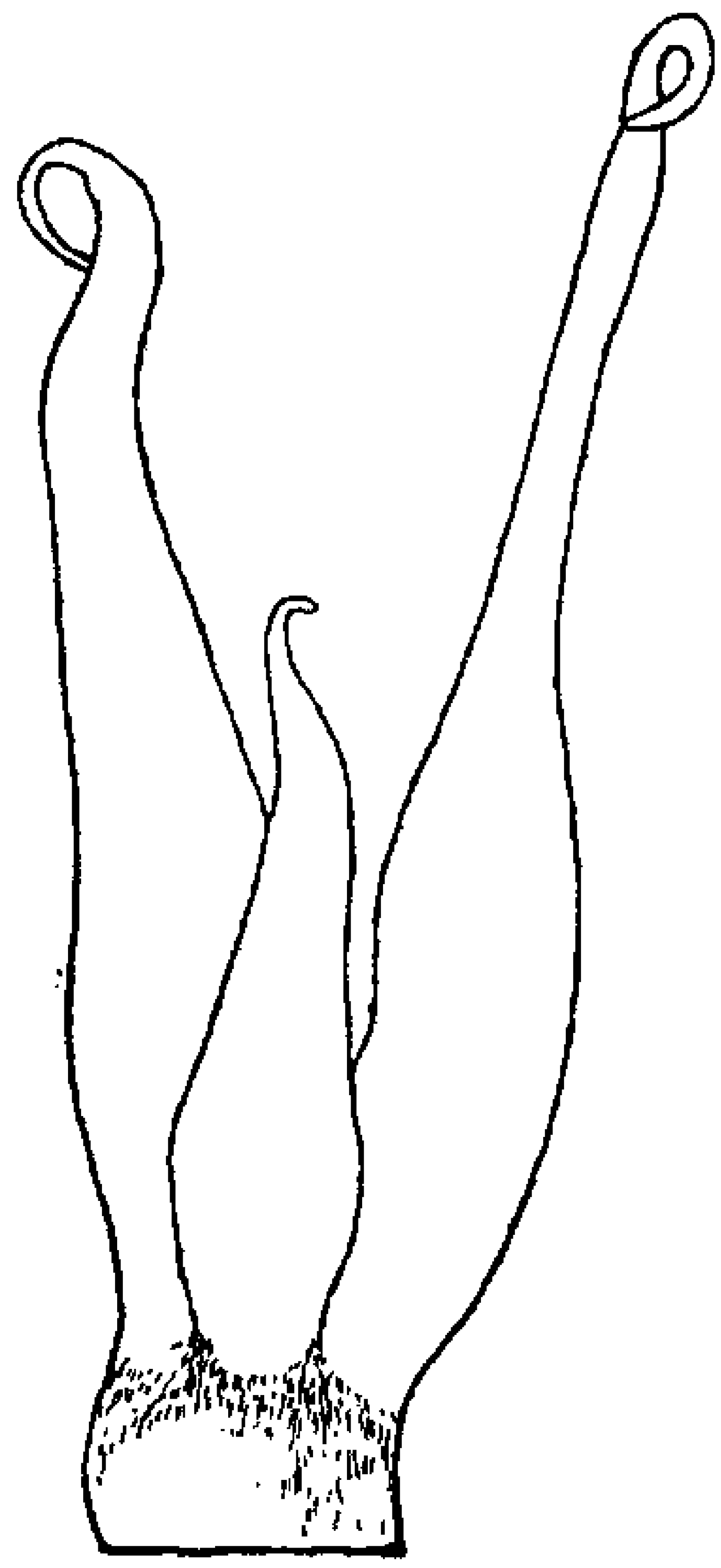
Multicarpellary Apocarpous Pistils in *Poinciana regia* Boj.

In this short note the abnormal occurrence of multicarpellary apocarpous gynaecia is recorded in *Poinciana regia* Boj, collected locally by the writer in the first week of August. Several flowers were collected in which the pistil was composed of more than one carpel. One such, from a not very immature flower-bud, is sketched in the accompanying figure, after the removal of the sepals, petals and stamens. In the material examined flowers were seen having 2-4 carpels. All the carpels were never of the same size. In many cases, one could make out from the outside a central growing point-like structure and it appears that this goes on forming new carpels laterally in acropetal succession. A detailed histological investigation is on hand and results will be published in due course.



Poinciana regia.
An abnormal pistil showing three carpels.

A. C. Joshi.

Botany Department,
Benares Hindu University.
Benares,
August 18, 1932.

On the Wave-Statistical Theory of Unimolecular Reactions.

In a previous paper, a relation between the disintegration constant and velocity of α-particles in radioactive disintegration was established by Kar and the author introducing a damping factor in the wave equation. In this paper it is suggested that the reacting molecules first of all absorb energy A—Q where A is the 'activation energy' and Q the heat of reaction such that the decomposed products and undecomposed molecules should be at the same energy level, before spontaneous damping or in the language of wave mechanics, 'austausch' takes place. This is analogous to the familiar activation hypothesis. Considering two regions, $x < r_0$, where damping takes place, and within which the molecules are present as complete entity and a region $x > r_0$, at the boundary of which there is a potential barrier which the resultant products must overcome, the following expressions for the velocity coefficient are deduced:—

$$k_1 \sim \frac{0\cdot 91}{h} \sqrt{(\mathrm{A}-\mathrm{Q})\,\mathrm{A}}\; e^{-\frac{\mathrm{A}}{k\mathrm{T}}} \quad .. \quad .. \quad (1)$$

(First approx.)

$$\text{or if } \mathrm{Q} \sim 0, \quad k_1 \sim 0\cdot 91\, \nu\, e^{-\frac{h\nu}{k\mathrm{T}}} \quad .. \quad (1a)$$

where $\mathrm{A} = h\nu$

$$\text{and} \quad \mathrm{A} = exp. \frac{\beta\,(\mathrm{Q}-\mathrm{A})}{\sqrt{\mathrm{A}}}\; e^{-\frac{\mathrm{A}}{k\mathrm{T}}} \quad .. \quad (2)$$

where β is constant and the damping co-efficient is large. Another alternative expression is obtained for the case when the damping is small in the following form:

$$k_1 \sim .e^{\beta' \sqrt{\nu + \mathrm{Q} - 2\mathrm{A}}}\,.\, e^{-\frac{\mathrm{A}}{k\mathrm{T}}} \quad .. \quad .. \quad (3)$$

It is to be noted that equation (1*a*) is similar to the expressions of Dushman, Polanyi and Wigner and the author, while (2) is similar to that obtained by Roginsky and Rosenkewitch.[1] The last two expressions involve the distance r_0 indicating that although ordinarily the reaction velocity co-efficient is independent of concentration, modification may take place at very low pressure either by the change of r_0 or diminution of the damping co-efficient on account of the abnormal decrease of density.

A. Ganguli.

Chandernagore,
September 1932.

[1] *Z. Phy. Chem.*, **10B**, 47, 1930.