

MUTATION IN A PROTEACEOUS TREE.

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(With Text-Figure 22.)

(Read before the Royal Society of Queensland,
30th September, 1918).

A number of specimens of the handsome Proteaceous tree, *Buckinghamia celsissima* F. v. M., have been introduced from North Queensland and are thriving in Brisbane gardens. In the normal flower there is at the base of the style "a single semiannular truncate and crenulate gland."* (*Glandula hypogyna solitaria, fere semiannulata*)†. Certain trees, however, present a striking divergence from the typical form. Several hundreds of flowers obtained from a tree at Woolloowin during February and March, 1918, were closely observed by us. In practically every flower the hypogynous gland is divided into four or five segments (usually five), and two of these are much elongated into supplementary style-like processes. These are about two thirds the length of the true style and terminate in small clavate discs which simulate stigmas, even as to colour. These supplementary style-like processes are very noticeable in the showy racemes. The length varies with development. In the earlier stages these processes are partly curved upon themselves inside the perianth tube and at no time do they reach the revolute limb which encloses the stamens. As the flower matures they are set

*Bentham, *Flora Australiensis*, v., p. 532.

†F. v. Mueller, *Fragm., Phytogr.*, vi, 247; italics Mueller's.

free and stand erect, usually one on each side of the central style, which may still be looped in. In still later stages they tend to shrivel and are easily misplaced. In no case was any enlargement to be detected at the base. The differences between the normal and abnormal flowers are illustrated in text-figure 22.

The flowers of our Proteaceæ are typically protandrous, and the remarkable mechanism which ensures cross fertilisation—the immature style when detached from the anthers being a temporary depot for pollen grains—has been described by Delpino, Bentham and a number of subsequent authors. As long ago as 1882, W. Trelease made interesting comments on the various views held*.

In *Buckinghamia celsissima* the central style may have a number of pollen grains adhering to it when first set free. Pollen grains also adhered readily to the supplementary style-like processes when artificially supplied, but no grains were actually detected upon them in a state of nature. It is, however, conceivable that these processes may be of value as pollen carriers through grains falling upon them, and a still further development would increase their utility. On the other hand, this variation may be of use from the decorative standpoint to the tree, which attracts large numbers of insects, principally Hymenoptera.

Upon inquiry we found that the tree examined had been brought as a seedling from another specimen at Enoggera. Many racemes from the parent tree were then observed and also a single raceme from a young one close by. Without exception, each flower showed a pair of supplementary style-like processes developed similarly to those on the first tree.

Searching also revealed one or two flowers with elongate processes in each of many racemes examined from trees in the Brisbane Botanic Gardens. In each raceme from another tree at Indooroopilly a few flowers were found with two elongate processes and a number with only one elongate process, the great majority being normal.

*Proc. Boston Socy. Nat. Hist., xxi, 1882, p. 419.

The first three trees demonstrate a race with well-developed supplementary style-like processes. There is no evidence of a graduated change from the tiny segments of the hypogynous gland, and it is, therefore, thought that this marked modification is better expressed as a mutation than as a variation. With the occasional exception in *Hakea digyna* Ewart and Davies* (through fusion of pedicels), a one-celled ovary seems to be the prevailing condition in Proteaceæ, and we do not know sufficient of their ancestry to warrant an interpretation of these structures as instancing a primitive tri-locular form. It has been suggested that the gynæcium of Proteaceæ is bi-carpellary because bidented or bifurcated style-ends are found in the genera *Agastachys* and *Adenanthos*, but Bentham expressed his opinion that these genera "are essentially monocarpellary."†

The hypogynous gland or glands usually possess fairly constant generic characters, and their value in classification was noted by Robert Brown.‡ He also recorded their resemblance to stamina and their function as secreting organs (*loc. cit.*, p. 133).

Instances of twin styles in Proteaceæ have been noted by Cheel (*Grevillea punicea* R. Br.)†† and Fletcher (*Grevillea burxifolia* R. Br.),‡‡ as well as in *Hakea digyna* Ewart and Davies.**

A normal raceme of *Buckinghamia celsissima* is well illustrated in Bailey's Queensland Flora (Vol. iv, p. 1352, pl. lx).

*Flora of the Northern Territory, 1917, p. 85

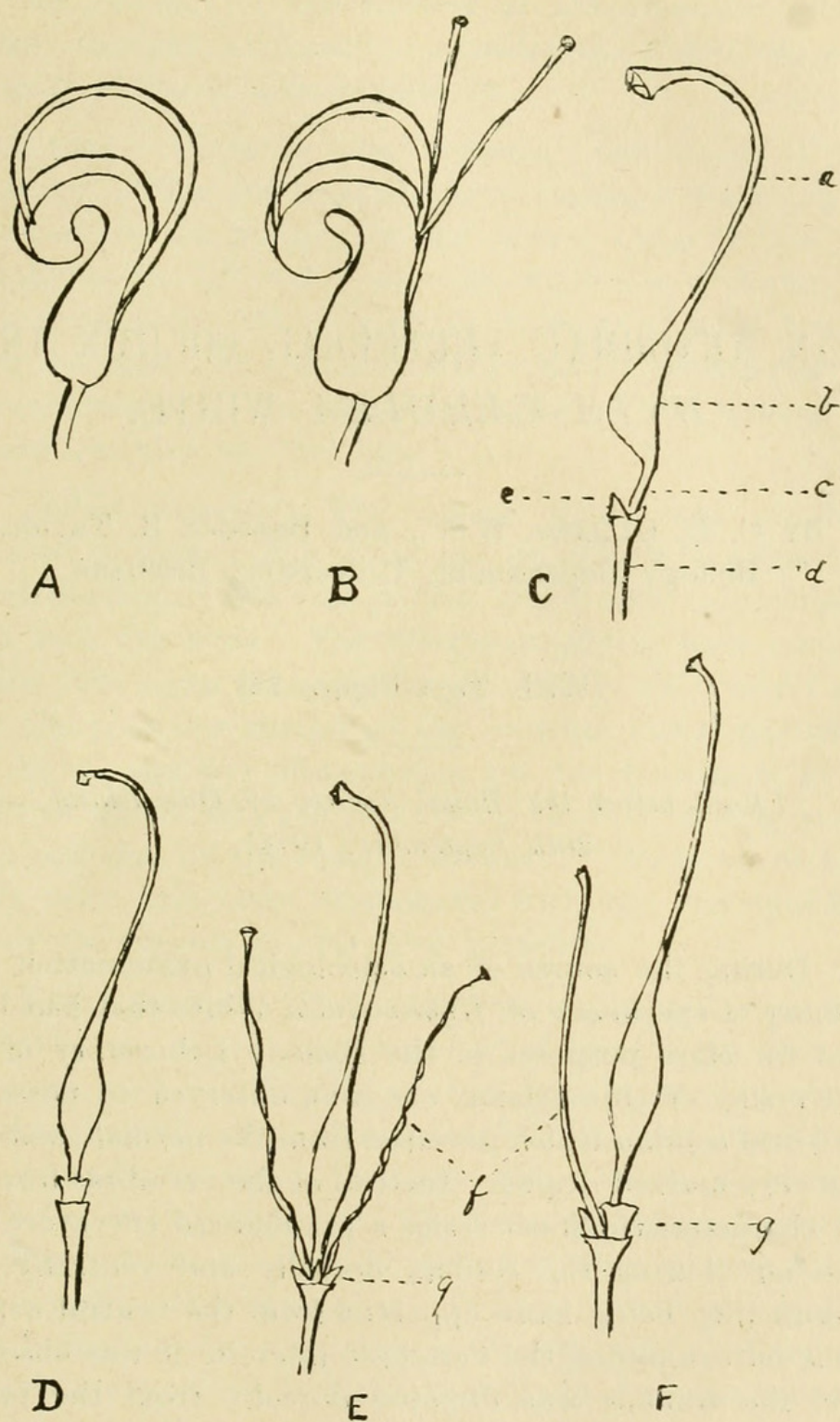
†Journ. Linn. Socy., Bot., xiii, 1873, p. 63.

‡Miscel. Bot. Works, Ray. Socy., ii, 1867, p. 17.

††Proc Linn. Soc. N.S.W., xxxvi, 1911, p. 158.

‡‡Proc. Linn. Soc. N.S.W., xlii, 1917, p. 247.

**Flora of the Northern Territory, 1917, p. 85.



Text-Figure 22. A—Flower bud (normal); B—flower bud showing position of the style-like processes; C—pistil (normal), side view: *a* style, *b* ovary, *c* stipes, *d* pedicel, *e* hypogynous gland; D—same, front view; E—pistil, front view; *f* elongate process; *g* the three small lobes of the hypogynous gland; F—pistil showing only one elongated process of the hypogynous gland. All enlarged.



Longman, Heber Albert and White, C. T. 1918. "Mutation in a Proteaceous Tree." *The Proceedings of the Royal Society of Queensland* 30, 162–165.

<https://doi.org/10.5962/p.351445>.

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