

ART. XXXVII.—*Observations on the Development of the Flower of Coriaria ruscifolia; Linn.*

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[Read before the Philosophical Institute of Canterbury, 5th August, 1886.]

Plate XXI.

THE dubious affinity of the genus *Coriaria* renders its study interesting. My observations on the development of the flower of *C. ruscifolia* showed many important departures from the type given by Hooker. They were made almost wholly on preserved specimens gathered at various times between September, when the buds first appear, and March, when the fruit is ripening. The bud arises, like all flower-buds, as a little rounded cellular papilla in the axil of a bracteole. It grows rapidly, and the sepals very quickly begin to become distinct from the rest of the flower (Plate XXI., fig. 1, s). A longitudinal section shows them as a rounded protuberance on each side of a central cellular mass. Seen from above they have the appearance of six distinct papillæ. They begin to grow up around the rest of the bud, and the petals and stamens arise as little rounded protuberances above the upper surface of the bud (fig. 2), while the central portion remains more or less flat. This, however, soon becomes rounded (fig. 3), and in some sections seemed to be clothed with a layer of loosish cells. The sepals meanwhile grow very fast, and soon begin to close over the bud, while the petals and stamens grow rapidly also (fig. 4). All this is shown in flowers gathered on the same day, September 30th, and the buds though showing different stages of development do not vary greatly in size, as can be seen from the figures. In a bud gathered on October 3rd there is seen a great advance in growth (fig. 5). The sepals completely close in over the rest of the bud, the petals grow around the stamens, and these nearly meet over the pistil, which now shows six distinct styles. Like the sepals, the petals, stamens, and styles arise as little papillæ, seen from above to be distinct from each other. All the four whorls of the flower have six segments each, although the flower is a Dicotyledon. This renders it extremely interesting. Hooker, in his account of the *Coriariæ*, mentions nothing of this peculiarity, but says that the parts of the flowers of the *Coriariæ* are in 5's or 10's. In the *C. ruscifolia*, however, I have found nothing but six in all four whorls of the flower. I cannot account for the prevalence of this number in the plant: nothing I have seen has tended to show how it arises, whether by the doubling of one (or two) parts, or by the suppression of two (or four) out of an original eight (or ten); but neither of these suppositions seem at all probable.

When the styles arise they are curved over towards each other, enclosing a hollow (fig. 6), but they soon begin to grow up straight, while the ovary begins to swell out (fig. 6). The cells at the top of the style now begin to be rounded off from one another, so that the beginning of the stigma can be recognized (fig. 6, *st.*). Meanwhile the stamens have been rapidly growing, and have differentiated into a short filament surmounted by a large anther (fig. 6, *f* and *a*). The origin of the pollen, however, is not yet visible. The growth of the sepals and petals has been going on by vegetative division of the cells, and there is nothing particularly to be noticed in these whorls till after the fertilization of the flower.

The stamens soon begin to form mother-cells in the usual way, but the most interesting part of the flower is the gynœcium. The stigmatic cells, which at first were found only at the tip of the style, now spread downwards (fig. 7, *st*) and the style rapidly becomes stigmatiferous right down to the ovary. At the same time each carpel of the ovary begins to get hollow, and a single ovule arises in each as a papillary outgrowth from the central wall of the carpel (fig. 7, *ov.*). It grows rapidly and curves downwards till it assumes an anatropous form, while a coat grows round the nucellus (fig. 8, *ov.*). The ovule is now pendulous, and grows rapidly, and about this time the flower opens. I made a great many sections to try and observe a second coat growing round the ovule, but failed. I cannot say whether there is only one coat or two. I obtained many sections showing the one coat growing up, as in fig. 8, and many showing the complete ovule, but none showing a second coat growing round it.

All these forms of development may be observed between the 3rd and 27th of October. About the latter date the flower expands. Transverse sections through it just before it opens give the appearance of fig. 9, and fig. 10. In the latter the fibro-vascular bundles of the petal show like two ridges on the inner surface; the anthers distinctly show the four loculi, and the six styles are compressed into an irregular hexagonal form.

The growth of the anthers has not been noticed since the formation of the mother-cells of the pollen. These divide and give rise to four pollen grains each, before the pollen grains become separated (fig. 12). The ripe pollen grains are much larger than when first formed, and the cell-wall is thickened in three places. In each grain there is a nucleus, usually with two nucleoli (fig. 14).

After fertilization the petals swell up and become juicy; when the fruit is ripe, the juice is a dark purple: the sepals remain, but the stamens wither (fig. 13). Each carpel gives

rise to an achene: in the unripe fruit, shown in fig. 13, the young seed encloses a hollow. I have made no sections of a perfectly ripe fruit.

EXPLANATION OF PLATE XXI.

- Fig. 1. Longitudinal section through very young bud of *Coriaria ruscifolia*  $\times 83$ ; *st*, peduncle; *b*, bracteole; *s*, sepal.
- Fig. 2. Longitudinal section of young bud of *C. ruscifolia*  $\times 83$ : *ped*, peduncle; *b*, bracteole; *s*, sepal; *p*, petal; *st*, stamen.
- Fig. 3. Longitudinal section through young bud of *C. ruscifolia*  $\times 83$ . Letters as in Fig. 2; *g*, gynœcium.
- Fig. 4. Longitudinal section through young bud of *C. ruscifolia*  $\times 83$ . Letters as in Fig. 3.
- Fig. 5. Longitudinal section through bud of *C. ruscifolia*  $\times 83$ : *s*, sepal; *p*, petal; *st*, stamen; *sty*, style.
- Fig. 6. Longitudinal section through ovary and stamens of bud of *C. ruscifolia*  $\times 83$ : *s*, sepal; *p*, petal; *f*, filament; *a*, anther; *o*, ovary; *sty*, style; *st*, stigma.
- Fig. 7. Longitudinal section through pistil of young flower of *C. ruscifolia*  $\times 83$ : *sta*, stamen; *o*, ovary; *ov*, ovule; *sty*, style; *st*, stigma.
- Fig. 8. Longitudinal section through ovary of young flower of *C. ruscifolia*  $\times 83$ : *sta*, stamen; *o*, ovary; *ov*, ovule; *n*, nucellus of ovary; *sty*, style.
- Fig. 9. Transverse section through young flower of *C. ruscifolia*  $\times 30$ : *s*, sepal; *p*, petal; *f*, filament: *o*, ovary; *ov*, ovule; *f.v.b.*, fibro-vascular bundles.
- Fig. 10. Transverse section through young unopened flower of *C. ruscifolia*  $\times 20$ : *s*, sepals; *p*, petals; *a*, anthers; *st*, styles.
- Fig. 11. Transverse section through ovary of *C. ruscifolia*  $\times 25$ : *ov*, ovules; *f.v.b.*, fibro-vascular bundles.
- Fig. 12. Division of mother-cells of pollen-grains into four,  $\times 650$ : *p*, pollen-grains in fours dividing.
- Fig. 13. Transverse section through unripe fruit of *C. ruscifolia*  $\times 25$ : *s*, sepal; *p*, petal; *ov*, ovule; *f.v.b.*, fibro-vascular bundles.
- Fig. 14. Ripe pollen-grains of *C. ruscifolia*  $\times 770$ , showing nucleus *n*, with two nucelli.

ART. XXXVIII.—*The Medicinal Properties of some New Zealand Plants.*

By J. BABER, C.E.

[Read before the Auckland Institute, 23rd August, 1886.]

As this paper is the result of what I have gathered chiefly from old settlers and Maoris, and of a few personal observations, its statements are of course open to inquiry. It appeared to me that by putting this information in a tabulated form the attention of pharmacists might be attracted, and more reliable results obtained.