

PAPERS READ.

OCCASIONAL NOTES ON PLANTS INDIGENOUS IN
THE IMMEDIATE NEIGHBOURHOOD OF SYDNEY.

No. 7.

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This paper treats of such species of the genus *Goodenia* as I have found in the immediate neighbourhood of Sydney. The genus belongs to the order *Goodeniaceæ*, so named after Dr. Goodenough, Bishop of Carlisle. Of the genus *Goodenia* we have the following species common about Sydney, *G. ovata*, *G. bellidifolia*, *G. stelligera*, *G. hederacea*, and a small road-side species, apparently a variety of *G. paniculata*. *G. paniculata* itself however, may be found, though it is not so common as the other species.

The flowers of this genus are very interesting. The unequally lobed corolla, the winged lobes, the position of the stamens and style, outside the corolla, the presence of an indusium, so unusual in flowering plants ; all rivet the attention of anyone engaged in the study of vegetable life ; and if my papers did not profess to speak only of plants belonging to the close neighbourhood of Sydney, I might refer to the elegance of some of the mountain species such as *G. decurrens* or *G. pendula*; but even those species I have named, as growing within the limit to which I confine myself, possess great beauty. I may refer especially to *G. ovata*, a fine showy plant of two to four feet high ; the purity of the colour of its flowers (almost golden yellow) contrasting with its dark green ovate leaves, gives it an exceedingly pleasing appearance. *G. stelligera* is a species found in or near marshes and swampy ground ; and varies exceedingly, even within the space of a few

yards, accordingly as it is found in dry or wet soil. Growing on the dry ground round the swamp, it is an insignificant plant of four to six inches high, with few flowers ; and all gradations from that to a fine robust plant of two feet, bearing a profusion of rich yellow flowers, may be found as the centre or very wet portions of the swamp are reached ; marking, not only its character as a marsh plant, but its necessary treatment if brought under cultivation.

I have examined very carefully all the species to which I have referred ; and as they all agree in their general form, and especially in those characters essential to this paper ; it will save time if I speak more particularly of one species only ; and I take for that purpose *Goodenia ovata*. The calyx is a linear tube with five linear lobes ; the lobes as long as the tube. The corolla monopetalous, but divided into two principal lobes of unequal size ; the upper and smaller one is again divided nearly to its base while the lower and larger lobe is divided into three sections, but not so deeply as the upper one ; there are five stamens ; the style simple, with an expanded crescent-like stigma, covered by an indusium. This indusium is an envelope rising from the style immediately below the stigma, passing on above it and completely covering it laterally ; but having its mouth open or closed as may be. It expands towards its upper part, adapting itself to the crescent form of the stigma ; its edges are densely ciliate. Speaking of it in one of his lectures, Dr. Woolls says, : “From the days of Robert Brown various opinions have been held respecting this indusium, some regarding it as an exaggeration of the rim which surrounds the stigmatic surface of Heathworts ; some again considering it as a part of distinct origin though intimately cohering with the pistil ; whilst others look upon it as necessary to the fructification of the flower. The parts have been observed to close on receiving the pollen. However that may be, the organ is one of deep interest.”

If we take a flower of *Goodenia ovata* in the bud, before it has even begun to open, and carefully dissect it, we shall find the five stamens as long as the pistil, the anthers just reaching to the top of the indusium ; the filaments closely packed round the style ; the

mouth of the indusium wide open, exposing the stigma inside, as though it were at the bottom of an open bag ; the whole wrapt up carefully and securely in the folds of the corolla. Great care is requisite in this dissection, as the anthers, even at this stage, are full of pollen, though not ripe ; and being exceedingly delicate they are liable to be broken and the pollen lodged on the stigma, which would lead to a- wrong conclusion as to its mode of fertilization. Now, if we examine a flower a little more open, but yet not fully expanded, we shall find this state of things quite altered. The style will now be much longer than the stamens, the corolla (as I have already said) divided into two principal lobes, the upper and smaller one again divided almost to its base ; the lower one thrice divided, though not so low down ; the stamens, no longer occupying, (as is usual in most other flowers,) the inside of the corolla, but escaping through the open division of the upper lobe, close to its base ; and generally growing out and away from it ; often at a right angle to it. The style will also be found outside the corolla ; but more erect and nearer to the back of the lobe ; while the indusium is either quite closed, or nearly so ; the deep ciliate fringe over its mouth, assisting to shelter the enclosed stigma. Taking now a mature and fully expanded flower we shall find the stamens still outside, and usually bent farther away from the corolla ; the anthers all open, and the pollen either in abundance, or, in some cases, past that stage, all gone, and the anthers shrivelled. The style however has become very long in proportion to the stamens, and inclined still more to the corolla ; until at last, the stigma covered by the indusium has re-entered it, through the same passage by which it had passed out, the division of the upper lobe. The re-entrance of the stigma into the corolla is the more readily effected, since at a short distance below it, the style is bent nearly at a right angle, just as though a tobacco pipe were held erect with its bowl upwards, then the stem would represent the style, and the bowl the indusium, enclosing the stigma.

The stigma is now, not only out of the reach of the anthers and pollen of its own flower by its relatively elevated position ; but it

is also prevented from contact with them, by the indusium completely covering it; and separated, too, from them, by the corolla. The mouth of the indusium now opens widely and the dense margin of cilia on its edges becomes more erect, forming a stiff brush, likely to sweep the pollen from any insect bearing it. It sometimes happens however, that although the mouth of the indusium is presented to the opening of the corolla, it may not have quite entered it when the stigma is ready to receive pollen; the slightest touch however of the corolla lobe, from the inside, opens the division, leaving the open indusium and stigma exposed from within, and in such a position, that an insect could not enter the corolla without coming into contact with them. The indusium will often be found in this position, (like that of a person standing in the open door-way of a room, but not actually in the room) open and full of pollen covering the stigma; and which could only have been placed on it from the inside of the corolla.

As to the fertilization of this plant; I think there can be little doubt, when we consider the construction of the flower, that it must be cross-fertilized. Either each flower must be fertilized by its own pollen while shut up in the bud; or by the pollen of some other flower, after the relative positions of the stigma and anthers are so changed, that contact between them is impossible. The first is unlikely, since neither pollen or stigma is mature; and in all the flowers I have examined in the bud, either quite closed or partly open, I have found the anthers unbroken and the open indusium free from pollen. Of course, it is quite possible, that an insect may alight on the anthers, load itself with pollen, and then go directly to the stigma of the same flower; and there is also a chance of its leaving pollen on one flower which it had gathered from another on the same plant; but there can be little doubt that the species to which I have referred (and perhaps the whole genus) are entirely dependent upon insects for their fertilization.



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