### *On the Structure of the Anthers in the* Aroideæ.
By M. van Tieghem.

From his investigations Chatin has deduced the general rule, that *anthers which open by terminal pores are destitute of fibrous cells.* The genus *Solanum,* the anthers of which have fibrous cells round the terminal pore, forms a curious exception to this. The author indicates the occurrence of similar exceptions in the apicilar anthers of several *Aroideæ.*

The sessile anther of *Richardia africana,* Schott, has two loculi, each divided into two locelli by a delicate longitudinal septum; and these open at the apex by a small vertical tube pierced through the thick plate formed by the connective above the loculi; beneath this terminal pore the septum is absorbed, to enable the loculi to communicate. The inner wall of the chamber is clothed, when mature, with a layer of prismatic cells perpendicular to its surface, and furnished with strong spiral bands. In each locellus this layer of spiral cells ceases at the two lines of origin of the septum, where it curves inwards a little and unites by means of smaller cells with the corresponding layer of the neighbouring locellus, thus forming two longitudinal ridges. The septum is therefore destitute of fibrous cells; when mature, it is composed only of a layer of interlaced threads, the remains of the cells of which it was originally composed. The delicate cellular membrane which clothes the whole interior of the locelli in the young anther is absorbed at the moment of dehiscence. The layer of spiral cells is continued to the terminal pore, the inner orifice of which it borders; but it does not line the wall of the little tube, which is formed of colourless cells, each containing a grain of starch, whilst the cells of the plate are larger and filled with a yellow liquid. Here, therefore, we have exactly the reverse of what occurs in *Solanum,* where the fibrous cells surround the pore without extending upon the inner surface of the cell.

The mode in which the anther of *Richardia* emits its pollen shows that it is a powerful agent of expulsion. Through each pore a white thread is seen to issue and become longer by degrees, which at last forms a little cotton-like ball, of a dull white colour, round the orifice. This filament is composed of two or three parallel rows of ovoid pollen-grains united by a gummy liquid; by exposure to the air, this cement evaporates, and the grains, becoming free, are disseminated. The author considers that the contraction of the cell causing this expulsion of the pollen is produced by the layer of fibrous cells; but he is unable to explain its mode of action.

In the anther of *Alocasia odora* and *metallica,* Schott, each of the two cells arranged round the dilated connective is constructed nearly in the same manner; but the cell, instead of opening upon the plate itself by a duct traversing its thickness, is bent outwards and opens directly beneath the plate by an orifice common to two confluent cells; the fibrous cells predominate round the pore, and several other rows are frequently added to the ordinary one at the upper part of the curve.

The difference is greater in *Aglaonema marantæfolia*, Schott. The bilocular anther is furnished with a short filament, and the connective does not form a plate. Each cell is divided into two locelli by a thick septum, absorbed beneath the terminal pore where the locelli communicate. The inner wall of each locellus is lined throughout with a strong layer of perpendicular fibrous cells: hence the quadrilocular structure of the anther. The fibrous layer is produced upon the outer walls up to the orifice, where it is covered directly by the epidermis.

Hence there is no necessary correlation between apicilar dehiscence and the absence of fibrous cells. The presence or absence of these is a character of more constancy and of a higher order than the mode of dehiscence. Thus in the Aroideæ we pass by insensible gradations from *Richardia*, &c., in which the apicilar dehiscence is most strongly marked, through *Arum* and *Dracunculus*, to rimate dehiscence, either transverse (*Arisarum*) or longitudinal (*Calla*, *Anthurium*, &c.), whilst the fibrous layer is still strongly developed; and this is further seen from the complete absence of these cells in *Lycopersicum* (where the dehiscence is longitudinal), and their nearly complete absence in *Solanum* (where it is apicilar). Moreover apicilar dehiscence is by no means common to all the genera of the families in which M. Chatin has ascertained the general absence of the fibrous cells: thus the Epacrideæ open their unilocular anthers by a longitudinal fissure; among the Ericaceæ *Leiophyllum*, *Pieris*, and *Epigæa*, and among the Melastomaceæ *Mouriria*, *Memecylon*, &c., open their bilocular anthers by two longitudinal fissures; lastly, in the Monotropeæ the unilocular anthers of *Monotropa* and *Hypopitys* open by a transverse fissure, whilst the bilocular anthers of *Pterospora* have a longitudinal dehiscence; and yet the fibrous layer is wanting in all these genera.

M. Chatin has also observed the structure of some abnormal anthers (those of *Hypoxis erecta* and *Pittosporum Tobira*), "which are destitute of fibrous cells at the same time that they are empty of pollen, or only contain it in an imperfect state; these sterile anthers have, no doubt, been seized by an arrest of development acting simultaneously upon the tissues of the second membrane and upon the pollen;" and from this he concludes "that in some plants the stamens of which have undergone an arrest of development, the absence of fibrous cells coincides with the imperfect evolution of the pollen." The author's observations upon *Ranunculus Ficaria* show that something very different may be the case. The anthers of the bulbiferous variety of this species produce no pollen, and this is the sole cause of the sterility of the plant. Each anther-cell, divided into two locelli by a septum, has its valve formed of an epidermis thickened by a layer of spiral and reticulated cells which does not extend over the septum or upon the inner wall of the cell formed by the connective, as appears to be generally the case in the *Ranunculi*. In the interior of each locellus there is a long mass narrowed at the two extremities, formed of several rows of large, polyhedric, colourless, thick-walled cells furnished with numerous dots; these cells

are united into a continuous tissue, separate from the walls of the locellus, so that these four masses may easily be extracted from the anthers. The mother cells of the pollen, instead of giving origin to ordinary grains and then becoming absorbed, have become thickened and acquired dotted walls. The layer of fibrous cells, however, has acquired its normal structure, although the author has never seen the anthers open, which would seem to indicate that the pollen-grains themselves have a part to perform in producing dehiscence. Hence two conclusions may be drawn:—

1. The abortion of the pollen in the anther does not always, as in the two examples cited by M. Chatin, imply that of the fibrous cells; the arrest of development may affect the mother cells of the pollen without reaching the walls of the anther.

2. Of the two simultaneous functions assigned by M. Chatin to the transitory membrane of the anther, which, according to him, is at once "the nurse of the pollen" and "the reservoir from which the cells of the second membrane draw the nourishment necessary for their rapid transformation," the latter alone is confirmed by the above observations.—*Comptes Rendus*, June 11, 1866, pp. 1289–1294.

## *Habits of* Zosterops dorsalis. By the Rev. R. Taylor.

(*In a Letter to Dr. J. E. Gray.*)

My dear Sir,—I have received your letter acknowledging mine with the *Zosterops dorsalis*; and I am pleased to find that I am correct in my supposition of its being an arrival from Australia or Tasmania. It appears to increase in New Zealand in a most extraordinary way, far more rapidly than any of our indigenous birds, and flies about in large flocks of several hundreds, making an incessant chattering,—quite a novelty in that respect. We hailed it as a blessing on its first arrival, as it attacked the American blight-insect and cleared the trees of it; but we now find it is of doubtful good, for it feeds upon the tender buds of the tree as well; and as at the approach of summer it retires to the high grounds of the interior, it gives the blight time to become as bad as ever before it returns.

Several new discoveries have been lately made in ornithology in the middle isle; but I think some of the birds supposed to be newly discovered are in reality old acquaintances. I expected to find the *Nestor superbus* to be quite new; but when I saw a specimen of it at the Otago Exhibition last year, I found it was my old friend figured in my work as the Korako (*Nestor meridionalis*); and lately a far more beautiful specimen of the same bird was procured by Mr. Buller, which was taken up the Wanganni river, with a brilliant bright-red back as well as breast. It is probably the male Korako.

Believe me, my dear Sir,

Ever most sincerely yours,

Richard Taylor.

Wanganni, May 7, 1866.