The shoot of the Ash has two nodes at which the leaves are strictly opposite, but elsewhere shifting has taken place, the distance between the two leaves of a pair varying from 3 mm. to 16 mm. Displacement of this kind is not uncommon in the Ash and in many other species of plants in which the leaves are typically opposite.[1] A further departure from the normal phyllotaxy has also been observed in the Ash in the form of a two-fifths arrangement of the leaves,[2] and the same abnormality is known to occur in several other plants whose leaves are normally decussate.

On some shoots of the Ash, in the winter condition, it is easy to see that there are two buds, one above the other in the axil of each leaf. In other shoots the lower bud, which is the smaller of the two, may be very small and inconspicuous, or it may be absent. Where there are two buds, the upper one is occasionally raised distinctly above the axil, e. g. 1 to 4 mm. above it. The shoot described in this note shows an exceptional case of displacement, one bud being 25 mm. (or a quarter of the length of the internode) above the node to which it belongs. In this case an additional bud has been formed, so that there are still two buds in the axil of the leaf, the lower being the smaller. At some of the nodes of a different shoot, where the upper bud is only shifted 3 to 4 mm. above the axil, a very small third bud is again present. A comparison of these cases appears to indicate a basipetal sequence of bud-formation; hence, where two buds are present, the lower should be regarded as the accessory one.[3]

On examining a number of young Ash trees it was observed that considerable shifting of leaves (and also of buds) is rarer where the internodes are comparatively short, but no more definite relation than this could be discovered by comparing measurements of displacements and of internodes [4] in the examples specially studied.

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**ON THE OCCURRENCE OF VEGETATIVE PROPAGATION IN DROSERA.**—The subject of the present note is the occurrence of vegetative reproduction and multiplication, by budding, in two species of *Drosera*, viz. *Drosera rotundifolia*, L., and *Drosera intermedia*, Hayne. The specimens which exhibited this phenomenon had been obtained in two consecutive years from near the large pond at Wisley. At the time of their collection (July), however, they showed no sign of the budding which they later exhibited.

The plants obtained on the first visit were transferred to the cool greenhouse at the writer's own home, and were grown in saucers on *Sphagnum* without covering. In the late spring of the following year it was noticed that young plants in various stages of development were arising from the blades of the leaves. Only a single plant developed from each leaf, but in some cases nearly all the leaves of a plant bore such

[1] Wydler: Flora, 1860, p. 628; de Vries: Pringsh. Jahrb. f. wiss. Bot., vol. xxiii (1892), p. 88.

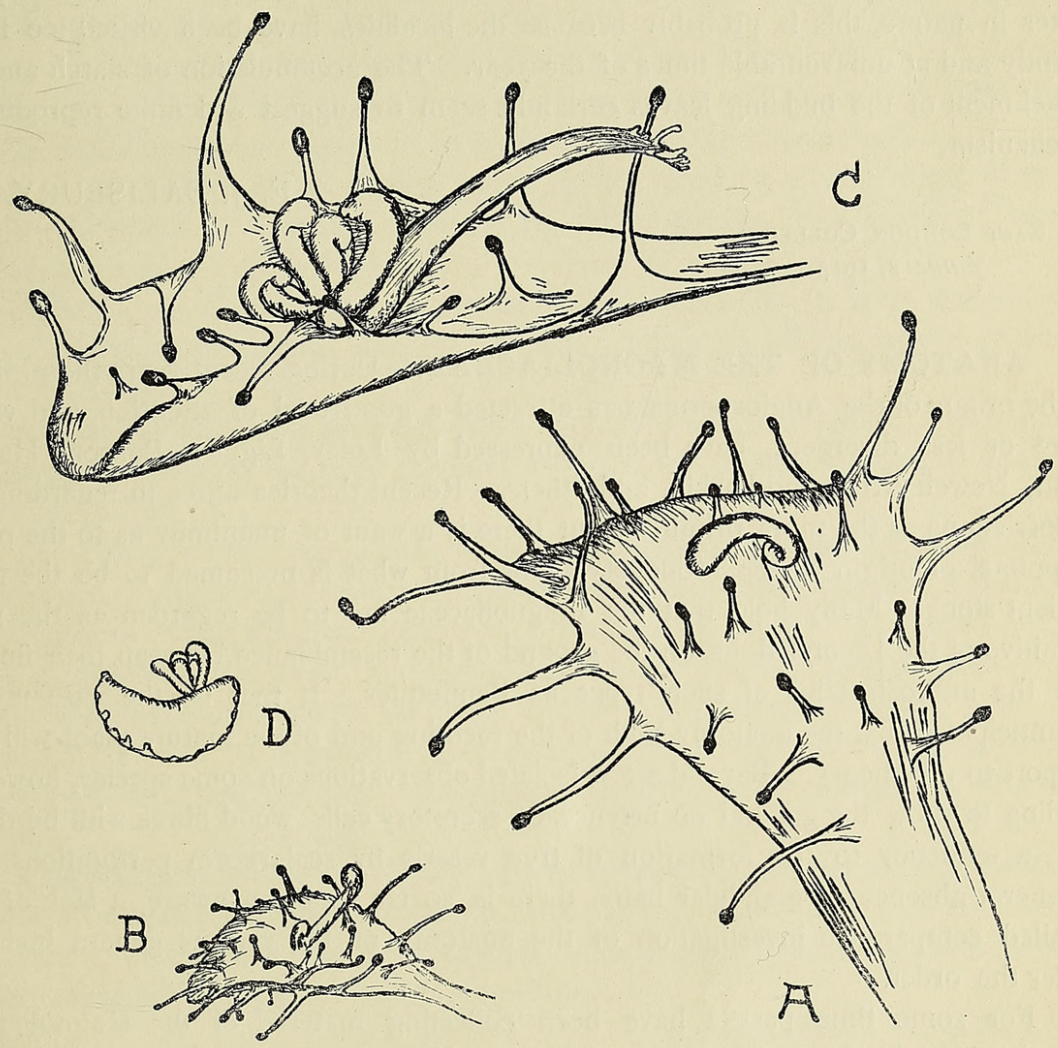
[2] de Vries: loc. cit., p. 88; Richardson: Gard. Chron., ser. 3, vol. xxxvi (1904), p. 133. Leaves in whorls of three also occur in the Ash.

[3] Cf. Ward, Trees, vol. i, p. 26. Here the upper bud is regarded as the accessory one.

[4] Cf. Groom, loc. cit., p. 99.

buds. Most commonly it was the older leaves which were affected, but occasionally quite young leaves could be seen bearing a vigorous daughter-rosette (Fig. D).

The plants collected on the second visit were taken to the warm house at East London College and grown in pots, on *Sphagnum* as before, but in this case were covered with bell-jars. In the season following, vegetative propagation was observed on these plants also.




The first indication that a leaf of *D. intermedia* is about to produce a new plant is the appearance of a small green protuberance on the upper surface. When sectioned this is found to consist of undifferentiated parenchymatous tissue. In slightly later stages the rudiment of the first leaf develops to one side and grows very rapidly (Fig. A). The next leaf develops more slowly (Fig. B), and on the opposite side. The later leaves develop in succession, but owing to the rapidity with which the first leaf usually develops the younger ones often appear as a rosette in the axil of the oldest (cf. Fig. C). This disparity between the rates of growth of the first and following leaves was not seen in *Drosera rotundifolia*, the leaves of the daughter-plants in this case being of nearly equal size (Fig. D).

In all cases the new plants arise in close proximity to the main vein of the leaf, with which their vascular supply is at first connected. A leaf bearing a very young

daughter-plant was found to have its cells (especially those near the point of budding) completely filled with large starch grains (nearly twice the size of those normally present in the leaf-cells). Very few of the latter were, however, present in leaves bearing daughter-plants in late stages of development.

Sooner or later the leaves of the parent become detached, by the decay of their petioles, and the new individuals become established as independent plants.

Although the vegetative reproduction described has not been observed by the writer in nature, this is probably because the localities have been visited too infrequently and at unfavourable times of the year. The accumulation of starch and the detachment of the budding leaves certainly seem to suggest a definite reproductive mechanism.

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East London College,
*January*, 1915.

**ANATOMY OF THE MAGNOLIACEAE.**—During recent years the problem of the origin of the Angiosperms has attracted a good deal of attention, and views, more or less divergent, have been expressed by Lotsy, Lignier, Benson, Hallier, Senn, Newell Arber and Parkin, and others. Recent theories agree in regarding the Dicotyledons as the more primitive, but there is a want of unanimity as to the point, or points, of origin of the Monocotyledons from what is presumed to be the more ancient stock. Many hold that the Magnoliaceae are to be regarded as the most primitive of the Dicotyledons, on the ground of the resemblance between their flowers and the anthostrobilus of such types as Bennettites. If that be the case it may be anticipated that the anatomy both of the seedling and of the mature plant will give support to the theory. Beyond a few isolated observations on some species, however, tending to show the general occurrence of secretory cells, wood fibres with bordered pits, a tendency to the formation of true vessels by scalariform perforations, and a general absence of glandular hairs, there is, so far as I am aware, a lack of any detailed comparative investigation of the anatomy of the various genera included under the order.

For some time past I have been collecting material of the Magnoliaceae and through the kindness of friends in various parts of the world I have been successful in obtaining eight out of the nine recognized genera, but as yet I have not been able to acquire specimens of *Zygogynum*. I would esteem it a favour if any one having access to this New Caledonian form would be so kind as to send me specimens. During the past winter I have investigated the adult anatomy of *Drimys Winteri* and endeavoured, though unsuccessfully, to raise seedlings from seeds supplied through the courtesy of several correspondents.

The literature on the subject is not very extensive, and beyond the papers recorded by Solereder (Syst. Anat. Dicot.), few investigations have been published on the subject. Strasburger, working on *Drimys*, draws attention to the gymnospermic character of the xylem coupled with the angiospermic mode of development of the megaspore, and Maneval has also studied the embryonic structure in *Magnolia* and *Liriodendron* (Bot. Gaz., vol. lvii). Paul Parmentier (Bull. Scient. de la France et