NOTES.

ABNORMAL PHYLLOTAXY IN THE ASH.—As the suppression of one leaf of a pair in the case of a plant with decussate phyllotaxis is a somewhat rare phenomenon, a specimen showing this and certain other abnormalities appears to be worth describing.

The specimen referred to is a shoot of the Common Ash (*Fraxinus excelsior*, L.), which Mr. T. A. Sprague kindly handed to me for examination.¹ The shoot had a solitary leaf at one of the nodes, and no trace was visible externally of the second leaf which would normally be present at the node. It seemed advisable, however, to study the specimen anatomically before assuming that total suppression of the second leaf had taken place.

Though the shoot showed considerable vertical displacement of some of the leaves, it appeared obvious that the phyllotaxy was fundamentally decussate, there being no difficulty in finding the nodal companion of any leaf, except in the case of the solitary leaf mentioned above.

Transverse sections through the node with the single leaf show that there is no leaf-trace for a second leaf. Also, instead of the normal broadening of the pith into oval or elliptical form as a preparation for the separation of leaf-traces for two leaves, the pith here undergoes a one-sided alteration in form, the extension of the pith taking place only on the side towards the solitary leaf.

The position of the solitary leaf is such as would be correct for one of a pair decussating with those above and below. In view, however, of the displacement of some of the leaves, a further examination of the anatomy of the shoot in relation to the phyllotaxy was made, with the following result. Where there is vertical displacement between two leaves which appear to represent a pair, the first preparation for nodal structure is normal; i. e. a practically symmetrical broadening of the pith takes place, but the succeeding stages, leading to the separation of the vascular supply of the lower of the two leaves, are reached earlier than those for the upper leaf.

The phyllotaxy of the specimen may therefore be described as decussate, modified by vertical displacement, and by the suppression of a leaf at one of the nodes. The solitary leaf is of normal size and shows no signs of a double nature. In the somewhat similar case, however, of a specimen of *Rhinanthus Crista-galli* bearing several alternate leaves described by Groom,² a double leaf was present at the point of transition from opposite to alternate arrangement, and the phenomenon is therefore explained as 'one of morphological concrescence or of physiological fusion of impulses'.

¹ The shoot was taken from a hedge near Chesham.

² Groom: Longitudinal Symmetry in Phanerogamia. Phil. Trans. Roy. Soc., ser. B, vol. cc, p. 106.

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 internodes⁴ in the examples specially studied.

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ON THE OCCURRENCE OF VEGETATIVE PROPAGATION IN DRO-SERA.—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.

Boodle, Leonard Alfred. 1915. "Abnormal phyllotaxy in the ash." *Annals of botany* 29, 307–308. <https://doi.org/10.1093/oxfordjournals.aob.a089548>.

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