Morphological Notes.

BY

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With Plate XXII.

IT frequently happens that interesting specimens come under notice, in a large botanical establishment like Kew, which hardly attract the attention they deserve when relegated to their places in a vast museum collection. Yet, though they rarely afford the bases for any extended research, they deserve detailed notice as they often illustrate important theoretical points, and may be useful to teachers for lecture illustrations.

I propose therefore, from time to time, to put such specimens on record in these notes, contenting myself in most cases with necessary but brief descriptions.

1. PERSISTENCE OF LEAF-TRACES.

The outward extension of leaf-traces is limited by the fall of the leaves to which they belong. It is not, however, apparently generally known that when the leaves are more or less persistent the leaf-traces are continued to them through successive annual zones of wood. This has already been described in detail by Dr. Oskar Markfeldt in 'Flora' for 1885 (pp. 33, 81, and 99):—'Ueber das Verhalten der Blattspurstränge immergrüner Pflanzen beim Dickenwachstum des Stammes oder Zweiges.'

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Markfeldt did not, however, have the opportunity of observing the persistence of the leaf-traces in stems of considerable size. It is the object of this note to point out that in such cases they form a conspicuous but unnoticed feature in the wood.

Fig. 3 (Pl. XXII) is a reproduction of a life-size photograph of part of the longitudinal section of the trunk of *Araucaria imbricata*, presented to the museums of the Royal Botanic Gardens in 1890 by the Right Honourable the Earl of Ducie, F.R.S., at whose seat, Tortworth Court in Gloucestershire, it was grown. The trunk from which the specimen was obtained was one foot four inches in diameter at the base. An annual ring has been cut through tangentially and is seen to be perforated by the leaf-traces. The photograph also shows sections of other leaf-traces traversing successive annual rings. In this case the sections are necessarily more oblique. The material does not enable me to ascertain whether the leaf-traces are prolonged indefinitely. But this point will no doubt be cleared up by Mr. Seward, who proposes to make a thorough examination of the trunk of the historic tree formerly living at Kew. This was introduced by Menzies in 1796, but died in 1892.

The same structure is shown no less conspicuously in a specimen of the wood of *Araucaria Cunninghamii* received from the Technological Museum, Sydney, in 1891. It is no doubt a characteristic feature of the wood of every species of the genus. It may be noted that according to De Bary (Comparative Anatomy of the Vegetative Organs of the Phanerogams and Ferns, p. 513), 'the demarcation of the annual rings' in *Araucaria* has been denied by some writers. Fig. 3 shows that in this respect the wood is in no way exceptional.

As far as I am aware this curious structure is peculiar to *Araucaria* amongst Coniferae. I had thought that some indication of it might have been found in *Abies*. But an examination of the extensive series of wood specimens in the Kew museums has failed to detect any evidence of its occurrence.

In *Pinus* a structure may be found which at first sight is similar. Fig. 1 is from a life-size photograph of a piece of 'yellow deal' (*Pinus sylvestris*) taken from an old building at Kew, and without further history. In this case the 'traces' penetrating the annual rings are not mere 'leaf-traces' but are the fibro-vascular cylinders of limited branches.

Fig. 2 shows a transverse section of the same specimen. This has passed through a 'branch-trace,' and shows its termination at the fourth annual ring.

In a specimen of the wood of *Pinus glabra* from N. America, presented to the Kew Museum by Prof. Sargent, the appearance presented in a tangential section near the centre of the trunk closely resembles those that occur in *Araucaria*.

The persistence of leaf-traces affords apparently a decisive character for assigning fossil Coniferous woods in which they occur, at any rate to the *Araucarineae*. Their absence is not however equally conclusive, as I am at present in possession of no evidence that they are continued after the leaves are finally thrown off in very old stems by the disruptive action of circumferential growth. They have, however, been traced to the exterior of the wood in an old stem grown at Kew which shows at least sixty annual rings, and in which all remains of the leaves have entirely disappeared. It is possible therefore that the leaf-traces may continue to extend indefinitely although any foliar function which may belong to them has ceased.

I must express my obligations to Mr. L. A. Boodle, F.L.S., who has taken much kind trouble for me in making the photographs.

FIG. 1

FIG. 2

FIG. 3

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