

The most important character that shows any considerable variation in the living species (apart from *Osmunda cinnamomea*) is the extent of the interruption in the continuity of the xylem ring caused by the departure of the leaf-traces. *Osmunda regalis* represents one extreme, where the xylem ring is broken up into many distinct strands free from one another, while the other extreme is shown by *Todea barbara* and *T. superba*, in which the strands are fused with each other and with the xylem of the leaf-trace, so forming continuous bands. As regards the two fossil species, *Osmundites Dunlopi*, with its continuous xylem ring, points in the direction of *Todea barbara*, while *O. Gibbiana* points in the direction of *O. regalis*, and the authors consider that amongst the living *Osmundaceae*, "so far as our data permit us to judge," *T. barbara* shows most resemblance to *O. Dunlopi*, and *O. regalis* to *O. Gibbiana*. But until the sporophylls are known the species are to be kept in the fossil genus *Osmundites*.

An unnamed *Osmundites* in the British Museum collection, said to have come from New Zealand, was examined, and was found identical with *O. Dunlopi*.

Besides the two species mentioned above, all the recorded fossils of an osmundaceous character are dealt with excepting one. A table is given showing the chronological order of the species, and a synopsis of their more important anatomical features. This latter shows that the medullation of the stele and the subsequent breaking-up of the xylem ring takes place *pari passu* with the advance from the older to the younger strata. The age of the fossils is as follows: Upper Permian, 5; Jurassic, 2; Upper Jurassic, 1; Lower Cretaceous, 1; Lower Eocene, 1; Lower Pliocene or Upper Miocene, 1.

Dealing with the ancestry of the *Osmundaceae*, the authors consider them, as a whole, as "an ascending series of forms whose vascular system is to be derived from a primitive protostele with a solid homogeneous xylem," by the medullation of which and the subsequent breaking-up of the peripheral xylem ring thus formed into separate strands the typical osmundaceous stele has been derived.

By a consideration of the methods through which the medullation of the stele has come about, the authors find the existence of an intermediate stage in which the pith consists of tracheae mixed with parenchyma, and it becomes inevitable that the mixed pith of the *Zygopterideae* is of the same nature and origin as that of the *Osmundaceae*, especially as the authors believe the two families have descended from a common ancestor. Further, the authors postulate the discovery of a primitive zygopterid stele with a solid xylem mass, the central tracheae of which are short, and transitional toward a pith, as in two of the osmundaceous genera dealt with.

This prophecy was confirmed by the discovery of a stele exactly as anticipated by W. T. Gordon, a figure of which is given.

The monograph concludes with an attempt to explain the derivation of the specialized leaf-trace of the *Zygopterideae* from the simple primitive form of the *Osmundaceae*.

L. C.

6. The Morphology of the Podocarpaceae. By Mary S. Young. (*Botanical Gazette*, vol. 50, pp. 81-100, pls. 4-6. August, 1910.)

Before the year 1902 very little was known regarding the morphology of the *Podocarpaceae*, but since that date a number of investigators, using in large part material from New Zealand, have found out a good deal about the group, the only genus yet untouched being *Pherosphaera*, with its two species. Of special interest is the question of relationships of the *Podocarpaceae*, particularly with regard to the *Araucarineae*.

The paper deals first with the gametophytes of *Phyllocladus*, the authoress having examined a considerable amount of material of *Phyllocladus alpinus*, which had been collected by the reviewer at fairly regular intervals from the 16th October to the 28th January. A full account is given of the male and female gametophytes, and of the process of fertilization, and there is something as to the development of the embryo. The conclusion come to by the authoress regarding the affinities of *Phyllocladus* is that it is a relatively primitive member of the *Podocarpaceae*, which branched off from them a comparatively short time after their separation from the *Taxineae*. This conclusion is based on the following: (1) *Phyllocladus* has primitive characters of the *Taxineae* which are being eliminated in the *Podocarpaceae*; (2) it has primitive characters of the *Podocarpaceae* which have been entirely eliminated in the *Taxineae*; (3) it has some advanced characters of *Podocarpaceae*; (4) the taxad resemblances are more superficial and variable, and the podocarp features more fundamental.

The remainder of the paper deals with the relationship between the *Podocarpineae* and the *Araucarineae*. The authoress brings together the available facts from the different publications bearing on the subject. She comes to the conclusion that the *Podocarpineae* and *Araucarineae* are very primitive, and that they are probably related; but the question is by no means settled. There are various gaps in our knowledge, especially regarding the *Araucarineae*, the female gametophyte of which is little known, while of the embryo we know virtually nothing. In the *Podocarpineae*, too, adequate knowledge is wanted of the female gametophyte, embryo, and the development of ovulate structures. Wanting the above knowledge, "we should be hardly justified in coming to a definite decision in regard to relationships, and at present it seems best to hold *Taxineae*, *Podocarpineae*, and *Araucarineae* apart as separate tribes, leaving open the question of larger grouping amongst conifers." L. C.

7. Trees and Shrubs of New Zealand. By L. S. Gibbs. (*The Gardener's Chronicle*, vol. 47, pp. 97, 98, 118, 131. February, 1910.)

An account of New Zealand trees and shrubs with regard to their value as plants for cultivation in English gardens, for which purpose the authoress recommends a number highly. The statement is made, "that beyond *Cordyline australis* and tree-ferns it is rare to see a native shrub or tree in a New Zealand garden." With the exception of *Piptosporum Kirkii*, the other species of the genus are described as "uninteresting." L. C.

8. *Pratia angulata* Hook. f., and *Lobelia linnaeoides* Petrie. By J. B[ayley] B[alfour]. (*The Gardener's Chronicle*, vol. 47, p. 98. February, 1910.)

Both the above plants are hardy in the Edinburgh Botanic Garden. *Pratia angulata*, although growing in damp situations in New Zealand, and noted by Cockayne as a bog-plant in Stewart Island, when grown in dry sandy soil in the full sun in Edinburgh forms a close carpet on the soil, and every leaf-axil sends up a short-stemmed flower, making during the summer a perfect sheet of white blossom. If the plant be grown in the shade, or where the soil is heavier and moister, the stems arch from the soil, forming more or less of a cushion, grow freely, and the flowers, which are produced in fair abundance, are concealed amongst the greenery and make little show. L. C.

9. Deforestation in New Zealand. By L. S. Gibbs. (*The Gardener's Chronicle*, vol. 44, pp. 355-56; November, 1908: and vol. 45, pp. 225-26 and 243-44; April, 1909.)

The authoress, who spent six months in New Zealand, gives, in three articles, her views regarding the wholesale destruction of forest in the Dominion, and the methods pursued. The observations were made chiefly from the most frequented tourist routes. The following extracts show the scope of the articles:—
 "The results of deforestation everywhere to be witnessed in the country between Auckland and the Bluff were such as to create an impression as painful as it was indelible. Past and present evidences of the effect of the destruction haunt me everywhere, from the barren plains and barren hills of the older 'settled' districts in the one case, to the miles of blackened tree-stumps, even on much-advertised tourist routes, in the other." "These results are caused by the requirements of the settlers; for, unfortunately, they and devastating bush-fires always go hand-in-hand. Once the fire has done its worst, English grass-seed is immediately sown, and cattle and horses are turned loose amongst the standing and prostrate logs, which are left to rot on the ground. A little homestead will be run up amidst the *débris*, a couple of rectangular paddocks will be, perhaps, cleared of the roots of the trees and enclosed by a hedge of *Pinus pinaster* (erroneously called *P. insignis*) and *Cupressus macrocarpus* respectively as wind-screens, and the result is a typical New Zealand landscape. To have the pine-wood without the cupressus would be wanting in imagination and taste." "The remaining forest land is generally Government property, and is leased in 'sections,' which, when large areas are opened up, are put up to auction. This land may be covered with the most splendid forest-growth, such as the Waimarina Bush, now being cut up by the Main Trunk Railway from Wellington to Auckland,