

in *P. Merkusii* this is less marked, while in *P. Khasya* there is no indication of such thickening. All three species contrast with the haploxylic Indian species in the feeble⁹ development of the tissue separating the endodermis from the vascular tissue."

These structural ecological results are certainly very interesting, and GROOM's further contribution, which is already in the press, will no doubt add valuable results. It is very desirable that further studies be made on material where the ecological factors are definitely known, and also that a single species be studied under its extreme of wet and dry conditions, in order to determine how much of the change is inherent in the species itself and how much is really due to the external conditions.

The so-called "bars of Sanio" of the Harvard school come in for very severe criticism. They show that these are composed partly at least of pectic compounds, but not of cellulose. They also consider that Miss GERRY mistook SANIO's description of trabeculae for these structures, and propose the term "Sanio's rims" for them, a terminology which is certainly much more in keeping with SANIO's idea ("die Umriss des Primordialtöpfels"). Miss GERRY, however, made a much more serious mistake, for she even quotes SANIO's description of the torus ("diese scheibenförmige Verdickung") as referring to the structures in question.

Resin plates were also found in some of the tracheids adjacent to the rays and also true trabeculae. The authors have also noted the presence of tracheids with bent ends: "when abutting on a medullary ray the end may fork, or bend, so as to run for some distance along the ray and thus form a transition towards a ray tracheid." They also found such tracheids forming radial series apart from the medullary rays.

The detailed description of the species is so arranged that easy reference can be had to any particular feature.—R. B. THOMSON.

Some Jurassic plants.—Among the pteridophytes described by THOMAS⁹ from the Marske Quarry of the Middle Jurassic of the Cleveland district of Yorkshire is a new marattiaceous fern, *Marattiopsis anglica*. The genus is "a very common Rhetic and Liassic form, and has been recorded from Sweden, Bornholm, Germany, Poland, and Tongking. Recently two incomplete leaflets from the Jurassic (Kimmeridge) beds of Sutherland have been placed by SEWARD in this genus. Allied forms from the Jurassic of Oregon have been described by LESTER WARD and others under the old name of *Angiopteridium*." Both fertile and infertile pinnae were found. The synangia are considered to have "projected somewhat above the surface, and to have had a fairly firm wall enclosing a number of loculi arranged in two rows; each locus probably

⁹ THOMAS, HUGH HAMSHAW, The fossil flora of the Cleveland District of Yorkshire: I. The flora of the Marske Quarry. Quart. Jour. Geol. Soc. 69:223-251. pls. 23-26. 1913.

formed a projection, and imparted to the synangium a corrugated appearance." The spores are small, about 0.3 mm., and densely covered with fine projections. "The usual tetrad scar is not seen on any example, but a single straight scar instead, which doubtless indicates that the spores were arranged in the spore mother cells bilaterally and not tetrahedrally."

Of the bennettitalean forms, the staminate sporophylls of *Williamsonia spectabilis* Nathorst are "not uncommon at Marske." THOMAS has been able to make an interesting restoration figure of an almost mature staminate flower of this species. The sporophylls are united into a cup below, and probably in the young condition arched over it, straightening out at maturity. The synangia "lie in regular rows, with their long axis at right angles to the sporophylls," and on the upper or inner side. The synangia of each row appear to be borne on slender stalks. "These stalks seem to have been given off on each side of the central portion of the sporophyll, and may be regarded either as lateral lobes of this organ, or possibly as arising as part of a pinnate structure like the microsporophyll of *Bennettites*, which is adnate with the broad structures hitherto termed sporophylls." He concludes, however, that "whatever may have been the method of production of the synangia of *Williamsonia spectabilis*, this form serves (as NATHORST believes) as a valuable connecting link between the type of microsporophyll seen in *Bennettites* (*Cycadeoidea*), where the sporophyll is a reduced pinnate structure, and the *Williamsonia whitbiensis* type, where the sporophyll is undivided, and bears a double row of synangia on its surface." There is evidence also of the presence of the *whitbiensis* type itself in the Marske beds, and of a female strobilus of *Williamsonia* and other bennettitalean remains. THOMAS' study of the leaves is especially interesting, and also his keenness in distinguishing the bennettitalean from the filicinean forms by microscopic examination of the epidermis, etc. Such critical study, which was inaugurated by NATHORST, puts the results from impressions much more nearly on a par with those from the study of petrifications.

One of the commonest fossil plants at Marske belongs to the Ginkgoales, *Baiera longifolia*, which has not before been recorded in England. THOMAS has not found a complete leaf, but judges that it must be at least 18 cm. in length. By its great size, and also by its epidermal structure, of which three figures are given, it is distinguished from *B. gracilis*, to which the specimens were previously assigned. He also found *Ginkgo digitata* and *Czekanowskia Murrayana* in the Marske beds.

Of the Coniferales two forms were found, *Taxites zamiioides*, of which both upper and lower epidermis are described, and *Elatides* (*Pagiophyllum*) *setosa*. Of the latter THOMAS reported, as his article was in process of publication, that "many specimens of this type have been recently found at Roseberry Topping, bearing male and female cones. These seem to indicate the necessity for creating a new species, and probably a new genus for the form here described."

Further study of the fossil flora of this region promises much for our knowledge of the bennettitalean and coniferous forms.—R. B. THOMSON.



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