Closterium moniliferum and *Cosmarium margaritiferum* occur in sensible numbers. The Plankton of the Cam, therefore, agrees with those Thames backwaters which, although richer in number of individuals, still have the Diatom element predominant (small backwater at Walton, backwater at Shepperton¹). Yet, as I was led to conclude in the case of the Thames backwaters, the Plankton of the Cam is still rather far from resembling that of a pond, and, however different from the Plankton of a big stream, still shows the essential characters of a river Plankton.

I may just add a few remarks on the Plankton of the Thames, based on three samples collected in April and May of this year. In correspondence with the mildness of the season, the number of individuals was already very considerable at this time of the year, and, as is to be expected, the green forms had reached a greater degree of development than at the corresponding season last year. Further, I was only able to recognize the *Melosira*-stage in one of the three samples (from Cookham), the other two having apparently already passed on to the *Synedra*-stage. It thus appears possible that some important changes in the periodicity of the Thames Plankton may take place according to the character of the season—a point which I hope to settle by periodical observations extending over a number of years.

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September 28, 1904.

ON A BRILLIANT PIGMENT APPEARING AFTER INJURY IN SPECIES OF JACOBINIA (N. O. ACANTHACEAE).—(Abstract.)²—Shoots of certain species of *Jacobinia*³, when bruised and extracted with water, yield a beautiful purplish liquid. Liebmann discovered these species while travelling in Central America about half a century ago, and found the Indians using them for dyeing purposes. Thomas⁴, while in Mexico, submitted the colouring principle of *Jacobinia Mohintli* to a brief examination. Since then these plants seem to have received no further investigation, and their peculiarity is apparently little known to botanists. The object of the present paper is to direct attention to this conspicuous example of pigment-formation, and to give a few details concerning the chromogen and the colouring matter resulting from it. The author hopes to make a full investigation later. So far, the observations have been made on the two very similar species, *Jacobinia tinctoria* and *Jacobinia Mohintli*. The peculiar behaviour of the former plant was brought to the writer's notice, when in Ceylon, by Mr. Willis, the Director of the Royal Botanic Gardens, Peradeniya.

The pigment does not exist as such in the living plant, but appears only on death. Leaves, however, killed by boiling water remain green and do not darken. Hence the pigment most likely arises through enzymic action. Slight alkalinity hastens its appearance. Oxygen is also necessary for its formation. It is readily soluble in water and gives a fluorescent solution, purple to violet by transmitted and blood-red by reflected light. A trace of acid robs the solution of most of its colour. The original tint reappears on neutralization. Alkali turns it bluer, and if strong

¹ Cf. Fritsch, Further observations, &c., pp. 639–646.

² Read before the Botanical Section of the British Association, Cambridge, August, 1904.

³ *Jacobinia tinctoria*, *J. Mohintli*, *J. incana*, *J. neglecta*, and *J. verrucosa*.

⁴ Journ. de Pharm. et de Chimie, 1866, sér. iv. t. iii. p. 251.

changes it to green, eventually destroying it. Light does not alter it. All parts of the plant except the flower can produce the pigment.

Such a reducing agent as stannous chloride decolorizes an aqueous solution of the pigment. Micro-organisms can also readily bleach it, when oxygen is excluded. On allowing air to enter, the original colour at once returns.

The whole phenomenon bears some resemblance to the way in which indigo arises in plant tissues. The chromogen of *Jacobinia* is probably a glucoside. In the living cell this substance and its enzyme may be differently situated, perhaps one in the protoplasm and the other in the sap. On the destruction of the cell the two come in contact. The first result is the formation of a colourless body. Then this through the oxygen of the air, possibly assisted by an oxidase, is changed into the pigment.

This behaviour of the *Jacobinia* is perhaps only a striking instance of a common feature of plant-juices, viz. their tendency to darken on exposure to the air.

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CAMBRIDGE.

ON THE STRUCTURE AND AFFINITIES OF FOSSIL PLANTS FROM THE PALAEOZOIC ROCKS.—V. ON A NEW TYPE OF SPHENOPHYLLACEOUS CONE (SPHENOPHYLLUM FERTILE) FROM THE LOWER COAL-MEASURES.—(Abstract.)¹—The class Sphenophyllales, of which the fossil described is a new representative, shows on the one hand clear affinities with the Equisetales, while on the other it approaches the Lycopods; some botanists have endeavoured to trace a relation to the Ferns. The nearest allies among recent plants are probably the Psilotaceae, which some writers have even proposed to include in the Sphenophyllales.

The new strobilus appears to find its natural place in the type-genus *Sphenophyllum*, as at present constituted, but it possesses peculiar features of considerable importance, which may probably ultimately justify generic separation. The specimen, of which a number of transverse and longitudinal sections have been prepared by Mr. Lomax, is from one of the calcareous nodules of the Lower Coal-Measures of Lancashire, and was found at Shore Littleborough, a locality rich in petrified remains, now being opened up by the enterprise of the owner, Mr. W. H. Sutcliffe.

The close affinity of the strobilus with *Sphenophyllum* is shown by the anatomy of the axis, which has the solid triarch wood characteristic of that genus, and by the fact that the whorled sporophylls are divided into dorsal and ventral lobes, as in all other known fructifications of this class. But whereas, in all the forms hitherto described, the lower or dorsal lobes are sterile, forming a system of protective bracts, while the ventral lobes alone bear the sporangia; in the new cone, dorsal and ventral lobes are alike fertile, and no sterile bracts are differentiated. On this ground the name *Sphenophyllum fertile* is proposed for the new species.

Each lobe of the sporophyll divided palmately into several segments, the sporangiophores, each of which consisted of a slender pedicel, terminating in a large

¹ Read before the Royal Society, Dec. 1, 1904.

Parkin, John. 1905. "On a brilliant pigment appearing after injury in species of Jacobinia (N. O. Acanthaceae)." *Annals of botany* 19, 167–168.

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