

Melanospora chionea (Fr.) Cda.

Perithecia scattered or gregarious, superficial, globose, 300-350 μ in diam., covered with long, soft, white, woolly hairs; beak long, rigid, curved, transparent, yellow, apex-fringed, white. Asci clavate, 45-48 \times 16-17 μ , 8-spored. Spores heaped together, or indistinctly 2-seriate, elliptically globose, rounded at both ends, 10-12 \times 9-10 μ , brown, 1-guttulate.

On pine needles, near Dunkeld, Perthshire, 19th April, 1914, Mr. James Menzies.

This somewhat rare Pyrenomycete has been found by Dr. Carlyle at Orton Moss in 1886 and subsequently at Bulmer, Yorkshire.

ADDITIONAL NOTES ON MARINE PYRENO-MYCETES.

Plate V.

By Geo. K. Sutherland, M.A., B.Sc.

ROSELLINIA LAMINARIANA nov. sp. (t. V., fig. 1-3).

Perithecia vel immersa et mature erumpentia vel ab initio in superficie densis hyphis crescentia, globosa, peridio crasso, ostiolo conico, primo eminentibus hyphis tecta, antequam maturescunt nuda, 350-450 μ diam.; asci cylindranei, longissimi, apicibus obtusis, octospori, 150 \times 15 μ ; sporidia monosticha, ellipsoidea vel ovoidea, primo annulo mucilagineo circumdata, colore fulvo vel nigro, plerumque guttam magnam olei exhibentia, 20-22 μ \times 12-14 μ ; paraphyses crassae et articulatae, mature deliquescentes.

Hab. In thallo *Laminariae*, Dorset.

This species was found first on fronds of *Laminaria*, collected near Lulworth Cove. It occurred along with profuse growths of *Cladosporium algarum*, and appeared later amidst the first impure cultures of that saprophyte. Its quick growth enabled it to be separated readily and thus studied under culture conditions, as well as in the natural state on the thallus. The mycelium, hyaline when immersed and light brown when exposed, varies in diameter from 2-10 μ . Its rapid growth enables it to form more or less dense webs of interlacing hyphae over the surface of moist fronds; in dry weather its

growth is limited and mainly in the substratum. Under favourable conditions the marginal hyphae may grow about one inch per day.

Perithecia begin to appear very soon, either in the superficial layers of the substratum or on the surface web. Their progress is rapid. The small immersed forms are pushed through the covering layers and finish their development, either on the surface, or with their basal portion slightly sunk in the frond. In three weeks from infection the perithecia have reached maturity. When first pushed through the substratum, they are seen to be covered with somewhat stiff, radiating, dark-coloured hyphae, which give them a bushy appearance. These gradually disappear, so that the mature peridium is smooth and black. At that stage the perithecium possesses a very distinct ostiole, which may vary from a short wart-shape to the long, conical form shown in Plate V., fig. 1b. Occasionally two ostioles appear on the same fruiting body. Although normally straight, bent ostioles are frequent. This is more characteristic of the genus *Sordaria*, but also occurs in *Rosellinia*, e.g., *R. Niesslii*. The thick, dark carbonaceous peridium is lined by numerous periphyses in the ostiole region. Until these have broken down or been pushed out, spore dispersal is prevented.

The long, cylindrical, blunt tipped asci, encased by hyaline, jointed paraphyses, fill the body. The swelling of the latter in moist conditions doubtless aids in spore dispersal. The walls of the asci are thin, but fairly persistent. The uniseriate ascospores are elliptical or ovate and dark brown or black. In the immature state they are surrounded by a mucilaginous ring, which seems to disappear later. A large conspicuous oil globule, characteristic of many species of *Rosellinia*, is also present.

This species shows characters which make it almost intermediate between *Rosellinia* and *Sordaria*. The elongated ostiole, occasionally bent, is of more frequent occurrence in the latter genus. The conical type, however, is found in several species of the former, e.g., *Rosellinia medullaris*, *R. malacotricha*, and *R. Niesslii*. In the last it is also distinctly curved, as in the species under consideration. The mucilaginous ring, usually regarded as a *Sordaria* characteristic when retained in the mature spore is found in several species of *Rosellinia*, e.g., *R. abscondita*, *R. Niesslii*, etc. When we take into consideration the habit of the perithecium, its carbonaceous and brittle nature, the persistent walls of the ostiole and the tufted hairy coating, found in so many species of *Rosellinia*, there seems little doubt that the species should be placed in that genus, rather than in *Sordaria*.

While this is the first species of *Rosellinia* to be described

as occurring on marine algae, a form with a somewhat analogous habit is found associated with gelatinous algae on marshy ground, e.g., *R. palustris*.

LULWORTHIA nov. gen.

Perithecia primo immersa postremo libera, magna, globosa, sine ostiolo evidenti; asci clavati vel fusiformes, raro cylindracei, parietibus tenuibus, octospori, aparaphysati; sporidia longissima, curvata, hyalina, continua, apicibus brevibus et hyalinis.

LULWORTHIA FUCICOLA nov. sp. (t. V., fig. 4-7).

Perithecia sparsa vel trina quaternave eodem loco crescentia, primo immersa postremo partim libera, in superiore parte carbonacea contextu denso, in inferiore parte rariore contextu, hyalina mollia, globosa vel leniter complanata, sine ostiolo evidenti, 350-450 μ ; asci crebri, clavati vel fusiformes, parietibus tenuibus, octospori, 90-120 μ \times 15-20 μ , aparaphysati; sporidia longissima utrinque leniter attenuata, cum apicibus brevibus hyalinisque, curvata, hyalina, continua 70-100 μ \times 4.5-5.5 μ .

Hab. In thallo vivo *Fuci vesiculosi*, Dorset.

So far this species has only been obtained once on the older stalk-like portions of the thalli of *Fucus*. The specimen described was collected at Durdle Door on the Dorset coast.

The first sign of attack is the occurrence of numerous, small, discoloured spots on the lower portion of the thallus. These become brown and at the same time perithecia are seen forming beneath the rind. With the gradual decay of the overlying tissue, these emerge and expose their upper portion as in plate V., fig. 4. The mycelium is localised more or less in the outer, cortical layers, and consists of very fine, much-branched hyphae, which cause the death and decay of the infected region. The mature perithecia are large, almost 0.5 mm., globose, or somewhat flattened, and usually without any trace of a neck-like ostiole. Only in the more mature forms does the tip seem to become pierced to form an opening. The exposed portion of the peridium is black, thick-walled, and carbonaceous; the immersed base which consists of loosely woven, delicate hyphae, remains soft-walled and almost hyaline.

The clavate or pointed asci are present in large numbers, but so far no trace of paraphyses has been found, even in the youngest stage examined. The asci possess very thin walls, which break down readily, setting free the spores, some time before they are dispersed. These elongated, hyaline and continuous bodies with short tips (Plate V., fig. 7) are curved and tapering, as shown in Plate V., fig. 6.

Before forming a new genus for this species every effort was made to place it, if possible, in an existing group. The type and habit of the perithecia and asci confine it to the Mycosphaerellaceae or the Pleosporaceae. The absence of paraphyses should, under our present classification, separate it from the latter, but, since occasional forms devoid of paraphyses have been placed under its genera, when they showed marked resemblance in other more essential characters, the possible relationship to this family has also been taken into consideration. Among the Mycosphaerellaceae it approaches most nearly to *Massalongiella*, but the important differences in the spores added to those in the perithecia are sufficient to exclude this genus. Among the possible genera in the Pleosporaceae are *Dilophia*, *Metasphaeria* and *Ophiobolus*. Since there appears to be considerable uncertainty as to the occurrence of paraphyses in *Dilophia*, the species under consideration may be held to share with it this absence of paraphyses in addition to an external resemblance in spores. However, the type and habit of the perithecia, the asci, the continuous spores and appendages render its inclusion under *Dilophia* objectionable. It might be held that *Lulworthia* was a form of *Metasphaeria* in which septa have not developed. But, while it resembles that genus somewhat in the type of perithecium and also in the possession of elongated spores, the attenuated, long, continuous spore with its hyaline tips, added to the absence of paraphyses, render that view untenable, even if we take into consideration *Metasphaeria? Peltigearum* (Arnold). This species has long, continuous spores, but its inclusion in the genus is open to question.

The possibility of any connection with *Ophiobolus* has also been considered, but, apart from mere length of spores, there is little in common. It is true that under *Ophiobolus* there have been included one or two forms with continuous spores, e.g., *Ophiobolus Xanthii* and *O. adnatus*. The position of these has, however, been questioned. But, even apart from the question of the continuous spore, the other characters are sufficiently distinct to make any connection extremely improbable.

The absence of any trace of clypeus or pseudostroma disposes of any spore resemblance to *Linospora* without taking any other differences into account.

It has been only after a careful comparison with possible genera that the writer has been impelled to admit the necessity for this generic separation.

PLEOSPORA LAMINARIANA nov. sp. (t. V., fig. 8-10).

Mycelium diffusum; perithecia primo tota immersa, postremo

erumpentia et partim libera, globosa, ostiolo brevissimo, contextu denso, atra, membranacea, 250-350 μ diam.; asci cylindracei parietibus crassis, octospori, 100-110 μ \times 25 μ ; sporidia ellipsoidea vel ovoidea, flava vel fulva, muriformia, plerumque septem transversa et complura directa septa habentia; paraphyses filiformes, mature deliquescentes.

Hab. In thallo *Laminariae*, Dorset and Orkney.

This species has been found only on the cast up fronds which strew the zone above tide-mark, and would appear to be entirely saprophytic. It usually accompanies the other saprophytes of this zone, e.g., *Cladosporium algarum* and *Diplodina laminariana*, from which its mycelium is distinguished by the immersed portions being always dark-coloured. Soon after infection the thallus becomes riddled with a strong growth of much branched, stout, brown hyphae. These form small, coiled masses beneath the rind, in which the perithecia take their origin. Even in this early stage the thick, dark wall is present. Inside this there is a more or less homogeneous mass of soft-walled hyaline cells, in the middle of which the young asci appear as in Plate V., fig. 8a. As the perithecia grow, they break through the covering rind and become partially superficial; a few may remain entirely immersed in the thallus and would appear to liberate their spores only on its disintegration.

In the early stages the asci are encased by numerous filamentous paraphyses, which usually disappear in the gradual crushing out of the parenchyma-like packing tissue, as the asci develop. The mature perithecia are irregularly globose and devoid of any neck-like ostiole, a feature which helps to differentiate them from the much smaller perithecia of *Pleospora Pelvetiae*. The asci are few in number, cylindrical and thick-walled, with eight irregularly biseriate spores. The paraphyses have usually disappeared before these reach maturity. The spores elliptical or ovate and at first yellow, become darker and muriform. Finally they possess seven transverse and a varying number of longitudinal septa. Many, however, have only five or six cross walls. In this connection it may be mentioned that an examination of several species of *Pleospora* has led to the conviction that the value laid upon the number of transverse septa as a specific character, has been over-rated. In the species studied the number seven is obtained finally in the following manner. The young spore divides first into two cells, then each of these again into two, thus giving three septa, easily distinguishable in the mature spore by their thickness and also by the greater constriction at their margins. Then all of these four cells, or any one or more may become transversely divided. There appears to be no definite order in the division of these, except that the two central ones usually de-

velop septa first, and that the terminal two frequently do not show them at all. Consequently the mature spores of the same species may possess seven, six, five or even four septa.

Pleospora laminariana has always been found accompanied by numerous pycnidia of the *Phoma* type which arise from a similar, if not from the same mycelium. Both these and their conidia differ from the description and measurements given for *Phoma Laminariae* Cooke and Masee, *e.g.*, the conidia are only about half the size, but as no type of that species has been available, the consideration of this pycnidial form may be postponed. The writer, however, is of the opinion that the original *Phoma Laminariae* represents the immature, continuous conidia of *Diplodina laminariana*, with whose measurements and description it agrees.

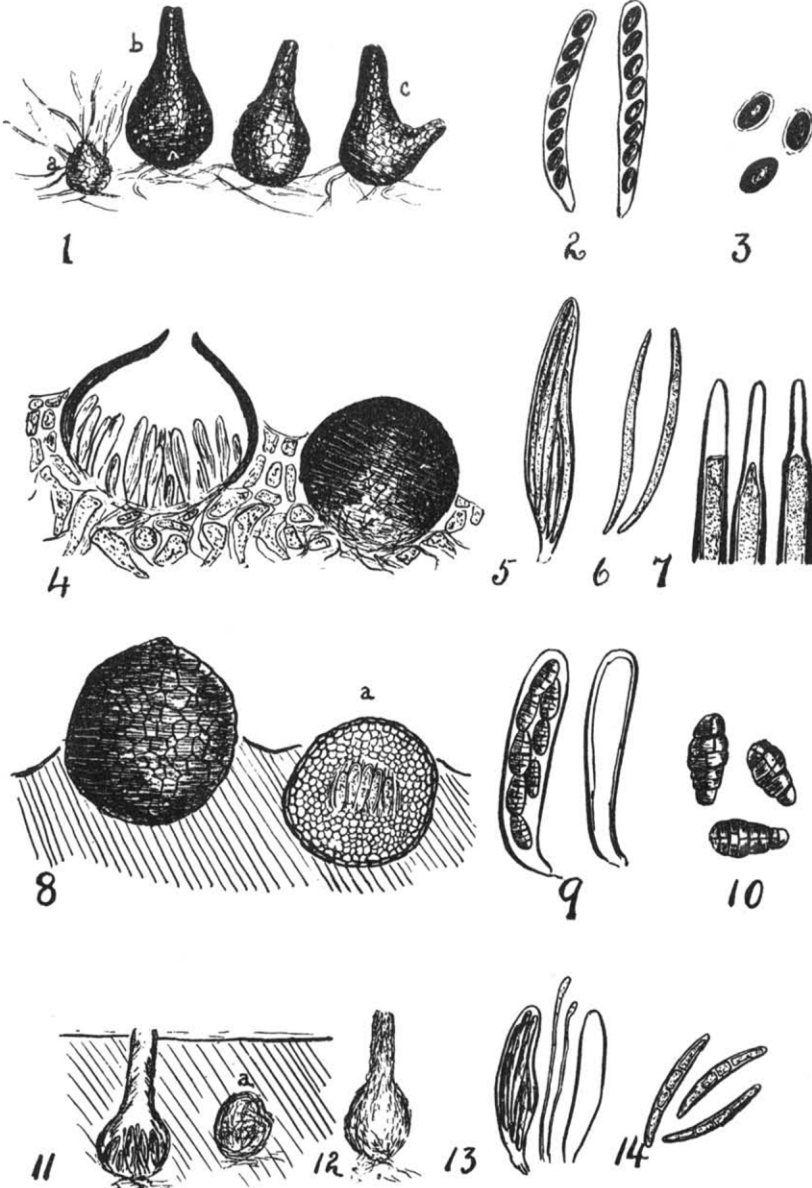
Species of *Orcadia* on *Fucus* (Plate V., figs. 11-14).

An examination of a blackened patch on the older thallus of a species of *Fucus vesiculosus* revealed the presence of a species of *Orcadia*, which is intermediate in asci and spore measurements between *Orcadia Ascophylli* and *O. pelvetiana*, while differing from both of them in its smaller perithecia. These are only 80-90 μ in diameter, with long ostioles varying from 80-120 μ \times 20-25 μ . As those of *O. Ascophylli* are 160-200 μ and *O. pelvetiana* 110-140 μ , it would appear to be sufficiently distinct to be regarded as a separate species. But as the asci and the spores resemble those of *O. pelvetiana* very closely, a study of further material and of its life history appears desirable before making a definite assertion. At the present time it is intended merely to note its presence on *Fucus vesiculosus* and to give a brief description for comparison with the two species already described.

The perithecia are immersed with the exception of the tip of the ostiole which may project from 5-10 μ . The peridium is invariably hyaline and soft-walled, consisting of the loosely woven structure characteristic of the genus. Its globose body averages about 90 μ in diameter, with an ostiole from 90-120 μ long \times 20-25 μ broad. The asci are clavate or fusiform, thin-walled, 60-70 μ \times 10-14.5 μ . They are mixed with numerous, attenuated, filamentous paraphyses, which possess dilated tips. The ascospores, spindle-shaped, hyaline, 3-septate, and thick-walled, are about 35 \times 5 μ , and break up readily into one-celled portions.

EXPLANATION OF FIGURES, PLATE V.

1. Perithecia of *Rosellinia laminariana*; a, immature perithecia with hairs.
2. Asci.



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1-3. *Rosellinia laminariana*. 4-7. *Lulworthia fucicola*
8-10. *Pleospora laminariana*. 11-14. *Orcadia* ? sp.

3. Ascospores.
4. Perithecia of *Lulworthia fucicola*, showing carbonaceous upper portion and soft-walled base.
5. Ascus.
6. Ascospores.
7. Ends of ascospores, enlarged to show hyaline tips.
8. Perithecia of *Pleospora laminariana*; a, immature perithecium with young asci.
9. Asci.
10. Ascospores.
11. Diagram showing Perithecia of *Orcadia*; a, coiled hyphae of young perithecium.
12. Perithecium, showing woven peridium.
13. Asci and paraphyses.
14. Ascospores.

COLOUR STANDARDS.

By J. Ramsbottom, M.A., F.L.S.

During the past ten years there have been published three schemes of colours: Oberthür and Dauthenay's "Répertoire de Couleurs," Klincksieck and Valette's "Code des Couleurs," and Ridgway's "Color Standards and Color Nomenclature." These three works have been adopted by different naturalists, and it has seemed to the British Mycological Society that the question of a colour standard is one that might profitably be brought to the notice of the Affiliated Societies of the British Association.

As everyone who has had to deal with colour in the natural sciences realises, there are two fundamental difficulties: (1) the difficulty of understanding what is intended by any colour term used in a description; (2) the difficulty which any worker himself has of satisfactorily naming the colours in a species under discussion.

It is obvious that these difficulties have not come forward suddenly during the present century, and in the few days at my disposal I have attempted to trace out various previous attempts to get over the difficulty. In this way it would appear that the requisites of a standard could best be appreciated.