

Dhui.—*S. obliqua* (Arn.) Schffn. 92. Apparently not uncommon on Lochnagar and Ben Muich Dhui. This plant, which seems to be one of the most distinct of the recently distinguished species of *Scapania*, is generally recognizable at a considerable distance by its brownish colour and the swollen tufts which rise conspicuously above the level of the other plants growing round the spring heads which it often affects.—*S. paludosa* K. Müll. var. *vogesiacae* K. Müll. 90. Canlochan, rare. 92. By a spring on Lochnagar, alt. ca. 3500 ft., a tall red-stemmed plant with the marginal cells of the leaves not so strongly thickened as in the Canlochan plant, but otherwise well characterized.—*S. rosacea* (Corda) Dum. 89. Near the head of Canlochan, sparingly.—*S. umbrosa* (Schrad) Dum. 92. Common on logs near Braemar.

*Radula Lindbergii* Gotts. var. *germana* Jack. 90. Canlochan.

*Madotheca rivularis* Nees. 92. Linn of Corriemulzie.

*Cololejeunea calcarea* (Lib.) Schffn. 92. Limestone rocks, Creag Choinnich, not uncommon.

*Frullania fragilifolia* Tayl. 92. Rocks, Craigandarroch, near Ballater; trees, Creag Choinnich, sparingly.

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EXPLANATION OF PLATE 526.—Figs. 1-6, *Diplophyllum gymnostomophilum* Kaal. 1, stem with leaves; 2, 3, antical lobes; 4, leaf-cells of antical lobe; 5, leaf-cells of postical lobe; 6, gemmæ (Glen Beag). Figs. 7-9, *Marsupella apiculata* Schiffn. 7, portion of stem; 8, leaves; 9, areolation of upper part of leaf (Ben Muich Dhui).

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## NOTES ON THE MYCETOZOA OF LINNÆUS.

BY G. LISTER, F.L.S.

THE International Botanical Congress, which met in Brussels in 1910, decided that the publication by Linné of the *Species Plantarum* in 1753 should be taken as a starting-point for the earliest generic and specific names of the Mycetozoa. In this book the binomial system of nomenclature is employed throughout for the first time; and, although as regards Fungi the work shows less grasp of the subject than that of some of Linné's predecessors, the fact of its publication gave an impetus to botanical study which soon led to a fuller recognition of Fungi, and with them of the Mycetozoa.

In the following notes reference is made first to the species of Mycetozoa described in *Species Plantarum*, and afterwards to the specimens preserved in the Linnean herbarium in the rooms of the Linnean Society at Burlington House.

While examining the specimens I had the invaluable assistance of Dr. B. Daydon Jackson, Secretary of the Linnean Society, whose knowledge of the correspondence of Linné enabled him in many cases to identify the handwriting of the notes on the sheets on which the specimens are mounted.

In the second edition of *Species Plantarum*, published in 1762-3, six or possibly seven species of Mycetozoa are described



under the fungus genera *Clathrus*, *Lycoperdon*, and *Mucor*. Although Linné's own descriptions here quoted are usually very short, they are in most cases accompanied by references to descriptions and illustrations of previous authors which permit the species to be identified.

The species are *Clathrus denudatus*, *C. nudus*, *C. recutitus*, *Lycoperdon radiatum*, *L. epidendrum*, *Mucor septicus*, and *M. Embolus*.

"CLATHRUS DENUDATUS. *C. stipitatus*, capitulo oblongo valvato. *C. pediculatus purpureus capite oblongo* Guett. Stamp. p. 17. *Clathroides purpureum pediculo donatum* Mich. Gen. p. 214, t. 94, fig. 1. Habitat in Europa australiori." The reference to Micheli's description and illustration makes it clear that this is the species now called *Arcyria denudata* Sheldon (syn. *A. punicea* Persoon).

"CLATHRUS NUDUS. *C. stipitatus*, capitulo oblongo axi longitudinale adnato. Fl. Suec. n. 1264. *Clathroidastrum* Mich. Gen. p. 214. Habitat in Italiæ lignis putridis." This brief description, and the diagrammatic figures of *Clathroidastrum* in Micheli's Nov. Plant. Gen. tab. 94, may apply to almost any species of the genus *Stemonitis*. Rostafinski follows Fries in giving *Clathrus nudus* as a synonym for *Stemonitis fusca* Roth.

"CLATHRUS RECUTITUS. *C. stipitatus* capitulo globoso, glande ovali. Fl. Suec. n. 1264. Habitat in Suecicæ truncis arborum." In the thirteenth edition of Linné's *Systema Naturæ*, edited by G. F. Gmelin (1791), this species is placed in the genus *Stemonitis*, with the following description:—"Stemonitis albida filis ovatis, stipite brevi." On the strength apparently of Gmelin's definition Fries gives *Clathrus recutitus* as a synonym for *Arcyria cinerea* (Bull.) Pers. (Syst. Myc. iii. 180).

"LYCOPERDON RADIATUM. *L. disco hemispherico, radiato, colorato*. Habitat in Suecicæ lignis Abietinis putridis, ad prædium nostrum Sæfja, ubi lectus 1760 a Filio. Magnitudine dimidii fructus Coriandri. Discus subglobosus, fuscus, elastice dehiscens, expellensque cum avolante polline lanam bombycinum, tumescentem, fuscum, rariorem adhærentem. Limbus campaniformis, niveus, sectus fere ad basin in partes 12 æquales, disco paulo longiores, basi integri ovali cingente discum." There is evidence to prove that the type here referred to is in the Linnean Herbarium (see below). The species is *Diderma radiatum* Lister.

"LYCOPERDON EPIDENDRUM. *L. cortice farinaque purpurea*. Fl. Suec. n. 1114. *L. epidendron miniatum pulverem fundens* Buxb. Hal. p. 203. *L. sanguineum sphaericum* 1 Buxb. cent. 5, p. 15, t. 29, f. 2. Habitat in Lignis parietis antiquis." This species is undoubtedly *Lycogala epidendrum* Fries.

"MUCOR SEPTICUS. *M. unctuosus flavus*. Fl. Suec. n. 1117; 1285. *Mucilago flava ramosissima mollis* Hall. helv. 5. *Spongia fugax mollis flava amœna* March. Act. 1727, p. 472. Habitat in vaporariis deservientibus visibili incremento, maturus semina



explodens." There is no doubt that this refers to *Fuligo septica* J. F. Gmelin. The reference to Jean Marchant's article quoted above is insufficient, and not quite correct. The full title of the article, in which the general appearance and growth of this species is graphically described, is as follows:—"Touchant une Végétation particulière qui naît sur l'Écorce du Chêne battue et mise en poudre, vulgairement appelée du Tan," published in *Hist. & Mém. de l'Académie Royale des Sciences*, p. 335, tab. 14, fig. 1, 2; read Dec. 1727; published 1729. A short abstract of this paper is given on pp. 40, 41 of the same volume.

"MUCOR EMBOLUS. M. seta nigra, villo fusco. *Embolus seta nigra villo fusco*, Fl. Suec. n. 1138, 1288. *Embolus nigerrimus villo albo adpersus*. Hall. helv. 8, t. 1, fig. 1." This is given by Fries as a synonym for *Stemonitis ovata* Persoon, a species now known as *Comatricha nigra* (Pers.) Schroeter, but it would seem that the description and Haller's illustration might apply equally well to *Comatricha typhoides* (Bull.) Rost. or to several species of *Stemonitis* (see note on specimen marked "*Embolus*" below). It is not surprising that the earlier authors failed to distinguish these species, for their characters can only be completely recognized with the aid of microscopic appliances unknown in their day.

In the Linnean Herbarium the following species are represented.

Within the cover marked "Clathrus" are four specimens of *Stemonitis*, each fastened down on a separate sheet.

With Dr. Jackson's permission I took a little of the spore-dust and some minute fragments of broken capillitium that were lying loose on the sheets, and examined them under the microscope. Fortunately in this genus the size and markings of the spores usually afford characters by which the species can be recognized.

On the first sheet is a specimen of *Stemonitis ferruginea* Ehrenb. The long-stalked sporangia form a fair-sized tuft, and measure 11 mm. in total height. The fragment of capillitium examined shows a close surface-net of rather stout threads, attached to the columella by few strong branches; the pale reddish spores are 4 to 5  $\mu$  diam. The sheet is marked in Linné's hand "Clathrus 3 nudus"; the numeral 3 refers to *C. nudus* being the third species described by him in the genus.

The specimen on the second sheet is also *Stemonitis ferruginea* Ehrenb. The sporangia are similar to those on the first sheet, except that the spores are rather larger and average 5  $\mu$  diam. The sheet is headed "Clathrus Linn. spec. 3, p. 1179" in the handwriting of Professor Johan Leche. At the foot of the paper Sir J. E. Smith\* has written "*nudus*" in pencil; below this, again, is written in a neat foreign hand:—"In parœcia Ulfsby, Biörne-

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\* Sir James Edward Smith, the British botanist (1759-1828), purchased the Linnean Herbarium in 1784 from the widow of Linné. He was the first President of the Linnean Society, founded 1788.



burgo adjacente lectus a Frid. Reinh. Brander in Betulis putridis." Björneborg is in the province Abo-Björneborg, S.W. Finland. Brader is referred to by Linné as "Magister," probably of Abo University. He may have been a friend of Leche's. The latter (born 1704, died 1764) was Professor of Anatomy and Medicine at Abo University; several sheets from his collection appear in the Linnean Herbarium.

On the third sheet is a fine specimen of typical *Stemonitis splendens* Rost. The total height of the sporangia is 14 mm.; the capillitium has a firm surface-net, with rounded meshes 20 to 30  $\mu$  diam., attached to the columella by few strong branches. On the sheet is written in pencil "Clathrus nudus," followed by an abbreviation that looks like "Angl." Dr. Jackson thinks the handwriting is that of the Swede, Jonas Dryander, a distinguished pupil of Linné, and that the note was probably made when he and Sir J. E. Smith went over the Linnean Herbarium together in 1784-5. It seems unlikely that the doubtful word "Angl" indicates that the specimen came from England, since *Stemonitis splendens* apparently requires a warmer climate than ours for its perfect development; the typical form has not been recorded from England, and is rare in Europe; but is abundant in the United States and in the tropics.

On the fourth sheet is a weathered specimen of *Stemonitis fusca* Roth., the spores of which, when highly magnified, show characteristic spinulose reticulation, and measure 7  $\mu$ . At the head of the sheet Linné has written "*Embolus*"; at the base the word "*lichenoides*" is written in a handwriting which resembles that of the great Swiss botanist, Albrecht von Haller, although Dr. Jackson feels that he could not assert that the writing is Haller's.\* It seems probable that this specimen is the type of *Mucor Embolus* L., the description of which has been quoted above.

Within the cover marked "Lycoperdon" are three specimens of Mycetozoa, representing the species *Diderma radiatum* Lister, *Lycogala epidendrum* (Linn.) Fries, and *Trichia Botrytis* Persoon.

The specimen of *Diderma radiatum* consists of about eighteen sporangia loosely clustered on five slips of wood. They are either sessile or on short stout brownish stalks; the sporangium-walls have split into five to ten widely-spreading lobes, pale brown or fawn-coloured on the outside, white within; from every sporangium the capillitium and spores are dispersed, leaving exposed the hemispherical fawn-coloured columella. The sheet is marked, in a handwriting which Dr. Jackson does not recognize, "*Lycoperdon radiatum* L., Sp. Pl. ed. ii. vol. ii. p. 1657, n. 7"; below this Rostafinski has written his name. Although Linné has not actually named this specimen, there can hardly be a doubt that it is the type of *Lycoperdon radiatum*, for, close to one of the slips of wood, he has written in a very small hand the word "*fili*,"

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\* *Mucor lichenoides* L. is a lichen, *Calicium quercinum* Pers. var. *lenticulare* Nyl.





Lister, Gulielma. 1913. "Notes on the Mycetozoa of Linnæus." *Journal of botany, British and foreign* 51, 160–164.

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