

XVI. *On Two New Genera of Fungi.* By the Rev. M. J. BERKELEY, M.A., F.L.S. &c.

Read June 1, 1852.

THE illustrious mycologist, Elias Fries, on more than one occasion, expresses the far greater pleasure that he has experienced in ascertaining with complete certainty a single synonym of the earlier writers on Fungi, than in discovering many new species; a sentiment which will meet a responsive echo in the approbation of most true lovers of science. There is indeed a great satisfaction in clearing up a point hitherto obscure; in finding that the pioneers of science, with all their disadvantages, were so far correct in their observations, and therefore worthy of trust in other particulars; the very subjects too are often interesting in an historical point of view; and not only so, but there is often much valuable information to be derived from their mode of regarding matters respecting which, for the most part, no scientific theories or prejudices existed, whatever other analogous drawbacks there might be, insomuch that on many points really juster views were entertained than by many of their successors. Such works as those of Micheli and Schmidel will repay the most attentive study, and many a circumstance has from time to time been brought forward as a new and important discovery, which they and others of their contemporaries had already accurately observed; while, on the other hand, from a careless inspection of their figures without due attention to the context, they have been made to vouch for facts respecting which they had no knowledge. To take a single instance in that branch of botany to which attention is more particularly called in the present memoir, and to which it is proposed to add two new genera, either founded on forms observed and described by the older botanists, or illustrated by matter furnished by them, but not recognized by more modern writers on the subject, the true structure of the hymenium of Agarics is accurately represented by Müller in *Agaricus comatus*, in an early figure of the 'Flora Danica,' whereas the figure in which Micheli is supposed to have represented that structure is meant to express something quite different, the simple circumstance of the quaternate disposition of the spores in Agarics being the only correlative fact known to that author, as appears from his text, which is usually too positive and luminous to admit of much question.

The objects to which the attention of the Society is now drawn are closely related to two which are figured, the one by Battarra and the other by Bulliard, though it should seem not absolutely identical. The first noticed shall be that which calls to mind a figure in the well-known work of the Italian botanist on the Fungi growing in the neighbourhood of Arimini, a work remarkable for its excellent illustrations and general faithfulness, and which may frequently be consulted with profit at the present day. The first edition of this work appeared in 1755, and a second edition was published in 1759, without however any alteration in the matter.



In the fortieth table a figure is given of a *Phallus* which has puzzled all succeeding botanists. Paulet copies it indeed in his large treatise on Fungi, colouring it after the description, and proposing it as a true figure of *Phallus caninus*, Hudson, to which however it bears at first sight but a remote resemblance. Fries says of it, under *Phallus caninus*, "Phallus exilis Marattæ, Batt. Arim. p. 76. t. XL. F. nisi præcedentis icon erronea affinis species\*." It seems, however, judging from the other figures contained in the volume, impossible that he should have gone out of his way to make anything so unlike the ordinary form of fungus in question. The account besides is too circumstantial to admit of much doubt. The fungus, Battarra informs us, was found by Father Maratta in the neighbourhood of Rome (ultra Genzanum), on the 5th of October, 1736, in a wood known by the name of Li Disertini, and communicated to the author in May 1754. Several specimens were found in a heap of rotten leaves. The volva is described as dirty white, coriaceous, and filled with a mucilaginous substance as in other species of *Phallus*. From this arose a club-shaped cellular receptacle, hollow within, the upper part being even and solid within (meaning probably that it was imperforate), and covered with a crust which was red when the fungus was young, but when it had arrived at maturity, the top was green, with a zone of red beneath it, the lower portion of the stem being dirty white, sprinkled with reddish brown superficial specks. When the fungus was passed maturity, the upper portion passed into a foetid fluid.

It should seem then that Battarra did not indeed see the fungus when fresh, and that his figure was taken from a dried specimen, for he says nothing of any drawing; but it is very difficult to conceive how a fungus tapering to a point, as exhibited in Sowerby's figure of *Phallus caninus*, could by any mode of drying assume the broadly clavate form exhibited by the figure.

A fungus, however, has been lately found by H. W. Ravenel, Esq., near the Santee River, South Carolina, which exhibits the peculiar form of that of Battarra, and when forwarded to me by the Rev. M. A. Curtis, was noticed as differing greatly in structure from other species of *Phallus*, in its not showing the slightest distinction between the stem and hymenium. It is true that at a later period specimens of the same species were found by Mr. Ravenel exhibiting the same form as that of *Phallus caninus*, but with the ample hymenium more clearly confluent with the stem, which differs but slightly from it in appearance and structure, and always perforated at the apex, while the loose cellular pale stem of *Phallus caninus*, at the first glance, is distinct from the short and more minutely cellular head. Excellent specimens of both, preserved in spirits, enable me to speak with the greater confidence, though my first observations were founded on the dried specimens only. As then two forms so widely different occur in a species analogous to *Phallus caninus*, though not identical with it, it is very possible that a clavate form of *Phallus caninus* may also exist, and that Battarra's figure is due to such a variety. This would be pretty well established if it were positively clear that the head in Maratta's plant is imperforate, but as he used the word 'perforate' in the description of other species, he would scarcely have omitted it in the present instance, and the phrase alluded to above may therefore be considered as intended to indicate something different from the more common

\* Two misprints in the above citation are corrected.



species of *Phallus*. We may, therefore, taking both the European and American species together, conclude, with tolerable certainty, that after all the figure of Battarra does indeed represent a peculiar state of the well-known species. No doubt whatever rests on the mind of Mr. Ravenel as to the identity of the clavate and more fusiform individuals of his plant, though, before ample materials had been collected, he had formed a different opinion.

Having, as far as the materials which have been collected permit, cleared up the very obscure plant of Battarra, I shall now advert more especially to that from South Carolina, which differs from *Phallus caninus*, not only in colour and a more compact texture, but in the important point of having the receptacle perforated.

In *Phallus caninus* the cells of the head are horizontal, compact, much smaller and quite different from those of the stem; in the new fungus, the cells of the head differ little in size, and are more numerous and not arranged horizontally. Though much stress cannot be laid on the clavate form of certain individuals, the structure, taken in conjunction with the perforated pileus, completely justifies the proposition of a new genus for its reception, unless such genera as *Dictyophora*, *Mutinus*, *Dictyophallus*, &c. are to be rejected as mere members of the genus *Phallus*. Indeed, though Fries does not consider *Dictyophora*, so remarkable for its beautiful reticulated veil-like appendage, as separable from *Phallus*, he has proposed a distinct genus, *Mutinus* (formerly *Cynophallus*), for the reception of *Phallus caninus*, in his 'Summa Vegetabilium Scandinaviæ.' On the same principles our plant must be generically distinct. The genus then may be characterized as follows:—

Gen. CORYNITES, Berkeley et Curtis.

*Uterus* rotundatus è membranâ duplici gelatinâ distentâ compositus, lobato-rumpens. *Receptaculum* cum stipite elongato celluloso-cribroso omninò continuum, obtusum, perforatum, massâ sporiferâ primùm sinuato-cellulosâ tenaci, mox vero diffuente, tectum. *Sporæ* minutæ.

Fungi terrestres, oblongi, subfusiformes, autumnales. Genus à Mutino, Fries, differt receptaculo minùs discreto, apice perforato.

C. RAVENELII, n. sp.

On sandy ground, in grassy places. Autumn. Santee River. Curtis, Nos. 2573, 3037. Ravenel, No. 844.

Egg globose,  $\frac{5}{8}$  of an inch in diameter. Volva bursting in two or three lobes closely applied to the stem.

Stem  $1\frac{1}{2}$ –2 inches high, 4–5 lines thick, bright red, coarsely cribose, attenuated below, above confluent with the receptacle, which is sometimes broadly clavate, sometimes conical, but always more or less obtuse, pervious at the apex, sometimes half as long as the stem. Mass of spores dark olive, soon washed off. Odour heavy and nauseous, but only perceptible when the hymenium is brought near to the nose.

Extreme forms are very different; some specimens approaching to the more ordinary form of *Mutinus caninus*, while others exactly resemble what is figured by Battarra.

The second subject to which I beg leave to call the attention of the Society, is to a group of fungi, of which *Sphærocarpus capsulifer*, Bulliard, is evidently the type. Though the description and figures are far from superficial, they appear for the most part to have been neglected by authors. As far as I have been able to discover, there are no notices of



the species, except by French botanists, and these appear to be for the most part mere compilations from Bulliard. DeCandolle's account, for instance, in the second volume of the 'Flore Française,' is only a transcript, as is also that of Chevallier; who adds to what DeCandolle says the circumstance mentioned by Bulliard, that when the fructifying mass is placed in water, the spores separate from one another as if they proceeded from a capsule, a circumstance which I have observed in one of the species, though not in the two which most nearly resemble the plant of Bulliard.

Duby next gives the characters of a supposed *Physarum*, under the name of *P. capsuliferum*, but as he describes the flocci as black, his plant cannot be the species of Bulliard; and his remark that Desmazières, who published *Didymium cinereum* at No. 272 of his 'Plantes Cryptogames du Nord de France,' thinks it may possibly be the same with that species, is conclusive as to the point, even though Bulliard has referred to Batsch's figure as a synonym of his *Sphaerocarpus capsulifer*.

These are all the notices I can find of this species. It is not in the General Index to Fries' 'Systema Mycologicum,' nor do I observe any notice of it in the text of his work, where so singular a production might have been expected to claim observation. Fries, indeed, in his general remarks, says that conglobated spores are described in several Myxogastres, but that such states are, according to his observations, always abnormal; which may be the reason why he has not noticed the species of Bulliard.

That the spores are, however, essentially conglobated in the species under consideration, and do not form mere accidental clusters, arising from inequable distribution of moisture amongst the mass, or from any other mechanical cause, is most evident under the microscope, the external spores being indeed always attached to a larger body in the centre, so that, when they are quite disunited, the size is seen to vary considerably; and in one species, where they are evidently echinulate, the little points are confined to those portions which were exposed after the fashion of the achænia in *Rhagadiolus edulis*; besides which, in an early stage of growth they are contained in a common sac. There is no doubt that several other *Physara* will be found to possess the same structure, and possibly all those species which have laminæ rather than flocci; and now that attention has been called to the subject, other instances may be found in other genera affording solid grounds for future division. The species which are now generically combined, with one exception of a *Didymioid* aspect, not only agree in structure, but in habit; the main distinction, indeed, besides differences of brightness of colour, consisting in minute variations in the spores. To Dr. Badham the credit of calling attention to Bulliard's figure, and ascertaining the structure, is entirely due, and I have therefore dedicated the genus to him, in the hope that its characters are so well founded as to ensure permanence, a very main point in such compliments.

Externally the fungi in question, with one exception, have the appearance of species of the genus *Physarum*, the peridium being single and smooth, and the spores mixed with flocci. These latter are broad and lamelliform in parts, but vary greatly in breadth, and intermixed with spores, as in other Myxogastres; but these spores grow in little acini-form masses, instead of being single, as in other allied fungi, with the exception of *Enerthenema*, *Reticularia* and *Ptychogaster*; in the former of which, figured by Mr. Bowman



in our Transactions, I have ascertained, as also in the present case, that they are produced within a vesicle, as in *Hymenogaster vulgaris*, Tulasne; thus confirming at once Mr. Bowman's curious genus, and M. Tulasne's observation of a similar anomaly in a different group of fungi; and in the two other genera they form little radiating fascicles. The figures prepared by Corda for his sixth fasciculus, of which, before his ill-fated voyage, he kindly sent me a copy, illustrate this admirably in the case of *Reticularia maxima* and *argentea*. *Tripotruchia*, Corda, has at first sight some resemblance, but the spores have short pedicels, which seems decisive as to their not being conglobated. The genus may be characterized as follows:—

BADHAMIA, n. g.

Peridium simplex, extus nudum, vel rarissimè subtomentosum; apice demùm lacerato apertum; flocci laxè reticulati, parietibus affixi, hic illic expansi in laminam sæpè triangularem peridio similem; sporæ globosæ vel subangulares, primum sacco communi inclusæ, demum liberatæ, conglobato-adnatæ.

*Fungi minores, fragilissimi, muscos vel corticem colentes, Physarum ut plurimum referentes.*

1. *Badhamia hyalina* = *Physarum hyalinum*, Auct.

2. *Badhamia utricularis* = *Physarum utriculare*, Auct.

3. BADHAMIA CAPSULIFER; peridiis sessilibus vel breviter membranaceo-pedicellatis obovatis congestis e nigrocæsiis albidis, floccis candidis.

*Sphaerocarpus capsulifer*, Bull. t. 470. fig. 2.

*Trichia capsulifera*, DeC. Fl. Fr. vol. ii. p. 254. 1815.

*Physarum capsuliferum*, Chev. Par. vol. i. p. 339. 1826? Duby, Bot. Gall. p. 861. 1830.

On moss. France.

This species differs from the two following in its spurious stem, more obovate peridia, and white flocci. It is probably most nearly related to *B. utricularis*.

4. BADHAMIA NITENS; peridiis sessilibus depressis congestis nitidè flavis, floccis flavis, sporis extus fortiter echinulatis.

On decayed oak branches. February 21, 1851. East Bergholt, Suffolk (Rev. Dr. Badham).

Forming little crowded orbicular patches, consisting of depressed sublentiform peridia of a bright persistent yellow, perfectly sessile, at length bursting above and dispersing their dark spores, so as to form a border resembling the stains produced by the sporidia of *Sphæria inquinans*. Flocci yellow, broad. Spores at first contained in a common vesicle, which bursts or is absorbed and exposes them in the form of little globose branches, which are often supported by an articulated thread, strongly echinulate, externally smooth towards the common axis. Mother-cells  $\frac{1}{1000} - \frac{1}{600}$  of an inch in diameter; spores  $\frac{1}{2500} - \frac{1}{2000}$ .

5. BADHAMIA PALLIDA; peridiis sessilibus depressis sublentiformibus hic illic congestis sparsisque pallido-luteis, floccis flavis, sporis majoribus granulatis: vesiculâ centrali magnâ.

On decayed oak branches. March 1, 1851. East Bergholt, Suffolk (Rev. Dr. Badham).

At first exhibiting more or less effused cream-coloured patches, which gradually assume a yellow tinge, and from which arise a few irregular groups of yellow depressed peridia, some of which are confluent, somewhat wrinkled. Flocci evidently continued from the peridium and of the same colour,



branched, forming triangular spaces at the origin of the branches. Mother-cells  $\frac{1}{800}-\frac{1}{300}$  of an inch in diameter. Spores slightly granulated,  $\frac{1}{2000}-\frac{1}{1730}$  of an inch long, attached to a large central vesicle. The peridium consists of a membrane, rough with very minute granules, which become more dense where the flocci are produced. In old specimens the patches assume an olive tinge.

6. *BADHAMIA FULVELLA*; peridiis gregariis sessilibus globosis nigris tomento subtili fulvo vestitis, floccis albidis.

On dead wood. East Bergholt, Suffolk (Rev. Dr. Badham).

Peridium very thin, black apparently, but yellow when divested of the spores. Gregarious, but not forming distinct patches, sessile, globose, clothed with very delicate tawny down. Mother-cells  $\frac{1}{1000}$  of an inch in diameter; spores  $\frac{1}{2000}-\frac{1}{2300}$ , black, forming a compact mass. Flocci often swollen in the middle, whitish.

The habit is that of a *Didymium* rather than of a *Physarum*.

### EXPLANATION OF THE PLATE.

Fig. 1. *a. Badhamia nitens*:—nat. size. *b. Separate peridia*:—slightly magnified. *c. Mother-cell, with young spores*. *d. Groups of spores*. *e. Spores, showing the external echinulate portion*:—all more or less magnified.

Fig. 2. *Badhamia pallida*:—nat. size. *b. Separate peridia*:—slightly magnified. *c. Portion of peridium*. *d. Flocci*. *e. Groups of spores, showing the large central cells, which are often pyriform*:—more or less magnified.

Fig. 3. Spores of *Badhamia hyalina*:—magnified.

Fig. 4. *Corynites Ravenelii*, in various states.



Berkeley, M. J. 1853. "On Two New Genera of Fungi." *Transactions of the Linnean Society of London* 21, 149–154.

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