
XXIX. *The History and Description of a Minute Epiphyllous Lycoperdon, growing on the Leaves of the Anemone nemorosa.* By Richard Pulteney, M. D. F. R. S. S. Lond. and Edin. and F. L. S.

Read June 5, 1792.

IT is many years since I was first acquainted with the production, of which I now beg to lay an account before the Linnean Society. But, although it had frequently occurred to me, I had neglected to give it an accurate examination by means of glasses; having rested in the opinion which I had met with in several modern authors, that those *Tubercula*, or *Puncta*, as they have been most commonly styled, on the leaves of the *Anemone nemorosa*, were the eggs of an insect.

An opportunity of seeing some of these plants early this Spring, put it in my power to give these appearances a more exact scrutiny; the result of which convinced me, that these tubercles were themselves a vegetable production of a parasitical kind, and of the order of *Fungi*: of which, it may be remarked, that very few species are known to vegetate on the perfect and living foliage, although many inhabit the dead and putrid leaves, of plants.

Before I describe more minutely the Fungus in question, I will briefly recite what I collect concerning the plant on which it is

found; which, on account of these tubercles, has, by some of those botanical authors who wrote soon after the restoration of botany, been considered as a distinct species. Hence some account of the plant becomes necessary to illustrate the subsequent observations; since, if I mistake not, some errors relating to it have remained undetected for upwards of two centuries.

After consulting all the older authors which I have it in my power to refer to, I can find no one who notices the singularity observable in the leaves of the *Anemone*, prior to THALIUS, a physician of *Northausen* in Germany; who appears to have been no inconsiderable botanist, at the period when he wrote. He with great diligence made a catalogue of the plants of the *Hartz*, or Black Forest, which was undertaken at the request of CAMERARIUS, and published by him after the death of the author, under the title of *Sylva Hercynia*, in 1588. In this work the author describes what he calls *Ranunculus Martii tertium Genus CORDI & TRAGI*. This genus he divides into five kinds or species, among which are included the *Anemone nemorosa*, and *ranunculoides* of LINNÆUS, and the moderns. I have only to notice what he remarks of his *Quintum Genus*, of which, however, it is unnecessary to detail his description at large. It is sufficient to observe, that he describes it as being always a *sterile* plant, and concludes with the following characteristic observation, which I give in his own words—“Hoc autem præ reliquis hujus
“ordinis generibus folia hæc peculiare obtinent, quod in dorso
“frequentibus veluti stigmatibus, seu punctulis protuberantibus
“sint picturata exasperataque.” *Sylv. Hercyn.* p. 98.

Caspar Bauhine, in his *Phytopynax*, p. 320. (which with respect to many of the plants is a more correct work than the *Pinax* itself) comprehends this variety under the synonyms of the *Anemone nemorosa*, adding, “Est et qui in dorso frequentibus punctulis protube-
“rantibus

“rantibus exasperatur:” which observation *John Bauhine*, his laborious brother, repeats in the *Historia Plantarum*, tom. iii. p. 413. *Caspar Bauhine*, again, in the *Pinax* itself, makes it his seventh species of the *Anemones sylvestres*, under the name of *Anemone nemorosa sterilis, foliis punctatis*, p. 177.

I find other authors also characterising this plant, as a variety of the *Anemone nemorosa*, by the epithets or trivial adjuncts *stigmatoides, insectorum vitium*, &c. Such are *Maurice Hoffmann*, in his *Flora Altdorfina* in 1662, and *Bromelius*, in his *Chloris Gothica* in 1694. But not having an opportunity of referring to these authors, I am unable to say how far their observations extend. It seems, however, that *Hoffmann* was the first who ascribed these appearances to the work of insects: but he does not say they were the eggs, but seems rather to consider them as the effect of punctures only. *Mentzel*, in his *Index Nominum Plantarum multilinguis*, printed in 1682, records it under the name of *Ranunculus nemorosus stigmatoides*, p. 258. But, in his *Pugillus rariorum Plantarum*, he goes much farther, and caught the idea of its resemblance to a Fern. “Hic absque flore crescit, et folia subtus tamque rubigine adpersa, “habet quasi in capillarem plantam degener.” By this description it evidently appears, that *Mentzel* had examined the plant in the mature state of these *Fungilli*, when indeed it bears a notable resemblance to a small Fern. The root of the *Anemone nemorosa* is known to creep in a horizontal direction; and *Mentzel* observes, that, unlike to the *flowering* species, which puts forth the leaf from the middle of the root, this *sterile* plant always sends up the stalk from one of the extremities. I mention this, since a few observations of my own, made by digging up the roots, tend to confirm the remark of this author. He notices further the length of the footstalk or petiole, which, with a paleness of the leaves,

distinguish these plants, at first sight, from the flowering plants of this kind.

Among the writers of our own country, Mr. Ray first records the plant as a variety under *Caspar* BAUHINE's name from the *Pinax* as above quoted; to which he adds, "Anemones sylvestris species "degener esse videtur." *Hist. Plant.* i. p. 624. Thus stood the matter until the publication of the third edition of RAY's *Synopsis*, by DILLENIIUS; when a leaf of this *Anemone*, laden with these tubercles, which had been found by DILLENIIUS, in BOBART's *Hortus Siccus*, had so far imposed upon the Professor, that he judged it to be a new species of Fern*, and introduced it into the *Synopsis* under the name of *Filix lobata globulis pulverulentis undique aspersa*, p. 125. *tab.* 3. *fig.* 1.

Whether Dr. HILL himself detected this error of Dillenius I am not informed; but as far as I know he was the first who revealed it, in his *British Herbal*, published in 1756, p. 12. and this with a flippancy of remark every where too conspicuous throughout that work, and which, in this instance, does less credit to his own candour and ingenuoufness, than it detracts from the accuracy of Dillenius, whom he tacitly endeavours to ridicule, under the appearance of rescuing the memory of Ray from the imputation of this error, although he must have known that no botanist could place it to Ray's account. I make this observation, because, in reality, it is as little wonderful that the plant, without the help of glasses, should, from these tubercles, have been mistaken for a Fern, if viewed when the *Fungi* were in their last period, verging to decay, as that, in their younger state, they should be mistaken for the eggs of an insect. Dr. Hill himself probably might have seen the

* Since the above was written I am enabled to add, by information from the present learned Professor of Botany at Oxford, that he has seen among *Dillenius's* papers a correction of the mistake by *Dillenius* himself. June 1793.

plant in the latter state, since his detection of the error (if it was his own) was but partial; he having, after all, considered the *puncta* as being effected by insects. He actually says, that “a small winged insect is apt to deposit its eggs on the under part of the leaves of this species,” (speaking of the *Anemone nemorosa*) “and they somewhat resemble the round dots in which the seeds of fern are lodged.” What degree of credit is due to this account, will be manifest from the subsequent history of the plant.

Although after this time neither HUDSON, LIGHTFOOT, MARTYN, LYONS, RELHAN*, nor any other author takes notice of this *Filix lobata*, yet some foreign writers of the most respectable note continued to advance the old opinion relating to these appearances on the leaves of the *Anemone*. “Foliis stigmatibus ex insectorum ictu notatis,” are the words of HALLER, *Hist. Plant. Helv. tom. ii. p. 64*; and the accurate POILICH, in his *Historia Plantarum Palatinatus electoralis*, adds, when speaking of this plant—“Variat quoque ubi folia minor ac latiora erant, lobata, subtus punctis nigris conspersa, quæ ab insectorum ictu nascuntur.”

After having thus traced the history of this production down to the present time, I must observe, that, although it would be unwarrantable in me to assert that no insect ever deposits its eggs on the under side of the leaves of the *Anemone nemorosa*, yet I suspect that the want of a precise examination of these *puncta* has been the sole reason of perpetuating an error, and that these *puncta*, whenever found, have been in reality, not of animal, but of vegetable origin: and I cannot help presuming that the description I shall give, and the reasons hereafter alleged, but above all a view of the plant itself, which I herewith submit to the inspection of the Gentlemen of the Society, will sufficiently establish this opinion.

* *Aecidium fuscum*. Relh. Cant. Suppl. iii. 36.

Before I had examined these appearances more minutely, and with glaffes, I had indeed doubted whether they were owing to the operation of, or were indeed the eggs of insects, from the circumstance, among others, of their being always found fparfedly placed on the leaf, and not in the aggregated mode, as insects *usually* deposit their eggs. A favourable opportunity, this Spring, of seeing some of these leaves loaded with tubercles, confirmed my fufpicions that they were not the eggs, the punctures, or even the work of insects, in any way whatever. Upon examining them with one of Mr. Adams's pocket lentes of three glaffes united, I observed, that these tubercles were not merely placed on the outer coat, but that they originated beneath the cuticle or external film of the leaf; and that the young white *Fungus* might be difcerned through this thin green coat. Others were feen juft emerging with the coat of the leaf lacerated, and fpread on the fide of the *Fungus*. On each leaf they are very often feen in different ftages of growth; fome juft appearing, others out, and with a puncture, or pore, juft difcernible on the top, which is the beginning of the aperture, that by and by enlarges, and the whole affumes a globular cup-like form, with lacerated edges, the cavity being lined with white duft, among which minute fibres or filaments may be difcerned. When the *Fungus* fades, it becomes, from being perfectly white, firft yellowifh, then brown, and finally, each *Fungus* is refolved into a farinofe particle refembling the fructification of a Polypody. This minute *Fungus* is fomewhat allied in its habit to the *Lycoperdon epiphyllum* LINNÆI, as found on the leaves of Colts-foot; but differs in not being aggregate, nor of an orange colour. Some of them, at a certain ftage of growth, bear fome refemblance to the figures of the *Carpobolus* E. F. tab. 101. in the *Genera Plantarum nova* of MICHELI; but the edges are lacerated in our *Fungus*, and not in any inftance divided into fmoother-edged,

edged, regularly shaped segments, like those of the above-mentioned figures; neither have I, as yet, observed the appearance of a *Volva*. To this may be added, that, during all its state of growth, and at maturity, it preserves uniformly a white colour, changing when dead into a yellowish brown.

As far as my observations extend, I judge, that this *Fungus* is seldom found on full grown, vigorous, and perfect, or flowering plants; but on the leaves of seedling plants, or of the first year's growth. The plants on which it is found are usually smaller than the others, the leaves of a paler colour, and the footstalk more lengthened, the whole giving the idea of a weakened or morbid state: but whether these *Fungilli* render the plant always *sterile*, an epithet which *Caspar BAUHINE* and other ancient authors have applied to it, or whether they occupy it in consequence of its having become morbid, I do not decide*.

Having made my earliest observations on this *Fungus*, when in its younger state of growth, and cup-like form, I hesitated whether it should be ranked with the *Peziza* or *Lycoperdon* genus: but in marking its progress to its old and decaying state, there remained no longer any doubt in which genus it ought to be classed. I judge it may not unaptly be named and described as follows:

NOMEN.

Lycoperdon (*Anemones*) parasiticum sphaericum sessile discretum album; ore multifido lacero; pulvere albo.

DESCRIPTIO.

Tubercula viridescencia, discreta, magnitudine inter se nec multum discrepantes, intra folii cuticulam primùm discernuntur: mox erumpunt fungilli albi, mammiformes, poro in summitate notati:

* Mr. Relhan observed the contrary.

fenfim dehifcunt in cyathos urceolatos five orbiculatos albiffimi coloris; marginibus subæqualibus in lacinias numerosas fectis. Cavitas dum maturefcunt fungilli, pulpa, five lanugine filamentofa, pulverem album fundente, repletur. Vacuo per maturitatem demum cyatho, pulvis per totum folii difcum difpergitur. Senefcens, flavefcemem, et per ætatem extremam fubfufcum, induit colorem: totus demum fungillus in cæspitem quafi vel globulum farinofum, nigrefcemem, filicum, vel fpecialiter polypodii, fructificationem æmulantem, contabefcit.

Lycoperdo epiphylo *Linnaei*, in pagina inferiore Tuffilaginis Farfaræ folii, crefcenti, affine, fed non idem; differt enim quod difcretum femper nec aggregatum. Color albus, nec aurantius; quod cyathi margines nec in octo tantum vel novem lacinias fecti, fed plurimas et irregulares.

LOCUS.

Habitat in dorfo *Anemones nemorofæ* foliorum virentium.

TEMPUS.

Verno viget tempore, dum planta cui infidet, virefcit. Juniora folia plantarum fortè annotinarum, potiffimùm videtur occupare hic fungus; et plantam, ut fufpicor, sterilem effe reddit. Sparfim et fine ullo ordine, dorfo folii folum, innafcitur, inter omnes ejufdem generis, minimus hic fungulus; neque confluens neque aggregatus, rarius enim duo contigui videntur. Decem, quindecim, vel viginti, immo etiam triginta fæpè plura, ad centum rarius, in uno foliolo numerantur.