VIII. *Remarks on Sclerotium stipitatum, Berk. et Curr., Pachyma Cocos, Fries, and some similar productions. By* FREDERICK CURREY, *Esq., M.A., F.R.S., F.L.S., and* DANIEL HANBURY, *Esq., F.L.S.*

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WE have investigated with some attention the nature of the body to which, in the preceding paper, Mr. Berkeley has given the name of *Sclerotium stipitatum*, and have compared it with the other tuberiform bodies described by him in a former paper published in the 3rd volume of the Journal of this Society. These other bodies are, *Pachyma Cocos*, Fries (the *Pe-foo-ling* of the Chinese); the substance called in China *Choo-ling*; and Professor Horaninow's *Mylitta lapidescens*. We have thought that a few additional remarks, accompanied by figures of the specimens and of their microscopic structure, may facilitate future inquiries, which are much needed in order to arrive at a satisfactory conclusion as to the nature of these anomalous productions.

And first with regard to *Sclerotium stipitatum*. Pl. IX. figs. 1, 2, and 3 represent the only three specimens which have hitherto reached this country, drawn to their natural size. We are quite of Mr. Berkeley's opinion, that they are of a fungoid nature, although it is impossible to speculate as to what the perfect state may be. Several hard, shapeless, fungoid bodies, the nature of which was long misunderstood, have been found to produce, under favourable circumstances, perfect *fungi* of well-known and very diverse genera. The tuber from which *Peziza tuberosa* is ultimately produced was supposed by Hedwig to be a dried Anemone root; and the true nature of the common Ergot of Rye was quite unknown until Tulasne called attention to the fact that it consists only of compact mycelium, which, under particular treatment, may always be made to produce a species of *Cordyceps*,—an observation which has since been verified by Mr. Berkeley and other mycologists. There is a black, cylindrical, fungoid body found in the interior of the stems of rushes, long known by the name of *Sclerotium roseum*, which has lately been found to give rise in the spring of the year to a species of *Peziza*, a description of which will be found in the 1st volume of the Journal of this Society*. This *Sclerotium* has also been treated successfully under cultivation: a specimen was gathered last November, and kept during the winter under the requisite conditions of moisture; and in the first week in April the *Peziza* appeared, a few days only before its occurrence in its native habitat. We think it not improbable that *Sclerotium stipitatum* might be treated so as to induce it to perfect its fructification; and we have some hope of procuring a further supply of specimens from India, to enable us to institute the necessary experiments. The specimens hitherto received, besides being only three in number, were destined by their sender, Dr.

* "On a new Species of *Peziza*, being the full development of *Sclerotium roseum*, Kneiff." by F. Currey, Esq., F.L.S. (*op. cit.* vol. i. p. 147).

Waring, for the Museum of the Pharmaceutical Society. Pl. IX. fig. 4 represents a thin section of the white inner substance of the *Sclerotium*, taken from near the circumference. The threads are of very irregular shape, and hardly similar in any two sections; but their general nature may be seen from the figure just referred to.

2. *Pachyma Cocos*, Fries. The variety of names which this remarkable substance has received, renders a list of its synonyms not undesirable; we therefore subjoin one which, with the needful references, will, we believe, be found nearly, if not quite, complete.

Pachyma Cocos, Fries, Syst. Mycologicum, vol. ii. (1822) p. 242, vol. iii. (1829) p. 223; Elenchus Fungorum, vol. ii. p. 39. Oken, Lehrbuch d. Naturgeschichte, 2ter Theil, Botanik, 2te Abtheil. 1te Hälfte (1825), p. 93. Tulasne, Fungi hypogæi, p. 197.

P. solidum, Oken, Lehrbuch d. Naturgeschichte (*l. c.*), p. 93.

P. Pinetorum, Horaninow, in Tatarinov, Catal. Medicamentorum Sinensium (Petrop. 1856, 8vo), pp. 2-23.

P. Coniferarum, Horaninow in litt.

Sclerotium Cocos, Schweinitz, Synopsis Fungorum Carolinæ superioris, in Act. Societatis Naturæ Scrutatorum Lipsiensis, tom. i. (1822) p. 56.

Lycoperdon cervinum, Walter, Flora Caroliniana (1788), p. 262.

L. solidum, Gronovius, Flora Virginica (1762), p. 176. Macbride, Linn. Trans. vol. xii. (1818) p. 368.

Tubera Terræ maxima, externe pulla et scabra, intus candida, Gronovius, Flora Virginica (1743), pars ii. p. 205.

Indian Bread or *Tuckahoe* M. J. B. in Gardeners' Chronicle, 16 Dec. 1848.

Pě fõ lîm, Cleyer, Specimen Medicinæ Sinicæ (1682), Med. Simp. No. 189.

茯苓 (*Fûh-ling* vel *Foo-ling*), Pun-tsaou-kang-muh, cap. xxxvii. sect. 4 (cum icone).

Fine specimens of this production, received many years since from Dr. Macbride of South Carolina, and described by him in the 12th volume of the 'Linnean Transactions,' under the name of *Lycoperdon solidum*, are to be seen in the Museum of the Society; and one of the most characteristic of these specimens is represented in Pl. X. fig. 5. Pl. X. fig. 6 represents a longitudinal section of a very similar specimen, and is interesting as exhibiting very completely the manner in which the root has been affected by the *Pachyma*. Dr. Macbride states that the *Pachyma* originates between the wood and bark of living roots, that it gradually detaches the bark, while it spreads round the wood and converts it into a substance similar to itself. The present section, however, exhibits an intermediate condition; for, although the bark is detached and the *Pachyma* interpolated between it and the wood, a great part of the wood itself is but little affected. The portion referred to by the letter *a* retains its natural colour and appearance; and when examined in section under the microscope, is found to consist of healthy woody tissue in an almost perfect state. This portion, when looked at with a lens, or even with the naked eye, may be seen to be traversed by narrow longitudinal white streaks, which the microscope shows to be very similar in composition to the part marked *b*, next described. This part (*b*) to the naked eye looks like wood of a very pale colour, but it presents a totally different appearance under the microscope. It consists of what appears to be a mass of mycelium, the threads of which have forced their way through the substance of the wood in every direction, separating the cells and converting them into irregularly shaped bodies of a highly refractive nature, having a good deal the appearance of

starch-granules, but without any concentric markings, and exhibiting no reaction with iodine. A section of this portion is shown in Pl. IX. fig. 7. The remaining parts of the specimen, marked *c* and *d*, and which constitute the main portion of the *Pachyma*, bear a general resemblance, when seen under the microscope, to the section shown in fig. 7; but the component bodies vary more in size, and many of them attain larger dimensions: the mycelium also is far less plentiful. A reference to Pl. IX. fig. 8 will show the form of a few of the latter bodies, a combination of which with tissue, such as that shown in fig. 7, constitutes the mass of the *Pachyma*. We entertain no doubt that the bodies shown in Pl. IX. fig. 8 are of the same nature as those in Pl. IX. fig. 7; *i. e.* they are wood-cells, in a more advanced state of disease and distortion. If it is wished to examine the threads or mycelium separately from the substance of the *Pachyma*, it may be done by selecting a specimen such as that shown in Pl. X. fig. 9, in which the substance is traversed by cracks. It will then be seen that (at least in some specimens) the opposite walls of the cracks are united by masses of white woolly fibres; and by taking a small quantity of the wool in forceps, and placing it under the microscope, it will be seen to consist exclusively of delicate threads entirely free from the irregularly shaped starchy-looking bodies forming the mass of the *Pachyma*. These threads are similar to those in Pl. IX. fig. 7, and are, we suspect, of fungoid origin; and although we see no reason to doubt that the *Pachyma* is in the main (as has been long supposed) only an altered state of the root of the tree, we think it highly probable that that altered state is the effect of fungoid disease, and that all the threads above alluded to may be the mycelium to which the disease is due. The section shown in Pl. X. fig. 6 exhibits at one end, at the points *e*, a brown dusty mass, formed by the disintegration of the inner bark. The greater part of the interior of this specimen is of a dirty brown colour, produced by a copious admixture of the particles of the bark with the substance of the *Pachyma*, which latter is not so pure and white as is usually the case.

3. *Choo-ling*, Berkeley, Journal of Proceedings of Linn. Soc. vol. iii. (1859) Botany, p. 102.

Chū līm, Clever, Specimen Medicinæ Sinicæ (1682), Med. Simp. No. 207.

Czžu-lin, Tatarinov, Catal. Medicamentorum Sinensium (Petrov. 1856), p. 17.

猪苓 (*Choo-ling*), Pun-tsaou-kang-muh, cap. xxxvii. sect. 4 (cum icone).

? *Hoelen*, Rumph. Herb. Amb. xi. p. 123.

Pl. IX. figs 10–13 represent specimens of this production, as to which we have little to add to Mr. Berkeley's account (*ut supra*). No botanical name has yet been proposed for it, which, in the uncertainty that exists respecting its origin and nature, is not to be regretted. Its microscopic structure is similar to that of *Pachyma Cocos*; but the threads by which its substance is traversed are much more interwoven and more branched, being in fact almost reticulate: they have not the appearance of being the mycelium of any fungus. We observe the same irregularly shaped bodies as in the *Pachyma*; but their dimensions, as remarked by Mr. Berkeley, are smaller: like the *Pachyma*, they are not rendered blue by iodine. In one or two specimens we have noticed an abundance of doubly pyramidal crystals, and we have also observed that the substance of the interior is much more tough and leathery than in *Pachyma*, which latter is in fact easily pulve-

rizable. The specimens of *Choo-ling* vary much in size as well as in form. The largest we have (and which is drawn in Pl. IX. fig. 10) weighs 481 grains, and the smallest 15 grains; the average of 46 specimens is 86 grains. All exhibit a thin, black, more or less shrivelled cuticle, closely investing the uniform, corky, cream-coloured substance of which the mass of the tuber consists.

4. *Myliitta lapidescens*, Horaninow, in Tatarinov, Catal. Medicamentorum Sinensium (Petrop. 1856), p. 34.

Lúi uón, Cleyer, Specimen Medicinæ Sinicæ (1682), Med. Simp. No. 227.

雷丸 (*Luy-wan*), Pun-tsaou-kang-muh, cap. xxxvii. sect. 4 (cum icone).

ಕರೂಪಲಗುಮ್ *Carom-pallagum*.

The fourth tuberiform substance to which we have alluded is that named by Horaninow *Myliitta lapidescens*. Specimens of this production, both from India and China, are drawn in Pl. IX. figs. 14–17. In a dry state they are extremely hard, so much so that, in the case of the Indian specimens, they might easily be supposed at first sight to be some stony substance from the chalk-beds out of which they are dug. There can be no doubt, however, of their vegetable nature, and but little, we think, as to their affinity with the hypogæous fungi. Although no trace of fruit is discernible, the inner substance is marked with veins, and a microscopic section shows the division of the tissue into *areolæ* similar to that exhibited by the hypogæous fungi. It is not easy to say whether it is truly of parasitic growth, though the natives of India assert it to be so. It will be seen, by referring to Pl. IX. fig. 15, that the specimen there represented has a small root-like excrescence on the left-hand side; and this excrescence, of which we have examined sections, is certainly of woody structure, although we are unable to say to what plant it belongs. Out of fifty Chinese specimens, however, only four exhibit these roots, which it is possible may be of accidental occurrence. The largest of these specimens weighs 106 grains, and the smallest 5 grains, the average weight of 50 being 24·6 grains. The largest Indian specimen weighs 268 grains.

We are informed by Dr. Waring that the native Indian name, *Carom-pallagum*, means literally, *Black pallagum*, *pallagum* signifying a medicinal substance. Our specimens are all grey or brown rather than black; but the wrinkles on the surface, which are very minute and which cannot be seen clearly without a lens, are of a very dark colour. It is possible that the specimens, when moist and fresh, may be of a darker colour than when in the hard and dry condition in which they reach this country. We think it hardly probable that the dry specimens in our possession should be brought to fructify, although the instance of Ergot of Rye producing fruit after having been baked in an oven shows that fungi may undergo a good deal of hard treatment without losing their vitality.

We are experimenting with the *Myliitta*; and if we succeed in causing it to produce fruit, we shall not fail to report the result.

EXPLANATION OF PLATES.

PLATES IX. & X.

- Figs. 1, 2, 3. Specimens of *Sclerotium stipitatum*, Bk. & Curr., natural size.
Fig. 4. Thin section of the inner substance of *Sclerotium stipitatum* highly magnified.
Fig. 5. Specimen of *Pachyma Cocos*, Fr., in the Linnean Society's herbarium, natural size.
Fig. 6. Longitudinal section of another specimen in the same herbarium.
Figs. 7 & 8. Thin sections of portions of the latter specimen, highly magnified.
Fig. 9. Portion of another specimen of *P. Cocos* in the Linnean Society's herbarium, showing cracks in the substance, the walls of which cracks are united by woolly fibres.
Figs. 10-13. Specimens of *Choo-ling*, natural size.
Figs. 14-17. Specimens of *Mylitta lapidescens*, Horan., natural size.

Lewin, del.

E.C. del.
Thibaut West, sculp.

W. West, imp.