

# BOTANICAL GAZETTE

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CONTRIBUTIONS FROM THE CRYPTOGAMIC LABORATORY OF HARVARD UNIVERSITY. LX.

A NEW AMERICAN SPECIES OF WYNNEA.

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(WITH PLATES IV AND V)

IN the third volume of HOOKER'S *Journal of Botany and Kew Garden Miscellany* (1851) BERKELEY published a description without figures of a large and striking discomycetous fungus, distinguished by the possession of long ear- or spoon-shaped apothecia, arising in a fasciculate fashion from a well-developed common stem. This form, which was said to have been found abundantly on rotten wood near Darjeeling, India, he placed in the then very comprehensive genus *Peziza*, comparing it to *Peziza onotica* and *P. leporina*, and designating it as *P. macrotis*. Some years later, however, having received from Dr. CURTIS a closely related North American species collected by BOTTERI near Orizaba, Mexico, he was led to create the new genus *Wynnea* for the reception of these two forms (*Jour. Linn. Soc.* 9: 1866), the Mexican species being used as the type under the name *Wynnea gigantea*. Both species were subsequently illustrated by COOKE in his *Micrographia*, the colors being no doubt guessed at from BERKELEY'S descriptions and from the dried specimens. *W. macrotis* is here said by COOKE to occur also in Mexico, but no authority for this statement is mentioned. During the forty years that have elapsed since the collection of *W. gigantea* by BOTTERI, there seems to have been no further mention of the occurrence of these or of other species of *Wynnea*, and in more recent years the genus has been consigned to the limbo of synonymy by SACCARDO in his *Sylloge*, where both species are included in the genus *Midotis*.

In the summer of 1888, a portion of which was spent by the writer in collecting fungi among the mountains of Tennessee and North Carolina, a species of *Wynnea* was found near Burbank, Tennessee, growing on the ground in rich woods, in a single locality; where several clusters of its long bluntly pointed, rabbit-ear-shaped dark brown apothecia were scattered in a limited space, each cluster borne on a well-defined stout stem emerging directly from the humus. The resemblance of this plant to COOKE's figure of *Wynnea macrotis*, to which it closely corresponds in form and color, was so striking that it was assumed to be that species, despite certain differences in the size and appearance of the spores when fully mature, and in the absence of any authentic material of the Indian species for comparison it was so referred.

A second visit was made to the same region in 1896, and the *Wynnea* was again encountered, both at Burbank and at Cranberry, North Carolina; one of the specimens from the last-named locality being parasitized by a fine species of *Syncephalis* described in a former number of the GAZETTE (24: 1. 1897) as *S. Wynneae*, the host being here recorded as *W. macrotis*. Having noticed, while gathering this material, that the stems appeared to have been broken from some attachment in every case, and not to have arisen like most humus *Pezizae* from an indefinite mycelium, a more careful examination was made in subsequent gatherings, and a little digging about the base of the stem showed that it originated in every case from a large, irregularly lobed, brown, firm, tuber-like body buried a few inches deep in the humus. This body, which was somewhat cartilaginous in consistency, showed, when cut, a chambered structure (figs. 5 and 6), the interior being traversed by light and dark more or less contrasting winding areas, closely resembling those characteristic of many *Tuberaceae* or *Hymenogastreae*; and at first sight it seemed not impossible that the *Wynnea* might actually be parasitic on some hypogaeous fungus. A microscopic examination of sections cut from this tuber, however, showed no signs of any structures which could by any possibility be considered to represent modified hymenia. The chambered interior, as is shown by the accompanying figures, is surrounded by an external layer or cortex of large, empty, thin-walled, brownish cells, those on the surface showing signs of degeneration

and wearing, which is rather abruptly succeeded by a peripheral region lying beneath it, composed of densely woven brownish filaments. As these filaments pass toward the interior, they become more loosely woven, the walls are much thickened, and the living protoplasmic contents are evident; the brownish tinge is lost as they pass into the white or colorless more or less gelatinous areas by which the adjacent chambers are separated. The chambers themselves show the greatest irregularity in contour, and are clearly marked off by a layer of dark cells which line them and contrast rather abruptly with the intermediate colorless areas above mentioned. These dark hymenium-like layers closely resemble the general external layer, and are made up of dark-walled, rounded, empty cells of somewhat smaller size, packed irregularly four or five deep; the somewhat ragged appearance of the superficial ones suggesting the lysigenous origin of the cavities which they line. Two such layers lying one on each side of an intermediate colorless region thus form the wall separating the cavities of two adjacent chambers (*fig. 6*). The early condition of this tuber-like body could not be determined, since all the specimens examined were well matured, and showed no signs of developing chambers. The body, however, appears to be in the nature of a sclerotium, which from its spongy structure may possibly serve the double purpose of supplying moisture as well as nutriment to the developing apothecia.

An examination of the specimens of *Wynnea gigantea* in the Curtis Herbarium shows that this species is characterized by a general habit closely resembling that of the Carolina form; and the main stem, where present in these specimens, is evidently broken from some attachment which may safely be assumed to have been a sclerotoid body similar to that above described. The presence of such a body might offer an additional reason for retaining BERKELEY'S genus, but its characters seem otherwise quite sufficient to remove it from *Midotis* or other known discomycetous genera. In regard to *Midotis* it may further be said that no one appears to have any definite knowledge of this genus at the present time, and it is altogether doubtful what the nature of this generic type really is. The name is first mentioned by FRIES (*Syst. Orb. Veg.* 363), without further allusion to a specific form than the remark "Species unica pleuropus;" while

in the *Elenchus* (2:29), published five years later (1830), the first mention of the type species, *Midotis lingua*, appears. This fungus, which is described as growing "ad basos truncorum" and as possessing an *inferior* hymenium, has not been found again, so far as is known; and it seems quite uncertain what it may have been, or even if it were anything more than some well-known form growing under abnormal conditions. The only discomycete known to the writer which might be referred to *Midotis*, and which possesses a truly inferior hymenium, is a plant found growing on dead logs in September, 1889, near New Haven, and again at Burbank; the material in the former locality being rather abundant. The apothecia are very thin, broadly spathulate, proliferous, and fasciculate, having a habit of growth very like that of some basidiomycete; the spores small and insignificant, and the inferior hymenium very characteristic and by no chance accidental. This plant, which has been provisionally referred to *M. plicata* Cke. & Hark., may perhaps really be a *Midotis* in the Friesian sense, on account of the unusual position of its hymenium; but that the other species included in the genus by various writers really belong here seems doubtful. The only species among these for the most part tropical forms, that the writer has examined, is the Cuban *M. verruculosa* B. & C., in which it is not possible to determine whether the hymenium is inferior or not. The status of *Midotis* itself being thus decidedly uncertain, it seems doubly undesirable to include in it the members of what at least appears to be a well-marked and peculiar genus.

Within the past year Mr. MASSEE has been so kind as to send to the writer a small fragment of the type material of *Wynnea macrotis* and *W. gigantea*, and, as has already been mentioned, he has examined the specimens of the latter species in the Curtis Herbarium, which form a part of the original gathering of BOTTERI, and include one large and very well-developed example. None of these, however, correspond very closely to the figures given by BERKELEY and COOKE, the apothecia, though somewhat more blunt than in the Carolina form, hardly presenting the thin, broadly spathulate, and freely proliferous habit represented in these drawings. Mr. MASSEE informs me that in his opinion the Berkeleyan species are not specifically distinct, although the color and habit of the two are so very differently represented in the *Micrographia*.

A comparative examination of the spores in all three species shows that when fully mature all are characterized by the presence of longitudinal markings, apparently corresponding to slight depressions and somewhat roughened intervening elevated regions which extend the whole length of the spores. Although these markings are conspicuous in the Carolina species, they are hardly visible until the numerous oily globules with which the spores are originally filled (*fig. 4*, upper spore) have been obliterated by treatment with glycerine or otherwise (*fig. 4*, two lower spores). While they are much less striking in *W. gigantea*, they are nevertheless readily seen (*fig. 8*), but in the material of *W. macrotis* received from Mr. MASSEE, they are exceedingly faint, possibly owing to the fact that the spores may not have been thoroughly matured. In all three species the spores are characteristically inequilateral, being more strongly curved on one side than on the other, apparent deviations from this rule being probably in all cases due to differences in the point of view. While in *W. macrotis* and *W. gigantea* they are bluntly rounded, they are more or less conspicuously apiculate or papillate at each extremity in the Carolina species, and the spore as a whole is distinctly larger. The spores of *W. macrotis* sent by Mr. MASSEE (*fig. 7*) are slightly smaller than those of *W. gigantea*; but the difference is insignificant, and could not serve to distinguish the species in the absence of other distinctive characters. Nevertheless it seems more desirable to retain both the Berkeleyan species until further data may be obtained by a re-examination of fresh material.

For convenience of reference the original descriptions of BERKELEY are quoted below. The genus may be characterized as follows, the sclerotium of the Carolina form being assumed to occur in the other species as well.

WYNNEA Berkeley & Curtis, Jour. Linn. Soc. 9:124. 1866.

Apothecia thick, firm, subcartilaginous, tough and subcoriaceous on drying, erect, elongate, ear-shaped, simple or subproliferous, several- to many-clustered on a common stalk arising from a sclerotium buried in the substratum. Paraphyses cylindrical, simple or branched. Asci cylindrical, tapering to an elongated base penetrating the subhymenium with the filaments of which it is continuous, without articulation. Spores large, inequilateral.

WYNNEA GIGANTEA B. & C., Jour. Linn. Soc. 9:124. *pl.* 17. *fig.* 31. *Midotis gigantea* Sacc. *Sylloge* 8:547.

“Common stem three inches high, three-quarters of an inch thick, deeply rugose and cracked, so that the surface resembles that of *Opegraphae*; above divided repeatedly, with subdivisions elongated into ear-shaped cups, which are smooth externally, but wrinkled, though not cracked like the stem when dry; the cups are from two and one-half to three inches long, with incurved margins variously divided and sometimes proliferous. Asci cylindrical, containing eight subcymbiform spores .00095 inch long, and more or less obtuse at either end. When steeped in water, the inside of the stem acquires a slight foxy tinge. The substance is so totally different from *Peziza*, though this curious fungus is closely allied to *P. leporina* and *P. onotica*, that it cannot be placed in the same genus. *Peziza macrotis* Berk., a species found abundantly at Darjeeling at 7,500 feet, is clearly congeneric and may be characterized *Wynnea macrotis* Berk., etc.”

Collected near Orizaba, Mexico, by BOTTERI, without note as to substratum.

#### WYNNEA MACROTIS Berk.

*Peziza macrotis* Berk., Hook. Jour. Bot. & Kew Gard. Misc. 3:203. 1851. *Wynnea macrotis* Berk., Jour. Linn. Soc. 9:124. 1866. *Midotis macrotis* Sacc., *Sylloge* 8:547.

“Inodorous, dry, firm, leathery, subcartilaginous, varying in size, sometimes five inches long; erect, tufted, connate below and thence branched; cups elongated, oblique auriform, of a bright liver color, smooth externally; margin subinvolute. Hymenium even, purplish. Sporidia oblong-elliptic, with one side in general more convex. Nucleus single, in dried specimens.”

On rotten wood Darjeeling, India, 7500<sup>ft</sup>, June-July.

#### *Wynnea americana*, nov. sp.

Sclerotium tough, subgelatinous, coriaceous on drying, irregularly lobed, variable in size, 50×40<sup>mm</sup> more or less, brown. Main axis becoming variously divided above almost immediately after emerging from the ground, the short divisions giving rise at once to clusters of apothecia of variable size and number. Apothecia several to about twenty-five on a single plant, typically simple, rarely proliferous, erect, elongate ear-shaped, very variable in size; the longest seen 130×60<sup>mm</sup>, the average about 80<sup>mm</sup>, the margins somewhat



THAXTER on WYNNEA



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involute on drying, the external surface rich blackish-brown, finely verruculose, the roughness due to projecting groups of irregular parenchyma-like cells becoming somewhat hair or chain-like toward the margins. Hymenium even, dark dull purplish-red, or brown. Asci elongate, about  $500-540 \mu$  long, the sporiferous part cylindrical, about  $18 \mu$  in diameter. Paraphyses septate, simple or irregularly branched, clavate, the slightly brownish terminal enlargement more abruptly and conspicuously distinguished in older specimens. Spores eight, subcymbiform,  $32-40 \times 15-16 \mu$ , the extremities apiculate or papillate; marked when mature by about eight roughened areas running longitudinally and separated by a corresponding number of smooth slightly depressed areas, the spore when fresh completely filled by numerous small round refractive oily masses.

Growing on the ground in rich woods, Burbank, East Tennessee, and Cranberry, North Carolina.

Professor DURAND has kindly allowed me to examine a specimen collected by E. WILKINSON at Mansfield, Ohio, and communicated by Professor KELLERMAN, which corresponds in all respects with the Carolina plant. The spores of BERKELEY'S species differ in shape and in their smaller size; those of *W. gigantea* measuring  $25-30 \times 12 \mu$ , and those of *W. macrotis* received from Mr. MASSEE  $20-25 \times 11-12 \mu$ . The apothecia of *W. gigantea* seem also to be somewhat smaller, more rounded distally, more numerous in a single plant, and distinguished by their much paler color.

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#### EXPLANATION OF PLATES IV AND V.

FIGS. 1-6.—*Wynnea americana* Thaxter.

FIG. 1. General habit of a well-developed plant. For the original of this figure, done in color by Mr. KRIEGER from a formalin specimen and colored sketches of my own from fresh material, I am indebted to Professor FARLOW.

FIG. 2. Paraphyses.

FIG. 3. An ascus showing connection with subhymenial filament.

FIG. 4. Three spores, the upper in optical section.

FIG. 5. Portion of a section of the subterranean sclerotium showing chambers and cortex. Leitz obj. C+oc. 1.

FIG. 6. Portion of walls between two chambers. Leitz obj. 1+oc. 1.

FIG. 7. *W. macrotis* Berk. Three spores, two in optical section.

FIG. 8. *W. gigantea* Berk. & Curt. Three spores, one in optical section.

The spores were drawn with Zeiss apochr.  $1.25^{\text{mm}}$  and 4 ocular.