

## IV.

CONTRIBUTIONS FROM THE CRYPTOGAMIC LABORATORY  
OF HARVARD UNIVERSITY.

## XVII. — FURTHER ADDITIONS TO THE NORTH AMERICAN SPECIES OF LABOULBENIACEÆ.

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THE present paper includes the additions which have been made during the season of 1891 to the previously recorded species of North American Laboulbeniaceæ, a small number only of new forms being reserved for later description from lack of sufficient material. Three new genera are represented, — *Ceratomyces* by two species, *Corethromyces* and *Acanthomyces* each by a single species. The genus *Heimatomyces*, formerly including a single European form, contributes ten species, nine of them new while, lastly, the genus *Laboulbenia* adds sixteen species, thirteen of which are undescribed. In all thirty species, by which the sum total of American forms is increased to forty-nine. The material examined was collected by the writer partly in Maine, partly in Connecticut; while very important additions have also been received through the kindness of correspondents, from whom the communication of hosts likely to be infested has been solicited. For such courtesy the writer is especially indebted to Mr. Theo. Pergande, who has sent Coleoptera collected in the vicinity of Washington, D. C., and to Miss A. M. Parker, for numerous interesting specimens taken at Slaughter, Washington. Mr. J. M. Aldrich has also kindly sent specimens from South Dakota, and Mr. Samuel Henshaw has determined the greater part of the insect hosts. For all these favors, the writer desires to express his grateful acknowledgments.

The contribution of aquatic forms is of especial interest, the genus *Ceratomyces* forming a distinct departure from previously described generic types. The considerable addition, also, to the



species of *Heimatomyces* serves accurately to define the characters of this genus, which proves to have been based by Peyritsch almost wholly on specific characters; while it is more than probable that the same author's genus *Chitonomyces* is also similarly based, and should be united with *Heimatomyces*. No specimens of the former genus being accessible, and the published figures leaving much uncertainty as to its true nature, the name *Heimatomyces* has been chosen to distinguish the American forms, their generic identity with *H. paradoxus* being unquestionable. The type of the genus is a very simple one, and may be characterized as follows.

### HEIMATOMYCES, PEYRITSCH.

Receptacle consisting of a basal and terminal portion: the basal including five cells, the two lower superposed, the three upper small and forming the base of the perithecium: the terminal portion including four cells more or less connected laterally with the perithecium, the terminal cell always free, bearing at its rounded apex a single simple thread-like appendage: the subterminal cell free from or connected on its inner side with the two remaining cells, the upper of which gives rise, from the angle made by the inner wall of the perithecium, to several simple thread-like evanescent appendages (trichogyne and antheridia?). Perithecium simple or appendiculate, symmetrical or asymmetrical. Asci sub-lenticular, 4-spore, spores fusiform or subfusiform, septate.

In a single species (*H. Halipli*) the middle of the three cells which usually form the base of the perithecium is enlarged, and extends the whole width of the receptacle, the base of which thus consists of *three* superposed cells. The terminal and subterminal cells of the receptacle may be elongated or modified; but the total number and general relative position of the cells seem to be very constant. In only two species, *H. paradoxus* and *H. appendiculatus*, is the perithecium modified by an outgrowth from one of its cells.

### HEIMATOMYCES SIMPLEX, nov. sp.

Pale yellowish or faintly brownish. Perithecium rather slender, continuing the strong curve of the receptacle evenly outward to its rather coarse blunt apex. Basal cell of the receptacle much longer than the flattened sub-basal cell, the septum between the two often obsolete: terminal cell bell-shaped, small. Spores  $26 \times 11 \mu$ .



Perithecia  $55-60 \times 11-12 \mu$ . Length of receptacle  $75 \mu$ . Basal cell  $15 \times 7.5 \mu$ . Total length  $90-100 \mu$ .

On *Laccophilus maculosus*, *Hydroporus spurius*, etc., Connecticut.

A very common species, occurring in considerable numbers on the elytra of the host, possessing the simple typical structure of the genus, and distinguished by its evenly curved habit, blunt perithecium, and uniform color.

#### HEIMATOMYCES HYALINUS, nov. sp.

Hyaline or very faintly tinged with yellowish brown. Perithecium large, at first hunched externally, and bent inward near the apex, becoming nearly straight, tapering to the rather small apex, which is bent somewhat abruptly outwards at maturity. Basal and sub-basal cells of receptacle broad, nearly equal, or the basal twice as long as the sub-basal, the two separated by a well defined septum. Spores  $8 \times 2.5 \mu$ . Perithecia  $75-90 \times 20 \mu$ . Total length to tip of perithecium  $110-120 \mu$ .

On *Laccophilus maculosus*, Connecticut.

Differing from the last in its larger size, and stouter straight perithecium, as well as in minor points. It occurs only on the posterior legs of its host.

#### HEIMATOMYCES AFFINIS, nov. sp.

Rather strongly suffused with yellowish brown. Perithecia commonly slightly curved inwards, or nearly straight, the tips often slightly bent outwards. Basal cell of receptacle large, sub-triangular, suffused laterally and terminally with deep black-brown: sub-basal cell very flat; terminal cell small, its axis bent strongly inwards. Spores  $50-55 \times 3 \mu$ . Perithecia  $100-110 \times 30 \mu$ . Basal and sub-basal cells of receptacle  $40-45 \mu$ . Total length to tip of perithecium  $150-170 \mu$ .

On *Laccophilus maculosus* and *Hydroporus* sp., Connecticut.

Nearly allied to *H. hyalinus*, from which it may be separated by its larger size and suffused basal cell. It occurs at the apex of the right elytron.

#### HEIMATOMYCES APPENDICULATUS, nov. sp.

Becoming faintly brownish. Perithecium tapering to a rather sharp apex, curved strongly outwards, hunched externally (often distorted by twisting), and bearing a straight, sub-clavate, one-celled, brownish appendage arising externally below the apex.



Basal cell of the receptacle rather narrow, more than twice as long as the squarish sub-basal cell. Spores  $32 \times 3 \mu$ . Perithecia  $55 \times 15 \mu$  to  $75 \times 22 \mu$ . Basal and sub-basal cells  $30\text{--}45 \mu$  in length. Perithecial appendage  $30\text{--}33 \times 4 \mu$ . Total length to tip of perithecium  $100\text{--}130 \mu$ . Greatest breadth  $30\text{--}36 \mu$ .

On *Laccophilus maculosus*, Connecticut.

A rare species, confined to the anterior pair of legs of its host, and distinguished at once by its clavate perithecial appendage which corresponds to the similar horn-like projection from the perithecium of *H. paradoxus*.

#### HEIMATOMYCES PARADOXUS, PEYR.

This species occurs not uncommonly on the edge of the left elytron of *Laccophilus maculosus* in company with *H. marginatus*. The ascogenic area is so placed that the asci and spores are much distorted at maturity; but the latter do not appear to have the peculiar shape represented by Peyritsch.

#### HEIMATOMYCES HALIPLI, nov. sp.

Strongly suffused with yellowish brown. Perithecia inflated, more strongly externally, rounded to the papillate tip. Base of receptacle composed of *three* superposed cells, the lower triangular, suffused with blackish at the base; the two upper much flattened, their septa horizontal; terminal cell small; an inconspicuous truncate hyaline projection arising near the trichogyne. Spores  $28\text{--}30 \times 3 \mu$ . Perithecia  $100 \times 35\text{--}40 \mu$ . Basal cells  $40\text{--}50 \mu$ . Total length to tip of perithecium  $150 \mu$ .

On *Haliplus ruficollis* and *Cnemidotus muticus*, Connecticut.

Occurs rarely on the right elytron of its host, usually upon *Haliplus*, a single specimen only having been found on *Cnemidotus*. It is distinguished from all other species by the three superposed basal cells of the receptacle, the upper of which appears to be what is usually the middle of the three cells which normally form the base of the perithecium. The inflated, abruptly papillate perithecium is also a distinguishing character.

#### HEIMATOMYCES LICHANOPHORUS, nov. sp.

Hyaline except for the suffused basal cell. Perithecia bent outwards at an angle from the basal part of the receptacle, tapering slightly to the papillate apex. Basal cell of receptacle enlarged and greatly elongated, more or less intensely blackened above its



hyaline base; sub-basal cell flat and almost obsolete. Terminal and subterminal cells together forming a straight finger-like projection as long as or longer than the perithecium. Spores  $33-37 \times 2.5-3 \mu$ . Perithecia  $65-90 \times 30 \mu$ . Total length to tip of perithecium  $150-180 \mu$ . Basal cell  $90-110 \mu$ .

On *Laccophilus maculosus*, Connecticut.

This species is confined to the median inferior anal plate of its host, and has only been observed upon males. It is not to be confused with any other species, being distinguished by its elongated basal and apical cells, almost black and white color, and papillate divergent perithecium.

#### HEIMATOMYCES RHYNCHOSTOMA, nov. sp.

Evenly suffused with yellowish brown. Perithecia relatively large, abruptly hooked at the broad apex, so that the papillate tip is turned inwards and is lateral in position. Basal cell of receptacle comparatively short, slightly inflated: sub-basal cell flattened: terminal and subterminal cells forming an outwardly curved, finger-like appendage exceeding the perithecium; the subterminal cell continued into a short well marked hook. Spores  $26 \times 3 \mu$ . Perithecia  $75 \times 22 \mu$ . Total length to tip of perithecium  $100 \mu$ . Basal cells of receptacle  $25-30 \mu$ .

On *Laccophilus maculosus* and *Hydroporus spurius*, Connecticut.

Occurs rather rarely on the margin of the right elytron, from the surface of which the perithecium projects in a characteristic fashion. The broad hooked apex of the perithecium and the finger-like development of its distal portion distinguish this species from any other form.

#### HEIMATOMYCES UNCINATUS, nov. sp.

Evenly suffused with pale yellowish brown. Perithecia large, curving evenly inwards to the somewhat pointed apex. Basal cells of the receptacle rather slender, the terminal cell pushed to one side and bent past the apex of the perithecium by a somewhat indurated, blunt, hooked outgrowth from the subterminal cell. Perithecia  $75-85 \times 20 \mu$ . Total length  $110-130 \mu$ . Basal cells of receptacle  $37 \mu$ .

On *Laccophilus maculosus* and *Hydroporus spurius*, Connecticut.

A rather rare species, occurring in groups on the inferior surface of the abdomen of its host, and distinguished by the peculiar development of the subterminal cell of the receptacle.



## HEIMATOMYCES MARGINATUS, nov. sp.

Long and slender, at first nearly hyaline, then yellowish. Perithecia straight, then suddenly bent inward below the hyaline, neck-like, strongly curved tip. Basal cells of the receptacle subtriangular, the sub-basal half as large as the basal, the three cells at the base of the perithecium more than usually developed: the terminal cells all becoming black and opaque at maturity; the terminal one continued by a squarish outgrowth basally hyaline, at first lateral and external, becoming terminal (the true apex of the cell being pushed inwards and becoming lateral), hardly exceeding the tip of the perithecium which it conceals. Spores  $30 \times 3 \mu$ . Perithecia  $95-110 \times 22 \mu$ . Total length to tip of perithecium  $140-160 \mu$ . Basal cells of receptacle  $25 \mu$ .

On *Laccophilus maculosus* and *Hydroporus spurius*, Connecticut, Maine.

A form peculiar for the modification of the terminal cells of the receptacle, which makes the perithecium appear as if bordered by a black band. It is found in company with *H. paradoxus*, and recalls the supposed genus *Chitonomyces*, which is said to be similarly associated on the left elytron of its host.

## CERATOMYCES, nov. gen.

Receptacle reduced, consisting of a small number of basal cells, above which it is directly continued by the basal cells of the perithecium and antheridial appendage. Perithecia highly developed, the walls composed of four longitudinal rows of superposed cells, the outer row continued into a horn-like appendage. Antheridial appendage arising at the base of the perithecium, composed of a series of superposed cells the upper angles of which may be cut off to form the base of filamentous appendages (antheridia?). Asci subclavate, 4-spored. Spores fusiform or acicular, once septate, involved in mucus.

## CERATOMYCES MIRABILIS, nov. sp.

More or less deeply suffused with yellowish brown. Perithecium elongate, the walls composed of longitudinal rows of superposed cells, about twenty-three in each row, the cells of adjacent rows alternating, their long axes transverse: the outer row continued below the apex of the perithecium as a curved horn-like projection, basally constricted and suffused, tapering distally to a



rounded tip (in unbroken specimens), and made up of a series (ten to sixteen) of more or less cylindrical superposed cells. Tip of perithecium subhyaline, subacute, curved towards the perithecial appendage. Antheridial appendage arising from the receptacle slightly above the ascogenous cell of the perithecium; subconical, composed of a variable number of superposed cells, from the upper angles of which may be cut off, by an oblique partition, small cells which give rise to the antheridial branches, the latter slender, hyaline, septate, simple or branching, evanescent. Receptacle composed of three superposed cells, deeply blackened except along the outer edge, surmounted by a larger inner blackened cell and two smaller outer subhyaline cells; the basal cell partly subhyaline, the foot large and wedge-shaped, the axis of the receptacle strongly bent between the basal and sub-basal cells. Spores slender, one or more times spuriously septate, fusiform or slightly rounded at the apex,  $100-120 \times 4 \mu$ . Asci flattened, subclavate on a short curved pedicel. Perithecia  $280-295 \times 65-75 \mu$ . Antheridial appendage one half to two thirds as long as the perithecium. Perithecial appendage  $180-200 \mu$ . Total length to tip of perithecium (maximum)  $450 \mu$ . Receptacle  $150 \times 75 \mu$ .

On *Tropisternus glaber* and *T. nimbatus*, Connecticut.

Taken in a single locality, at Milford. The trichogyne arises apparently from the angle between the perithecium and the antheridial appendage, thus indicating a probable relationship to the *Heimatomyces* section of the family. The parasite inhabits the inferior surface of its host in various positions.

#### CERATOMYCES CAMPTOSPORUS, nov. sp.

Closely resembling the last in general appearance. Perithecia strongly curved near the base, proportionately stouter and shorter, each row of cells made up of from thirty-five to forty members, which, especially in the external row, are successively inflated, giving the outline on this side a strongly corrugated appearance: perithecial appendage of fewer, longer cells, not bent or blackened towards its base. Receptacle very small, triangular, straight, of not more than two or three superposed cells, the lower quite opaque. Antheridial appendage arising from a short curved basal cell, above which it is abruptly inflated, tapering thence to a rather slender apex. Spores more slender than in *C. mirabilis*, tapering at both extremities, slightly swollen and strongly bent near the base,  $110 \times 3.5 \mu$ . Perithecia  $275 \times 85-90 \mu$ . Receptacle  $90 \times 50 \mu$ .



On *Tropisternus glaber*, Connecticut.

This species occurs with the last, but more rarely, and was at first mistaken for a mere variety of it. The differences, however, are important and constant, the peculiarity of structure presented by the spores being unique in the group.

### CORETHROMYCES, nov. gen.

Receptacle reduced to a basal with two or three terminal cells, giving rise on one side to the free perithecium, on the other to several long straight rigid cylindrical jointed appendages, which bear externally at short intervals numerous secondary appendages.

### CORETHROMYCES CRYPTOBII, nov. sp.

Perithecium (immature) long and narrow, the tip bent slightly inwards. Primary appendages three or four in number, brownish, rather closely 11-12-septate, cylindrical, straight, tapering slightly; the secondary branches simple, aseptate or pseudoseptate, somewhat divergent, comprising a row of larger brown appendages on either side, between which arise a few smaller hyaline ones; the larger appendages about equal in number to the segments of the primary appendage (six to seven). Receptacle opaque above the small hyaline basal cell. Primary appendages  $150-160 \times 8-10 \mu$ ; secondary appendages (longer)  $100-110 \times 5.6 \mu$ . Receptacle  $75 \times 40 \mu$ . Perithecium (immature)  $100-110 \times 20 \mu$ .

On *Cryptobium pallipes*, Virginia (Pergande).

A single immature specimen of this remarkable genus was found growing on one of the posterior legs of its host. The highly differentiated appendages are quite different in character from those of any other genus. In their natural position they almost wholly obscure the perithecium, and, springing from the greatly reduced receptacle, present the appearance of a brush-like tuft, the true nature of which is not at once apparent.

### ACANTHOMYCES, nov. gen.

Perithecia as in Laboulbenia, clearly differentiated from the receptacle. Main axis of the receptacle composed of superposed squarish cells, and, above its basal cell on the inner side, of a series of smaller appendage-bearing cells extending up to and around the base of the perithecium: the appendages simple, rigid, septate. Spores as in Laboulbenia.



## ACANTHOMYCES LASIOPHORA, nov. sp.

More or less suffused with blackish brown. Perithecia borne on the apex of the receptacle, somewhat inflated, nearly symmetrical, tapering to a rather blunt apex. Appendages arranged in two rows of larger bristle-like members, hyaline at the tips, blackish below, running from the apex of the basal cell (one opposite each upper inner angle of the cells of the main axis) to the apex of the receptacle, where they envelop the base of the perithecium: from the cells of the receptacle between these two rows arise smaller appendages, which become more numerous towards its extremity. Receptacle slender at the base, expanding upwards, consisting of a main axis of about twelve superposed vertebra-like cells, at first hyaline, becoming blackish, and of a series of smaller cells almost completely concealed by the appendages. Spores involved in mucus, 1-septate,  $30 \times 3 \mu$ . Perithecia  $140-145 \times 50 \mu$ . Larger appendages  $75-90 \mu$ . Receptacle  $175 \mu$ .

On *Atranus pubescens*, Connecticut.

The slightly branched terminal trichogyne of this singular form is hidden between the appendages at maturity. The character of the antheridia could not be determined from the material examined, and the minute structure of the receptacle, apart from the main axis, is almost completely hidden by the appendages.

## LABOULBENIA COMPACTA, nov. sp.

More or less tinged with olive-brown. Perithecia moderate, tapering towards the somewhat coarse-lipped, outwardly oblique apex. Pseudoparaphyses forming a dense tuft, hardly exceeding the perithecia in length, simple, or once branched above the basal cell, tapering evenly to the apex, 1-3-septate, tinged with brownish near the base: arising from a broad cellular base of eight or more cells, above a more or less well marked disk of insertion situated just above the base of the perithecium. Receptacle very short and stout, subtriangular: cell II. much broader than its length, wedge-shaped distally: cell III. greatly reduced, broad and flat: cell V. unusually large, its base resting on cell III. Spores  $60 \times 4 \mu$ . Perithecia  $110 \times 40 \mu$ . Pseudoparaphyses  $90-100 \mu$ . Total length to tip of perithecia  $180-190 \mu$ . Greatest breadth  $65 \mu$ .

On *Bembidium* sp., Maine.

A small well marked species of the *luxurians* type, differing in its peculiar shape and abundant straight appendages inserted on a



multicellular base, which is more highly developed than in *L. luxurians* or *L. fumosa*.

LABOULBENIA LUXURIANS, PEYR.

A form which appears to be identical with this species, and closely allied to *L. fumalis*, occurs usually on the tips of the elytra of species of *Bembidium* in Maine, and has also been sent to me from Washington by Miss Parker.

LABOULBENIA VARIABILIS, nov. sp.

At first hyaline, becoming more or less tinged with brown. Perithecia moderate, tapering only slightly to the rather blunt, outwardly oblique, coarse-lipped apex, which is more or less deeply blackened below, especially on the inner side. Pseudoparaphyses very variable in number, sometimes hardly branched, sometimes forming a dense fascicle: arising more or less indefinitely from a small number of basal cells above cells IV. and V. of the receptacle, from which they are not separated by any disk of insertion: the basal portion short, constricted at the blackish septa, the segments slightly inflated; the distal portion slender, cylindrical, aseptate or obscurely septate, hardly tapering; often hardly exceeding the perithecium, sometimes several times its length. Antheridia overlapping one another on special lateral branches, forming a subconical cluster. The plane of insertion of the pseudoparaphyses usually opposite the middle of the perithecium, sometimes carried beyond its apex by the elongation of cells III. and IV. of the receptacle. Receptacle medium or much elongated; cell V. often enlarged, and protruded along the inner face of the perithecium, so as to throw the pseudoparaphyses and their insertion outwards. Spores  $50-60 \times 6 \mu$ . Perithecia  $92-130 \times 33-50 \mu$ . Pseudoparaphyses  $150-480 \mu$ . Total length to tip of perithecium  $180-550 \mu$ .

On *Omophron Americanum*, *Chlœnius Pennsylvanicus*, Connecticut. On *Nebria pallipes*, *Chlœnius æstivus*, Virginia (Pergande). On *Platynus extensicollis*, *Patrobus longicornis*, *Pterostichus corvinus*, S. Dakota (Aldrich).

A species remarkable for its great variation in size even on the same host, as well as the irregularities connected with the number and relative insertion of its pseudoparaphyses. The latter are peculiar from their differentiation into a basal short portion, composed of a small number of slightly inflated cells, and a distal



filamentous, scarcely septate portion. The subconical clusters of antheridia are also quite peculiar to this species, and distinguish it from other known forms.

LABOULBENIA GALERITÆ, nov. sp.

Perithecia punctate becoming almost opaque, elongate, subcylindrical, slightly rounding to the base and rather abruptly tapering to the blunt apex: the latter slightly oblique outwards. Pseudoparaphyses simple, septate, slightly constricted at the lower septa and tapering towards the somewhat blunt apex: arising from a subconical, cellular base in (usually three) nearly vertical rows, from three to four pseudoparaphyses in each row: the base of insertion hyaline above, nearly black below, placed below the base of the perithecium. Receptacle moderate, or slightly elongate; cells III., IV., and V. externally, or almost wholly, opaque. The basal cells of the perithecium greatly enlarged and elongated, so as to form a distinct, stout, neck-like hyaline base, on which it is borne entirely free. Spores  $50 \times 5.5 \mu$ . Perithecia  $155 \times 37 \mu$ . Pseudoparaphyses (long)  $350 \mu$ . Total length to tip of perithecia  $375 \mu$ .

On *Galerita janus*, D. C. (Pergande).

This very distinct and peculiar species occurs, often in great numbers, on all parts of its host, and is distinguished by the insertion of its paraphyses on a subconical cellular base, as well as by the neck-like base of its perithecium.

LABOULBENIA GYRINIDARUM, nov. sp.

Blackish brown, nearly or quite opaque. Perithecia large, subconical or subcylindrical: usually straight externally, rounded internally; the apical lobes modified to more or less distinct, short, straight, simple appendages. Pseudoparaphyses hyaline or basally brownish, arising in a broad dense tuft from several basal cells, several times irregularly branched, rather closely septate basally and constricted at the septa, distally sparingly septate, slender, cylindrical; seldom extending more than two thirds of the distance from the base to the apex of the perithecium. Receptacle distally very broad, cells I. and II. short and slender, rarely elongate. Asci 4-spored,  $150 \times 37 \times 18 \mu$ . Spores  $90 \times 7-8 \mu$ . Perithecia  $190 \times 90 \mu$ . Pseudoparaphyses  $100-110 \mu$ . Total length to tip of perithecium  $480 \mu$ : greatest breadth  $160 \mu$ .

On *Gyrinus* sp., Connecticut.



This constitutes the second species of the genus which is peculiar to an aquatic host; but is quite distinct from the form represented by the excellent figures of Robin under the name of *L. Guerinii*. Its paraphyses recall those of *L. variabilis* in their general structure; but in no other species are they so densely tufted, while the appendiculate apex of the perithecium is unique in the genus. The species is a common one, growing upon the elytra as a rule, and was collected in numerous localities about New Haven.

LABOULBENIA BRACHINI, nov. sp.

More or less evenly suffused with amber-brown. Perithecia rather short and stout, tapering to the broad, often abruptly truncate, black apex, the lip edges of which are hyaline. Pseudoparaphyses hardly exceeding the mature perithecium, arising primarily from two basal cells, — a larger inner nearly hyaline, a smaller outer more or less opaque, — on which are closely set, so as to form almost a semicircle, the ten or more basal cells of the simple, slightly curved (outward) and tapering pseudoparaphyses, the inner hyaline, the outer blackened at the base. Disk of insertion oblique, in position between the lower thirds of the perithecium. Receptacle normal, short or sometimes elongate. Perithecia  $125-185 \times 75 \mu$ . Pseudoparaphyses (long)  $150 \mu$ . Total length to tip of perithecium  $550 \mu$  (average  $375 \mu$ ): greatest breadth  $110 \mu$ .

On *Brachinus* sp., Virginia (Pergande).

A species readily distinguished from *L. Rougetii*, which occurs in Europe on a similar host, by its fan-like pseudoparaphyses, amber color, and black-tipped perithecium. The specimens bearing the parasite, usually at the base of the elytra, were taken by Mr. Pergande in dry situations near Washington, D. C.

LABOULBENIA CURTIPES, nov. sp.

Olive-brown except for the hyaline contrasting basal cell of the receptacle. Perithecium large, containing very numerous asci and spores, inflated externally, nearly straight, the rather small apex strongly bent outwards. Pseudoparaphyses arising from two blackened basal cells, in a small tuft, slender, tapering, straight, inconspicuous, hardly exceeding the middle of the perithecium. Receptacle small and short in proportion to the perithecium; cell I. hyaline, contrasting with cell II., which is short, broad, and distally wedge-shaped. Spores  $40 \times 4 \mu$ . Perithecia 110–135



$\times 55 \mu$ . Pseudoparaphyses  $55 \mu$ . Total length to tip of perithecium  $200-225 \mu$ : greatest breadth  $50-55 \mu$ .

On *Bembidium bimaculatum*, Washington (Miss Parker).

This species occurs usually upon the posterior legs of its host, and is peculiar for the great number of spores which it produces in its unusually large inflated perithecia, the pseudoparaphyses being almost obsolete in mature specimens.

LABOULBENIA PARVULA, nov. sp.

More or less suffused with dark olive-brown. Perithecia slightly inflated, darker at the base and apex, the latter expanded slightly, rather large, the coarse lips oblique inwardly or nearly horizontal. Pseudoparaphyses exceeding the tip of the perithecium, arising primarily from two basal cells, above which from six to eight ultimate branches are formed, the outer larger, straight, divergent, nearly opaque at its base; the rest straight, nearly hyaline: disk of insertion black, just above the base of the perithecium in position, and producing a constriction at the apex of the receptacle. Receptacle short, cells III.-VII. becoming nearly opaque, cell II. less deeply colored, cell I. nearly hyaline, or suffused only on the outer side. Spores  $35-40 \times 4 \mu$ . Perithecia  $100 \times 40 \mu$ . Total length to tip of perithecium  $165-180 \mu$ : greatest width  $44-50 \mu$ .

On *Platynus extensicollis*, Virginia (Pergande). On *Bembidium bimaculatum*, Washington (Miss Parker).

A small species, without striking peculiarities, yet easily separated from any form known to me, and apparently constant in its characters, as shown by a comparison of material from two such widely separated localities as those above mentioned.

LABOULBENIA INFLATA, nov. sp.

Hyaline or slightly tinged with brownish. Perithecia rather small, straight, the tip bent outwards, a black patch below the rather coarse hyaline lips. Pseudoparaphyses two to four in number, peculiar from the inflation of the first two or three basal cells, above which they are rigid, thick-walled, curved slightly outwards, hyaline, tapering to a blunt apex; the basal cell of the outer pseudoparaphysis is much larger than the rest, short, flat, and much inflated. Receptacle normal, the cell walls unusually thick. Pseudoparaphyses  $120 \mu$ . Perithecia  $85 \times 30 \mu$ . Total length to tip of perithecium  $190 \mu$ .

On *Bembidium* sp., S. Dakota (Aldrich).



The short inflated basal cells of the rigid, nearly hyaline paraphyses, associated with a definite disk of insertion, distinguish this small species from other forms with which it might possibly be confused. Three specimens only, in good condition, were found growing on the elytra of the host.

LABOULBENIA RECTA, nov. sp.

Olivaceous. Perithecia rather small, slightly rounded to the large, almost cylindrical, abruptly truncate, blackened apex, the lips of which may be very slightly oblique inwards. Pseudoparaphyses stout, arising from two basal cells, the outer twice as long as the inner, each giving rise to from two to three branches, which may in turn be once or twice branched, all the branches parallel to one another and to the main axis of the receptacle and of the perithecium, which they exceed by more than half its length: disk of insertion thick, black, horizontal, placed opposite the middle of the perithecium. Receptacle normal, rather elongate. Spores  $75-80 \times 6-7 \mu$ . Pseudoparaphyses  $175 \mu$ . Perithecia  $150-180 \times 50-75 \mu$ . Total length to tip of perithecium  $380 \mu$ : greatest breadth  $75-110 \mu$ .

On *Platynus extensicollis*, Connecticut.

A rare species, occurring on the legs of its host in company with *L. scelophila*, to which it bears some resemblance in the branching of its paraphyses. A small number of specimens from three localities near New Haven show little variation.

LABOULBENIA CONTORTA, nov. sp.

More or less suffused with reddish brown. Perithecia suffused with blackish brown, sometimes nearly opaque, considerably inflated, strongly curved outwardly at the apex, so that the nearly hyaline, very broad, hatchet-shaped lips are almost vertical in position: the whole perithecium at maturity usually so twisted near the base that its axis crosses the pseudoparaphyses obliquely. Pseudoparaphyses exceeding the perithecium by about twice its length, arising from two basal cells, the outer twice as large as the inner; the outer pseudoparaphysis simple or once branched above the sub-basal cell, the inner sometimes branched above the basal and sub-basal cells: disk of insertion thick, black, placed about one third of the distance from the base to the apex of the perithecium. Receptacle abruptly expanded above cell II., cells I. and II. rather elongate, the rest somewhat reduced and rounded. Spores  $75 \times 5 \mu$ .



Perithecia  $150-180 \times 60-75 \mu$ . Total length to tip of perithecium  $330-400 \mu$ : greatest width  $90-100 \mu$ . Pseudoparaphyses  $300 \mu$ .

On *Platynus extensicollis*, Connecticut.

This peculiar species occurs rarely on the inferior lateral face of the thorax of its host, seldom elsewhere, and is abundantly distinct from any other species of the *flagellata* type. The twisting of the perithecium is apparent only in mature specimens, yet this modification seems characteristic and analogous to the more pronounced distortion of the following species.

LABOULBENIA GIBBEROSA, nov. sp.

More or less faintly tinged with reddish brown. Perithecia short, stout, expanding slightly from the base to a conspicuous external hunch just below its broad, almost truncate apex. Pseudoparaphyses arising from a large outer and a very small inner basal cell, simple or bearing two to three branches always above the sub-basal cell, constricted at the septa, the segments becoming slightly inflated, the tips usually curved and tapering: the disk of insertion small and thick. Receptacle elongate, strongly twisted above cell II., the twist continued by cells IV. and V., which are much elongated, and carry the pseudoparaphyses out at right angles to the axis of the perithecium. Spores  $50 \times 4.5 \mu$ . Pseudoparaphyses  $180 \mu$ . Perithecia  $125 \times 50 \mu$ . Total length to tip of perithecium  $500-550 \mu$ .

On *Platynus extensicollis*, Connecticut.

A number of specimens of this rare and singular species show that the twisted receptacle is a constant character, which is sometimes carried to such an extreme that the ordinary direction of the pseudoparaphyses is reversed, the elongation and curvature of cells IV. and V. bending them towards the base of the receptacle. The species is large and unusually elongate, growing on the inferior surface of its host, usually near the base of the middle pair of legs.

LABOULBENIA SCHIZOGENII, nov. sp.

Hyaline or pale yellowish. Perithecia rather short, smoky or nearly opaque, especially towards the apex, the prominent rounded hyaline lips of which are slightly oblique outwards. Pseudoparaphyses from two basal cells, each giving rise to two to four branches, which may in turn be one to three times branched: the branches all hyaline or pale yellowish, slightly curved and rounded at their extremities: disk of insertion small and thick, very ob-



lique, placed above the middle third of the perithecium, from which it is wholly separated through the elongation of cell V. Receptacle usually elongate, cell V. being continued beyond the insertion of the pseudoparaphyses nearly to the lips of the perithecium, cells IV. and V. being thus almost superposed. Spores  $70 \times 5.5 \mu$ . Perithecia  $100-120 \times 50-55 \mu$ . Pseudoparaphyses (long)  $270 \mu$ . Total length to tip of perithecium  $350-375 \mu$ : greatest width  $75 \mu$ .

On *Schizogenius lineolatus* and *S. ferrugineus*, Connecticut.

A rare species, at once separable by the peculiar relative position of the pseudoparaphyses, and the unusual elongation of cell V., which is sometimes approached by specimens of *L. variabilis*.

#### LABOULBENIA PEDICELLATA, nov. sp.

Hyaline, becoming brownish, long and slender. Perithecia distally subconical, inflated on the inner side, the apex rather broad and usually somewhat pointed, nearly symmetrical. Pseudoparaphyses, when perfect, exceeding the perithecium, arising primarily from two basal cells, the outer twice as long as the inner, bearing at its apex a roundish cell, from which arise three branches two to three times subdichotomously branched, the branches curved and more or less hooked at the apex. After fertilization, the inner basal cell produces a number of branches curved towards the perithecium, and often producing secondary branches: disk of insertion rather broad, blackish, oblique, inserted just above the base of the perithecium. Receptacle long and slender through the great elongation of cell II. Spores  $50 \times 3.5 \mu$ . Perithecia  $90-95 \times 36-40 \mu$ . Pseudoparaphyses  $90-100 \mu$ : longest  $150 \mu$ . Total length to tip of perithecium  $300 \mu$ : greatest width  $45 \mu$ .

On *Bembidium* sp., Maine.

Allied to *L. vulgaris*, from which it is distinguished by its slender, elongate, cylindrical basal cells, and by its inflated, pointed perithecium, which is also differently situated in relation to the insertion of the pseudoparaphyses.

#### LABOULBENIA VULGARIS, Peyr.

A form referable to this species, and occurring on the elytra of species of *Bembidium*, has been received from Washington on hosts collected by Miss Parker, and is also not uncommon on *Bembidia* taken in Maine. The figures and description given by Peyritsch leave much to be desired, yet the determination seems tolerably certain.





Thaxter, Roland. 1892. "Further additions to the North American species of Laboulbeniaceae." *Proceedings of the American Academy of Arts and Sciences* 27, 29–45.

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