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# THE HYPOCREALES OF NORTH AMERICA—I

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(WITH PLATES 4 AND 5, CONTAINING 33 FIGURES)

The Hypocreales might be briefly defined as the bright-colored sphaeriaceous fungi, the bright color being the most conspicuous character of this order, the early described members of which were included in the genus *Sphaeria*. In addition to color, the plants of the order are characterized by membranaceous perithecia and fleshy stromata, when the latter are present, as opposed to the carbonaceous perithecia and stromata and, usually, the black color of the true pyrenomycetes. While no one of these characters is sufficient in itself, taken together they are quite definitive of the order, which appears to be a well-marked natural group.

The plants of this order exhibit in their life-histories two phases, the conidial and ascigerous, the so-called imperfect fungi representing the conidial phase of many of the species. In no group of fungi is there more need of a close and critical study of the life-histories of its individual members than in the one now under consideration. In a few cases this has been done, with the result that some of the species have been found to be of extreme economic importance in their relation to plant diseases, and doubtless the same fact will be discovered with reference to other species when critical work of this kind is extended to those forms. While the conidial phase in a part of the order is obscure, in others it is often profuse, forming a distinct fleshy or cottony stroma, on which are produced first conidiophores and conidia, and later perithecia, the latter containing the asci and spores. The characters of the conidiophores and conidia are very variable and will furnish much valuable information as to the natural relationship of the various members when the life-histories of the species are better known. In one group, which is here treated as a tribe, the stromata develop from a sclerotium, the latter term

being used in its broader sense to include any fungous growth which produces its ascigerous stage only after a period of rest.

The order contains approximately two hundred species in the region covered in the present work, which are distributed throughout temperate and tropical America. While many species occur throughout North America, others are found only in the tropics.

The classification of the order is a question concerning which there are many different views. A single family is usually recognized, and this is divided by Lindau\* into six subfamilies. The system adopted in the present monograph corresponds in many respects with that proposed by Lindau, but differs in that perithecial and stromatic characters are considered of primary importance in the separation of the order into families and tribes, while spore characters (color, form, septation, etc.) are retained as of generic or specific importance only.

The genus *Nectria* as commonly considered includes both stromatic and non-stromatic species. This difference was recognized by Fries, and has continued to be recognized as a sectional or subgeneric character up to the present time. Dr. M. C. Cooke went a step further and raised Saccardo's subgenus *Dialonectria* to generic rank, although this is not commonly so recognized. The separation of this genus on the presence or absence of a stroma is here maintained, but since the type of the genus *Nectria* falls among the non-stromatic species, the name *Nectria* is retained for those forms, while a new name is proposed for the stromatic species. In recent times, other genera, such as *Ophionectria* with filiform spores and *Calonectria* with many-septate spores, have been segregated from the old genus and a separation of *Nectria* on the presence or absence of a stroma necessitates a similar separation of other genera in which stromatic and non-stromatic species have been associated. The free (non-stromatic) forms of nectriaceous plants are here brought together in the tribe Nectrieae.

With the stromatic and perithecial characters as a basis, the order consists of two well-defined groups, which are here treated as families, each of which is in turn divided into two tribes. The details of this classification are contained in the synopsis given below.

\* E. & P. Nat. Pfl. 1: 346. 1897.

## Order HYPOCREALES

Perithecia globose, ovate, conical, cylindrical, fusoid, or flask-shaped, free on the substratum (occasionally subepidermal) or united by a common matrix, varying from a cottony subiculum to a distinct fleshy stroma, bright-colored, white, yellow, red, brown, violet, but never entirely black, except in extreme age, opening by an ostiolum; perithecial wall membranaceous or submembranaceous, never carbonaceous; stroma when present bright-colored and soft, fleshy or cottony, and varying in size from 1–2 mm. to several cm. in diameter, patellate or effused, with the perithecia entirely superficial or partially to entirely immersed; asci cylindrical, clavate, or subovoid, mostly 4–8-spored but often becoming 16-spored by the separation of each original spore into 2 globose or subglobose cells; spores simple or compound, hyaline or colored, globose to filiform.

Conidiophores and conidia very variable.

Stroma wanting, or when present, with the perithecia entirely superficial, usually in cespitose clusters.

1. NECTRIACEAE.

Stroma or stromatic base always present and forming a conspicuous matrix in which the perithecia are partially to entirely immersed, rarely subsuperficial especially in aged specimens.

2. HYPOCREACEAE.

## Family 1. NECTRIACEAE

Perithecia entirely free on the substratum (occasionally subepidermal), or seated on a fleshy or tubercular stroma, but when the latter is present, perithecia always superficial, usually in cespitose clusters; stroma often obscured at maturity by the perithecia and occasionally becoming obsolete in aged specimens, but in such cases its presence is indicated by the densely cespitose clusters of perithecia.

Stroma and stromatic base entirely wanting; perithecia free on the substratum, scattered or crowded, occasionally subepidermal.

1. NECTRIACEAE.

Stroma or stromatic base always present; but often obscured at maturity by the perithecia and occasionally disappearing in weathered specimens but its presence indicated by the densely cespitose clusters of perithecia.

2. CREONECTRIACEAE.

## Tribe I. NECTRIEAE

Perithecia free (without stroma) and occurring singly but often gregarious and occasionally more or less crowded on the surface of the substratum, or formed beneath the epidermis and becoming erumpent-superficial, smooth, verrucose, or clothed with deciduous mycelial threads or well-developed hairs; asci cylindrical to clavate or subovoid, 4–8-spored; spores simple or compound, globose to filiform, hyaline or colored; conidial phase never forming a stroma.

Spores hyaline.

Perithecia subepidermal, becoming erumpent-superficial.

Spores simple.

1. HYPONECTRIA.

Spores septate.

2. NECTRIELLA.

Perithecia superficial on the substratum.

Spores simple.

Spores appendiculate; perithecia beaked.

3. ELEUTHROMYCES.

Spores without appendages; perithecia not beaked.

4. PSEUDONECTRIA.

Spores compound, 1–many-septate.

Spores 1-septate.

5. NECTRIA.

Spores more than 1-septate.

Perithecia light-colored, yellow or red.

Spores elliptical to fusiform.

6. CALONECTRIA.

Spores filiform or subfiliform.

7. OPHIONECTRIA.

Perithecia dark-colored, blue.

8. GIBBERELLA.\*

Spores dark-colored, brown or blackish.

Spores simple.

Spores subglobose, rough; perithecia subglobose.

9. NEOCOSMOSPORA.

Spores elliptical, smooth; perithecia flask-shaped.

10. MELANOSPORA.

Spores compound, 1-septate.

11. LETENDRAEA.

I. HYPONECTRIA Sacc. *Michelia* 1: 250. 1878

Perithecia globose or subglobose, subepidermal, often becoming erumpent; asci 8-spored; spores elliptical or subelliptical, hyaline, simple. Distinguished from *Nectriella* by the simple spores.

Type species: *Sphaeria Buxi* DC.

Spores  $5-6 \times 1.5-2$  mic., on stems of *Opuntia* sp.

1. *H. Cacti*.

Spores  $10 \times 2-2.5$  mic., on herbaceous stems.

2. *H. dakotensis*.

\* See Creonectrieae.

I. HYPONECTRIA CACTI (Ellis & Everh.) Seaver,  
Mycologia 1: 20. 1909

*Nectriella Cacti* Ellis & Everh. Jour. Myc. 8: 66. 1902.

Perithecia minute, scattered, subepidermal, globose or subglobose, expanded above the epidermis into a disc-like ostiolum; perithecia red, with the ostiolum lighter, whitish (in preserved specimens), about 200 mic. in diameter; asci cylindrical or clavate, 8-spored,  $40-50 \times 3-4$  mic.; spores 2-seriate, simple, hyaline, straight or curved,  $5-6 \times 1.5-2$  mic.

On stems of *Opuntia* sp.

TYPE LOCALITY: Alabama.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: Alabama, *Carver 584* (type).

2. HYPONECTRIA DAKOTENSIS Seaver,  
Mycologia 1: 20. 1909

Perithecia scattered or occasionally 2 or more in close contact, subepidermal, becoming more or less erumpent, long covered by the thin, whitish epidermis of the host, scattered over whitish patches on the substratum but with no apparent superficial mycelial growth; ostiolum forming a disc-like expansion above the surface of the epidermis with a distinct perforation in the center, slightly hairy, especially near the margin of the disc where the hairs appear as a delicate fringe; perithecia 200 mic. in diameter; asci clavate, 8-spored,  $30-45 \times 5$  mic.; spores mostly 2-seriate above, often 1-seriate below, fusoid, with usually 2 large oil-drops, and 1-2 smaller ones toward either end,  $10 \times 2-2.5$  mic.; paraphyses present, delicate (*pl. 4. f. 5*).

On herbaceous stems (*Ambrosia trifida?*).

TYPE LOCALITY: Fargo, N. Dakota.

DISTRIBUTION: Known only from type locality.

ILLUSTRATIONS: Mycologia 1: *pl. 2. f. 1-4*.

2. NECTRIELLA Fuckel, Symb. Myc. 175. 1869

*Charonectria* Sacc. Michelia 2: 72. 1880.

Perithecia globose or subglobose, entirely subepidermal or erumpent-superficial; asci 8-spored; spores hyaline, 1-septate.

Type species: *Nectriella Fuckelii* Nitsch.

Distinguished from *Hyponectria* by the compound spores.

Perithecia large, 400 mic. in diameter, pale red.

1. *N. Pedicularis*.

Perithecia small, 175-200 mic. in diameter, scarlet.

2. *N. peponium*.

1. *Nectriella Pedicularis* (Tracy & Earle)

*Charonectria Pedicularis* Tracy & Earle, *Plantae Bakerianae* 1: 26. 1901.

Scattered or gregarious, perithecia prominent but long covered by the thin epidermis, orbicular, at length subdepressed, bright-coral-red, smooth, soft, perforated by an obscure ostiolum, 400 mic. in diameter; asci numerous, cylindrical, with a stem-like base,  $100 \times 8$  mic.; spores obliquely 1-seriate, hyaline, minutely granular within, 1-septate, subelliptical, ends acutish,  $17 \times 4$  mic.

On dead stems of *Pedicularis crenulata*.

TYPE LOCALITY: Colorado.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: Colorado, *Baker & Earle 230* (type).

The species is distinct in the large perithecia and spores.

2. *Nectriella peponum* (Berk. & Curt.)

*Nectria peponum* Berk. & Curt. *Grevillea* 4: 16. 1875.

*Nectria perpusilla* Berk. & Curt.; Ravenel, *Fungi Car. Exsicc.* 51.

Perithecia scattered or gregarious, at first covered by the thin epidermis, becoming subsuperficial, but nestling in minute cavities in the substratum; ovoid, with a prominent, obtuse ostiolum,  $175 \times 200$  mic., bright red, nearly scarlet, component cells of the perithecial wall distinct, 5 mic. in diameter; asci clavate, 35-40  $\times$  5-6 mic., 8-spored; spores 1-septate, fusoid, hyaline,  $10 \times 4$  mic.

On dead gourds.

TYPE LOCALITY: South Carolina.

DISTRIBUTION: North Carolina, South Carolina.

EXSICCATI: Ravenel, *Fungi Am. Exsicc.* 338 and *Fungi Car. Exsicc.* 51.

The species very closely resembles *Nectria sanguinea* (Bolton) Fries, but differs in its habitat and subhypodermal character, as well as in the color of the perithecia.

## DOUBTFUL SPECIES

*Nectria Galii* Plow. & Hark. *Bull. Cal. Acad. Sci.* 1: 26. 1884.

"Perithecia scattered, immersed then erumpent, obtuse, pale red; asci cylindrical, very delicate, mic.  $60 \times 5-8$ , sporidia eight, uniseriate, pale straw-colored, oblong-oval, with bluntly-pointed ends, mic.  $10 \times 5$  on *Galium trifolium*."

"Mr. Phillips figures the sporidia as being uniseptate. I was unable to make out any septum, but the specimens examined may have been less mature than Mr. Phillips'."

The erumpent character of the perithecia of the above species and the 1-septate spores would place it in the genus *Nectriella*. No specimen of this species has been examined by the writer.

### 3. ELEUTHROMYCES Fuckel, Symb. Myc. 183. 1869

Perithecia free on the substratum, globose or subglobose, continued into a long neck, brownish or amber; substance soft; asci cylindrical, 4-8-spored; spores simple, fusiform, continued into a more or less bristle-like apex at either end.

Type species: *Eleuthromyces subulatus* Fuckel.

Distinguished from *Pseudonectria* by the flask-shaped perithecia and the appendiculate spores.

Perithecia large, 500 mic.-1 mm. high.

1. *E. subulatus*.

Perithecia small, 150-180 mic. high.

2. *E. Geoglossi*.

### 1. ELEUTHROMYCES SUBULATUS Fuckel,

Symb. Myc. 183. 1869

?*Clavaria brachiata* Batsch, Elench. Fung. Cont. 1: 234. 1786.

*Sphaeria subulata* Tode, Fungi Meckl. 2: 44. 1791.

*Isaria brachiata* Schum. Pl. Saell. 2: 443. 1803.

*Sphaeronema subulatum* Fries, Syst. Myc. 2: 536. 1822.

Perithecia scattered or gregarious, subglobose below, tapering into a long neck, smooth or nearly so, yellowish or amber, 200-300 mic. in diameter at the base and 500 mic.-1 mm. high; asci cylindrical, fusoid, 8-spored, about  $50 \times 2-3$  mic.; spores simple, elongated, averaging  $4 \times 2$  mic., tapering into a bristle-like appendage of variable length at either end (*pl. 4. f. 12, 13*).

On partially decayed fungi.

TYPE LOCALITY: Europe.

DISTRIBUTION: Ontario.

ILLUSTRATIONS: Batsch, Elench. Fung. Cont. 1: *pl. 28. f. 163*; Tode, Fungi Meckl. 2. *pl. 15. f. 117*; E. & P. Nat. Pfl. 1<sup>1</sup>: *f. 238, D-E*; Nees, Syst. *pl. 43. f. 345, B*; Winter; Rab. Krypt. Fl. 1<sup>2</sup>: 84. *f. 1-4*.

SPECIMENS EXAMINED: Ontario (no name).

Recognized by the very large perithecia.

2. **Eleuthromyces Geoglossi** (Ellis & Everh.)

*Hypomyces Geoglossi* Ellis & Everh. Jour. Myc. 2: 73. 1886.

*Peckiella Geoglossi* Sacc. Syll. Fung. 9: 944. 1891.

Perithecia superficial, closely gregarious, when fresh of a dirty greenish-yellow, when dry yellowish to amber, more or less furfuraceous, nearly globose, tapering into a rather long neck, 150 mic. in diameter at the base and 180 mic. high; asci slender, 50-75 × 4-5 mic., 8-spored; spores mostly 1-seriate, with the ends overlapping, hyaline, simple, tapering into an appendage-like extremity at either end, 10-12 × 3-4 mic. (*pl. 4. f. 10, 11*).

On *Geoglossum* sp.

TYPE LOCALITY: New Jersey.

DISTRIBUTION: New Jersey and New York.

SPECIMENS EXAMINED: New Jersey, *Ellis* (type); New York, *Seaver*.

Distinguished from the preceding by the much smaller perithecia as well as by the habitat.

The material collected by the writer in New York corresponds exactly with the type in spore characters but there is some difference in the color of the perithecia, those of the type being nearly black while those of our own collection are, with transmitted light, amber. As there are no notes on the color of the type specimen that difference might be due to drying.

This species was placed in the genus *Hypomyces* by Mr. Ellis but differs from the plants of this genus in the entire absence of stroma. Both the perithecial and spore characters strongly suggest the above genus.

4. **Pseudonectria** nom. nov.

*Nectriella* Sacc. *Michelia* 1: 51. 1877.

Perithecia free on the substratum, globose to ovoid, bright colored, yellow, red, etc., smooth or minutely rough, soft, membranaceous; asci cylindrical, 8-spored; spores elliptical or sub-elliptical, simple, hyaline.

Type species: *Nectria Rousseliana* Montag.

Distinguished from *Nectria* by the simple spores.

1. **Pseudonectria sulphurata** (Ellis & Everh.)

*Nectria sulphurata* Ellis & Everh. Proc. Acad. Nat. Sci. Phil. 1890: 248. 1891.

Perithecia small, about 200 mic. in diameter, at first globose finally collapsing, sulphur-yellow-pruinose, becoming green with age; asci cylindrical,  $50-60 \times 5-6$  mic., 8-spored; spores more or less crowded in the ascus, becoming partially 2-seriate, hyaline, allantoid, elongated, with ends obtuse,  $7-12 \times 2-2.5$  mic.

On dead wood of *Populus tremuloides*.

TYPE LOCALITY: Sand Coulee, Montana.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: Sand Coulee, Montana, *Anderson* (type).

Ellis states in the description of this species: "Perithecia . . . covered with a sulphur-yellow granulose-pruinose coat which finally disappears and leaves the perithecia black." The type specimens from which our description is drawn shows the perithecia to be of a beautiful aeruginous-green color. This fact not being mentioned in the original description, it is probable that this change of color comes about with age.

The specimen in the herbarium of Mr. Ellis was first referred to the genus *Nectriella* Sacc. and afterwards described as a *Nectria*. While in very small spores it is often difficult to determine the presence or absence of the septum this seems to be a non-septate form and is therefore placed in the genus to which it would properly belong.

This species is entirely different from *Nectria sulphurea* Ellis & Calk., which occurs on old fungi.

#### DOUBTFUL SPECIES

*Nectria mycetophila* Peck, Ann. Rep. N. Y. St. Mus. 26: 85. 1874. *Nectriella mycetophila* (Peck) Sacc. Syll. Fung. 2: 449. 1883.

"Perithecia crowded or scattered, minute, smooth, subglobose, pale yellow when young, then pinkish-ochre. Ostiola minute, papillate, distinct, darker colored. Asci subclavate. Sporidia oblong, simple,  $12-13 \times 4$  mic."

On decaying fungi.

TYPE LOCALITY: New York.

DISTRIBUTION: Known only from type locality.

The above description is quoted from Mr. Peck as no material is available for examination.

*Hypocrea perpusilla* Montag. Hist. Phys. Polit. et Nat. l'île de Cuba. Pl. Cell. 335. 1838. *Nectriella perpusilla* (Montag.) Sacc., Michelia 1: 51. 1877.

5. NECTRIA Fries, Summa Veg. Scand.

387 (in part). 1849

*Nectria* Fries, Syst. Orbs. Veg. 105 (as possible genus). 1825.

*Dialonectria* Sacc. (as subgenus) Syll. Fung. 2: 490. 1883.

*Dialonectria* (Sacc.) Cooke, Grevillea 12: 77. 1884.

Plants parasitic or saprophytic; perithecia superficial, entirely free, scattered or occasionally crowded, without stroma or common subiculum but individual perithecia often surrounded near the base by a scant mycelial growth, globose, ovate or conical in form; perithecial wall composed of distinct coarse cells or cell structure obscure, smooth, pruinose, furfuraceous, clothed with deciduous or well-developed, flexuose or bristly hairs; ostiola papilliform, obtuse, or obscure; color from whitish to yellow, orange or blood-red to reddish-purple, varying much in a given species according to age and conditions; asci cylindrical or clavate, mostly 8-spored; spores hyaline, 1-septate, elliptical, fusoid or fusiform, constricted or non-constricted at the septum; paraphyses often present but delicate and indistinct.

Type species: *Sphaeria Peziza* Tode.

The genus as treated here is used in its restricted sense to include only those forms in which stroma and a common subiculum are entirely wanting.

Perithecia pale, ranging in color from orange to sulphur-yellow or whitish.

Perithecia large, 250-300 mic. in diameter (mostly 300).

Naked or nearly so (occasionally clothed with deciduous mycelial threads).

Saprophytic on various substrata.

Perithecia smooth or nearly so; spores elliptical.

1. *N. Peziza*.

Perithecia covered with coarse granules; spores fusoid.

2. *N. tremelloides*.

Parasitic on foliaceous lichens.

3. *N. diplocarpa*.

Clothed with a dense covering of sulphur-yellow hairs.

4. *N. flavociliata*.

Perithecia small, 100-150 mic. in diameter (mostly less than 200).

Densely clothed with hyaline hairs (white to the naked eye).

- Spores broad-elliptical. 5. *N. lactea*.  
 Spores very slender, allantoid (1-2 mic. broad).  
 Spores  $5 \times 2$  mic. 6. *N. Rexiana*.  
 Spores  $6-7 \times 1.5-2$  mic. 7. *N. squamulosa*.  
 Naked and smooth or only minutely rough.  
 Spores large, 15-22 mic. long.  
 Spores allantoid; plants parasitic on lichens. 8. *N. rubefaciens*.  
 Spores fusoid or fusiform, nearly straight; plants saprophytic  
 Spores broad-fusoid, 7 or more mic. broad.  
 On foliage of dead cedar; spores  $15 \times 7$  mic. 9. *N. thujana*.  
 On bark; spores  $18-22 \times 7-10$  mic. 10. *N. dispersa*.  
 Spores narrow-fusoid (4 mic. broad) or fusiform.  
 Spores narrow-fusoid,  $18-22 \times 4-5$  mic. 11. *N. Eucalypti*.  
 Spores fusiform,  $18-22 \times 5-6$  mic. 12. *N. Apocyni*.  
 Spores small, less than 14 mic. long (mostly 7-10).  
 Perithecia sulphur-yellow-pruinose; substratum yellow. 13. *N. sulphurea*.  
 Perithecia not sulphur-yellow-pruinose.  
 Perithecia pale, almost white, becoming subtruncate. 14. *N. truncata*.  
 Perithecia orange, fading to pale yellow, not truncate. 15. *N. conigena*.  
 Perithecia deep red, ranging in color from scarlet or blood-red to reddish-purple.  
 Perithecia with a few bristly hairs; plants on herbaceous stems. 16. *N. consors*.  
 Perithecia naked (with no well-developed hairs).  
 Perithecia conical or subconical in form.  
 Spores large,  $15-17 \times 5-6$  mic. 17. *N. Papilionacearum*.  
 Spores small,  $10-11 \times 3-4$  mic. 18. *N. Brassicae*.  
 Perithecia ovate; ostiolum very obtuse.  
 Spores narrow-fusoid; on wood. 19. *N. sanguinea*.  
 Spores broad-fusoid; on sphaeriaceous fungi. 20. *N. epispheeria*.

I. NECTRIA PEZIZA (Tode) Fries, Summa  
Veg. Scand. 288. 1849

- Sphaeria Peziza* Tode, Fungi Meckl. 2: 46. 1791.  
? *Peziza hydrophora* Bull. Hist. Champ. 243. 1809.  
*Peziza (Dasyscypha) vulpina* Cooke, Hedwigia 14: 82. 1875.  
*Dialonectria vulpina* Cooke, Grevillea 12: 83. 1883.  
*Nectria rimincola* Cooke, Grevillea 11: 108. 1883.  
? *Nectria lasioderma* Ellis, Am. Nat. 17: 194. 1883.  
*Nectria Umbellulariae* Plow. & Hark. Bull. Cal. Acad. Sci. 1: 26.  
1884.  
*Nectria vulpina* Ellis & Everh. N. Am. Pyrenom. 103. 1887.  
*Nectria betulina* Rehm. Ann. Myc. 3: 519. 1905.

Perithecia superficial, scattered, gregarious or occasionally crowded, globose or subglobose, usually collapsing from the top becoming pezizoid, at first clothed with a scant covering of delicate, white mycelial threads (no true hairs) which disappear with age leaving the perithecia smooth or in very old specimens slightly rough and furfuraceous, 250–500 mic. in diameter (mostly 300), varying in color from deep-orange to pale-yellow, color darker in dried specimens but fading in weathered specimens; ostiolum minute in young specimens, just visible and in older forms depressed and inconspicuous; asci cylindrical or clavate, 8-spored, 50–75 × 5–6 mic.; spores broadly elliptical, obliquely 1-seriate or crowded, becoming partially 2-seriate, thick-walled, 1-septate, not constricted, with 1 large, conspicuous oil-drop in each cell, 10–14 × 4–6 mic. (mostly 10 × 5 mic.); paraphyses short, branched, not conspicuous (*pl. 4. f. 3; pl. 5. f. 1*).

On decaying, decorticated wood; more rarely on bark, fungi and old hemp cloth.

TYPE LOCALITY: Mecklenburg, Germany.

DISTRIBUTION: New York to Ontario, North Dakota and Louisiana.

ILLUSTRATIONS: Tode, Fungi Meckl. 2: *pl. 15. f. 122*; Bulliard, Herb. France, *pl. 410. f. 2*; Currey, Trans. Linn. Soc. 22. *pl. 57. f. 44*; Berkeley, Outl. Brit. Fung. *pl. 24. f. 6*; Grevillea, Crypt. Fl. 4. *pl. 186. f. 2*.

EXSICCATI: Ravenel, Fungi Am. Exsicc. 644; Ellis, N. Am. Fungi 774; Wilson & Seaver, Ascom. & Lower Fungi, 16. Other specimens examined: California, *Harkness*; Iowa, *Arthur, Seaver*; Louisiana, *Langlois*; Maine, *Harvey*; New York, *Atkin-*

son, *Brown, Seaver*; North Dakota, *Seaver* (various collections); New Jersey, *Ellis* (various collections); Ohio, *Hawkins, Morgan*; Ontario, Canada, *Dearnness, Macoun*.

Distinguished by the large, pale, globose-peizoid perithecia and the broad-elliptical, non-constricted spores.

A more complete account of this species is being published in the Bulletin of the Torrey Botanical Club.

2. NECTRIA TREMELLOIDES Ellis & Everh. Jour.

Myc. 2: 121. 1886

Perithecia gregarious, subglobose, coarsely furfuraceous, orange, fading to pale yellow, about 300 mic. in diameter, with a scant, dirty whitish mycelial growth near the base; asci clavate,  $50 \times 7$  mic.; spores 1-seriate or partially 2-seriate above, hyaline, 1-septate, fusoid, very slightly constricted,  $9-13 \times 3-4$  mic. (*pl. 5. f. 3*).

On bark of dead willow.

TYPE LOCALITY: Louisiana.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: Louisiana, *Langlois 592* (type).

Distinguished by the large coarsely furfuraceous perithecia.

This species has been reported but once and the type specimen seems to be quite distinct in the presence of the bran-like granules with which the perithecia are covered but whether this character is constant must be decided from a study of fresh material.

3. NECTRIA DIPLOCARPA Ellis & Everh. Proc. Phil.

Acad. Sci. 1890: 244. 1891

Perithecia gregarious or scattered, occasionally several closely crowded, superficial, subglobose, 250 mic. in diameter, nearly smooth, collapsing when dry and becoming pezizoid, flesh-colored; asci clavate,  $40-50 \times 8-12$  mic.; spores elliptical,  $8-12 \times 4-5$  mic., 1-septate, hyaline; in addition to the ordinary ascospores there are other large, hyaline, 1-septate, spore-like bodies  $30-45 \times 18-25$  mic. present in the perithecia (*pl. 5. f. 2*).

On thallus of foliaceous lichens (*Parmelia?*).

TYPE LOCALITY: New York.

DISTRIBUTION: New York to Missouri.

SPECIMENS EXAMINED: New York, *Brown* (type).

As to the nature of the large bodies present in the perithecia, which are truly spore-like, it is difficult to determine. Mr. Ellis was of the opinion that they represent mature ascospores while the smaller spores present in the ascus are immature. This seems doubtful to us since the large bodies could not be found within an ascus.

The species very closely resembles *Nectria Peziza* (Tode) Fries, both in perithecial and spore characters, but is distinguished by its parasitic habitat as well as by the presence of the large spore-like bodies which accompany the asci within the perithecia.

#### 4. *Nectria flavociliata* nom. nov.

*Nectria bicolor* Ellis & Everh. Proc. Acad. Nat. Sci. Phil. 1893: 443. 1893. Not *Nectria bicolor* Berk. & Br.

Perithecia thickly gregarious, large, 250–300 mic. in diameter, subglobose with a papilliform ostiolum, clothed, except a space around the ostiolum, with obtuse, septate, clavate hairs which are hyaline near the base but golden-sulphur-yellow near the apices; asci clavate, 35–40 × 7–8 mic., 8-spored; spores 2-seriate, crowded, fusoid, 1-septate, hyaline, 8–12 × 2.5–3 mic. (*pl.* 5. *f.* 11).

On dead twigs of *Carya*.

TYPE LOCALITY: Wilmington, Delaware.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: Delaware, *Commons* (type).

Distinguished by the large, golden-yellow-ciliate perithecia.

“The yellow color of the hairy coat is the same as in *Nectria sulphurea* Ellis & Calk., but there is no subiculum, and in that species the perithecia are not hairy but simply pruinose. *Fusarium episphaericum* Cooke & Ellis\* appears to be the conidial stage.”

The hairs in this species are well developed and prominent. The name suggested by Ellis & Everh. is a homonym.†

#### 5. *NECTRIA LACTEA* Ellis & Morgan; Ellis & Everh.

N. Am. Pyrenom. 110. 1892

Perithecia minute, 125–200 mic. in diameter, nearly globose, gregarious or crowded, yellowish, at first clothed with a dense

\* Grevillea 5: 50. 1876.

† Jour. Linn. Soc. 14: 116. 1875.

covering of delicate, white hairs so that the whole cluster of plants has a whitish appearance, except the ostiolum which is bare, becoming yellowish with age; hairs about 2 mic. in diameter, usually roughened externally with minute granules but occasionally smooth; asci cylindrical, 8-spored,  $40-50 \times 5$  mic.; spores 1-seriate, broad-elliptical, hyaline, 1-septate, with 1 oil-drop in each cell,  $5-8 \times 3-4$  mic. (*pl. 5. f. 5*).

On old fungi, *Polyporus*, *Stereum*, and also on rotten wood.

TYPE LOCALITY: Ohio.

DISTRIBUTION: New York to Ohio, Florida and Louisiana.

SPECIMENS EXAMINED: Florida, *Calkins*; New York, *Seaver*; Louisiana, *Langlois 1213*; Ohio, *Morgan* (type).

Distinguished by the broadly elliptical spores.

Two collections of fresh material of this species were made by the writer in the vicinity of New York City, during the autumn of 1906. The specimens collected were on old wood and correspond well with the type material of this species. In external appearance the species closely resembles *Nectria Rexiana* Ellis or *Nectria squamulosa* Ellis but spore characters are very different. The spores are similar in form and arrangement to those of *Nectria Peziza* (Tode) Fries but are much smaller.

#### 6. NECTRIA REXIANA Ellis, Am. Nat. 17: 194. 1883

Perithecia nearly globose, yellowish, clothed with a dense covering of long, flexuose, hyaline (white to the naked eye), septate, rough hairs, perithecia 150-200 mic. in diameter; asci cylindrical,  $30-40 \times 4-5$  mic., 8-spored; spores mostly 1-seriate or partially 2-seriate above, minute, cylindrical or allantoid, hyaline, faintly 1-septate,  $5 \times 2$  mic. (*pl. 5. f. 6*).

Parasitic on *Chondrioderma*.

TYPE LOCALITY: New York.

DISTRIBUTION: Maine to New York.

SPECIMENS EXAMINED: New York, *Rex* (type); Maine, *Harvey*.

Distinguished by the comparatively large perithecia and small size of the spores.

#### 7. NECTRIA SQUAMULOSA Ellis, Bull. Torrey Club 9: 20. 1882

Perithecia gregarious, minute, 100-125 mic. in diameter, light colored (when dry nearly white) with a prominent ostiolum which

is darker, clothed externally, except the ostiolum, with a dense covering of delicate, hyaline hairs which are 2 mic. in diameter and 10–20 mic. long; asci narrowed above and below, 20–25 × 5–6 mic., 8-spored; spores mostly 2-seriate, minute, 6–7 × 1.5–2 mic., 1-septate, sometimes very slightly constricted (*pl. 5. f. 7*).

On rotten wood.

TYPE LOCALITY: New Jersey.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: New Jersey, *Ellis* (type).

Distinguished from the preceding by the smaller perithecia and slightly larger spores.

This and the preceding species very closely resemble each other both in external and internal characters, however there seems to be a slight difference so the two are here allowed to remain as distinct.

#### 8. NECTRIA RUBEFACIENS Ellis & Everh. Jour.

Myc. 3: 116. 1887

Perithecia scattered or gregarious, superficial, subglobose, 80 mic. in diameter, smooth or with a few poorly developed hair-like outgrowths, at first pale, becoming orange; asci broad-clavate, 35–40 × 12 mic., 8-spored; spores irregularly crowded, cylindrical-allantoid, hyaline or subhyaline, 1-septate, scarcely constricted at the septum, 14–18 × 2–3 mic (*pl. 5. f. 8*).

Parasitic on the thallus of some lichen, on dead limbs.

TYPE LOCALITY: Newfield, New Jersey.

DISTRIBUTION: New Jersey.

SPECIMENS EXAMINED: New Jersey, *Ellis* (type).

Distinguished by the allantoid spores.

In the original description of this species Mr. Ellis states: "The species has been observed now for the past eight years and seems to be quite distinct from any of the other lichenicolous species." He also stated that the thallus of the lichen *Parmelia tiliacea* (?) turns dull red (bright red within). The spores in the specimens examined by the writer are pale reddish but Mr. Ellis describes them in the fresh material as being hyaline.

#### 9. NECTRIA THUJANA Rehm; Sacc. *Michelia* 1: 295. 1878

Perithecia scattered, or gregarious, pale orange, nearly globose, becoming depressed and more or less pezizoid; asci clavate,

60–80 × 13 mic., 8-spored; spores partially 2-seriate, broad-fusoid, 1-septate, very slightly constricted, 17–18 × 7 mic., hyaline (*pl. 5. f. 9*).

On dead foliage of *Cupressus*.

TYPE LOCALITY: Newfield, New Jersey.

DISTRIBUTION: Known only from type locality.

EXSICCATI: Ellis, North Am. Fungi, 130. Other specimens examined: New Jersey, *Ellis* (cotype).

Distinguished by the size of the broad-fusoid spores as well as by the habitat.

Our own examination shows the spores to be larger than indicated by Mr. Ellis in previous descriptions. The perithecia except for the smaller size somewhat resemble those of *Nectria Peziza* (Tode) Fries but the species is readily distinguished by the difference in the form and size of the spores.

10. NECTRIA DISPERSA Cooke & Ellis, *Grevillea* 5: 33. 1876

? *Nectria poliosa* Ellis & Everh. *Jour. Myc.* 2: 39. 1886.

? *Lasionectria poliosa* Ellis & Everh. *Jour. Myc.* 3: 1. 1887.

Perithecia scattered, globose, with a minute ostiolum, orange, nearly smooth, collapsing; asci cylindrical, 70–80 × 10–12 mic. 8-spored; spores 1-seriate with the ends overlapping, subfusoid, a little constricted at the septum, often slightly unsymmetrical, with several oil-drops, hyaline, 18–22 × 7–10 mic.

On bark and old fungi.

Distinguished by the size of the spores.

TYPE LOCALITY: Maine.

DISTRIBUTION: Maine to (Florida ?).

ILLUSTRATIONS: *Grevillea* 5: *pl. 75. f. 14*.

SPECIMENS EXAMINED: Maine, *Blake* (cotype): Florida, *Calkins* 138.

A note is enclosed with the type of this species in the Ellis collection stating that the last mature perithecium had been used in writing the description for the *Journal of Mycology* so that the writer has little to draw from in the present work except the description by Mr. Ellis. Accepting the spore measurements given by Mr. Ellis this character is sufficient to distinguish the species from any of the others listed in this paper.

*Nectria poliosa* Ellis & Everh. corresponds with the above in

spore measurements, but from the description apparently differs in possessing perithecia which are clothed with hairs; the type here again is too meager to permit of a fair examination. This latter character is one which is very uncertain in the present genus, the perithecia of many of the species which are usually considered smooth being clothed when young with mycelial threads which often fall off later. This character seems to be very variable depending upon age and other conditions. In only a few cases in the present genus are the perithecia found to be clothed with well-developed hairs.

II. NECTRIA EUCALYPTI (Cooke & Hark.) Sacc.

Syll. Fung. 9: 969. 1891

*Dialonectria Eucalypti* Cooke & Hark.; Cooke, Grevillea 12: 82. 1884.

*Dialonectria depallens* Cooke & Hark. Grevillea 12: 82. 1884.

*Nectria depallens* (Cooke & Hark.) Sacc. Syll. Fung. 9: 962. 1891.

Perithecia scattered, superficial, nearly globose, with a papilli-form ostiolum, smooth, pale red to yellowish, entire or often collapsing, 200–250 mic. in diameter; asci clavate, 8-spored,  $50-55 \times 7-8$  mic.; spores crowded,  $18-22 \times 4-5$  mic., 1-septate, 2-seriate (*pl. 5. f. 10, 11*).

On *Eucalyptus* and stems of *Lupinus*.

TYPE LOCALITY: California.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: California, *Harkness* (probably cotype).

Distinguished by the pale perithecia and large fusoid spores.

Dr. Cooke in Grevillea (l. c.) distinguishes *Nectria depallens* (Cooke & Hark.) Sacc. from the above by a difference in the color of the perithecia the one being ochraceous and the other testaceous-red and by the larger size of the spores, those of *Nectria Eucalypti* being  $16-18 \times 4$  mic. and *Nectria depallens* (Cooke & Hark.) Sacc.  $22-24 \times 4-4.5$  mic. In the specimen examined by the writer of each of these species, both of which were collected in California by Harkness and are evidently cotype although not marked, the difference in the color of the perithecia is too slight and the character too variable to be considered. While

the difference in the size of the spores seems from the description to be quite marked, camera lucida drawings of the spores of the two specimens mentioned above which drawings accompany this paper show no marked difference either in form or size. I am unable to discover any character by which the two supposed species can be separated notwithstanding the fact that Saccardo (l. c.) has placed the two species in different subgenera.

12. NECTRIA APOCYNII Peck, Ann. Rep. N. Y.

St. Mus. 26: 84. 1874

Perithecia scattered or crowded in small clusters, subglobose, more or less collapsed when dry, slightly rough, dull red; ostiolum minute; asci clavate, 8-spored,  $60-65 \times 12$  mic.; spores 2-seriate and often irregularly crowded, oblique, fusiform with ends acute, almost sharp, 1-septate, a little constricted at the septum, granular within,  $18-22 \times 5-6$  mic. (*pl. 5. f. 12*).

On the lower part of the stems of Indian hemp, *Apocynum cannabinum*.

TYPE LOCALITY: North Greenbush, New York.

DISTRIBUTION: KNOWN only from type locality.

SPECIMENS EXAMINED: New York, Peck (cotype).

The species is distinct in the large size and fusiform character of its spores.

The above description of the microscopic characters are taken from a part of the type collection which was received by the kindness of Mr. Peck. Other characters are recorded from his notes as the specimens are discolored with age and too small to draw conclusions as to the general appearance of the perithecia except that of the size. The species is easily distinguished from any of the other forms listed here by its fusiform spores which approach those of the genus *Hypomyces*.

Mr. Peck states (in letter) that he has seen this species but once. He has described the conidia as "subhemispherical or irregular, small, pale red; spores fusiform, straight, .0005-.0006 in. long." This description would seem to indicate the presence of a stroma although I have been unable to detect one. Until the species has been collected and studied from fresh material, it is difficult to decide this point.

13. *NECTRIA SULPHUREA* (Ellis & Calk.) Sacc.  
Syll. Fung. 9: 966. 1891

*Dialonectria sulphurea* Ellis & Calk.; Ellis & Everh. Jour. Myc. 4: 57. 1888.

Perithecia scattered, sulphur-yellow-pruinose and seated on a sulphur-yellow-pruinose base 1 or more cm. in diameter, often becoming reddish-brown with age, 200 mic. in diameter; asci evanescent; spores small, fusoid with the ends obtusely pointed, 1-septate and constricted at the septum, often with an oil-drop in each cell,  $7-12 \times 3-4$  mic. (*pl. 5. f. 13*).

Parasitic on old fungi, *Stereum*.

TYPE LOCALITY: Jacksonville, Florida.

DISTRIBUTION: Ohio to Florida.

EXSICCATI: Ellis & Everhart, N. Am. Fungi, 1947. Other specimens examined: Florida, *Calkins* (type); Ohio, *Morgan*.

Distinguished by the sulphur-yellow-pruinose perithecia and the sulphur-yellow-pruinose base, as well as by the habitat.

While the perithecia are seated on the yellow base this does not resemble a stroma but the substratum seems to be stained being of the same color as the perithecia themselves. In both specimens examined it has been impossible to make out an ascus but the arrangement of the spores seems to indicate its presence.

14. *NECTRIA TRUNCATA* Ellis, Am. Nat. 17: 194. 1883

Perithecia minute, 125-150 mic. in diameter, gregarious, yellowish (dried specimens almost white), slightly collapsing, becoming subtruncate, or with the ostiolum still more depressed so as to appear umbilicate; asci when young tapering into a rather pointed apex, finally clavate, 8-spored,  $35-40 \times 5$  mic.; spores crowded, fusoid, 1-septate, slightly constricted,  $12 \times 2-3$  mic. (*pl. 5. f. 14*).

On the inside of white cedar bark which has been stripped from the tree.

TYPE LOCALITY: Newfield, New Jersey.

DISTRIBUTION: Known only from type locality.

EXSICCATI: Ellis, N. Am. Fungi, 1332. Other specimens examined: Newfield, New Jersey, *Ellis* (type).

Distinguished by the small, pale perithecia and minute spores.

15. *NECTRIA CONIGENA* Ellis & Everh. Bull Torrey

Club 10: 77. 1883

*Dialonectria filicina* Cooke & Hark. Grevillea 12: 101. 1884.*Nectria filicina* Sacc. Syll. Fung. 9: 963. 1891.

Perithecia scattered or gregarious, often subcespitate, nearly globose with a minute ostiolum, smooth, orange, becoming pale yellow with age, entire or collapsing with age; asci clavate, 8-spored; spores partially 2-seriate or irregularly crowded, fusoid, 1-septate, slightly constricted, granular within,  $8-10 \times 3-4$  mic. (*pl. 4. f. 8; pl. 5. f. 15, 16*).

On hard materials, stipe of tree fern, cone of *Magnolia*, shell of buckeye.

TYPE LOCALITY: Newfield, New Jersey.

DISTRIBUTION: New Jersey to Ohio and California.

SPECIMENS EXAMINED: New Jersey, *Ellis* (type); Ohio, *Morgan*; California *Harkness* (probably cotype of *Nectria filicina* Cooke & Hark.) Sacc.

Distinguished by the pale perithecia and small spores.

Aside from some comparatively slight variations in perithecia I can discover no character by which to distinguish *Nectria filicina* (Cooke & Hark.) Sacc. from *Nectria conigena* Ellis & Everh., although there seems to be a wide difference in the habitat of the two species. In the former the perithecia are mostly entire while in the latter they are partly collapsed. This difference however might be due to age since in both cases they show some tendency to collapse. The spores of the two forms are identical, as is shown from the accompanying drawing which was made with the aid of the camera lucida.

16. *Nectria consors* (Ellis & Everh.)*Dialonectria consors* Ellis & Everh. Jour. Myc. 4: 122. 1888.*Nectriella consors* Sacc. Syll. Fung. 9: 941. 1891.

Perithecia subconical, tapering above into an acute ostiolum, scarlet, minute, 125-150 mic. in diameter, clothed with bristle-like, obtusely pointed, septate, reddish hairs, except the ostiolum; asci clavate, 8-spored,  $50 \times 6-7$  mic.; spores 2-seriate, fusoid, hyaline, 1-septate,  $7-10 \times 2-3$  mic.

On dead stems of *Polygonum*.

TYPE LOCALITY: St. Martinsville, La.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: Louisiana, *Langlois* (type).

Distinguished by the conical form of the perithecia and the bristle-like hairs.

The spores of this species were originally described as simple but our examination shows them distinctly 1-septate. Nothing is known of this species except from the type collection. In color the perithecia resemble those of *Nectria Brassicae* Ellis & Sacc. but differ from that species in the hairy perithecia. The species would seem to be very distinct in the presence of well-developed, bristle-like hairs which are colored slightly reddish. It is to be regretted that the type material of this species is so scant that it is impossible to make as careful study of the species as would otherwise.

#### 17. *Nectria Papilionacearum* sp. nov.

Plants hypophyllous, scattered or gregarious, accompanying other sphaeriaceous fungi (*Pardiella*), surrounded at the base by a few white mycelial threads; perithecia subconical, bright red, nearly scarlet,  $150-175 \times 175-200$  mic., walls coarsely cellular; cells very variable but averaging 8-10 mic. in diameter; asci clavate, 8-spored,  $75 \times 10$  mic.; spores 2-seriate above, often 1-seriate below, fusoid, 1-septate, constricted at the septum, with 1 or more oil-drops in each cell,  $15-17 \times 5-6$  mic. (*pl. 4. f. 7; pl. 5. f. 19*).

On leaves of papilionaceous plants, *Lespedeza* and *Rhynchosia*, accompanying other sphaeriaceous fungi (*Parodiella*).

TYPE LOCALITY: Missouri.

DISTRIBUTION: Missouri to S. Carolina.

EXSICCATI: Ravenel, *Fungi Am. Ex. 647*. Other specimens examined: Missouri, *Kellermann, 1002, 1003*.

The specimens in Ravenel's exsiccati were distributed as *Nectria Peziza* Fries from which they are very different both in gross and microscopic characters.

The specimens collected by W. A. Kellermann in Missouri, from which this description is drawn, were first referred to *Nectria erubescens* Desm., from which they also differ in both external and spore characters. They were later referred to *Nectria episphaeria* (Tode) Fries, which they quite closely

resemble. The form of the perithecia, size of the spores and phylogenous habitat are sufficient to set it apart as distinct from that species.

As to whether these plants occur on the living leaves no statement is made by the collectors, but the leaves appear to have been collected in the living condition and since the fungi which they accompany are reported to be parasitic it is likely that the *Nectria* also occurs on the leaves while living. Although accompanying *Parodiella* the plants do not seem to be parasitic on the fungus, but since in the three specimens examined the *Nectria* accompanies the *Parodiella* there may be a close relationship between the two fungi as well as between the fungi and the leguminose host on which they occur.

#### 18. NECTRIA BRASSICAE Ellis & Sacc.

*Michelia* 2: 374. 1881

Perithecia scattered or gregarious, subconical, entire or bilaterally-collapsing, blood-red, 120–150 mic. in diameter; perithecial wall composed of coarse cells, variable in form and size, 5–8 mic. in diameter; asci clavate,  $60 \times 7-8$  mic., 8-spored; spores mostly 2-seriate, fusoid or subclavate, 1-septate, hyaline,  $10-11 \times 3-4$  mic. (*pl. 5. f. 20*).

On herbaceous stems of various kinds, *Brassica*, *Solanum*, *Ipomoea*, etc.

TYPE LOCALITY: New Jersey.

DISTRIBUTION: New Jersey to Louisiana.

EXSICCATI: Ellis, N. Am. Fungi 572, 572b; Ellis & Everhart's Fungi Columb. 1747. Other specimens examined: New Jersey, Ellis (cotype); Louisiana, Langlois 1208, 1775, 1804.

Closely related to *Nectria sanguinea* (Bolton) Fries, but distinguished by a difference in the form and size of the perithecia as well as by a slight difference in the size and arrangement of the spores. The perithecia resemble in form, *Nectria Papilionacearum* Seaver, but the spores are very different.

#### 19. NECTRIA SANGUINEA Fries, Summa Veg.

Scand. 388. 1845

*Sphaeria sanguinea* Bolton, Fungi Halifax 3: 121. 1789.

?*Hypoxylon phoeniceum* Bull. Herb. France, *pl. 487. f. 3*. 1790.

*Nectria athroa* Ellis & Everh. Proc. Acad. Nat. Sci. Phil., 1890: 247. 1891.

*Nectria viticola* Berk. & Curt. Grevillea 4: 45. 1875.

Perithecia gregarious or scattered, superficial, ovoid, mostly entire, but often collapsing when prematurely dried, smooth, blood-red, shining, about  $200-275 \times 250-300$  mic. when mature; ostiolum obtuse but very prominent; asci cylindrical,  $60-75 \times 6-7$  mic., 8-spored; spores obliquely arranged in the ascus, 1-seriate below, partially 2-seriate, above, narrow fusoid or subelliptical, slightly constricted,  $10-12 \times 4-5$  mic., granular within (*pl. 4. f. 6*; *pl. 5. f. 17*).

TYPE LOCALITY: Nova Scotia.

DISTRIBUTION: Nova Scotia to New Jersey, Ohio and Kansas.

ILLUSTRATIONS: Bolton, Fungi Halifax, 3: *pl. 121. f. 1*; Bulliard, Herb. France *pl. 487. f. 3*.

SPECIMENS EXAMINED: Alabama, *Peters 5225* (cotype of *N. viticola* Berk. & Curt.); New Jersey, *Ellis*; New York, *Seaver*; Ohio, *Morgan*; Kansas, *Kellerman & Swingle 1325*.

Distinguished by the blood-red, ovoid, mostly entire perithecia and their habitat on rotten wood.

This species is usually attributed to Sibthorp,\* although Bolton's description quoted above antedates that of Sibthorp by five years. No type specimen of this species has been seen and it is doubtful if such exists but the species is so well defined that Bolton's description and accompanying illustrations leave little chance for doubt as to its identity. The species is fairly well marked by the ovoid, blood-red perithecia which occur on rotten wood entirely destitute of stroma. The following is the note accompanying the original description.

"This *Sphaeria* grows on putrid wood; great numbers grow in close neighborhood but do not in any wise adhere to one another. They are oval or egg-shaped; the base broader than the top. Each has a perforation in the top, and is about the size of a poppy seed, as in the lower figure; the other figures shew them as they appear when magnified and cut both perpendicularly and horizontally. The colour on the outside is deep, bright bloody hue; the surface shining with a gloss like polished coral; the inside and seeds are white."

\* Sibth. Fl. Oxoniensis 404. 1794.

The perithecia and spores of *Nectria athroa* Ellis & Everh. are a little smaller than the average of this species but this may be due to immature specimens. In other respects this is a typical specimen of the above species.

20. *NECTRIA EPISPHAERIA* (Tode) Fries, Summa  
Veg. Scand. 388. 1845

*Sphaeria episphaeria* Tode, Fungi Meckl. 2: 21. 1791.

Perithecia gregarious or scattered, superficial, subovoid, for the most part bilaterally collapsing when dry, smooth, blood-red, perithecial wall composed of rather coarse cells, perithecia variable but ranging from 150–250 mic. in diameter; asci cylindrical,  $60 \times 5$  mic., 8-spored; spores obliquely 1-seriate, broad-fusoid,  $4-6 \times 9-12$  mic. (mostly  $5 \times 10$ ), 1-septate, hyaline (pl. 4. f. 1, 2; pl. 5. f. 18).

On old fungi of various kinds, especially sphaeriaceous fungi.

TYPE LOCALITY: Mecklenburg, Germany.

DISTRIBUTION: New York to California and Canada to Nicaragua.

ILLUSTRATION: Tode, Fungi Meckl. 2: pl. 11. f. 89.

EXSICCATI: Ellis, N. Am. Fungi 469, 469 (b); Ravenel, Fungi Am. Exsicc. 340; Smith, Central Am. Fungi 4. Other specimens examined: Alabama, Carver 305, Earle; California, Harkness; Connecticut, Thaxter; Kansas, Kellerman & Swingle; Louisiana, Langlois; Maine, White; New Hampshire, Farlow; New Jersey, Ellis, Brown, Small; New York, Peck; North Dakota, Seaver (various collections); Nicaragua, C. Am., Smith; S. Carolina Ravenel 551.

Distinguished by the broad-fusoid spores as well as by the habitat and manner of collapsing.

This species very closely resembles the preceding and is considered by most writers as scarcely distinct. The habitat and manner of collapsing are usually given as the distinguishing characters. From our own studies the species would seem to differ in the spore characters as well. In the present species the spores are broad-fusoid and approximately twice as long as broad, while in the preceding, *Nectria sanguinea* (Bolton) Fries, they are narrow-fusoid or approximately three times as long as broad. This difference is shown in the camera lucida drawing of the two

species which accompanies this paper, which drawings are made from material which is typical of the two species. A careful study of material from widely different localities is necessary in order to determine whether or not this character is constant.

## DOUBTFUL SPECIES

*Dialonectria gibberelloides* Ellis & Everh. Jour. Myc. 4: 122. 1888. *Nectria gibberelloides* (Ellis & Everh.) Sacc. Syll. Fung. 9: 963. 1891.

Perithecia scattered, nearly black (quite black in dried material), 150–200 mic. in diameter, contracted into a stem-like base below, finally collapsing; asci clavate, 8-spored,  $35 \times 5-6$  mic.; spores partially 2-seriate, fusoid, 1-septate, straight or slightly curved, hyaline,  $12-15 \times 2.5-3$  mic.

On dead stalks of *Zea Mays*.

TYPE LOCALITY: Louisiana.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: Louisiana, *Langlois 1457* (type).

As would be inferred by the specific name, this species resembles a *Gibberella* but differs in the absence of blue color from the perithecia, the 1-septate spores and a difference in the form of the perithecia. The spores resemble those of the genus *Nectria* but it is doubtful from the general appearance of the plants if they should be included with this genus. If color be regarded strictly as a characteristic of the order Hypocreales this species could scarcely be included with the order.

*Nectria (Lasionectria) setosa* Ferd. & Winge, Bot. Tidsskrift 29: 11. 1908.

Perithecia superficial, scattered or slightly gregarious, at first globose, then plane when dry pezizoid-collapsing, 250–500 mic. in diameter, flesh-colored or orange, hairs scattered, of the same color, rigid, thickened below, above slightly attenuate and finely divided (conidiophorous) as long as 100 mic., principally near the base; asci when young, lanceolate-subfusoid, when mature cylindrical-clavate, 50–70 mic. (p. sporif.)  $\times 8-10.5$  mic., narrowed into stem as long as 20 mic.; 8-spored; spores above 2 seriate, below 1-seriate oblong-elliptical, ends rotundate, not at all or scarcely constricted at the septum,  $12-14.5 \times 5-6$  mic., hyaline.

On decayed dried sheaths of *Musa* sp.

TYPE LOCALITY: St. Thomas, W. Indies.

DISTRIBUTION: St. Thomas to St. John.

ILLUSTRATIONS: Bot. Tidsskrift 29: *pl. 1. f. 4.*

No type specimen of this species has been seen, but a specimen collected on decaying leaves of *Musa* in Jamaica by Dr. W. A. Murrill corresponds well with the above description. The specimens examined differ from *Nectria Pesiza* (Tode) Fries, which they quite closely resemble in general appearance, in the nature of the fairly well developed hairs which clothe the perithecia, and also in the spores, which are longer and proportionately narrower than in that species. Also, the perithecia are of a deeper red color.

6. CALONECTRIA de Not. Comm. Critt. Ital. 2: 477. 1867

Perithecia free, often closely gregarious, or scattered, with no true stroma but perithecia often surrounded with radiating white mycelia which give to some of the species a stromate appearance; perithecia globose to ovate, red or yellow; asci elongated, 8-spored; spores elongated, more than 1-septate.

Type species: *Calonectria Daldiniana* de Not.

Distinguished from *Nectria* by the many-septate spores. The genus as treated here is used in its restricted sense including only the non-stromatic species. The three species described here occur on the remains of other fungi so that the substratum with the white mycelium which surrounds each perithecium gives the stromatic appearance but close examination will show the perithecia to be entirely free, not connected by a stroma or stromatic base.

Spores small, not exceeding 15 mic. in length.

1. *C. erubescens.*

Spores large, 25-35 mic. in length.

Spores subelliptical; plants occurring on fungi on dead branches.

2. *C. diminuta.*

Spores fusiform; plants on leaves.

3. *C. melioliodes.*

I. CALONECTRIA ERUBESCENS (Rob.) Sacc.

Michelia 1: 309. 1878.

*Sphaeria erubescens* Rob.; Desm. Ann. Sci. Nat. III. 6: 72. 1846.

Perithecia minute, gregarious in clusters or scattered, surrounded by a scant growth of radiating mycelial threads, at first pale red, fading to pale yellow, subglobose, with a minute ostiole, often collapsing when dry, becoming pezizoid; asci clavate,

35-40 × 6 mic., 8-spored; spores crowded, small, elliptical to fusoid, 1-3-septate, 10-12 × 2-3 mic.

On living leaves of various kinds, usually on the remains of *Meliola*.

TYPE LOCALITY: France.

DISTRIBUTION: Florida.

EXSICCATI: Desm. Pl. Crypt. de France 1766 (cotype). Other specimens examined: Florida, *Nash 1955*, *Calkins 66*, and *Martin*.

In the original description of this species no mention is made of its occurrence on *Meliola* but aside from this fact the American material examined conforms well with that from Europe.

2. *CALONECTRIA DIMINUTA* (Berk.) Berl. & Vogl.;

Sacc. Syll. Fung. 9: 985. 1891

*Nectria diploa diminuta* Berk. Grevillea 4: 46. 1875.

*Dialonectria diminuta* Cooke, Grevillea 12: 83. 1884.

? *Calonectria Dearnessii* Ellis & Everh. Proc. Acad. Nat. Sci. Phil. 1890: 245. 1891.

Perithecia minute, 150-175 mic. in diameter, scattered or more or less crowded on the substratum surrounded by radiating mycelium giving somewhat the appearance of a stroma while no true stroma is present, orange, partially collapsing; asci cylindrical or clavate, 8-spored; spores irregularly crowded, variable in size and form, elliptical, clavate or subfusoid, usually 3-septate, hyaline, 25-35 × 6-7 mic.

On sphaeriaceous fungi, *Massaria*, etc.

DISTRIBUTION: S. Carolina to Canada (?).

EXSICCATI: Ellis & Everh. N. Am. Fungi 2548. Other specimens examined: London, Ontario, *Dearness 1346* (type of *C. Dearnessii* Ellis & Everh.).

3. *CALONECTRIA MELIOLOIDES* Speg. Anal. Soc. Ci.

Argent. 19: 41. 1886

*Calonectria guarapiensis* Speg. Anal. Soc. Ci. Argent. 19: 41. 1886.

Plants gregarious and surrounded by an evanescent, white mycelial growth consisting of delicate radiating hyphae; perithecia subglobose to ovate, 200-250 mic. in diameter with the wall composed of irregular cells 5-8 mm. in diameter, clothed with a

few rigid, hyaline, many-septate hairs with a bulbous base; hairs 7-8 mic. in diameter and 200-400 mic. long; asci clavate, 8-spored, 80-100  $\times$  12-15 mic.; spores 2-seriate or irregularly crowded, fusiform, 3-septate, hyaline, 30-35  $\times$  7-8 mic.

On the mycelium of *Meliola* on living leaves.

TYPE LOCALITY: Brazil.

DISTRIBUTION: Louisiana.

EXSICCATI: Roumeguere, Fungi Sel. Exsicc. 4141 (cotype); Roumebuere, Fungi Gall. Exsicc. 4047 (cotype of *C. guarapiensis* Speg.); Louisiana, *Langlois* 2224.

This species resembles in external appearance as well as in habitat the various specimens of *Calonectria erubescens* (Rob.) Sacc., but are easily distinguished by the difference in form and much larger spores. Also in some of the specimens examined the two species seem to occur together, some of the perithecia containing the large spores and others the small spores which are characteristic of the two species respectively.

#### DOUBTFUL SPECIES

*Calonectria Curtisii* (Berk.) Sacc. *Michelia* 1: 316. 1878.

#### 7. OPHIONECTRIA Sacc. *Michelia* 1: 323. 1878

Perithecia scattered or gregarious, globose or pyriform, superficial, light-colored, yellow or brownish; asci cylindrical to clavate, 8-spored; spores very much elongated, approaching filiform, at least 10 times as long as broad, many-septate.

Type species: *Nectria trichospora* Berk. & Br.

The genus is distinguished from *Calonectria* by the spores, which are much longer, approaching or entirely filiform. Only the non-stromatic forms are treated here.

Perithecia globose or subglobose, spores 35-50 mic. long,  
on fungi.

1. *O. cerea*.

Perithecia elongated, substipitate, spores 60-75 mic.

2. *O. cylindrothecia*.

#### 1. OPHIONECTRIA CEREAE (Berk. & Curt.) Ellis & Everh.

N. Am. Pyrenom. 118. 1892

*Sphaeria cerea* Berk & Curt. *Grevillea* 4: 108. 1876.

*Calonectria cerea* Sacc. *Syll. Fung.* 2: 551. 1883.

*Nectria (Calonectria) fulvida* Ellis & Everh. Jour. Myc. 1: 140. 1885.

*Dialonectria fulvida* Ellis & Everh. Jour. Myc. 2: 136. 1886.

*Ophionectria Everhartii* Ellis & Galw. Jour. Myc. 6: 32. 1890.

Perithecia gregarious, nearly globose, dull yellow becoming darker with age, more or less rough and furfuraceous externally, or with a few hair-like outgrowths, with a papilliform ostiolum, 150–175 mic. in diameter; asci cylindrical, 8-spored, 65–80 × 8–12 mic.; spores varying from fusiform to cylindrical or clavate, straight or curved, with the ends usually acute, hyaline or very pale yellow, 7–10-septate, 35–50 × 3–3.5 mic.; paraphyses short, indistinct.

On old fungi, especially *Diatrype*.

TYPE LOCALITY: S. Carolina.

DISTRIBUTION: Newfoundland and Ontario to S. Carolina.

ILLUSTRATION: Ellis & Everh. N. Am. Pyrenom. pl. 15. f. 1–3.

SPECIMENS EXAMINED: Newfoundland, *Waghorne 755*; Ontario, *Dearnness 2292*; New Jersey, *Ellis* (type of *D. fulvida* and *O. Everhartii*).

Distinguished by the globose, slightly furfuraceous perithecia and by the habitat.

## 2. *Ophionectria cylindrothecia* sp. nov.

Perithecia gregarious or scattered, cylindrical to clavate or fusoid, tapering below into a stem-like base, also tapering above, yellowish, translucent, nearly smooth, rather hard when dry, often with a few septate, hair-like mycelial strands near the base. naked above, 125–150 × 275–300 mic.; asci cylindrical or clavate, 8-spored, 100–125 × 12–15 mic.; spores apparently enclosed in a separate membrane within the ascus, so that the outer wall of the ascus stretches 10–20 mic. beyond the apex of the spore cluster; individual spores tapering toward either end, hyaline or very slightly yellowish, 7–12-septate, 60–75 × 5 mic.; paraphyses present, indistinct (pl. 4. f. 4).

On old corn stalks, *Zea Mays*.

TYPE LOCALITY: Ohio.

DISTRIBUTION: Known only from type locality.

Ohio, *Morgan 1007* (type).

Distinguished by the elongated perithecia and the large size of the asci and spores as well as by the habitat.

This specimen in the Ellis collection and also in the material received from Mr. Morgan, which is a part of the type collection, is labeled *Ophionectria cerea* (Berk. & Curtis) Ellis & Everh., but examination of this material shows it to be entirely different from other specimens of *Ophionectria cerea* (Berk. & Curtis) Ellis & Everh. in external as well as in microscopic details. Its habitat is also entirely different from that species.

9. NEOCOSMOSPORA Smith, U. S. Dept. Agric. Div. Veg. Phys. Path. Bull. 17: 7-59. pl. 1-10. 1899

Perithecia as in *Nectria* (bright red in the known species); asci numerous; ascospores in one row, brown, globose or short-elliptical, continuous, with a distinct, wrinkled exospore (the latter sometimes wanting in smaller spores); paraphyses present, inconspicuous, broad, loosely jointed, unbranched, consisting of about 5 cells.

Three conidial stages, *Cephalosporium*, *Fusarium* and *Oidium*.

1. Microconidia (*Cephalosporium* stage). Spores colorless, oval to narrow-elliptical, straight or slightly curved, simple, 4-25  $\times$  2-6 mic., borne singly on the ends of short branches of a mycelium which fills the water ducts and interior parts of the living stems of melon and cowpea, conidia often 1-2-septate in cultures.

2. Macroconidia (*Fusarium* stage). Spores lunulate, 3-5-septate, 30-40  $\times$  4-6 mic., borne on the surface of dead stems in immense numbers on innumerable, small, oval or hemispherical conidial beds; conidiophores compact, irregularly branched, single spores colorless, in mass pink to deep salmon-color.

3. On the surface of the dead stems of watermelon and in old cultures of the melon fungus on horse dung, globose, thin-walled, smooth, terminal or intercalary bodies are formed, in mass brick-red, individuals 10-12 mic. in diameter, extreme limits, 7-15 mic.

Type species: *Fusarium vasinfectum* Atk.

The position of this genus is uncertain.

1. NEOCOSMOSPORA VASINFECTA (Atk.) Smith, U. S. Dept. Agric. Div. Veg. Phys. Path. Bull. 17: 7-50. pl. 1-10. 1899  
*Fusarium vasinfectum* Atk. Ala. Agric. Exp. Sta. Bull. 41: 28. 1892.

Perithecia gregarious, often closely crowded, bright red, smooth, with a very prominent, obtuse ostiolum, becoming per-

porate; perithecial wall composed of large cells, 12–15 mic. in diameter; perithecia  $200\text{--}225 \times 250\text{--}275$  mic.; asci nearly cylindrical, 8-spored,  $85\text{--}90 \times 12\text{--}15$  mic.; spores 1-seriate or often irregularly crowded, globose or subglobose, at first hyaline and surrounded with a transparent exospore, becoming brown, with several large oil-drops within, at maturity outer surface becoming wrinkled and rough, mostly  $10 \times 10$  mic. in diameter; paraphyses present, inconspicuous, simple, septate.

Parasitic on cotton and okra, *Gossypium herbaceum*, *G. Barbadense* and *Hibiscus esculentus*.

TYPE LOCALITY: Alabama.

DISTRIBUTION: S. Carolina to Virginia and Arkansas.

EXSICCATI: Ellis & Everhart's Fungi Columbiana 1434. Other specimens examined: Alabama, Earle (for perithecial characters).

*Neocosmospora vasinfecta tracheiphila* Smith, l. c.

*Nectriella tracheiphila* Smith, Proc. A. A. A. Sci. 44: 190. 1895 (hyponym).

Perithecia as above, spores mostly  $12 \times 12$  mic. Parasitic on cowpea, *Vigna sinensis*.

*Neocosmospora vasinfecta nivea* Smith, l. c.

*Fusarium niveum* Smith, Proc. Am. Ass. Adv. Sci. 43: 289. 1894 (hyponym).

Perithecia as above; spores globose or elliptical, wrinkled or smooth generally smaller than in the preceding and more often elliptical. Parasitic on watermelon.

#### 10. MELANOSPORA Corda, Ic. Fung. 1: 24. 1837.

Perithecia superficial, without stroma, globose-pyriform, with a long neck, usually clothed at the tip with a fringe of hairs and perithecia often hairy; asci broad-clavate, 4–8-spored; spores simple, colored, brown or brownish-black.

Type species: *Melanospora Zamiae* Corda.

The genus *Melanospora* is distinguished from *Ceratostoma* mainly by the lighter color and less decidedly carbonaceous perithecia. The two genera grade so closely into each other that it becomes difficult to draw a fast line between them although some of the species show undoubted relationship with the Hypocreales.

Of the three species recorded for North America one undoubtedly belongs to this genus while the other two are here included doubtfully.

## I. MELANOSPORA CHIONEA (Fries) Corda, Ic.

Fung. 1: 24. 1837

*Ceratostoma chioneum* Fries, Obs. Myc. 2: 340. 1818.*Sphaeria chionea* Fries, Syst. Myc. 2: 446. 1822.

Perithecia gregarious or scattered, globose, clothed with a dense covering of white hairs, with a light colored beak up to 1 mm. long and 100 mic. in diameter, clothed with a few hairs at the apex; hairs which clothe the perithecia, 3 mic. in diameter, septate, long and flexuose; asci evanescent, obovate-clavate, stipitate, 8-spored,  $35-40 \times 13-16$  mic.; spores 2-seriate or irregularly crowded, globose-elliptical, brown,  $10-12 \times 9-10$  mic. (*pl.* 4. f. 9).

On decaying pine leaves and more rarely on leaves of deciduous trees.

TYPE LOCALITY: Europe.

DISTRIBUTION: Ontario.

ILLUSTRATIONS: Fries, Obs. Myc. 2: *pl.* 7. f. 2; Corda, Ic. Fung. 1: *pl.* 7. f. 297 B; Ellis & Everh. N. Am. Pyrenom. *pl.* 14. f. 1-5. Winter, Rabenh. Krypt. Fl. 1<sup>2</sup>: 85. f. 1-3.

SPECIMENS EXAMINED: Ontario, *Dearness* 1370.

The American material of this species corresponds very closely with European specimens examined except in the matter of habitat. A specimen of the species from the herbarium of Fries is contained in the collection of the New York Botanical Garden but unfortunately it shows no perithecia, these having doubtless been removed by those who have previously studied the specimen. Other European specimens have been studied with which our material is identical.

## DOUBTFUL SPECIES

*Melanospora parasitica* Tul. & Tul. Sel. Fung. Carp. 3: 10. 1865. *Sphaeronema parasitica* Tul. Ann. Sci. Nat. IV. 8: 40. (Note 2). *Ceratostoma biparasiticum* Ellis & Everh. Bull. Torrey Club 24: 127. 1897.

Perithecia scattered, enveloped in a growth of white, septate, mycelial threads about 3 mic. thick, black, at least when mature, ovate, 100-175 mic. in diameter, with a long, slender, naked beak, about 1 mm. in length and 30-40 mic. in diameter; asci clavate, 8-spored,  $20 \times 6$  mic.; spores elongated, cylindrical, with the ends rounded, pale brownish,  $6-7 \times 2$  mic.

Parasitic on stems of *Isaria farinosa*.

TYPE LOCALITY: Europe.

DISTRIBUTION: Ohio to New York.

ILLUSTRATIONS: Tul. & Tul. Sel. Fung. Carp. 3: *pl.* 3. *f.* 11-14;  
Grevillea 11: *pl.* 158. *f.* 3.

SPECIMENS EXAMINED: Ohio, *Lloyd*; New York, *Wilson*,  
*Seaver*.

*Sphaeria lagenaria* Pers. Syn. Fung. 58. 1801. *Ceratostoma lagenarium* Fries, Summa Veg. Scand. 396. 1849. *Auerswaldia lagenaria* Rabenh. Hedwigia 1: 116. 1856. *Melanospora lagenaria* (Pers.) Fuckel, Symb. Myc. 1: 126. 1869.

Perithecia scattered or gregarious, nearly globose, sparingly clothed with pale brown hairs, 400-500 mic. in diameter, with a beak, 1-2 mm. long and 100 mic. in diameter, tip of beak clothed with hyaline hairs, entire perithecium at maturity black; asci broad-clavate, 35-40 × 12-15 mic.; spores elliptical or fusoid, at first hyaline, becoming dark brown, 12-16 × 10-11 mic.

On old fungi (*Polyporus*).

TYPE LOCALITY: Europe.

DISTRIBUTION: New York.

SPECIMENS EXAMINED: New York, *Clinton*.

In this and the preceding species the perithecia are entirely black (at least in mature specimens). From general appearance it would seem doubtful to the writer if they should be included with this genus.

## II. LETENDRAEA Sacc. *Michelia* 2: 73. 1880.

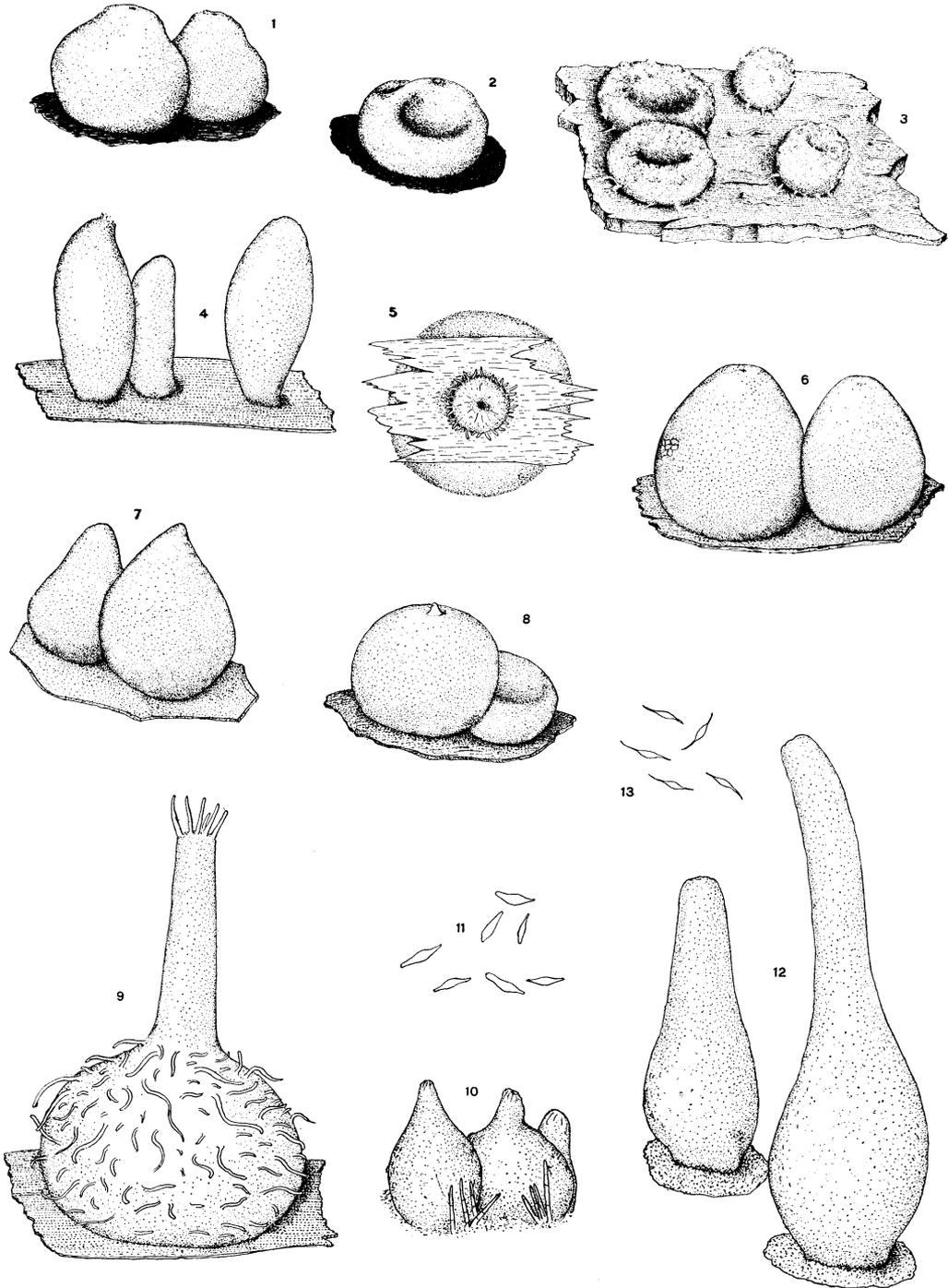
Perithecia superficial, gregarious, globose or ovate, with a papilliform ostiolum; asci 8-spored, cylindrical or clavate; spores elliptical or fusoid, 1-septate, brown.

Type species: *Letendraea eurotioides* Sacc.

Distinguished from subgenus *Phaeonectria* Sacc. by the absence of stroma.

## I. LETENDRAEA LUTEOLA Ellis & Everh. Proc. Phil. Acad. Sci. 1895: 415. 1895

Perithecia gregarious, 250-300 mic. in diameter, brown, becoming black with extreme age, with a prominent ostiolum, entire or occasionally collapsing; asci cylindrical, 75 × 5 mic.; spores mostly 1-seriate or partially 2-seriate above, elliptical, straight



VARIATIONS IN THE FORM OF PERITHECIA

or slightly curved, becoming brown, 1-septate, scarcely constricted at the septum, with an oil-drop in each cell,  $10-12 \times 4-5$  mic., paraphyses present, delicate.

On rotten wood.

TYPE LOCALITY: Ohio.

DISTRIBUTION: Known only from type locality.

SPECIMENS EXAMINED: Ohio, *Morgan 1109* (type).

In the specimens examined the perithecia are gregarious but with no apparent stroma. The large brown perithecia and the brown septate spores are sufficient characters by which the species may be recognized.

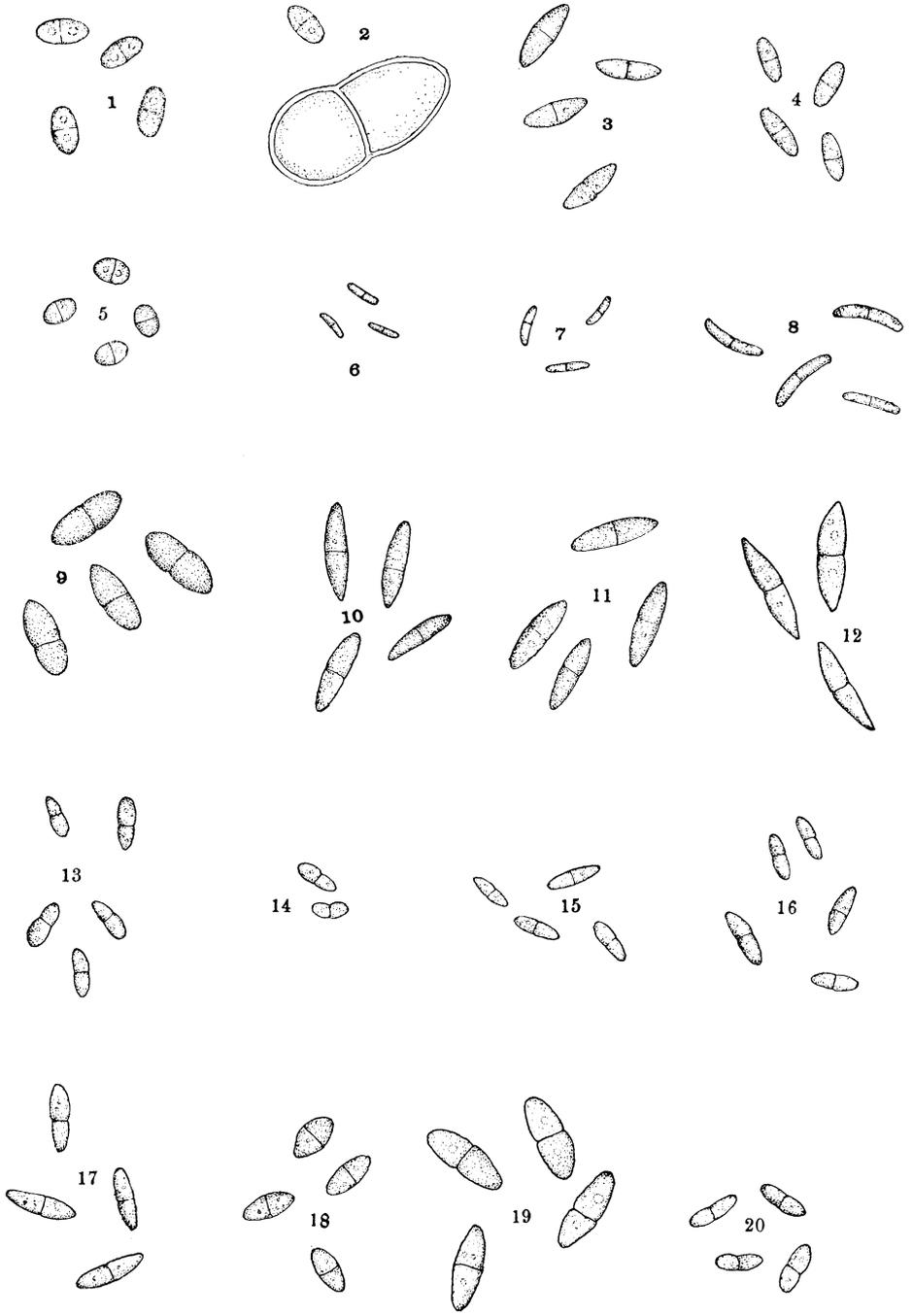
#### EXPLANATION OF PLATE IV.

1. *Nectria episphaeria* (Tode) Fries. The perithecia as they appear when moist,  $\times 85$ .
2. *Nectria episphaeria* (Tode) Fries. One of the bilaterally collapsing perithecia as they appear when dry,  $\times 85$ .
3. *Nectria Peziza* (Tode) Fries. Perithecia subglobose, pezizoid-collapsing,  $\times 30$ .
4. *Ophionectria cylindrothecia* Seaver. Perithecia subcylindrical,  $\times 85$ .
5. *Hyponectria dakotensis* Seaver. Perithecia subepidermal,  $\times 100$ .
6. *Nectria sanguinea* (Bolton) Fries. Perithecia ovate, entire,  $\times 85$ .
7. *Nectria Papilionacearum* Seaver. Perithecia subconical,  $\times 85$ .
8. *Nectria conigena* Ellis & Everh. Perithecia entire or pezizoid-collapsing,  $\times 85$ .
9. *Melanospora chionea* (Fries) Corda. Perithecia flask-shaped, hairy,  $\times 85$ .
10. *Eleuthromyces Geoglossi* (Ellis & Everh.) Seaver. Perithecia subflask-shaped,  $\times 85$ .
11. *Eleuthromyces Geoglossi* (Ellis & Everh.) Seaver. Subappendiculate spores,  $\times 1,000$ .
12. *Eleuthromyces subulatus* Fuckel. Perithecia subflask-shaped,  $\times 85$ .
13. *Eleuthromyces subulatus* Fuckel. Appendiculate spores,  $\times 1,000$ .

## EXPLANATION OF PLATE V.

The spores on this plate were drawn with the camera lucida, the object being to show the comparative size and form of the spores in the different species of the genus *Nectria*. The drawings are from type material where such is available. In a few cases the type specimens were too scant to permit of such drawings.

1. *Nectria Peziza* (Tode) Fries. Drawn from material collected by the writer.
2. *Nectria diplocarpa* Ellis & Everh. Drawn from type material.
3. *Nectria tremelloides* Ellis & Everh. Drawn from type material.
4. *Nectria flavociliata* Seaver. Drawn from type material.  
*Nectria bicolor* Ellis & Everhart. Drawn from type material.
5. *Nectria lactea* Ellis & Morgan. Drawn from type material.
6. *Nectria Rexasiana* Ellis. Drawn from type material.
7. *Nectria squamulosa* Ellis. Drawn from type material.
8. *Nectria rubefaciens* Ellis & Everh. Drawn from type material.
9. *Nectria thujana* Rehm. Drawn from Ellis, N. Am. Fungi 160. This material was collected in the type locality and identified by Mr. Ellis, who collected the type material. Cotype material has been examined, but the perithecia are so scarce that it was impossible to find any in good condition.
10. *Nectria Eucalypti* Cooke & Harkness. Drawn from material collected by Harkness in the type locality. Probably cotype.
11. *Nectria depallens* Cooke & Harkness. Drawn from material collected by Harkness. Probably cotype.
12. *Nectria Apocyni* Peck. Drawn from cotype material.
13. *Nectria sulphurea* Ellis & Calkins. Drawn from type material.
14. *Nectria truncata* Ellis. Drawn from type material, in which it was difficult to find mature spores.
15. *Nectria conigena* Ellis & Everh. Drawn from type material.
16. *Nectria filicina* Cooke & Harkness. Drawn from material collected by Harkness. Probably cotype.
17. *Nectria sanguinea* (Bolton) Fries. Drawn from Rehm's Ascomyceten 1771.
18. *Nectria epispheeria* (Tode) Fries. Drawn from material collected in Ohio on *Diatrype* sp.
19. *Nectria Papilionacearum* Seaver. Drawn from type material.
20. *Nectria Brassicae* Ellis & Sacc. Drawn from N. Am. Fungi 572. Probably cotype.



SPORES OF SPECIES OF NECTRIA