

A REASSESSMENT OF BELONIDIUM MONT. & DUR.

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(With five Text-figures)

A study of the sole original species of *Belonidium* Mont. & Dur. revealed that this generic name has been misapplied by subsequent authors. The taxon is redefined as a subgenus of *Dasyscyphus* S. F. Gray. A brief account is given of the latter genus and its subdivisions and of other genera assigned to the Hyaloscyphaceae trib. Lachneae (*Psilachnum* Höhn., *Diplocarpa* Massee) and subfam. Trichocyphelloideae (*Lachnellula* P. Karst., *Perrotia* Boud.) transferred from the Helotiaceae to the Hyaloscyphaceae, as well as of some other genera, *Trichodiscus* Kirschst., *Lasiobelonium* (Sacc.) Sacc. and *Zoellneria* Vel. The taxonomic significance of lanceolate paraphyses, characteristic in the Hyaloscyphaceae of the Lachneae, and in other families of Helotiales is discussed, with notes on *Cenangioopsis* Rehm, *Mollisiopsis* Rehm and other genera. The species previously referred to *Belonidium* by De Notaris and later authors are reviewed and suggestions are made as to their taxonomic positions and status with incidental notes on such genera as *Belonopsis* (Sacc.) Rehm, *Calycellina* Höhn., *Strossmayeria* S. Schulz., *Allophylaria* Karst., and the introduction of *Nipterella* Starbäck ex Dennis, gen. nov. *Hymenoscyphus* S. F. Gray is taken up for the bulk of species currently referred to *Helotium* Pers. New combinations are made with *Allophylaria* (1), *Belonopsis* (2), *Calycellina* (1), *Cenangioopsis* (2), *Dasyscyphus* (12), *Hymenoscyphus* (3), *Lachnellula* (17), *Lasiobelonium* (1), *Nipterella* (2), *Perrotia* (3), *Pezizella* (1), *Psilachnum* (2), *Strossmayeria* (1), *Unguicularia* Höhn. (1).

The generic name *Belonidium* Mont. & Dur. (Fl. Alger. tab. 28 fig. 8. ?1846) was proposed for a single species, *B. aeruginosum* Mont. & Dur., which was carefully figured with analyses. Captions but no formal diagnosis of either genus or species appeared in the text to the Atlas volume, 1868. The plate constitutes effective publication of both genus and species but the genus was first brought to the general notice of mycologists by De Notaris (1864). He ascribed it to Montagne and Durieu, cited the above plate, and gave the following generic diagnosis:

"Ascomata cupularia sessilia, vel breviter stipitulata, cyathoidea, vel infundibuliformia, ore in sicco saepius coarctata. Excipulum cellulis elongatis, arctis contextum subceraceum. Asci 8-spori. Paraphyses filiformes. Sporidia teretiuscula, utrinque obtusa 4-6, locularia, hyalina."

It will be observed that there is no mention of hairs and that the paraphyses are stated to be filiform. De Notaris referred to his extended genus seven species, viz:

Belonidium aeruginosum Mont. & Dur., without comment.

B. molinae De Not. with short diagnosis. Rehm took this to be a synonym of *B. vexatum*.

B. vexatum De Not., currently referred to *Belonioscypha* Rehm, in Helotiaceae.

B. campanula (Nees ex Fr.) De Not., chosen by Nannfeldt as lectotype of *Belonioscypha*.

B. tami (Lamy) De Not., referred by von Höhnelt to his genus *Pezizellaster*, in Hyaloscyphaceae.

B. hystrix De Not., referred by von Höhnelt and by Nannfeldt to *Belonium* in Dermateaceae.

B. aurelia (Pers.) De Not., referred by Fuckel to his genus *Arachnopeziza*, in Hyaloscyphaceae.

De Notaris' contributions to the genus have thus been distributed by subsequent authors among three families of the Helotiales.

Saccardo (1884) selected as lectotype of *Belonidium* Mont. & Dur. *B. campanula* (Nees) De Not. but this is obviously an impossible choice, especially as he clearly ascribed the genus to Montagne and Durieu, not to De Notaris. By the time he compiled volume 8 of the "Sylloge fungorum" (1889) he had either forgotten or repented of his earlier selection and seems to have fixed instead on *B. molinae* De Not., though he still ascribed the generic name to its original authors and dated it 1846. *Belonidium molinae* appears in 1889 as the first species of subgenus *Eubelonidium* whereas *B. campanula* and *B. vexatum* are referred to subgenus *Podobelonium*, *B. aurelia* to subgenus *Arachnoscypha* and *B. tami* with *B. aeruginosum* to subgenus *Lasiobelonium*. *Belonidium hystrix* has been transferred to *Belonium*, under the name *B. graminis* (Desm.) Sacc. Clements and Shear selected as type species *B. lacustre* (Fr.) Phill., an even more ridiculous suggestion as this does not appear in De Notaris' list of 1864 and is not by modern ideas congeneric with any of his species nor, as we shall see, with that of Montagne and Durieu.

There would seem to be no doubt that the generic name must be interpreted in conformity with the characters of *B. aeruginosum*, the sole foundation species. By courtesy of M. R. Heim I have been permitted to examine the excellent material in the type collection of this at Paris and find it to be a Hyaloscyphaceous fungus with long granulate hairs and narrow but distinctly lanceolate paraphyses. It is most unfortunate that the manuscript diagnosis attached to the type collection was not published as it clearly indicates the essential characters and would have obviated a century of misapplication of the name:

Belonidium aut qualicumque nomen. Nov. Gen. Tribus Patellariaceae.

Cupula ceracea libere evoluta extus villosa, margine siccitate involuta, hymenium carneum tandem frustulatum fatiscens, cupula explanata remanente. Asci cylindrici paraphysibus tenuibus continuis acutis parcissimis (non nisi augmento maximo conspicuis) mixti. Sporidia acicularia transversim pluriseptata.

The hairiness of the apothecia led to a comparison with *Volutella* Tode in the notes appended to this manuscript diagnosis. Examination of the type shows the

hairs to be cylindrical or very slightly tapered to obtusely rounded tips, up to $175 \times 4-5 \mu$, their walls thick, hyaline, not pseudoamyloid, with a finely granulate surface, multiseptate. The asci measure $60 \times 7 \mu$, with pore blued by Melzer's reagent; ascospores hyaline, cylindric-fusoid, $17-21 \times 1.5-2 \mu$, 3-septate; paraphyses lanceolate, $70 \times 2-2.5 \mu$ (Fig. 1). It appears probable that *Erinella ilicina* Urries is a synonym.

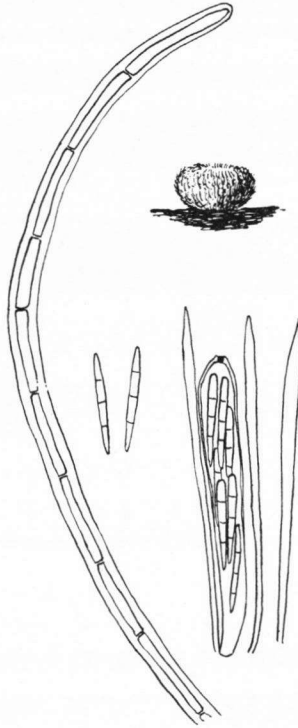


Fig. 1. *Belonidium aeruginosum*. Apothecium ($\times 10$), hair, ascus and paraphyses, spores ($\times 660$).

Belonidium is therefore to be regarded as a synonym of *Dasyscyphus* S. F. Gray, when that genus is taken in the wide sense of *Lachnum* emend. Nannfeldt. For those who prefer to separate the sessile species of the genus it offers a legitimate name in place of *Lachnella* auct. non Fries and an earlier name than either *Trichopeziza* Fuckel (1870) or *Dyslachnum* Clents (1909), based on *Peziza mollissima* Lasch.

It may be appropriate here to consider also the application of *Trichopeziza* Fuck. This was proposed by Fuckel (1870: 295) as a genus of twelve species, defined as,

"Cupulae carnosio-coriaceae, plerumque minutissimae, sessiles subsessilesve, siccatatae globosae, clausae, humectatae plus minusve apertae, extus undique pilosae. Discus concavus. Asci octospori. Sporidia cylindracea oblongave, continua, hyalina. Paraphyses adsunt.

Meist sehr kleine, fast oder ganz sitzende, trocken fast kugelförmige oder am Scheitel genabelte, mitunter lebhaft gefärbte oder schneeweiße, aussen behaarte Becherpilze. Dürre, weiche Pflanzentheile bewohnend".

Comparison with the unpublished diagnosis of *Belonidium* shows the chief difference to be one of ascospore septation, a character no longer regarded as necessarily of generic significance in the Helotiales. The genus was adopted by Saccardo in "Sylloge fungorum" volume 8 but has been ignored by most later authors, presumably because they thought it indistinguishable from *Dasyscyphus*, *Lachnum* or *Lachnella*. Boudier (1907), indeed has a genus "*Trichopeziza* Fuck." but, as he excluded from it every one of Fuckel's original twelve species his usage evidently cannot be accepted. No type species was indicated by Fuckel but Saccardo (1884) selected as lectotype for *Trichopeziza* as a subgenus of *Lachnella* "*L. sulfurea* Pers." At least seven of the original species have at some time been referred to *Dasyscyphus* and it seems clear from the diagnosis the name was intended to apply to a genus of Hyaloscyphaceae. There seems no good reason to reject Saccardo's choice but it may be worth while briefly to consider the fate of Fuckel's foundation species in subsequent systems.

1. *Trichopeziza punctiformis* (Fr.) Fuck. As illustrative of this species Fuckel quoted his "Fungi rhenani" No. 1194, which consists of dead oak leaves bearing apothecia of *Dasyscyphus capitatus* (Peck) Le Gal (= *D. scintillans* Masee). Fuckel identified his fungus with Fries' form "a. nivea" of *Peziza punctiformis*, but probably in error, for Fries gave the substrata of *P. punctiformis* as "Ad folia decidua putrescentia *Myricae*, *Alni* &c." His form "c" was "in foliis quercinis reperitur circa Parisios" but this was "fusca, badia" whereas *D. capitatus* is pure white throughout. *Peziza punctiformis* Fr. is considered by modern authors to have been a cyphellaceous fungus.

2. *T. nivea* (Hedw.) Fuck. Hedwig's fungus is interpreted today, by those who recognise it at all, as a species of *Dasyscyphus*.

3. *T. villosa* (Pers.) Fuck. *Peziza villosa* Pers. is generally assumed to be a basidiomycete, *Cyphella villosa* (Pers. ex Fr.) Karst. or *Lachnella villosa* (Pers. ex Fr.) Gillet.

4. *T. mollissima* (Lasch) Fuck. *Peziza mollissima* Lasch is a *Dasyscyphus* when the genus is interpreted in a comprehensive sense, see below.

5. *T. sulphurea* (Fr.) Fuck. This, too, is a *Dasyscyphus* of the same group as *D. mollissima*. Saccardo selected it as lectotype of *Lachnella* subgenus *Trichopeziza* and listed it as the first species of *Trichopeziza* in "Sylloge fungorum". There is, unfortunately a little uncertainty about the correct interpretation of the species. Rehm recognised three species of similar aspect on dead herbaceous stems, distinguished partly by ascospore characters, partly by the reaction of the hair cells to alkalis. These were:

Erinella nylanderii Rehm with ascospores $25-33 \times 2 \mu$, hair sap violet with alkali. This is the interpretation of *P. sulphurea* favoured by Karsten and Saccardo.

Lachnum sulfureum (Pers.) Karst. sensu Rehm with ascospores $8-10 \times 1.5-2 \mu$, hair sap violet with alkali.

Lachnum leucophaeum (Pers.) Karst. with ascospores $10-18 \times 1.5-2 \mu$, hair sap not coloured by alkali. This differed principally in the yellow sap of its hair cells from a fourth species, *L. mollissimum* (Lasch) Karst. and in my opinion these two are not specifically distinct.

In practice the distinction between *Lachnum sulfureum* sensu Rehm and *L. leucophaeum* is also much less clear cut than indicated above. Kirschstein (1938) came to a similar conclusion, "Unter den *Lachnum*-Arten gibt es zwei, die beim Bestimmen grosse Schwierigkeiten machen. Es sind dies *Lachnum sulphureum* (Pers.) Rehm und *L. leucophaeum* (Pers.) Karst. . . . Die gleiche Ansicht spricht auch Rehm aus. Er führt aber dann doch ein sicheres Unterscheidungsmerkmal an, das ist die verschiedene Reaktion der Haare auf Ätzammoniak. Da mir dieses Unterscheidungsmerkmal doch zu sehr an den Haaren herbeigezogen zu sein scheint; denn ich halte eine chemische Reaktion zur Feststellung von Verwandtschafts-verhältnissen für durchaus ungeeignet und lehne sie ab. Wenn man im Aussehen und Bau der Pflanzen keine Unterscheide finden kann, so muss man sie für identisch erklären." Whilst I would not be quite so dogmatic in rejecting colour reactions as taxonomic characters I agree that in this instance the reaction is often difficult to observe and may not be constant. I therefore agree with Kirschstein in uniting *L. leucophaeum* and *L. sulphureum* sensu Rehm.

The problem then is to decide between the conflicting interpretations of the latter species. Unfortunately the specimens surviving in the Persoon herbarium under the name *Peziza sulphurea* are not in good enough condition to settle the question finally. Of four collections so labelled one, on *Atropa*, was queried by Persoon and is evidently of no authority. One, number L 910.256-900, no longer bears apothecia. The other two carry apothecia but they are so immature that I was unable to recover asci from them. One, number L 910.256-897, labelled *Peziza sulphurea* var., has hairs in which the yellow sap is certainly not discoloured by ammonia. In the other, number L 910.261-594, labelled *Peziza sulphurea*, the reaction is uncertain. In the absence of ascospores I do not feel the evidence is clear enough to justify rejecting the first precise definition of the species by microscopic characters, that by Nylander (1869). He recognised three species in the group:

Peziza sulphurea Pers. with ascospores $14-24 \times 2-2.5 \mu$, up to 3-septate, hairs violet with ammonia.

P. leucophaea (Pers.) Nyl. with ascospores $6-15 \times 1-1.5 \mu$, hairs yellow in ammonia.

P. mollissima Lasch with ascospores $7-11 \times 1.5 \mu$, hairs colourless.

I would accept this interpretation with the modification that I doubt if *P. leucophaea* and *P. mollissima* be specifically distinct and therefore adopt the latter name as the older in specific rank. Nylander stated his concept of *P. sulphurea* to be based on Fries, Scler. Suec. 453. In the Kew example of this number I can obtain no violet colour in the hairs with alkali and find ascospores only $12-14 \times 1-2.5 \mu$. This whole species complex evidently deserves further critical study but for the

time being I call Rehm's *Erinella nylanderi* *Dasyscyphus sulphureus* and unite his *Lachnum sulfureum*, *L. leucophaeum* and *L. mollissimum* under the last name. The problem is still further complicated by the existence of *Erinella discolor* Mouton. I have seen the type of this, Mouton 304, on *Urtica* stems, which has light yellow hairs with no colour change in alkali and ascospores which vary from 3-septate $25 \times 3 \mu$ to 6-septate $67 \times 2 \mu$. If one rejects the colour reaction this can be regarded as only an extreme variant of *D. sulphureus*.*

6. *T. relicina* (Fr.) Fuck.

7. *T. nidulus* (Schmidt & Kunze) Fuck. Species 6 and 7 are sessile Hyaloscyphaceae with brown smooth-walled hairs, generally referred to *Dasyscyphus* or *Lachnella* auct. non Fries.

8. *T. pulverulenta* (Lib.) Fuck. This, too is a *Dasyscyphus* in the wide sense.

9. *T. pulveracea* Fuck. This is a *Pyrenopeziza*, without true hairs.

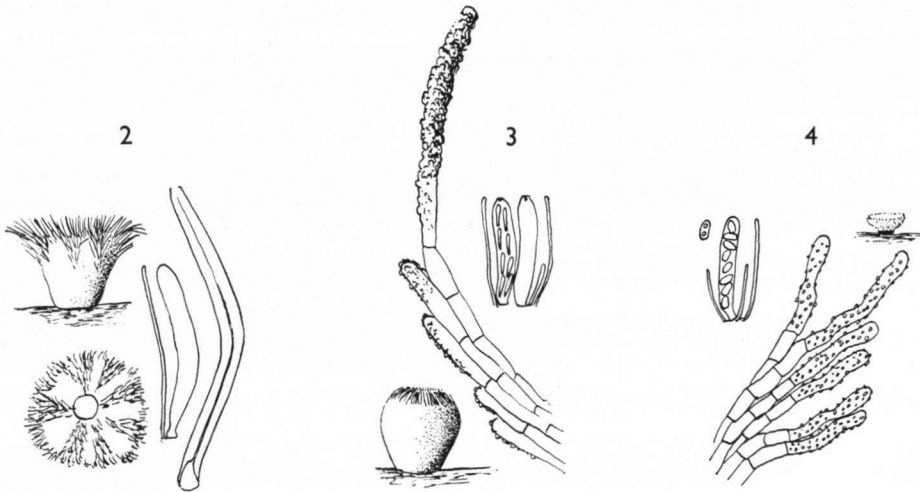
10. *T. stipae* Fuck. is *Phialea stipae* (Fuck.) Rehm and it is difficult to account for its inclusion in *Trichopeziza* since Fuckel himself described it as "glabris".

11. *T. hexagona* Fuck. This is an *Unguicularia* or *Urceolella*, with cupulate sessile apothecia about 200μ diameter, bearing glassy, hyaline, white hairs, densely massed around the rim and extending in bands down the flanks. The hairs measure $50-60 \times 4-5 \mu$, with thick walls stained purple in Melzer's reagent; asci $35 \times 4 \mu$, paraphyses filiform, obtuse, as long as the asci; ascospores not seen but described as $4 \times 2 \mu$. The substrate is rotting stalks of *Aspidium filix-mas*. It may be renamed ***Unguicularia hexagona*** (Fuck.) Dennis, *comb. nov.* (basionym, *Peziza hexagona* Fuck., Fungi rhenani No. 2076. 1867, with description) (Fig. 2). Whether *U. winteriana* (Rehm) Nannfeldt on *Asplenium filix-femina* is distinct depends on the range of ascospore size in *U. hexagona*.

12. *T. aspidii* (Lib.) Fuck. According to "Fungi rhenani" No. 2287 this is an extremely minute, sessile, cupulate, cream-coloured species on dead fronds of *Aspidium aculeatum*. The apothecia are about 200μ across, their margin white with very heavily encrusted, obtuse, thinwalled, cylindrical hairs about $30 \times 5 \mu$; asci $20 \times 4 \mu$, pore blued by Melzer's reagent, 8-spored, ascospores clavate, $5-6 \times 1 \mu$; paraphyses filiform, obtuse, no longer than the asci. In spite of the marginal hairs I doubt if this be Hyaloscyphaceous. The incrustation is peculiar and the filiform obtuse paraphyses exclude any otherwise suitable genus of that family. Its affinities may be rather with *Pezizella chrysostigma* (Fr.) Sacc., which also has a hairy margin and grows on ferns. It may stand, therefore, as ***Pezizella aspidii*** (Lib.) Dennis, *comb. nov.* (basionym, *Peziza aspidii* Lib., Pl. crypt. Arduennae, Fasc. III, No. 226. 1834, with description) (Fig. 3). Alternatively *P. aspidii* may have affinity with *Trichopeziza viridula* Grelet (1953) which has similar hairs but occurs on rotten wood (Fig. 4). I have seen a collection on *Fagus* from Yorkshire (Bramley K61/13) which is probably not specifically distinct from this though somewhat smaller in all its dimensions. The apothecia are scattered on the surface

* The only other collection I have seen referable to *Erinella discolor* is one, also on *Urtica*, by W. G. Bramley, Pickering, Yorkshire, 15 Nov. 1938.

of the decorticated wood, subsessile $\frac{1}{8}$ – $\frac{1}{2}$ mm diameter, with dark brown base, paler with a hint of yellow or green towards the margin, disc grayish. The excipular cells are thinwalled, prismatic, about $10 \times 3 \mu$ and bear thinwalled, cylindrical, flexuous, obtusely rounded, mostly nonseptate hairs, up to 45×2.5 – 3μ , with rather coarse yellowish-brown granules deposited on their walls. Asci 20 – 25×3 – 4μ , 8-spored, sessile, apex rounded, pore not blued by Melzer's reagent; ascospores mostly uniseriate, elliptic-cylindric or slightly allantoid, 3 – 4×1.5 – 2μ , with polar guttules; paraphyses cylindric, 1μ thick, often shorter than the asci.



Figs. 2–4. — 2. *Unguicularia hexagona*. Apothecium ($\times 80$), ascus, paraphysis and hair ($\times 660$). — 3. *Pezizella aspidii*. Apothecium ($\times 15$), hairs with excipular cells, asci and paraphyses ($\times 660$). — 4. *Trichopeziza viridula*. Apothecium ($\times 15$), hairs, ascus, paraphyses and spores ($\times 660$).

I do not see the second type of pointed smooth hair figured by Grelet but mounts show large numbers of loose pointed bodies, up to 45×2.5 – 3μ broad at the base, which appear to be conidia, perhaps borne on basal hyphae. This fungus would evidently fall in *Cistella* Quél. sensu Nannfeldt. *Trichopeziza coerulescens* (Rehm) Sacc. is perhaps something similar.

It is now possible to subdivide the comprehensive genus *Dasyscyphus* S. F. Gray into a number of apparently natural smaller genera and subgenera, taking as primary characters the nature of the paraphyses and hairs. Nineteenth century mycologists, notably Karsten and Rehm, impressed by the conspicuous lanceolate paraphyses of *D. virgineus* S. F. Gray and its allies, regarded the presence or absence of these organs as a generic character. Subsequent authors, finding it difficult to draw a sharp distinction between lanceolate and cylindrical paraphyses, have

questioned the validity of this character and have even claimed that the same species can exist in states with cylindrical and with lanceolate paraphyses respectively. After studying well over 100 species of Hyaloscyphaceae trib. Lachneae, however, I believe that in all true species of this tribe the paraphyses, if not distinctly lanceolate, are at least pointed at the tip and that there is a real distinction to be drawn between such slender cylindrical paraphyses with pointed tips and those with obtusely rounded tips. Such difficult cases as do occur are easily referred to *Dasyscyphus* in the strict sense by their obvious close resemblance to species with clearly lanceolate paraphyses. On this basis I propose the following arrangement:

1. Paraphyses lanceolate, sometimes apparently cylindrical but then with distinctly pointed tips Hyaloscyphaceae trib. Lachneae
2. Hairs cylindrical or at least obtuse, hyaline or, if coloured, thinwalled or colour in the sap, their walls covered with granules throughout at least the greater part of their length or else tipped by crystal masses:
 3. Apothecia mostly distinctly stipitate, hairs without coloured sap or else with the surface minutely and evenly granulate *Dasyscyphus* subgen. *Dasyscyphus*
 3. Apothecia sessile, hairs often with coloured sap or covered with loose fine coarse granules or coloured matter, ascospores often septate . . . *Dasyscyphus* subgen. *Belonidium*
2. Hairs smooth, not tipped by crystal masses:
 4. Hairs hyaline or nearly so, thinwalled:
 5. Hairs long, thinwalled, sharp-pointed *Dasyscyphus*, series *Acutipilae*
 5. Hairs shorter, thinwalled, cylindrical and obtuse or rudimentary:
 6. Paraphyses lanceolate *Psilachnum*
 6. Paraphyses filiform with lanceolate septate tips *Diplocarpha*
 4. Hairs brown, very long or stiff, with thick walls and glandular tips
Dasyscyphus subgen. *Trichopezizella*
1. Paraphyses cylindrical, slender, with obtuse tips:
 7. Hairs having granulate walls:
 8. Hairs pointed, excipular cells rounded *Trichodiscus*
 8. Hairs obtuse:
 9. Hairs brightly coloured, often with a coarse incrustation of coloured granules, ascospores characteristically cylindrical and septate (except in *P. succinea*), not on conifers *Perrotia*
 9. Hairs light coloured or with finely granulate walls, ascospores very variable in shape but usually nonseptate (except in *L. pseudofarinacea*), many species on conifers *Lachnellula*
 7. Hairs smooth:
 10. Hairs hyaline *Lasiobelonium*
 10. Hairs brown and glandular-tipped *Zoellneria*

DASYSCYPHUS S. F. Gray, Nat. Arrang. Brit. Pl. 1: 670. 1821.

This includes a rather homogeneous group of over 80 species plus a number of small fairly well defined groups for which I am not at present prepared to propose generic or even subgeneric rank. These are:

1. Series *Bicolores*, typified by *D. bicolor* (Bull. ex Mérat) Fuck., characterised by their more rigid thickwalled hairs.
2. Series *Niveae*, typified by *D. niveus* (Hedw. ex Fr.) Sacc. emend. Le Gal, in

which a hair with the cylindrical granulate type of shaft is tipped by a smooth glandular cell.

3. Series *Acutipilae*, typified by *D. acutipilus* (Karst.) Sacc., with smooth-walled, pointed, hyaline hairs.

Tropical species tend to have elongated, multiseptate, fasciculate ascospores and for these a genus, *Dasyscyphella* Tranzschel, has been proposed but I doubt if it be possible even to separate them as a clear-cut series within the subgenus *Dasyscyphus*. To the latter belong:

Dasyscyphus acuum (A. & S. ex Fr.) Sacc.

D. albidroseus (Rehm) Dennis

D. albidulus Penz. & Sacc.

D. albidus (Penz. & Sacc.) Dennis

D. albocitrinus (Cooke) Sacc.

D. albopileatus (Cooke) Sacc.

D. apalus (Berk. & Br.) Dennis

D. apiculatus Dennis

D. arundinariae (Berk.) Sacc.

D. avellaneo-melleus (Starb.) Dennis

D. bambusae Rick

D. bambusinus (Bres.) Dennis

D. brasiliensis (Mont.) Le Gal

D. brevipilus Le Gal

D. callimorphus (Karst.) Sacc.

D. calosporus (Pat. & Gaill.) Dennis

D. calycioides Rehm

D. calyculiformis (Schum. ex Fr.) Rehm

D. candidus Rodway

D. carneolus (Sacc.) Sacc.

D. cassandrae (Tranzschel) Dennis

D. cerinus (Pers.) Fuck.

D. ciliaris (Schrad. ex Fr.) Sacc.

D. clandestinus (Bull. ex St. Amans) Fuck.

D. clavisporus Mouton

Dasyscyphus concinnus (Kirschst.) Dennis, *comb. nov.* (basionym, *Lachnum concinnum* Kirschst. in Ann. mycol., Berl. **36**: 384. 1938).

D. controversus (Cooke) Rehm

D. corticola (Masse) Dennis

D. diminutus (Rob.) Sacc.

D. dumorum (Rob.) Masse

D. dussii Dennis

Dasyscyphus eburneus (Kirschst.) Dennis, *comb. nov.* (basionym, *Lachnum eburneum* Kirschst. in Ann. mycol., Berl. **36**: 385. 1938).

D. ellisianus (Rehm) Sacc.

- D. emerici* (Berk. & Phill.) Sacc.
D. enzenspergerianus (P. Henn.) Dennis
D. eriophori (Quél.) Dennis
D. espeletiae Dennis
D. fascicularis (Vel.) Le Gal
D. filiceus Cooke & Phill.
D. fimbriiferus (Berk. & Curt.) Sacc.
D. flavidulus Rehm
D. fugiens (Bucknall) Massee
D. fuscescens (Pers. ex Fr.) S. F. Gray
D. gaultheriae (Ell. & Ev.) Sacc.
D. glabrescens (Cooke & Phill.) Sacc.
D. grevillei (Berk.) Massee
D. hyalopus (Cooke & Massee) Dennis
D. imbecillis (Karst.) Sacc.
D. lachnodermus (Berk.) Rehm
D. lanariceps (Cooke & Phill.) Sacc.
D. lasseri Dennis
D. mapirianus (Pat. & Gaill.) Dennis
D. martini Dennis
D. melanophthalmus Dennis
D. minutissimus (Crouan) Le Gal [= *D. rhytismatis* (Phill.) Sacc.]
D. misellus (Rob.) Höhn.
D. nudipes (Fuck.) Sacc.
D. orinocoensis (Pat. & Gaill.) Dennis
D. palearum (Desm.) Massee

Dasyscyphus palmae (Kanouse) Dennis, *comb. nov.* (basionym, *Dasyscyphella palmae* Kanouse in *Mycologia* 33: 464. 1941)

- D. papyraceus* (Karst.) Sacc.
D. pritzelianus (P. Henn.) Dennis
D. pteridicola Dennis
D. pteridis (A. & S. ex Fr.) Massee
D. pteridophyllus Rodway
D. pudibundus (Quél.) Sacc.
D. pudicellus (Quél.) Sacc.
D. pulverulentus (Lib.) Sacc.
D. pygmaeus (Fr.) Sacc.

Dasyscyphus radotinense (Vel.) Dennis, *comb. nov.* (basionym, *Lachnum radotinense* Vel., *Monogr. Discom. Bohem.* 1: 261. 1934)

- D. rehmi* (Staritz) Sacc.
D. raphidophorus (Berk. & Curt.) Dennis
D. rhodoleucus (Sacc.) Sacc.
D. roridus (Wallr.) Sacc.

- D. salicariae* Rehm
- D. schroeterianus* (Rehm) Dennis
- D. singerianus* Dennis
- D. soppittii* Massee
- D. subcorticalis* (Pat.) Dennis
- D. sulphurellus* (Peck) Sacc. [= *D. cruciferus* (Phill.) Sacc.]
- D. sydowii* Dennis
- D. uleanus* Dennis
- D. ulei* (Wint.) Sacc.
- D. varians* Rehm
- D. virginellus* (Cooke) Sacc.
- D. virgineus* S. F. Gray

Of these *D. calyculiformis*, *D. cerinus*, *D. pulverulentus* and *D. ulei* are somewhat anomalous in possessing hairs with coloured sap but in structure of the hair they appear to belong here rather than with subgenus *Belonidium*. *Dasyscyphus acuum* is a greatly reduced species for which a separate generic name is available, *Clavidisculum acuum* (A. & S. ex Fr.) Kirschstein (1938: 379).

Series *Bicolores* includes *D. bicolor* (Bull. ex St. Amans) Fuck, *D. capitatus* (Peck) Le Gal, *D. patulus* (Pers. ex Fr.) S. F. Gray and *D. scabro-villosus* (Phill.) Sacc (= *D. bicolor* var. *indicus* Müller & Dennis).

Series *Niveae* includes *D. crystallinus* (Fuck.) Sacc., *D. distinguendus* (Karst.) Sacc., *D. dryinus* (Karst.) Sacc. and *D. niveus* (Hedw. ex Fr.) Sacc.

Series *Acutipilae* includes *D. acutipilus* (Karst.) Sacc., *D. albotestaceus* (Desm.) Massee, *D. laetius* (Karst.) Sacc. and probably *D. andinus* (Pat.) Dennis, though this approaches subgenus *Belonidium* in its ascospore characters.

Subgenus **Belonidium** (Mont. & Dur.) Dennis, *stat. nov.* (basionym, *Belonidium* Mont. & Dur., Fl. Alger. tab. 28 fig. 8. ?1846).

Though too closely linked with species of subgenus *Dasyscyphus* to justify reviving the old genus *Lachnella* auct. non Fries this group of species seems to me a rather natural one fairly easily recognised even if difficult to define logically. It differs from *Perrotia* in its lanceolate paraphyses. The species included are:

Dasyscyphus aeruginosus (Mont. & Dur.) Dennis, *comb. nov.* (basionym, *Belonidium aeruginosum* Mont. & Dur., Fl. Alger. tab. 28 fig. 8. ?1846)

Dasyscyphus albolabra (Ell. & Ev.) Dennis, *comb. nov.* (basionym, *Lachnella albolabra* Ell. & Ev. in Bull. Torrey bot. Club **24**: 467. 1897)

Dasyscyphus columbinus (Kalchbr. & Cooke) Dennis, *comb. nov.* (basionym, *Peziza columbinus* Kalchbr. & Cooke in Grevillea **10**: 144. 1882)

D. corticalis (Pers. ex Fr.) Massee

D. elegantulus (Karst.) Rehm

Dasyscyphus fuscus (Müller & Dennis) Dennis, *comb. nov.* (basionym, *Perrotia fusca* Müller & Dennis in Sydowia **13**: 46. 1959)

Dasyscyphus himalayensis (Müller & Dennis) Dennis, *comb. nov.* (basionym, *Perrotia himalayensis* Müller & Dennis in Sydowia **13**: 48. 1959)

Dasyscyphus lonicerae (A. & S. ex Fr.) Dennis, *comb. nov.* (basionym, *Peziza lonicera* A. & S. ex Fr., Syst. mycol. **2**: 115. 1822)

D. mollissimus (Lasch) Dennis

D. sulphureus (Pers.) Masee

D. triseptatus Dennis.

Subgenus *Trichopezizella*.

The type species is *Dasyscyphus nidulus* (Schmidt & Kunze) Masee, other species are **Dasyscyphus badiellus** (Karst.) Dennis, *comb. nov.* (basionym, *Peziza badiella* Karst. in Not. Sällsk. Fauna Fl. fennica **10**: 201. 1869), *D. barbatus* (Kunze) Masee, *D. horridulus* (Desm.) Masee, **Dasyscyphus hystriculus** (Karst.) Dennis, *comb. nov.* (basionym, *Lachnum hystriculum* Karst., Myc. fenn. **1** in Bidr. Känn. Finl. Nat. Folk **19**: 182. 1871) and *D. relicinus* (Fr.) Boud.

DIPLOCARPA Masee, Brit. Fungus-Fl. **4**: 307. 1895.

There is a single species, *D. bloxami* (Berk.) Seaver (1937).

PSILACHNUM Höhnelt in Mitt. bot. Inst. techn. Hochsch. Wien **3**: 73. 1926.

Von Höhnelt's genus is distinguished by its apothecia with rudimentary or narrowly cylindrical, obtuse, thinwalled hairs free from the external granulation so characteristic of those of *Dasyscyphus* species. The type species is *P. lateritio-album* (Karst.) Höhn. and he referred to it also *P. lanceolato-paraphysatum* (Rehm) Höhn., which I have not seen, *P. suspectum* (Rehm) Höhn. and *P. granulosellum* Höhn. [*Urceolella chionea* (Masee & Crossland) Rehm sensu Rehm non Masee & Crossland]. I would refer here also **Psilachnum helotioides** (Rehm) Dennis, *comb. nov.* (basionym, *Lachnum helotioides* Rehm in Rabenh. Krypt.-Fl. **1** (3): 884. 1893) and **Psilachnum inquilinum** (Karst.) Dennis, *comb. nov.* (basionym, *Helotium inquilinum* Karst., Myc. fenn. **1** in Bidr. Känn. Finl. Nat. Folk. **19**: 147. 1871), also *Lachnum acutum* Vel. (Mon. Discom. Bohem. **1**: 254. 1934) if I have interpreted it correctly. Von Höhnelt referred *P. inquilinum* to *Dyslachnum* Clements but that was based on *Peziza mollissima* Lasch, with quite different hairs.

PERROTTIA Boud. in Bull. Soc. mycol. France **17**: 24. 1901.

The type species is *P. flammea* (A. & S. ex Fr.) Boud. I have discussed this genus in "Kew Bulletin" (1958: 323) and there transferred to it two Australian species, *P. aurea* (Masee) Dennis and *P. lutea* (Phill.) Dennis. I would now also transfer to *Perrotia* the following: **Perrotia atrocitrina** (Berk. & Br.) Dennis, *comb. nov.* [basionym, *Peziza atrocitrina* Berk. & Br. in J. Linn. Soc. (Bot.) **14**: 106. 1873], **Perrotia phragmiticola** (P. Henn. & Ploettner) Dennis, *comb. nov.* (basionym, *Dasyscypha phragmiticola* P. Henn. & Ploettner in Verh. bot. Ver. Prov. Brandenburg **41**: 97. 1899) and **Perrotia succinea** (Phill.) Dennis, *comb. nov.* (basionym, *Peziza succinea* Phill. in Grevillea **5**: 116. 1877).

TRICHODISCUS Kirschst. in Verh. bot. Ver. Prov. Brandenburg **46**: 25. 1924.

The type species is *T. prasinus* (Quel.) Kirschst. (l.c.) and a second species recently described is *T. sedi* E. Müller & al. Kirschstein referred also to this genus two other German species and three from Java, none of which I have seen. Judging from the published figures I doubt if the Javanese species be congeneric with *T. prasinus*. *Trichodiscus marchicus* (Kirschst.) Kirschst. seems to be the same as *Peziza trichodea* Phill. & Plowr.

Another possible candidate is *Trichopeziza virescentula* Mouton but I have no note on the excipular structure of this fungus. *Phialea subciboria* Rodway may perhaps also fall in *Trichodiscus* but its hairs are not pointed and have a finely granulated surface like those of *D. elegantulus* (Karst.) Rehm.

LACHNELLULA Karst. in Medd. Soc. Fauna Fl. fennica **11**: 138. 1884.

Trichoscyphella Nannfeldt in Nov. Acta Soc. Sci. upsal., Ser. 4, **8**: 298. 1932.

The diagnosis of *Lachnellula* reads simply "Est. *Lachnella* sporis sphaeroideis", with a reference to the type species "*L. chrysophthalma* (Pers.) Karst." and the genus has, in fact, been distinguished from *Trichoscyphella* solely by its spherical ascospores. Nannfeldt has also shown that the true *Peziza chrysophthalma* Pers. was actually a '*Trichoscyphella*' and that the correct name of the type species of *Lachnellula* is *L. suecica* (Fuck.) Nannfeldt.

The type species of *Trichoscyphella* is *T. calycina* (Schum. ex Fr.) Nannfeldt, with small fusoid ascospores. It is difficult to distinguish these two genera because there are a number of species with minute subglobose or ovoid ascospores and the most logical course seems to be to unite them. This unfortunately involves changing the names of a few fungi of economic importance but it has the incidental advantage of eliminating the epithet '*calycina* Schum. ex Fr.', the correct application of which has always been doubtful.

The typical species of *Lachnellula* are saprophytes or parasites on conifers, with yellow discs and white excipular hairs but a few coniferous species have brown hairs and red or brownish discs. The genus may also be extended to cover a few fungi of nonconiferous substrata which seem more akin to *Lachnellula* than to any other genus known to me. Of these, *L. pulveracea*, at least, is accompanied by a microconidial state similar to that described for *L. willkommii* (Hartig) Dennis.

To *Lachnellula* as emended above I refer:

Lachnellula abietis (Karst.) Dennis, *comb. nov.* (basionym, *Helotium abietis* Karst., Mycol. fennica **1** in Bidr. Känn. Finl. Nat. Folk **19**: 154. 1871)

Lachnellula agassizii (Berk. & Curt.) Dennis, *comb. nov.* (basionym, *Peziza agassizii* Berk. & Curt. in Grevillea **1**: 5. 1872)

Lachnellula arida (Phill.) Dennis, *comb. nov.* (basionym, *Peziza arida* Phill. in Grevillea **5**: 117. 1887)

L. calycina Sacc.

Lachnellula ciliata (G. G. Hahn) Dennis, *comb. nov.* (basionym, *Dasyscypha ciliata* G. G. Hahn in Mycologia **32**: 141. 1940)

Lachnellula flavovirens (Bres.) Dennis, *comb. nov.* (basionym, *Dasyscypha flavovirens* Bres., *Fungi tridentini* 1: 92. 1887)

Lachnellula fuscosanguinea (Rehm) Dennis, *comb. nov.* (basionym, *Dasyscypha fuscosanguinea* Rehm in *Ber. naturh. Ver. Augsburg* 26: 30. 1881)

Lachnellula gallica (Karst. & Har.) Dennis, *comb. nov.* (basionym, *Lachnella gallica* Karst. & Har. in *Rev. mycol.* 12: 170. 1890)

Lachnellula hahniana (Seaver) Dennis, *comb. nov.* (basionym, *Lachnella hahniana* Seaver, *N. Amer. Cup Fungi, Inoperc.* 245. 1951)

Lachnellula inspersa (Berk. & Curt.) Dennis, *comb. nov.* (basionym, *Peziza inspersa* Berk. & Curt. in *J. Linn. Soc. (Bot.)* 10: 368. 1868)

Lachnellula phyllocladi (Dennis) Dennis, *comb. nov.* (basionym, *Trichoscyphella phyllocladi* Dennis in *Kew Bull.* 15: 302.

Lachnellula pini (Brunch.) Dennis, *comb. nov.* (basionym, *Lachnella pini* Brunch. in *Bergens Mus. Aarbog* 8: 8. 1911)

Lachnellula pseudofarinacea (Crouan) Dennis, *comb. nov.* (basionym, *Peziza pseudofarinacea* Crouan, *Fl. Finistère* 52. 1867)

Lachnellula pseudotsugae (G. G. Hahn) Dennis, *comb. nov.* (basionym, *Dasyscypha pseudotsugae* G. G. Hahn in *Mycologia* 32: 118. 1941)

Lachnellula pulveracea (A. & S. ex Fr.) Dennis, *comb. nov.* (basionym, *Cenangium pulveraceum* A. & S. ex Fr., *Syst. mycol.* 2: 181. 1822)

L. resinaria (Cooke & Phill.) Rehm

Lachnellula subtilissima (Cooke) Dennis, *comb. nov.* (basionym, *Peziza subtilissima* Cooke in *Grevillea* 3: 121. 1871)

Lachnellula tricolor (Sow. ex Fr.) Dennis, *comb. nov.* (basionym, *Peziza tricolor* Sow. ex Fr., *Syst. mycol.* 2: 134. 1822)

Lachnellula willkommii (Hartig) Dennis, *comb. nov.* (basionym, *Peziza willkommii* Hartig, *Wicht. Krankh. Waldbaume* 98. 1874)

Trichoscyphella calycina (Schum. ex Fr.) Nannfeldt = *Lachnellula subtilissima* as it is antedated in *Lachnellula* by *L. calycina* Sacc. *Lachnellula schumannii* Rehm, *L. rehmi* Ferdinandsen & Jørgensen and *Trichoscypha vuillemini* Boud. are other names for *L. calycina* Sacc.

LASIOBELONIUM (Sacc.) Sacc. in *Syll. Fung.* 14: 789. 1899.

At the place of publication cited there is no generic diagnosis. Instead a single species is described, *L. subflavidum* Ell. & Ev., with reference to its place of publication (1897), and also a reference to Saccardo's subgenus *Lasiobelonium* of *Belonidium* Saccardo, 1889: 502). Clements and Shear (1931) accepted the genus as based on the subgenus of 1889 and selected as lectotype one of the three species there referred to it, viz. *Belonidium amoenum* Speg., on dead culms of *Rostkovia grandiflora* (Juncaceae) in Staten Island. The type material of this in Spegazzini's herbarium is in poor condition but appears to me to have smooth hairs and filiform paraphyses and thus to be distinct from *Dasyscyphus apalus* (Berk. & Br.) Dennis, which one might expect to find on this host family. If this be correct the genus, so typified,

forms a convenient home for a few species with cylindrical paraphyses, smooth hyaline hairs and elongated ascospores. These include *L. aquilinellum* Höhn. and ***Lasiobelonium miniopsis*** (J. B. Ell.) Dennis, *comb. nov.* (basionym, *Peziza miniopsis* J. B. Ell. in Bull. Torrey bot. Club **8**: 66. 1881).

ZOELLNERIA Vel., Mon. Discom. Bohem. **1**: 298. 1934.

Lectotype, *Z. rosarum* Vel. (l.c.). I have redescribed this species in "Kew Bulletin" (1959) and on page 324 (1958) of the same volume have transferred to the genus two Australian species, *Z. eucalypti* (Berk.) Dennis and *Z. clelandii* (Hansford) Dennis.

In considering the affinities of the above genera it is clear that *Dasyscyphus*, *Psilachnum* and probably *Diplocarpa* belong to the Hyaloscyphaceae trib. Lachneae. I would place *Perrotia* beside *Lachnellula* in the Trichoscyphelloideae but transfer the subfamily from the Helotiaceae to the Hyaloscyphaceae. *Zoellneria* I suspect belongs to Helotiaceae or possibly even to Sclerotiniaceae near *Rutstroemia*. Kirschstein referred his genus *Trichodiscus* to Mollisiaceae, i.e. Dermateaceae subfam. Mollisioidae of Nannfeldt and I think he was right, in spite of the granules on the hairs. Before placing *Lasiobelonium* I would like to see better material of the lectotype.

In view of the importance attached above to lanceolate paraphyses of the Hyaloscyphaceae it may be worth while briefly to consider how much significance attaches to their occurrence in other families of Helotiales. It does not follow that a character accorded generic value in one family will be of equal importance in a different context. Nevertheless some authors have been sufficiently impressed by the lanceolate paraphyses of certain Dermateaceae to propose on their account several small genera, most of which have not been generally accepted.

In Helotiaceae one finds paraphyses of this kind in *Phialea* (Fr.) Gill., most conspicuously in *P. incertella* Rehm on leaves of *Koeleria*. There would seem to be a case for segregating in a separate genus the small group of dark coloured species of *Phialea* on Gramineae but they are not fungi with which I am very familiar and I do not propose to do so here.

Sometimes placed in a genus referred to Helotiaceae are the very peculiar *Heterosphaeria chlorosplenella* (Rehm) Rehm and *H. oxyparaphysata* (Rehm) Rehm, both at some time placed in *Lachnum* or *Lachnella* but both referred by von Höhnelt (1917) to his genus *Pyrenopezizopsis*, without printing the necessary combinations. *Pyrenopezizopsis* Höhn. was based on *Lachnum noppeneanum* Feltgen and it is therefore most unfortunate that M. Reichling, who has kindly searched for the type in the Feltgen herbarium at Luxembourg had to report that though the packet so labelled by Feltgen still exists there it is empty. According to Feltgen his fungus was on *Quercus* twigs but von Höhnelt asserted that the type, still extant in his day, was on *Rubus* and in this Rehm followed him. I see no real structural difference between

Trichopeziza chlorospleniella Rehm and *Cenangioopsis aureola* (Rabenh.) Rehm and von Höhnelt was of a similar opinion regarding *L. noppeneanum*. Rehm has already transferred *L. noppeneanum* to *Cenangioopsis* Rehm and it appears to me that this whole group of species is best placed there though, admittedly, *C. quercicola* (Romell) Rehm which Nannfeldt selected as type species of *Cenangioopsis* has a much more scurfy excipulum than the others, more like that of an *Encoelia*. If this view be adopted *Cenangioopsis* contains the following European species:

Cenangioopsis quercicola (Romell) Rehm, the type species, on *Quercus*, with ascospores $7.5-9 \times 2-3 \mu$.

C. noppeneanum (Feltg.) Rehm, on *Rubus* (?), with ascospores $7-8 \times 2-3 \mu$.

C. aureola (Rabenh.) Rehm, on *Eupatorium*, with ascospores $12-15 \times 3-5 \mu$.

Cenangioopsis oxyparaphysata (Rehm) Dennis, *comb. nov.* [basionym, *Mollisia oxyparaphysata* Rehm in Rabenh. Krypt.-Fl. 1 (3): 535. 1891], on Compositae, with ascospores $7-10 \times 2-2.5 \mu$.

Cenangioopsis chlorospleniella (Rehm) Dennis, *comb. nov.* (basionym, *Trichopeziza chlorospleniella* Rehm in Hedwigia 21: 100. 1882), on *Aconitum*, with ascospores $6-8 \times 1-2 \mu$.

The two last named are possibly not distinct and not host limited for Dr. E. Müller has sent me a very similar fungus on *Polygonatum* stems from the Alps.

If all these belong to Dermateaceae then so, I think, does *Heterosphaeria*. A more obviously Dermateaceous genus with lanceolate paraphyses is *Mollisiopsis* Rehm (1908: 315) with type species *M. subcinerea* Rehm, on dead *Thalictrum* stems in North America. Here the structure apart from the paraphyses is exactly that of a *Mollisia* and Nannfeldt is certainly mistaken in uniting *Mollisiopsis* with *Lachnum*. I have not seen the later species *M. lachnoides* Rehm, on stems of *Chamaenerium angustifolium*, but according to Nannfeldt the third species, *M. euparaphysata* (Schroeter) Rehm, on *Eriophorum* and *Juncus*, is a synonym of *Hysteropezizella diminuens* (Karst.) Nannfeldt, which is a *Hysterostegiella*. Presumably *Mollisia lanceolata* Gremmen (1956) on *Ulmaria palustris*, also belongs in *Mollisiopsis* and possibly also *Pyrenopeziza heteroparaphysata* Grelet & Crozals, on *Urtica*, if the lanceolate paraphyses were not immature asci.

Von Höhnelt's genus *Hysterostegiella* was differentiated from *Hysteropezizella* by its lanceolate paraphyses. In accordance with his policy of treating hymenial characters as of subordinate value Nannfeldt united these two genera under the latter name. I would be disposed to keep them distinct but, on the other hand, there seems little but the wide difference in substrate to separate *Stegopeziza* Höhn., based on *Naevia lauri* Cald. on dead leaves of *Laurus nobilis*, from *Hysterostegiella*.

A genus *Belonidium* has remained in use up to quite recent years by mycologists still fascinated by Saccardo's delusively simple system of Discomycete genera differentiated on a basis of ascospore shape and septation. Now that the name has

been eliminated it is necessary to consider how to dispose of the elements of this *Belonidium* auct. non Mont. & Dur. The fate of the species added by De Notaris has been indicated above. *Belonidium pruinatum* (Jerd.) Masee has become the type species of *Polydesmia* Boud. *Belonidium jerdoni* Masee is *Pseudohelotium pineti* (Batsch ex Fr.) Fuck. The fungus called by British authors *Belonidium minutissimum* (Batsch ex Berk. & Br.) Phill. is *Strossmayeria basitricha* (Sacc.) Dennis. A group of species with dark coloured mollisoid apothecia with elongated multiseptate ascospores can be accommodated in *Belonopsis* (Sacc.) Rehm, as already shown by Nannfeldt. Combinations in *Belonopsis* are apparently still required for:

Belonopsis pullum (Phill. & Keith) Dennis, *comb. nov.* (basionym, *Belonidium pullum* Phill. & Keith in *Grevillea* 6: 75. 1877).

Belonopsis rhenopalaticum (Rehm) Dennis, *comb. nov.* [basionym, *Belonidium rhenopalaticum* Rehm in *Rabenh. Krypt. Fl.* 1 (3): 565. 1877], which is perhaps the same as *Mollisia ventosa* subsp. *mediella* Karst. (in *Medd. Soc. Fauna Fl. fennica* 9: 111. 1883).

After all the above have been eliminated, however, there remain a number of species for which it is less easy to find appropriate genera.

One of these fungi, on rotten, decorticated wood of *Fagus*, has lain undetermined in Kew herbarium since 1925 but it seems to be identical with, or very closely allied to, *Belonidium ochraceum* Grellet & Crozals. The yellow sessile apothecia are urceolate, with minutely pruinose surface and concave disc 0.5 mm diameter. The excipulum is composed of thinwalled prismatic cells, running out into short, thinwalled, obtuse, cylindrical hairs, with finely granulate walls. The clavate asci, $75-85 \times 8-10 \mu$, have the pore blued by Melzer's reagent and contain eight biseriate, elliptic-fusoid, straight or slightly curved, hyaline ascospores, $15-20 \times 3 \mu$, which ultimately become three-septate. The paraphyses are filiform, enlarged to 2μ at the obtusely rounded tip. There is no change of colour with ammonia.

In structure, habit and stature this is a *Cistella* Quél. emend. Nannfeldt but the recognised species of that genus consistently have small unicellular ascospores. Moreover *Cistella* Quél. 1886 is a later homonym of *Cistella* Blume 1825, though the latter is a moribund genus of Orchidaceae which has never been taken up, so that there would be no serious objection to conservation of Quélet's genus. On the other hand if the latter were extended to include species on coniferous needles the name *Clavidisculum* Kirschstein (1938: 379) might be acceptable, though I have chosen above to interpret the species of *Clavidisculum* as extremely reduced species of *Dasyascyphus* subgen. *Dasyascyphus*. An alternative genus for *B. ochraceum*, however, is *Calycellina* von Höhnelt 1918, in which the anatomy is again similar and the ascospore shape and tendency to septation more so but the recognised species occur on dead leaves. In our complete ignorance of the life histories of these minute Helotiales it is difficult to assess the importance to be attached to the kind of substrate. As *Cistella* remains at present an illegitimate name and the ascospores agree better with those of *Calycellina* it appears best to refer *B. ochraceum* to the latter genus, as ***Calycellina ochracea*** (Grel. & Croz.) Dennis, *comb. nov.* (basionym, *Belonidium*

ochraceum Grelet & Crozals in Bull. Soc. mycol. France **44**: 336. 1928), in spite of its occurrence on rotten wood.

A rather more difficult problem is that of *Belonidium clarkei* Massee & Crossland (1901). Here pulvinate sessile apothecia, light greenish yellow when fresh but drying greenish black, are produced on the surface of damp rotten wood, sometimes at least, of *Quercus*. The general appearance, with convex disc and downcurved margin, is suspiciously like that of some lichen apothecia but there seems to be no associated thallus, no gonidia in the apothecial base and no blue or red reaction of the hymenium with iodine. The flesh is composed throughout of soft, almost colourless, somewhat agglutinated hyphae, closely woven in the flesh, undulating but more or less parallel at right angles to the surface through most of the excipulum, more slender and curved upwards nearly parallel with the surface towards the obtusely rounded margin. The asci measure $90 \times 8 \mu$, with the pore not blued by iodine, and contain eight biseriate, narrowly elliptic-cylindric, straight or slightly curved, 3-septate ascospores, $12-15 \times 2.5-3 \mu$. The paraphyses are filiform. Judging by the description *Belonidium viridi-atrum* Sacc. & Fautr. is an earlier name for the same fungus. The structure is distinctly reminiscent of *Calycella* but the ascospores are not and with some hesitation, perhaps still with a hang over from the Saccardo era, I refer the species to *Strossmayeria* S. Schulz. as ***Strossmayeria viridi-atra*** (Sacc. & Fautr.) Dennis, *comb. nov.* (basionym, *Belonidium viridi-atrum* Sacc. & Fautr. in Bull. Soc. mycol. France **16**: 22. 1900). Then probably *Belonidium sphenosporum* Kirschst. (in Ann. mycol., Berl. **36**: 375. 1938) is also a *Strossmayeria*, ***Strossmayeria sphenospora*** (Kirschst.) Dennis, *comb. nov.* On the other hand *B. funiculatum* Kirschst., (in Ann. mycol., Berl. **36**: 376, 1938), seems to be a species of *Allophylaria* P. Karst., ***Allophylaria funiculata*** (Kirschst.) Dennis, *comb. nov.* It may be noted that the ascospore may become three-septate in the type species, *A. sublicoides* (Karst.) Nannfeldt.

The type of *Belonidium incanescens* Kirschstein (1939) was apparently lost, at least Dr. J. Kohlmeyer tells me it cannot be found in Kirschstein's herbarium at Berlin. It grew on pine cones and it seems possible it may have been a state of *Pseudohelotium pineti*, though the ascospores were described as a little broader than is usual in that species.

A species with still another kind of structure is *Belonidium parksii* Cash. Here the receptacular anatomy is like that of *Cenangium*, with subparallel hyaline hyphae bearing chains of dark brown, pyriform to globose, thinwalled cells at the surface but the asci are very different, with large pore plug stained deep blue by iodine while the ascospores are from one to three septate. Near the margin the chains of excipular cells run out into short, cylindrical, dark brown hairs. The paraphyses are cylindrical with rounded tips, not capitate as in *Cenangium*. *Belonidium parksii* bears a marked resemblance to *Niptera duplex* Starb. which Starback (1895) was at first disposed to make the type of a genus, *Nipterella*, but eventually decided not to do so. It appears to me best to validate *Nipterella* as a genus of Helotiaceae subfam. Encoelioideae, distinguished from *Cenangium* by the iodine reaction of its asci and

by the septate ascospores, from *Cenangiopsis* by the cylindrical, not lanceolate, paraphyses and from *Heterosphaeria* by having more than one layer of dark cells on the outside of the receptacle and by the septate ascospores.

Nipterella Starbäck *ex* Dennis, *gen. nov.*

Apotheciis subsuperficialibus, sessilibus, cupulatis; hypothecio crasso, homoganeo filamentis hyalinis composito; excipulo distincto, fusco, grosse celluloso-parenchymatico. Ascis octosporis, inoperculatis, apice jodo coerulescentibus; ascosporis hyalinis, 1-3-septatis; paraphysibus filiformibus. — Typus: *Niptera duplex* Starbäck.

Nipterella duplex (Starbäck) Dennis, *comb. nov.* [basionym, *Niptera duplex* Starbäck in Bihang svensk Vet.-Akad. Handl. (Afd. 3) **21** (5): 27. 1895]. (Fig. 5b).

On dead wood of *Juniperus* in Sweden, ascospores $9-16 \times 2.5-4 \mu$, becoming 1-septate.

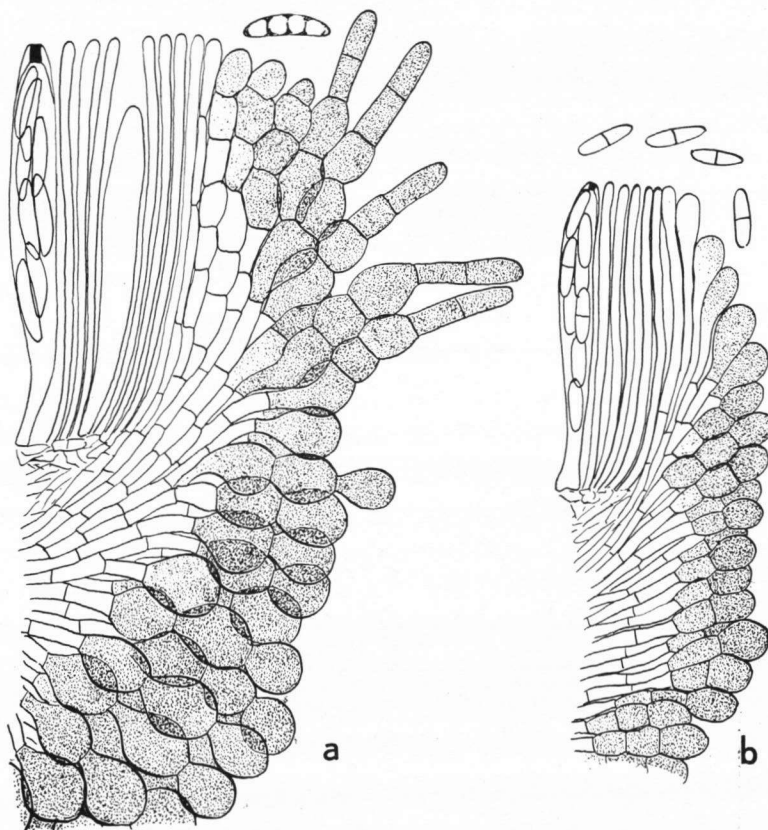


Fig. 5. — a. *Nipterella parksii* ($\times 660$). — b. *Nipterella duplex* ($\times 660$).

Nipterella parksii (Cash) Dennis, *comb. nov.* (basionym, *Belonidium parksii* Cash in Mycologia **28**: 248. 1936) (Fig. 5a).

On dead twigs of Ericaceae, Cornaceae, Cupuliferae, Rhamnaceae, Rosaceae in western North America, ascospores $11-17 \times 2-4 \mu$, 1-3-septate.

There remain a few tropical fungi with apothecia resembling those commonly referred to *Helotium* Pers. ex St. Amans 1821 (non *Helotium* Tode ex Fries 1825), but with multiseptate ascospores. They have not the phialeoid structure of *Belonioscypha* Rehm but it would appear at first sight possible to refer them to *Podobelonium* (Sacc.) Sacc. This, however, was founded on four species, two of which have been referred to *Belonioscypha*, one to *Strossmayeria*, while the fourth, *Belonidium capense* (Kalchbr. & Cooke) Sacc., has ascospores which are multiguttulate but appear to me consistently nonseptate. In any case as ascospore septation is not an entirely reliable character there would seem to be little justification for recognising a genus parallel with *Belonioscypha* but with helotiid excipulum. The problem then becomes involved in the larger issue of the dismemberment of the comprehensive genus *Helotium* auct. Here the type species, *H. acicularis*, falls in the smallest segregate, already recognised as such by Boudier but under the name *Cudoniella* Sacc. which he mended in 1907 by in effect selecting as lectotype *Cudonia queletii* Fr. "Le type est fondé sur l'*Helvella acicularia* de Bulliard qui est identique au *Cudonia queletii* de Fries qui pousse sur les vieilles souches pourries." To this restricted genus belong *H. aciculare* Pers., *H. clavus* (A. & S. ex Fr.) Gillet and *H. vernalis* Dennis. *Helotium clavus* is the type species of *Haplocybe* Clements (1909), if the commonly accepted synonym be correct. *Haplocybe* was perhaps illegitimate from the outset as it was rather obscurely stated to include *Moellerodiscus* Henn. 1902, perhaps because the latter name was too difficult for Clements to pronounce.

For the bulk of the species currently referred to *Helotium* Pers. the obvious generic name would appear to be *Hymenoscyphus* S. F. Gray, if this can be typified by *Peziza fructigena* (Bull. ex Merat) S. F. Gray. In later years this genus was taken up in a rather comprehensive sense by Phillips and by Schroeter and emended as a subgenus of *Helotium* Pers. by Rehm. It was also unfortunately adopted in a comprehensive sense by O. Kuntze who printed in it a large number of combinations some of which prove objectionable homonyms. As Rehm admits for his subgenus *Hymenoscypha* of *Helotium*, "Sporen . . . später durch Quertheilung zwei- bis vierzellig" there would seem to be no objection to admitting to *Hymenoscyphus*:

Hymenoscyphus lasiopodium (Pat.) Dennis, *comb. nov.* (basonym, *Belonidium lasiopodium* Pat. in Bull. Soc. mycol. France 16: 184. 1900) = *Belonidium hirtipes* A. L. Smith 1901 but not *Hymenoscyphus hirtipes* (Mout. & Sacc.) O.K.

Hymenoscyphus sclerogenus (Berk. & Curt.) Dennis, *comb. nov.* [basonym, *Peziza sclerogena* Berk. & Curt. in J. Linn. Soc. (Bot.), Lond. 10: 369. 1868].

Hymenoscyphus musicola (Dennis) Dennis, *comb. nov.* [basonym, *Belonidium sclerogenum* (Berk. & Curt.) Sacc. var. *musicola* Dennis in Kew. Bull. 13: 461. 1959].

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