Notes RBG Edinb. 40(2):375–397 (1982)

NOTES ON BRITISH LICHENICOLOUS FUNGI: IV*

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ABSTRACT. Notes on 18 taxa are presented. *Actinopeltis peltigericola* D. Hawksw., *Endococcus alpestris* D. Hawksw., *Everniicola* D. Hawksw. (Coelomycetes), *E. flexispora* D. Hawksw., *Paranectria superba* D. Hawksw., *Skyttea spinosa* D. Hawksw. & Coppins and *S. viridis* D. Hawksw. & Coppins are described as new. *Lecidea insidiosa* Th.Fr., *Libertiella malmedyensis* Speg. & Roum., *Metasphaeria stereocaulorum* (Arnold)Sacc., *Opegrapha pulvinata* Rehm and *Paranectria oropensis* (Ces.) D. Hawksw. & Piroz. are reported or confirmed from the British Isles for the first time. Additional British collections of *Clypeococcum cladonema* (Wedd.)D. Hawksw., *Endococcus parietinus* (Lindsay) Clauz. & Roux, and *Nectriella tincta* (Fuckel) R. Sant. are noted. Previous reports of *Bacidia beckhausii* Körber being lichenicolous, and of the presence of *Buellia adjuncta* Th.Fr. in the British Isles, are shown to be erroneous. *Muellerella opegraphicola* Zopf is shown to be an additional synonym of *M. polyspora* Hepp ex Müll. Arg., and the new combinations *Clypeococcum grossum* (Körber) D. Hawksw. and *Skyttea lettaui* (Grumm.) D. Hawksw. are also made.

As with the three earlier parts of this series, the present paper comprises notes on new or otherwise interesting lichenicolous fungi discovered in the British Isles, together with nomenclatorial or other remarks.

Since the publication of the previous part of this series (Hawksworth, 1980a), a revision of the lichenicolous Coelomycetes so far described has been issued (Hawksworth, 1981), and the new odontotremoid genus *Skyttea* described for seven lichenicolous discomycetes (Sherwood et al., 1981). *Sclerococcum sphaerale* (Ach.) Fr. has recently been obtained in pure culture (Hawksworth & Jones, 1981), and alterations in author citations or names arising from the reversion of the starting point date for non-lichenized fungi to 1753 discussed (Hawksworth, 1982).

Actinopeltis peltigericola D. Hawksw., **sp. nov.** Fig. 1.

Ascomata thyriothecia, superficialia, atrobrunnea ad nigra, dispersa, 50–70μm diam.; paries superus ex cellulis oblongis, brunneis 3–4μm diam. compositus; paries basilaris pallidior; collum ostioli 15–20μm diam., ex cellulis rubro-atro-brunneis crassitunicatis compositum; 3–6 setae ad collum affixae, atrobrunneae, acutae, divergentes, 12–35μm longae, ad basim ad 6μm latae. *Paraphyses* desunt. *Asci* late-clavati, bitunicati, 25–35 × 9–11μm, 4-spori. *Ascosporae* ellipsoideae ad anguste ellipsoideae, hyalinae, guttulatae, laeves, 1-septatae, eciliatae, (13.5–)15–21 × (3–)4–5μm.

HOLOTYPUS. Cyprus, Divisio 2, latere septentrionali e Mt Tripylas, proxime via Stavros ad Kykko, in thallo *Peltigerae membranaceae,* 18 iv 1979, *J. R. Edmondson & M. A. S. McClintock* E.2841 (IMI 262877). Iso. E.

Ascomata thyriothecia, superficial, dark brown to black, scattered, 50–70μm diam., margin entire; upper wall composed of red-brown to pale

* III in *Notes RBG Edinb.* 38: 165–183 (1980).

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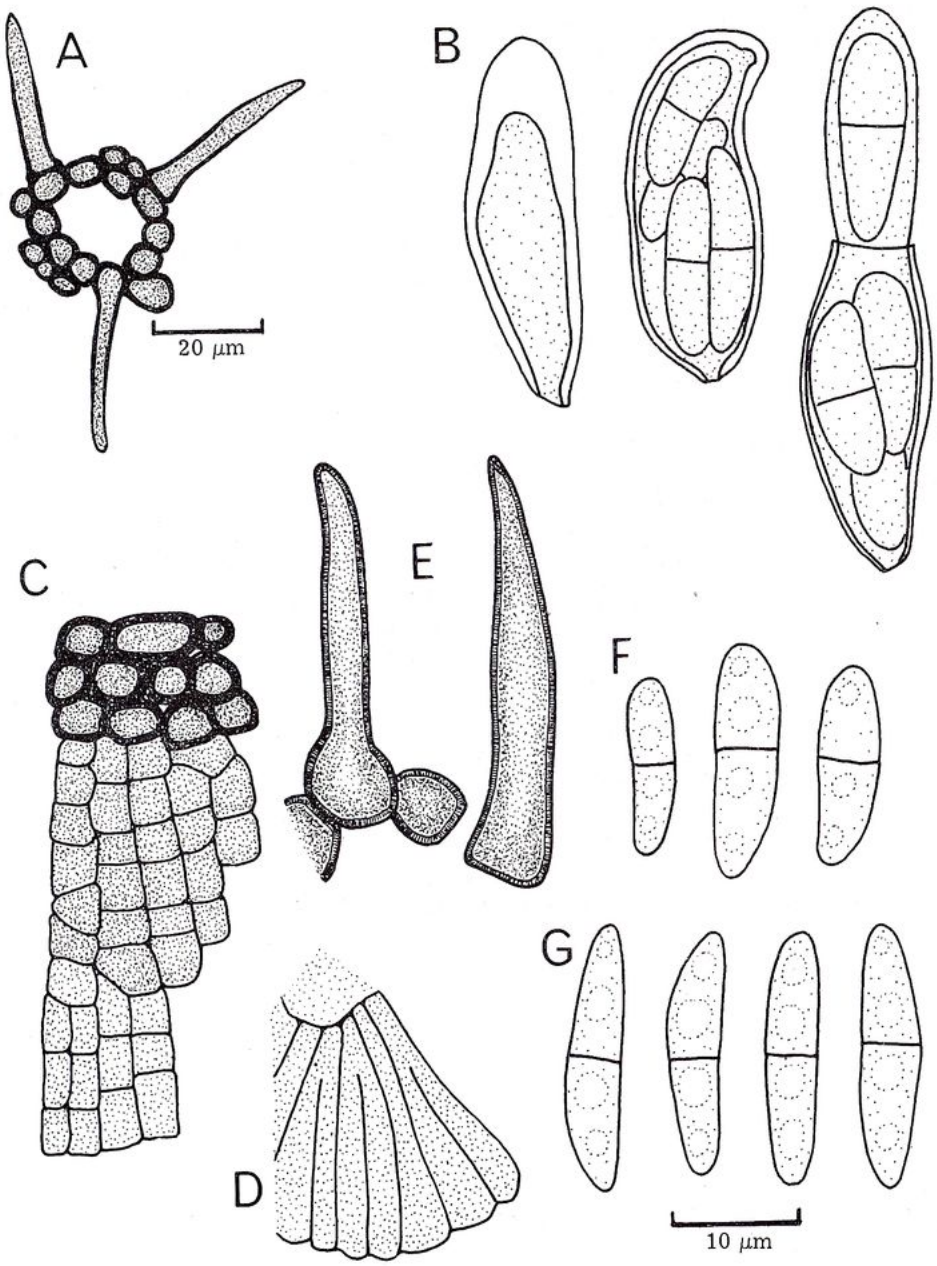

FIG. 1. *Actinopeltis peltigericola*. A, ostiolar collar and setae; B, young, mature, and discharging asci; C, upper plate of the thyriothecium showing the regular radial orientation of the cells; D, lower plate from a young thyriothecium; E, setae; F–G, ascospores. A–F from the holotype (IMI 262877), G from IMI 253192.

brown ± quadrangular cells arranged in radiating rows, cells 3–4μm diam.; basal plate pale fuscous brown, at first of elongated forked radiating cells with almost no transverse walls; ostiolar collar 15–20μm diam., the limiting cells thick-walled, dark red-brown, angular to rounded, mainly 5–6μm diam., ostiolar pore 10–15μm wide, ascomata rarely 2-pored; ostiolar setae present, 3–6 per ostiole, deep red-brown, simple, smooth-walled, spinose, 12–35μm tall, swollen to about 6μm at the base but tapering gradually to 1.5–2μm wide at the tip. *Paraphyses* absent. *Asci* broadly clavate, thick-walled, the apex strongly thickened, internal apical beak broad and shallow, not reacting with iodine, bitunicate, 25–35 × 9–11μm, 4-spored. *Ascospores* distichously arranged in the asci, ellipsoid to narrowly ellipsoid, rounded at the apices, 1-septate, 0–4 or more guttulate, hyaline, smooth-walled, not or slightly constricted at the septum, no cilia seen to arise from the septa, (13.5–)15–21 × (3–)4–5μm.

ENGLAND. Shropshire, Stiperstones, The Bog, on underside of *Peltigera rufescens* (Weis) Humb. on old lead mine, 26 x 1980, *O. L. Gilbert* (E, IMI 253192, hb. Gilbert).

WALES. Caernarvonshire, Betwys-y-Coed, on underside and upper surface of *Peltigera praetextata* (Flörke ex Sommerf.) Zopf on *Quercus*, 26 v 1980, *M. R. D. Seaward* (E, hb. Seaward 103393).

Actinopeltis peltigericola occurs on rather old thalli of at least three *Peltigera* species, most abundantly on veins on the underside of the thallus lobes but also sometimes spreading to the upper surface. In addition to the three collections cited here it is possible that the *Microthyrium* sp. mentioned by Santesson (1949) also refers to this fungus, suggesting that it has a wide distribution, at least in Europe.

The outwardly spreading ostiolar setae place this fungus in the genus *Actinopeltis* Höhnel rather than in *Trichothyrina* (Petrak) Petrak, a very similar genus separated on this single feature by Ellis (1977). When setae occur in *Trichothyrina* they are small and converge to produce a cone-like structure and are not displayed outwards as in *Actinopeltis*.

Actinopeltis peltigericola does, however, strongly recall *Trichothyrina cetrariicola* (Nyl.) D. Hawksw., a species described and illustrated by Hawksworth (1980a: 180–182), except in the setae. Indeed, I provisionally referred *A. peltigericola* to *Trichothyrina* (Hawksworth, 1980b : 386). *T. cetrariicola* is otherwise only separated by the smaller ascomata and markedly longer ascopores. I question whether these two species should really be retained in different genera, and so consider that the desirability of retaining *Trichothyrina* on the criteria advocated by Ellis (1977) requires a critical re-assessment.

Actinopeltis peltigericola is the fourth dark-coloured setose pyrenomycete to be recognised on *Peltigera* species. *Herpotrichiella peltigerae* (Fuckel) D. Hawksw. has 1–3 septate ascospores 19–24 × 6–8μm, asci with an elongated canal in the thickened apex, and subglobose ascomata 100–150μm diam.; *Trichosphaeria lichenum* P. Karsten & Hariot has simple (or ?1-septate) fusiform ascospores 6–9 × 2μm, and ascomata about 100μm diam.; and *Wentiomyces peltigericola* D. Hawksw. has narrowly ellipsoid 1-septate ascospores 12–16 × 3.5–4.5μm, 8-spored asci about 65 × 10μm, and globose ascomata 80–125μm diam. For further

information on these species, all of which differ from *A. peltigericola* in ascomatal structure, see Hawksworth (1980b).

Bacidia beckhausii Körber, Parerg. Lich., 234 (1860).

Smith (1911: 158; 1926: 173) mentioned that a form of this species 'with rather large apothecia scattered or aggregated in small groups was found by Crombie parasitic on the squamules of *Cladonia pyxidata* var. *pocillum*'. The material on which this report was based (Scotland, Argyllshire, Appin, *J. M. Crombie*, BM) has recently been re-examined by Mr B. J. Coppins (*in litt.*) and found to be *Toninia squalida* (Ach.) Massal. scattered amongst *Cladonia* squamules; the *Toninia* was mixed with the *Cladonia* and not parasitic on it. Smith's reference to *B. beckhausii* being able to be lichenicolous is consequently erroneous.

Buellia adjuncta Th. Fr. in Bot. Notiser 1866: 14 (1866).
Syn.: *Karschia adjuncta* (Th. Fr.) Arnold in Flora 57: 103 (1874).

This species has recently been studied in detail by Hafellner (1979: 50–51) who found it to be restricted to the thalli of *Lecanora straminea* (Wahlenb.) Ach., a maritime lichen known in the British Isles only from Orkney and Shetland and the extreme north of Scotland.

Wade & Watson (1936:187) mentioned the occurrence of this species in Glamorganshire but gave no further details. Watson (1948: 311) later indicated that it was known in the British Isles only '. . . from V.C. 41 on *Lecanora expallens* and *L. conizaeoides,* and from V.C. 58 on the latter host'. There appear to be no more recent reports of this species from the British Isles. Examination of material from Glamorganshire (V.C. 41) in Watson's herbarium in K (Glamorganshire, on ash trees near Criag Llanishan, iii 1932, *A. E. Wade*; Cefn-llan, on hawthorn, iii 1932, *A. E. Wade*) revealed that both specimens from that county were the recently described *Buellia pulverea* Coppins & P. James (Coppins & James, 1978: 195–198), a species tolerant of high sulphur dioxide levels and mentioned by Coppins & James from nearby Breconshire on the basis of a specimen collected in 1940. The herbarium packets are discoloured reddish, as is characteristic of the species, and they agree also in microscopic details and chemical reagent tests; indeed it was presumably the C+red and PD+orange reactions which led Watson to assume that he was dealing with *L. expallens* and *L. conizaeoides*. Although the specimen mentioned by Watson from Cheshire (V.C. 58) could not be found, it is reasonable to assume Watson used the name also for *B. pulverea* from that area.

Buellia adjuncta must consequently be omitted from the British list as based on misdetermined material of *B. pulverea.*

Clypeococcum cladonema (Wedd.) D. Hawksw. in Bot. J. Linn. Soc. 75: 197 (1977).

For description, illustrations and synonyms see Hawksworth (1977a: 197–199).

ENGLAND. Devon, South Hams, Prawle Point, on thallus of *Parmelia pulla* Ach. on schistose rocks in the xeric supralittoral, 24 viii 1980, *D. L. Hawksworth* 5032 (IMI 251252).

A second British record and new host for this species, which was previously only known in the British Isles from thalli of *Cetrelia olivetorum* (Ach.)Culb. & C.Culb. in Argyll.

The genus *Clypeococcum* D. Hawksw. is now known to include three species: *C. cladonema, C. hypocenomyceae* D. Hawksw. (Hawksworth, 1980a: 167) and **Clypeococcum grossum** (Körber) D. Hawksw., **comb. nov.** (basionym: *Tichothecium grossum* Körber, Parerg. Lich. : 469, 1865; holotype: 'in saxis alpinis inf. Ottraen, Nordlandiae', 6 vii 1828, herb. Körber L-910.215–461). This last species occurs on *Umbilicaria* thalli and differs from the other species of the genus in the much broader spores (14–17.5 × 7–10μm). Although *C. grossum* was only previously known from the type material it may have a wide distribution, suggested by a recent collection of it made in Canada (British Columbia, Wells Gray National Park, tallus slope below Crystal Lake, on *Umbilicaria polyphylla* (L.) Baumg., 8 viii 1978, *T. Goward* 78–892, IMI 260702).

Endococcus alpestris D. Hawksw., **sp. nov.** Figs 2, 3C–D.

Fungus lichenicola. *Mycelium* immersum vel superficiale, ex hyphis brunneis, irregulariter ramosis, crassitunicatis, verruculosis, 4–5μm crassis. *Ascomata* pseudothecia, plerumque superficialia, subglobosa vel suboblata, ostiolata, nigra, 70–100(–120)μm diam., aggregata; muris 8–15μm latis, textura angulari, ex cellulis atrobrunneis, 5–8 × 2.5–4μm. *Paraphyses* (pseudoparaphyses) desunt; centrum cum iodo non reagens. *Asci* subcylindrici vel elongato-clavati, bitunicati, 38–50 × 8–11μm, 8-spori. *Ascosporae* ellipsoideae, 1-septatae, brunneae, laeves, 9–10.5(–11) × 3.5–4μm.

HOLOTYPUS. Anglia, Devonia, Bere Alston, Great Whiterack Wood, in ramulis *Usneae floridae* (L.)Wigg., 20 i 1971, *B. J. Coppins* s.n. (IMI 240523). Iso. E.

Mycelium immersed or superficial, intermingled with hyphae of the host to form gall-like swellings at the apices of branches, composed of brown hyphae which are repeatedly irregularly branched, mainly orientated towards the point of origin of the gall, thick-walled, verruculose, 4–5μm thick. *Ascomata* pseudothecia, arising in groups of 5–50 on a gall-like swelling terminating a branch, galls capitate and 200–500(–900)μm wide, galls and ascomata black, somewhat shiny, pseudothecia mostly superficial with only the base immersed in the tissues of the gall, subglobose to suboblate, ostiolate, the ostiole scarcely protruding, 70–100(–120)μm diam.; wall mainly 8–15μm thick, dark brown, textura angularis, formed of radially compressed subglobose to polyhedral pseudoparenchymatous cells, the cells near the ostiole less compressed, cells thick-walled, those on the outside the most deeply pigmented, smooth-walled, 5–8 × 2.5–4μm in vertical section, 3–6μm diam. in surface view. *Paraphyses* (pseudoparaphyses) absent; centrum composed of gelatinized tissue and the remains of discharged asci, not turning blue in iodine. *Asci* arising from the base of the ascomatal cavity, subcylindrical to elongate-clavate, bitunicate, the apex thickened and with a small internal apical beak, not turning blue in iodine, 38–50 × 8–11μm, 8-spored. *Ascospores* distichously to almost uniseriately arranged in the asci, ellipsoid, rounded at the apices, sometimes slightly

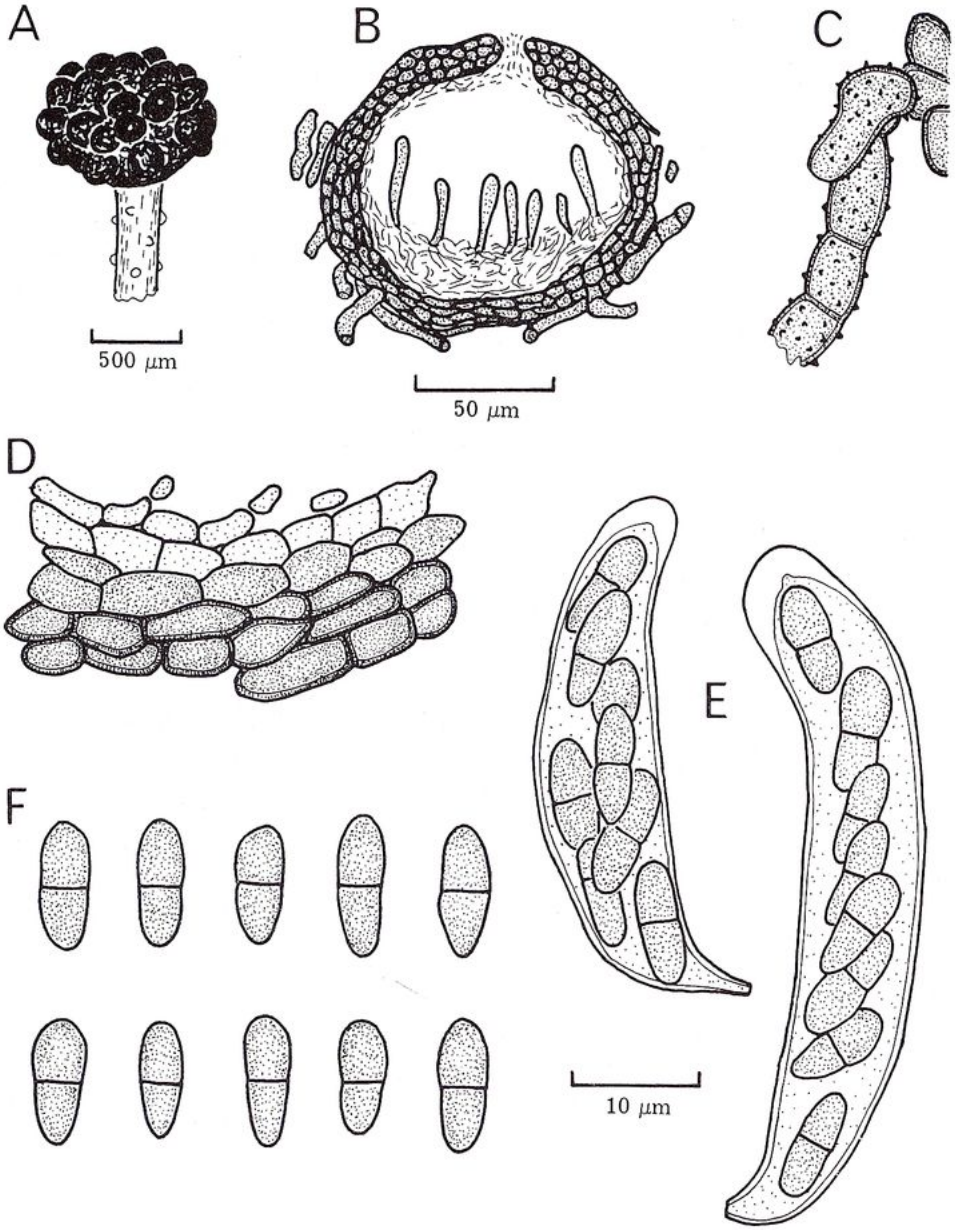

FIG. 2. *Endococcus alpestris*. A, group of ascomata on a gall-like swelling terminating a branch of the host; B, vertical section of perithecium (pseudothecium); C, hyphae arising from the lower part of a perithecium showing verruculose walls; D, vertical section of the perithecial wall; E, asci, showing the variation in shape; F, ascospores. From the holotype (IMI 240523).

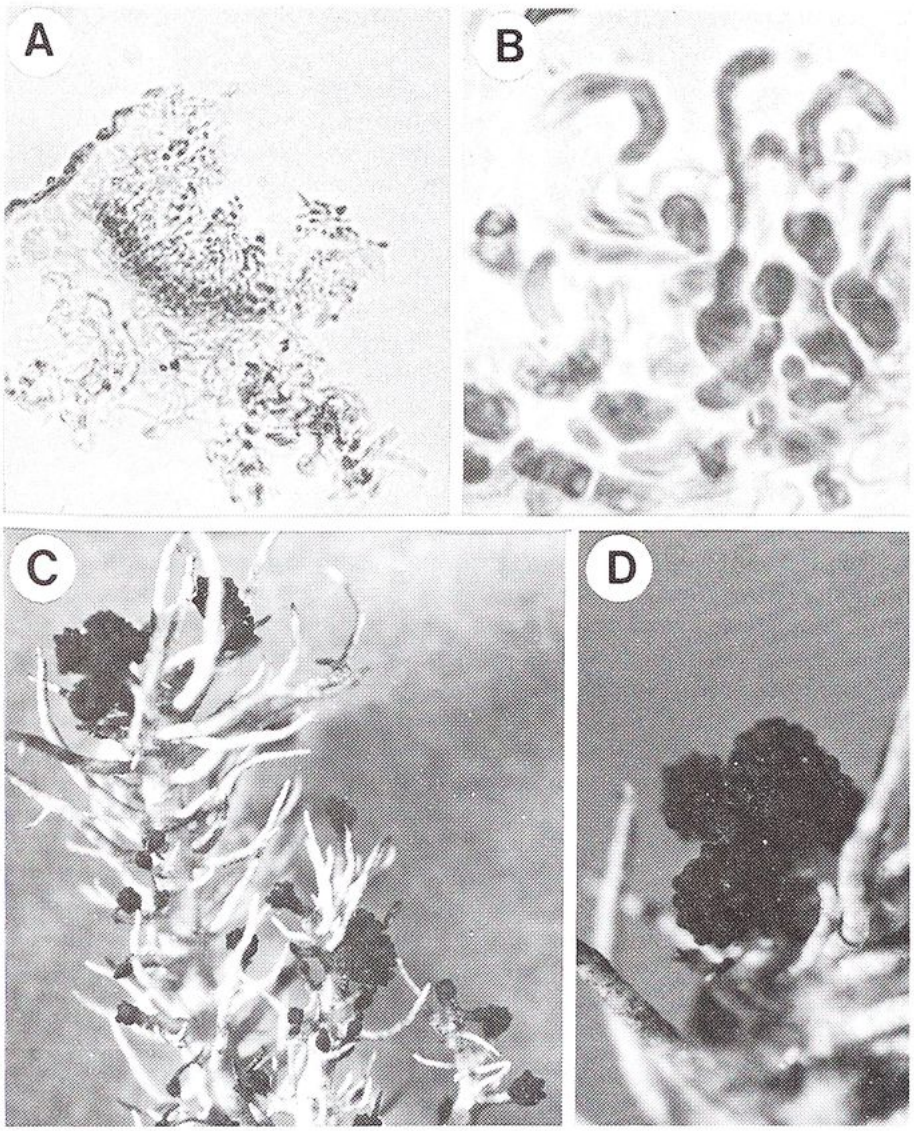

FIG. 3. A–B, *Everniicola flexispora* from the holotype (E): A, vertical section of pycnidium (×500); B, conidiogenous cells with attached conidia (×2500). C–D, *Endococcus alpestris* from the holotype (IMI 240523): C, part of the *Usnea florida* thallus showing the terminal black galls (×13); D, ascomata clustered over terminal galls (×25).

attenuated at the base, 1-septate, not or slightly constricted at the septum, the upper cell very slightly larger, brown, smooth-walled, lacking a distinct gelatinous sheath, 9–10.5(–11) × 3.5–4μm.

Three additional specimens have been seen:

ENGLAND. Devon, Buckland-in-the-Moor, Holne Chase by the junction of

the Rivers Dart and Webburn, on thalli of *Usnea subfloridana* Stirton, 25 viii 1979, *F. S. Dobson* (IMI 241054); Braunton, near Braunton Burrows, on *U. florida*, vi 1971, comm. D. S. Chapman (IMI 262879).
WALES. Carmarthen, Lampeter, Pumpsaint, Ogofau Gold Mines, on *U. florida,* i 1980, *R. G. Woods* (E).

This fungus forms striking gall-like outgrowths covered in ascomata on the apices of branches of *Usnea florida* and *U. subfloridana*, stopping the growth of the branches. Even in heavily infected thalli, however, the branch supporting the mass of fruits retains its normal colour suggesting that this is a parasymbiotic rather than a parasitic fungus. It is conceivable that *Endococcus alpestris* attacks the peculiar pink gall-like carpoids, quite common in south-west England, that have been named *Biatoropsis usnearum* Räsänen, but I doubt that it causes them. Santesson (1949) considered that *Biatoropsis* galls were caused by an *Abrothallus* de Not. species but detailed anatomical investigations by Galløe (1950) failed to demonstrate any foreign fungal hyphae in the galls, except where these were secondarily attacked by *A. usneae* Rabenh. The causal agent of the *Biatoropsis* galls remains uncertain.

Endococcus alpestris is a typical member of its genus having pseudoparenchymatous walls to the pseudothecia, smooth-walled ascospores, and lacking paraphyses. It is unusual for the genus in that the ascomata are largely superficial and densely aggregated but I do not feel these criteria merit transfer to a separate genus. The shape and size of the ascospores separate the species from other members of *Endococcus* Nyl. (see Hawksworth, 1979, 1980a). It is conceivable that *Sphaerellothecium alpestre* Fried., described from an *Usnea* in the Italian Tirol, belongs to the same species but its ascospores were stated to be much broader, $10 \times 7\mu m$ (Friederich, 1904: 30). As Friederich's material could not be traced (V. Wirth, *in litt.*) it has not been possible to check his ascospore measurements. I have, however, employed his epithet in order to preclude the possibility of a name change should his material be discovered and prove to be conspecific with *E. alpestris*. Keissler (1930: 398) placed *S. alpestre* as a synonym of the species now called *E. araneosus* (Rehm) H. Olivier but the reason for this is obscure; *E. araneosus* has ascospores $12–14 \times 3–4\mu m$ and occurs on *Aspicilia, Lecanora* and *Ochrolechia* species.

Endococcus parietinus (Lindsay) Clauz. & Roux, Champ. Lich. Non-Lich., 28 (1976). Fig. 4.
Syn.: *Microthelia parietina* Lindsay in Trans. R. Soc. Edinb. 25: 241 (1869).
ENGLAND. Somerset, Stoke Moor, Wedmore, on *Xanthoria parietina* (L.)Th.Fr. on dolomitic conglomerate gatepost, 11 iv 1981, *E. J. McDonnell* (IMI 257306).

This fungus was originally described from a single fragment of a specimen of *Xanthoria parietina* from Cottishall, Norfolk in K but the type material has not been been located in BM, E or K (Hawksworth, 1979 : 287). The rediscovery of material in Somerset conforming closely to Lindsay's description confirms the placement of this species in *Endococcus*. The ascomata occur on the thallus, and most abundantly on the apothecia; the fungus does not discolour the apothecia but some discolouration and

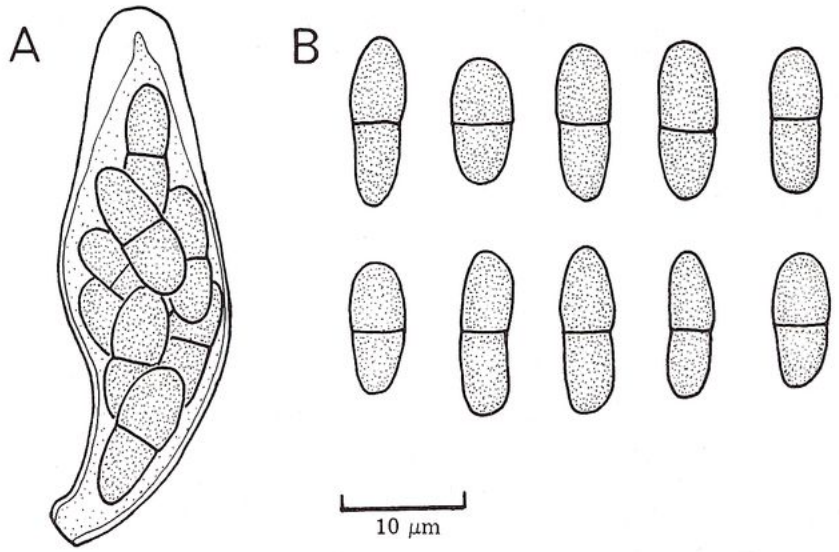

FIG. 4. *Endococcus parietinus*. A, ascus; B, ascospores. From IMI 257306.

gall-like growths occur on the thallus. The ascomata are immersed in the lower third to two-thirds and are black, globose, 50–80μm, with 8-spored asci about 40 × 15μm and rather pale brown ellipsoid ascospores measuring 10.5–13(–14) × (3.5–)4–5μm which are smooth-walled and scarcely constricted at the septum.

Endococcus parietinus is perhaps most similar to *E. exerrans* Nyl., which occurs on crustose lichens, but that species has ascospores (12–)14–18 (–20) × 3.5–5(–6)μm.

Everniicola D. Hawksw., **gen. nov.**

Genus lichenicola ad Coelomycetes Sphaeropsidales pertinens. *Conidiomata* singularia, uniloculata, dispersa, subglobosa vel plusminusve cupuliformia, immersa, brunnea, ostiolata, cum muris subhyalinis vel pallide brunneis e cellulis pseudoparenchymaticis. *Conidiophora* desunt. *Cellulae conidiogenae* enteroblasticae, acrogenae, subglobosae vel breve ampulliformes, phialidicae, non prolifericae, hyalinae. *Conidia* subcylindrica sed flexa, plerumque L-forma, hyalina, 0–2 septata, laevia.

Species holotypica, adhuc unica, est *Everniicola flexispora* D. Hawksw.

Genus lichenicolous, belonging to the Coelomycetes, Sphaeropsidales. *Conidiomata* arising singly, uniloculate, scattered, subglobose or almost cupuliform, immersed, brown, ostiolate, the walls subhyaline or pale brown and composed of pseudoparenchymatous cells. *Conidiophores* absent. *Conidiogenous cells* enteroblastic, acrogenous, subglobose or short-ampulliform, phialidic, not proliferating, hyaline. *Conidia* subcylindrical but bent, mostly L-shaped, hyaline, 0–2 septate, smooth.

This new genus is described here for the single species *Everniicola flexispora,* introduced below. No genus which could accommodate this

fungus has previously been recognized as occurring on lichens (Hawksworth, 1981) and no other suitable coelomycete genus could be traced (Michaelides et al., 1979; Sutton, 1980).

Everniicola flexispora D. Hawksw., **sp. nov.** Fig. 3A–B, 5.

Fungus lichenicola. *Conidiomata* singularia, uniloculata, dispersa, subglobosa vel plusminusve cupuliformia, 20–40μm diam., immersa, brunnea, ostiolata, cum muris subhyalinis vel pallide brunneis, 5–8μm crassis, e cellulis pseudoparenchymaticis subglobosis ad subpolyedricis, 4–6μm diam. *Cellulae conidiogenae* enteroblasticae, acrogenae, subglobosae vel breve ampulliformes, phialidicae, non prolifericae, hyalinae, 2.5–4μm diam. *Conidia* subcylindrica sed flexa, plerumque L-forma, hyalina, (0–)1(–2) septata, laevia, ubi recta 8–10(–11.5) × 1.5–2μm.

HOLOTYPUS. Gallia, Pembrokeshire, proxime Orielton, in thallo *Everniae prunastri* in ramulis *Fagis,* 25 vi 1970, *P. Harrold* (E).

Fungus lichenicolous, forming brownish necrotic patches 0.5–1mm wide on the upper surface of the thallus of the host, the patches delimited by a slightly deeper brown marginal zone 50–75μm thick; vegetative hyphae irregularly branched, immersed, mainly 2–3μm wide. *Conidiomata* arising singly in the central parts of the lesions, 10–30 to each infection spot, pycnidial, immersed, brown, subglobose to almost cupuliform, 20–40μm diam., ostiolate, the ostiole scarcely erumpent; wall 5–8μm thick, rather poorly developed, subhyaline to pale brown, composed of 1–2 layers of pseudoparenchymatous cells, the cells not densely compacted, subglobose to almost polyhedral, with slightly thickened walls, individually 4–6μm diam. *Conidiogenous cells* completely lining the inner wall of the pycnidial cavity, densely compacted, enteroblastic, acrogenous, subglobose or short-ampulliform, phialidic, no proliferations seen, hyaline, 2.5–4μm diam. *Conidia* arising singly, not adhering in chains or mucous, subcylindrical but bent, most commonly at right angles just above the centre, somewhat variable in shape, appearing short-vermiform to arcuate or falcate depending on aspect, the apex sometimes slightly broadened and the base tending to be somewhat attenuated and truncated, hyaline, (0–)1-septate but a single 2-septate conidium was seen, smooth-walled, not distinctly guttulate, 8–10(–11.5) × 1.5–2μm (length measured as if straightened out).

This remarkable fungus, which is currently known only from the holotype collection, has conidia quite unlike those of any lichenicolous coelomycete so far described. A further coelomycete, *Lichenoconium erodens* M. S. Christ. & D. Hawksw., occurs on the type specimen, and has already been reported from other collections of *Evernia prunastri* (Hawksworth, 1977 b: 175); it occurs near the base of the holotype and is easily separated macroscopically from *E. flexispora* by the larger more erumpent pycnidia and the absence of clearly delimited margins to the infection spots. The normal pycnidia of *E. prunastri* appear to be very rare but all authors seem to agree that they are formed pleurogenously and give rise to conidia which are straight, acicular, and 6–7 × 0.5μm (Smith, 1918: 162).

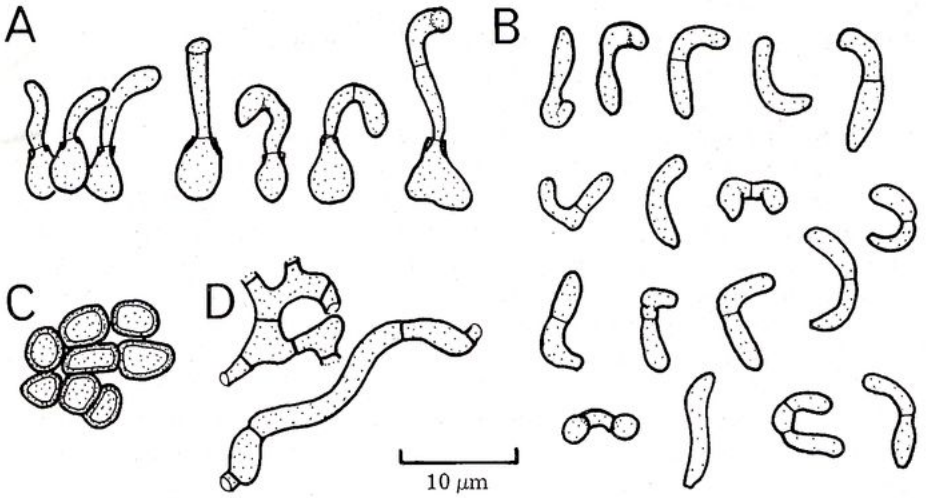

FIG. 5. *Everniicola flexispora*. A, conidiogenous cells with attached conidia; B, conidia; C, surface view of pycnidial wall cells; D, hyphae ramifying amongst host tissues. From the holotype (E).

Lecidea insidiosa Th. Fr. in Bot. Notiser 1867: 153 (1867).

For a detailed account of the anatomy and biology of this species see Poelt (1974).

ENGLAND. E Kent, Dungeness, on *Lecanora varia* on wood, 4 iii 1981, *T. D. V. Swinscow* (BM). Shropshire, Sutton near Shrewsbury, on *Lecanora varia* on lignum, 18–, *W. A. Leighton* (BM).

SCOTLAND. Berwickshire, Hume Castle, on *Lecanora varia* on top bar of gate, 9 x 1981, *B. J. Coppins* 8836 (E).

This species, which has not previously been reported from the British Isles, kills the fungal partner of its host and takes over the algae so becoming lichenized itself. It can consequently be considered as a lichenicolous lichen. The black apothecia are 0.2–0.7mm diam. and the lecanorine asci form ellipsoid ascospores (8.5–)9.5–11 × 4.5–5.5(–6)μm.

Libertiella malmedyensis Speg. & Roum. apud Spegazzini in Revue Mycol. 2: 22 (1880).

For a description, illustrations, and discussion of the nomenclature of this species see Hawksworth (1981: 30–33).

ENGLAND. Worcestershire, Cutnall Green, on thallus of *Peltigera spuria* on disused railway line, 6 iii 1981, *Mrs M. E. Clark* MC 3044 (IMI 256679).

This remarkable coelomycete is now confirmed for the British Isles for the first time. The name *Libertiella peltigerae* (Lib. ex Cooke) Keissler was included in the checklist of Watson (1948: 327, as '*Libbertella peltigerae*'), a synonym of *L. malmedyensis,* but this record was not accepted by Hawksworth et al. (1980) as it was based on a dubious report from an unidentified *Cladonia* species — almost certainly a misidentification.

Metasphaeria stereocaulorum (Arnold) Sacc., Syll. Fung. 2:183(1883). Fig. 6.

Syn.: *Leptosphaeria stereocaulorum* Arnold in Flora 57:175 (1874).
Sphaeria stereocaulorum (Arnold) H. Olivier in Bull. internat. Acad. Géogr. Bot. 17: 166 (1907).
Sphaerulina stereocaulorum (Arnold) Vouaux in Bull. Soc. Mycol. Fr. 29:35 (1913).

Ascomata perithecia, arising singly, scattered over decolourized pale brownish areas of the host thallus, not forming galls, immersed at first but the uppermost third emergent with age, subglobose, black, 75–125μm diam.; ostiole distinct, slightly depressed, c.40μm wide; walls composed of interwoven irregularly branched hyphae (textura intricata), hyphae dark olivaceous brown to dark brown, almost black in the vicinity of the ostiole, mainly 2–3μm wide. *Paraphyses* (pseudoparaphyses) trabeculate, persistent, branched and filiform, remotely septate, 1–1.5μm thick; centrum not reacting with iodine. *Asci* arising from the base of the perithecial cavity, subcylindrical to elongate-clavate, scarcely stalked, bitunicate, thick-walled, with a distinct internal apical beak when young, less marked at maturity, not turning blue in iodine, 50–70 × 10–12μm, 8-spored at first but only 4(–6) reaching maturity. *Ascospores* distichously arranged in the asci, elongate-ellipsoid to subfusiform, rounded at the apex and attenuated at the base, 3-septate when mature, not or slightly constricted at the septa, sometimes guttulate, smooth-walled, lacking a gelatinous sheath, 22–25 × (5–) 5.5–6.5μm.

On thalli of *Stereocaulon alpinum* Laurer, *S. dactylophyllum* Flörke and *S. vesuvianum* Flörke; in Austria, northern Italy and Scotland. Reports on *Pachyospora verrucosa* (Ach.) Massal. and *Solorina crocea* (L.) Ach. (Keissler, 1930: 435) require re-investigation.

SCOTLAND. West Inverness, Ben Alder, Coire Cheap, alt. 700m, on *Stereocaulon dactylophyllum* on heath, 8 viii 1981, *B. W. Fox* 1282 (hb. Fox, IMI 262876).

This species, which has not previously been recognized as occurring in the British Isles, was treated by Keissler (1930:434) in *Sphaerulina* Sacc. but the presence of trabeculate pseudoparaphyses exclude it from that genus. Even though the correct interpretation of the generic name *Metasphaeria* Sacc. is currently unclear, it seems appropriate to retain this fungus here for the time being as it is almost certainly congeneric with *M. tartarina* (Nyl.) Keissler, a species occurring on *Ochrolechia* thalli (Vězda, 1970; Hawksworth, 1975).

According to Keissler (loc. cit.), the asci of *M. stereocaulorum* can reach 75μm in length and the ascospores 30μm. I have not seen Arnold's material of this species but the published description and illustrations (Arnold, 1874:175, Table II, Fig. 25) leave no doubt that the Scottish material belongs to the same taxon.

Muellerella opegraphicola Zopf in Hedwigia 35: 342 (1896).

The original description of this species (Zopf, 1896:342) was as follows:

'Müllerella opegraphicola Zopf. sec. Linds. Observ. 549. 555. Perithecien schwarz. Schläuche birnförmig, vielsporig. Sporen einzellig, blassbraun. Keine Paraphysen.'

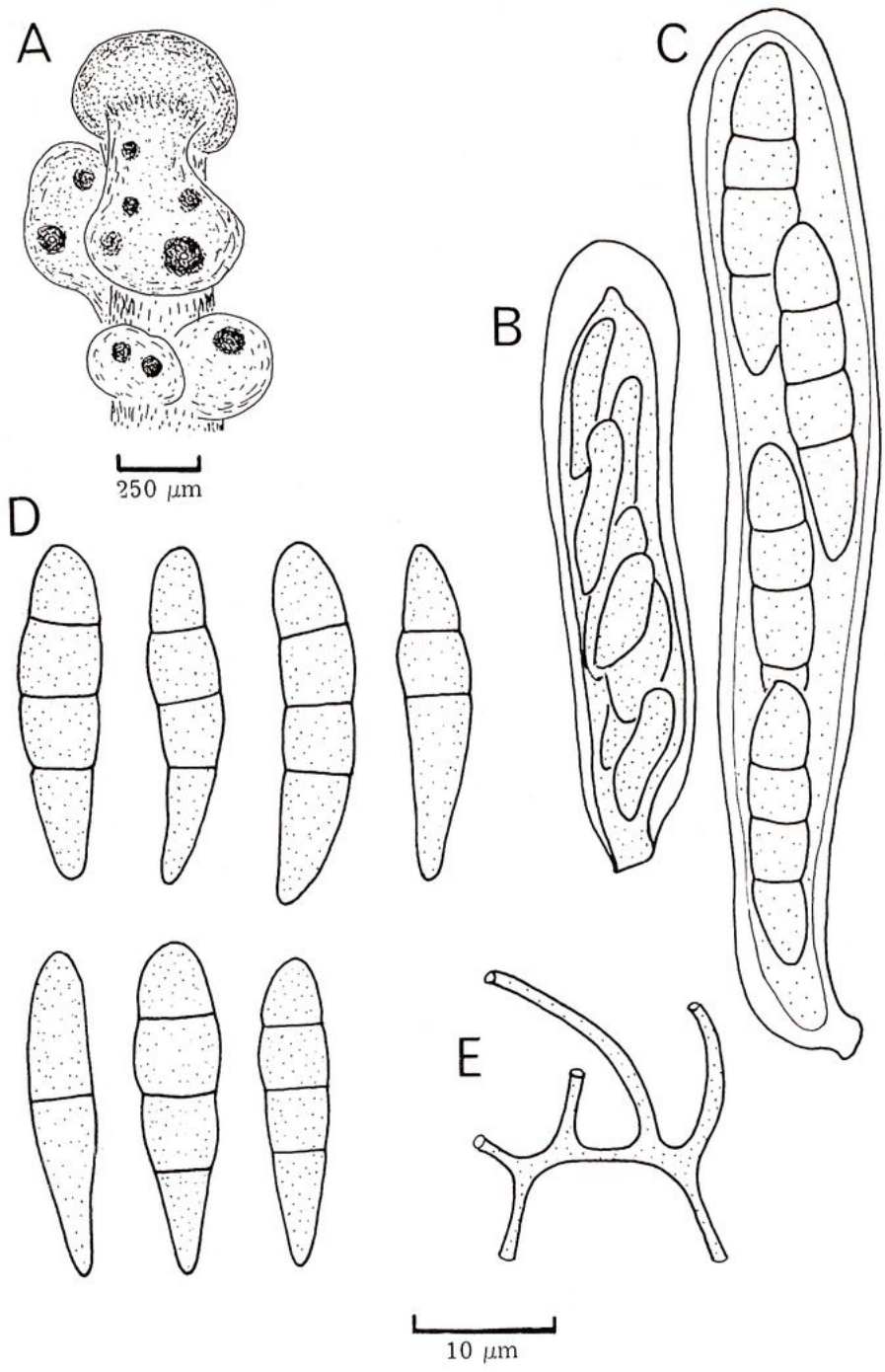

FIG. 6. *Metasphaeria stereocaulorum*. A, ascomata on phyllocladia of *Stereocaulon dactyllophyllum*; B, immature 8-spored ascus; C, mature 4-spored ascus; D, ascospores; E, trabeculate pseudoparaphyses showing anastomoses. From IMI 262876.

Lindsay (1869:549) refers to a species with simple pale brown spores contained in asci 'Associated with *Opegrapha atra*, Pers., var., and *Lecidea canescens*. Aghada; corticolous; Carroll.' but on p. 555, the legend to Pl. 24, he mentions two specimens on *Opegrapha atra* Pers.: Leighton's *Lich. Exs.* no. 245, and Schaerer's *Lich. Helv.* no. 634, illustrated in Fig. 25 and Fig. 26, respectively. Fig. 25 is of brown 1-septate spores and Fig. 26 a multispored ascus and simple colourless spores. As Zopf clearly stated that the spores were simple and included in multispored asci, Schaerer's exsiccatum and not that of Leighton must be regarded as the holotype (topotype) of Zopf's name. This is in agreement with Lindsay's description but Vouaux (1913:42) and Keissler (1930:319) refer only to Leighton's exsiccatum.

Examination of Leighton's exsiccatum (Devon, Torquay; sub *Opegrapha atra* var. *parallela*; E, but not that in BM) showed that it supported the coelomycete *Lichenodiplis lecanorae* (Vouaux) Dyko & D. Hawksw. (Hawksworth & Dyko, 1979) on an unidentified thallus (perhaps of *Pertusaria leioplaca* (Ach.) DC., a host from which I have seen other collections of this fungus) and not *O. atra*. Schaerer's exsiccatum (Ad Pinum piceam in Bernenseium m. Gurten; sub *O. atra* λ. *radiata*; BM, E), however, supports *Muellerella polyspora* Hepp ex Müll. Arg. on the thalli of *Arthonia radiata* (Pers.) Ach., the usual host for this fungus. As Zopf's name must be typified by the latter, *M. opegraphicola* should be added to the list of synonyms for *M. polyspora* and not retained as a distinct taxon.

Nectriella tincta (Fuckel) R. Sant. apud Eriksson in Svensk Bot. Tidskr. 58: 235 (1964).

ENGLAND. Devon, South Hams, Prawle Point, on thalli of *Anaptychia fusca* (Huds.)Vainio on schistose rocks in the xeric supralittoral, 24 viii 1980, *D. L. Hawksworth* 5030 (IMI 251251).

A second record of this pathogenic species from the British Isles, which was first reported from Ireland by Hawksworth (1980a:170). In the Devon material the host lobes were bleached and killed by the invading fungus, but the damaged areas tended to be localized within thalli so that entire plants were not destroyed.

Opegrapha pulvinata Rehm apud Lojka in Verh. zool.-bot. Ges. Wien 19: 500 (1869).

Syn.: *Celidium pulvinatum* (Rehm) Rehm in Rabenh. Krypt.-Fl. 1(3): 427 (1891).

See Keissler (1930:102) for further synonyms and a description of this species.

SCOTLAND. South Ebudes, Colonsay, Cùirn Mhóra, near Loch Breac, on *Dermatocarpon miniatum* (L.) Mann, 28 viii 1981, *B. J. Coppins* 8761 [with *F. Rose & R. Ashby*] (BM,E).

This species, which has not previously been reported from the British Isles, is a member of the *Opegrapha parasitica* (Massal.) Vězda group with 3-septate brownish ascospores which measure 20–21.5×6.5–7μm in the Scottish specimens; the original description gave the ascospores as 15–18×2–4μm, but Keissler (loc. cit.) reported them as 18–24×4–7μm.

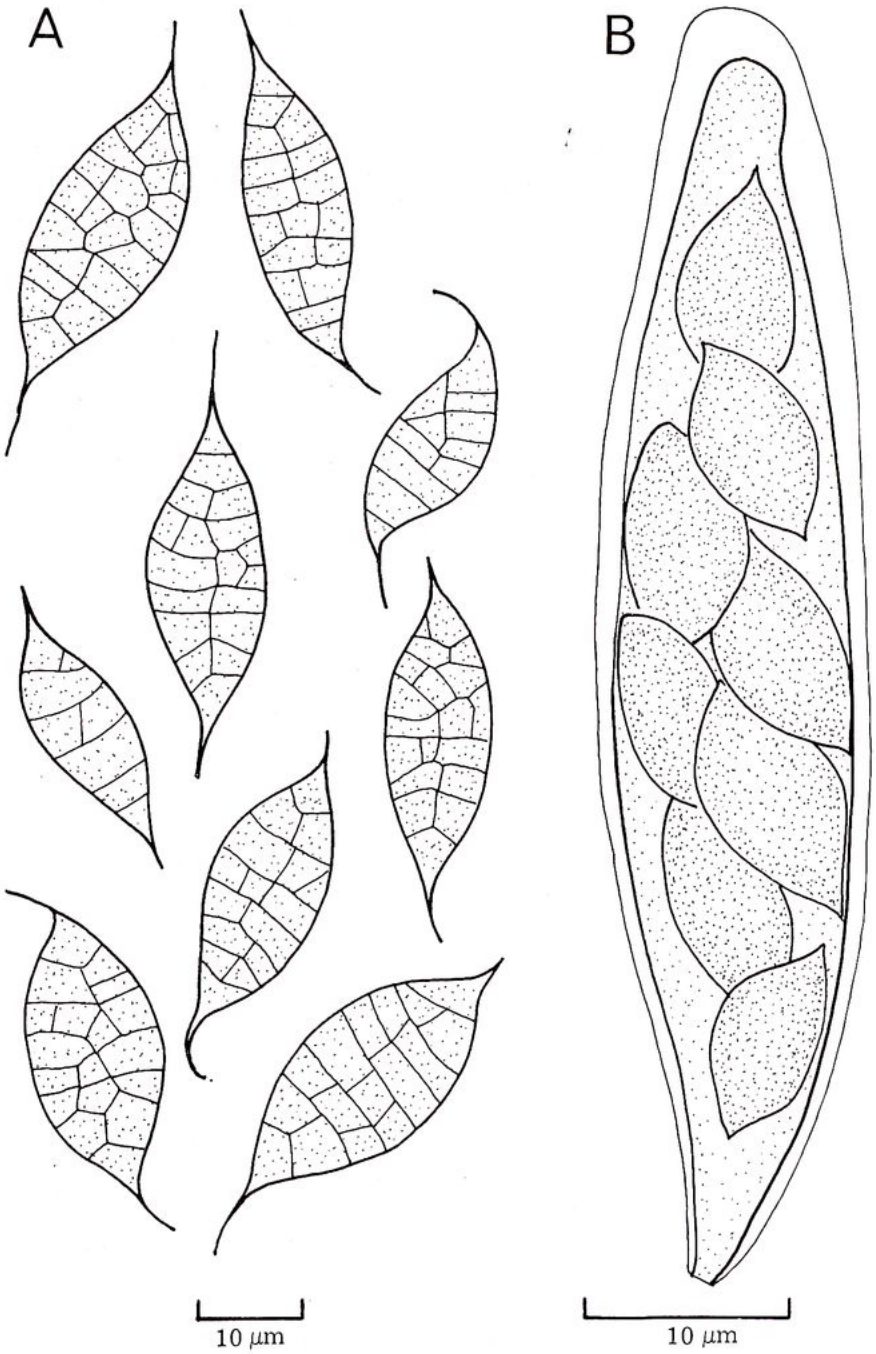

FIG. 7. *Paranectria oropensis*. A, ascospores; B, maturing ascus. From IMI 253556.

The exciple in the Scottish material turns reddish brown in potassium hydroxide and the asci are about 60×19μm. Mr B. J. Coppins is investigating this group and will report on it in detail later.

Paranectria oropensis (Ces.) D. Hawksw. & Piroz. in Can. J. Bot. 55: 2555 (1977). Fig. 7.

For a recent description see Samuels (1976: 6) and for a discussion of the nomenclature see Hawksworth & Pirozynski (1977).

SCOTLAND. Argyll Main, Seil, Ballachuan, wood S of Port Mòr, on *Parmeliella atlantica* on *Corylus,* 6 viii 1980, *B. J. Coppins* 8114 (E,IMI 253556).

The nomenclature of this species has been much confused with *Paranectria affinis* (Grev.) Sacc. and for this reason Hawksworth et al. (1980: 70) considered that the presence of *P. oropensis* in the British Isles required confirmation. *P. oropensis* can now be confirmed for the British Isles on the basis of the collection on *Parmeliella atlantica* noted above, a new host for the species. *Paranectria oropensis* was first described from *Cladonia* squamules (not *Lecidea granulosa* as is often stated; see Hawksworth & Pirozynski, 1977), but has also been noted in Ireland on an undetermined leprose thallus (Folan & Mitchell, 1970: 169) and in Austria on material named as *Lecidea enteroleuca* (Keissler, 1930: 289).

In the Scottish collection the asci are characteristically 8-spored and the ascospore bodies measure (22–)25–32(–36)×(9–)11–14(–15)μm and have cauda to 12μm long. The separation of this species from *P. affinis* and the newly recognized *P. superba* is discused under the latter below.

Paranectria superba D. Hawksw., **sp. nov.** Fig. 8.

Fungus lichenicola. *Ascomata* perithecia, superficialia, in subiculo albo aggregata, 300–400μm diam., pallide aurantiaca sed ostiolo rubro-aurantiaco; muris cum pilis subhyalinis ad 50×3–4μm instructis, e cellulis pseudoparenchymaticis et polyedricis, plerumque 7–10μm diam.; ostiola 50–70μm lata, cum periphysibus instructa. *Paraphyses* desunt. *Asci* elongato-clavati, crassi-tunicati, unitunicati, 60–85×13–18μm, 2- vel 4-spori. *Ascosporae* late fusiformes, bicaudatae, muriformes ubi maturitatae, hyalinae, (23–)30–45.5×(10–)13–18(–20.5)μm (cauda exclusa); caudae rectae vel arcuatae, non septatae, (10–)15–18(–23)×0.5–1.5μm.

HOLOTYPUS. Magna Britannica, Anglia, Derbyshire, Hassop, Harry Becca Mine, in thallo *Peltigerae rufescentis* (Weis) Humb., xii 1979, *O.L. Gilbert* (IMI 244539).

Ascomata perithecia, superficial, aggregated in groups of 3–6 on a basal whitish subiculum, 300–400μm diam., pale orange but becoming deep reddish-orange at the ostiole, the outer surface clothed in hairs; hairs subhyaline, simple or branched, particularly near the base, intertwined and forming a felt-like covering to the perithecia, near the apex mainly to 50×3–4μm; peridium composed of several layers of pseudoparenchymatous cells, cells swollen-polyhedrical, hyaline to orange, mainly 7–10μm diam., the pigment contained in globules; ostiole not neck-like, short, 50–70μm wide, lined internally with filiform periphyses. *Paraphyses* absent. *Asci* elongate-clavate, with a short stalk, thick-walled, apparently

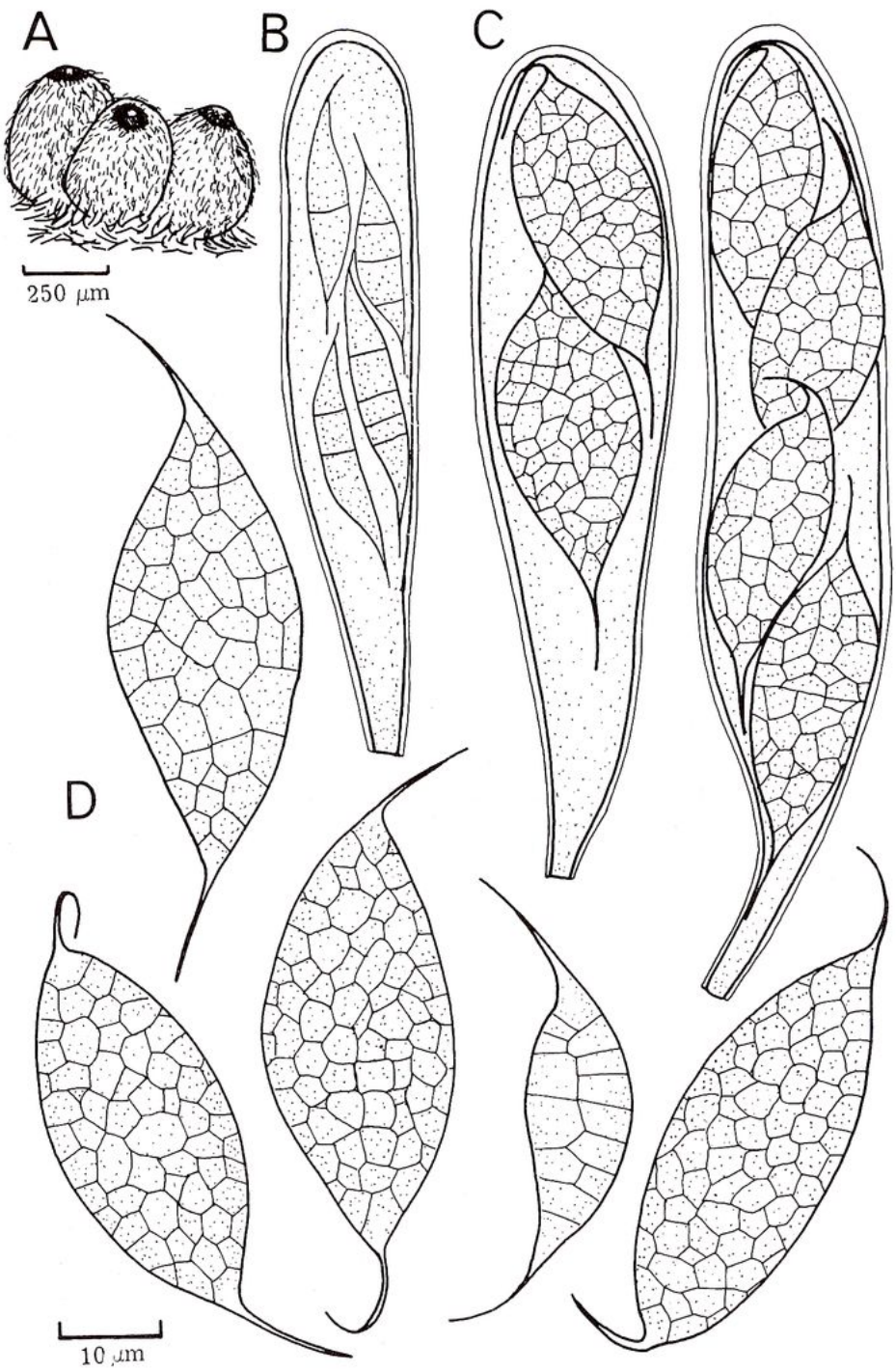

FIG. 8. *Paranectria superba*. A, group of perithecia, more deeply pigmented around the ostiole, and subiculum on the host thallus; B, immature ascus; C, mature 2-spored and 4-spored asci; D, ascospores. From the holotype (IMI 244539).

unitunicate, the apex slightly thickened but lacking an internal beak, no apical apparatus distinguished, 60–85 × 13–18μm, 2- or 4-spored. *Ascospores* overlapping-uniseriate or distichous in the asci, broadly fusiform, bicaudate, initially 2–3-septate but becoming muriform prior to release from the asci, usually with 20–50 irregularly polygonal cells when mature, remaining hyaline, rather variable in size, the larger spores from 2-spored asci, spore body (23–)30–45.5 × (10–)13–18(–20.5)μm (excluding the cauda); cauda single-celled, straight to arcuate, (10–)15–18(–23) × 0.5–1.5μm.

Paranectria Sacc. (syn. *Ciliomyces* Höhnel), a genus of the Hypocreales, is exclusively lichenicolous and hitherto included two species (Hawksworth & Pirozynski, 1977): *P. affinis* (Grev.) Sacc. with persistently 3 (–4) transversely septate ascospores 21–30(–38) × 5–7μm (on *Ephebe lanata* (L.) Vainio), and *P. oropensis* (Ces.) D. Hawksw. & Piroz. in which the spores are muriform with 5–8 transverse and 1–2 longitudinal septa and measure (22–) 25–32(–36) × (9–)11–14(–15)μm (see above). *Paranectria superba* can be viewed as a further development of spore type in the genus in view of the many more cells developed when mature; these cells develop from the 2–3 transverse septa visible in young spores within the asci (Fig. 8B). The species is distinguished from *P. oropensis* not only in spore septation but further by the much longer and, particularly, the broader spores, the much longer cauda, and in having 2- or 4-spored and not 8-spored asci; they also occur on quite different hosts.

Hawksworth (1980b: 364) noted that several quite unrelated genera of fungi restricted to *Peltigera* thalli tended to have a prediliction for the development of 2- or 4-spored asci and massive ascospores. *Paranectria superba* provides a further example of a species exhibiting these features which may be assumed to be of considerable biological importance.

Skyttea spinosa D. Hawksw. & Coppins, **sp. nov.** Fig. 9.

Ascomata apothecia, lichenicola, in thallis *Verrucariae* crescentia, erumpescentia, primo clausa, poro lato aperientia, urceolata, 100–150μm diam., excipulo olivaceo, pseudoparenchymatico, cellulis plerumque 5–10μm diam., pilis glabris hyalinis 20–35μm longis et cum apicibus refractis. *Paraphyses* filiformes, simplices, septatae, 1.5–2μm latae. *Asci* crassitunicati, 30–35 × 5–7μm, apice crassati, in iodo non caerulescentes, 8-spori. *Ascosporae* hyalinae, anguste-ellipsoideae, biguttulatae, non-septatae, 6–7(–7.5) × 1.5–2μm.

HOLOTYPUS. Scotia, Dunbarton, Loch Lomond National Nature Reserve, Shore Wood, in thallo *Verrucariae* supra saxa prope lacum, 5 ix 1980, *B. J. Coppins* 8215 (E).

Ascomata apothecia, erumpent and almost superficial when mature, 100–150μm diam., black, round, the inner margin divided by delicate radiately arranged fissures, disc to 50μm diam., hairs not visible with a dissecting microscope or lens (× 50); ectal excipulum composed of olivaceous to greenish olivaceous pseudoparenchymatous cells, the cells becoming brownish in potassium hydroxide, irregular in shape and mainly 5–10μm diam.; hairs hyaline, or rarely with a brownish tinge near the base, smooth, simple, non-septate, the apex markedly thickened internally and so

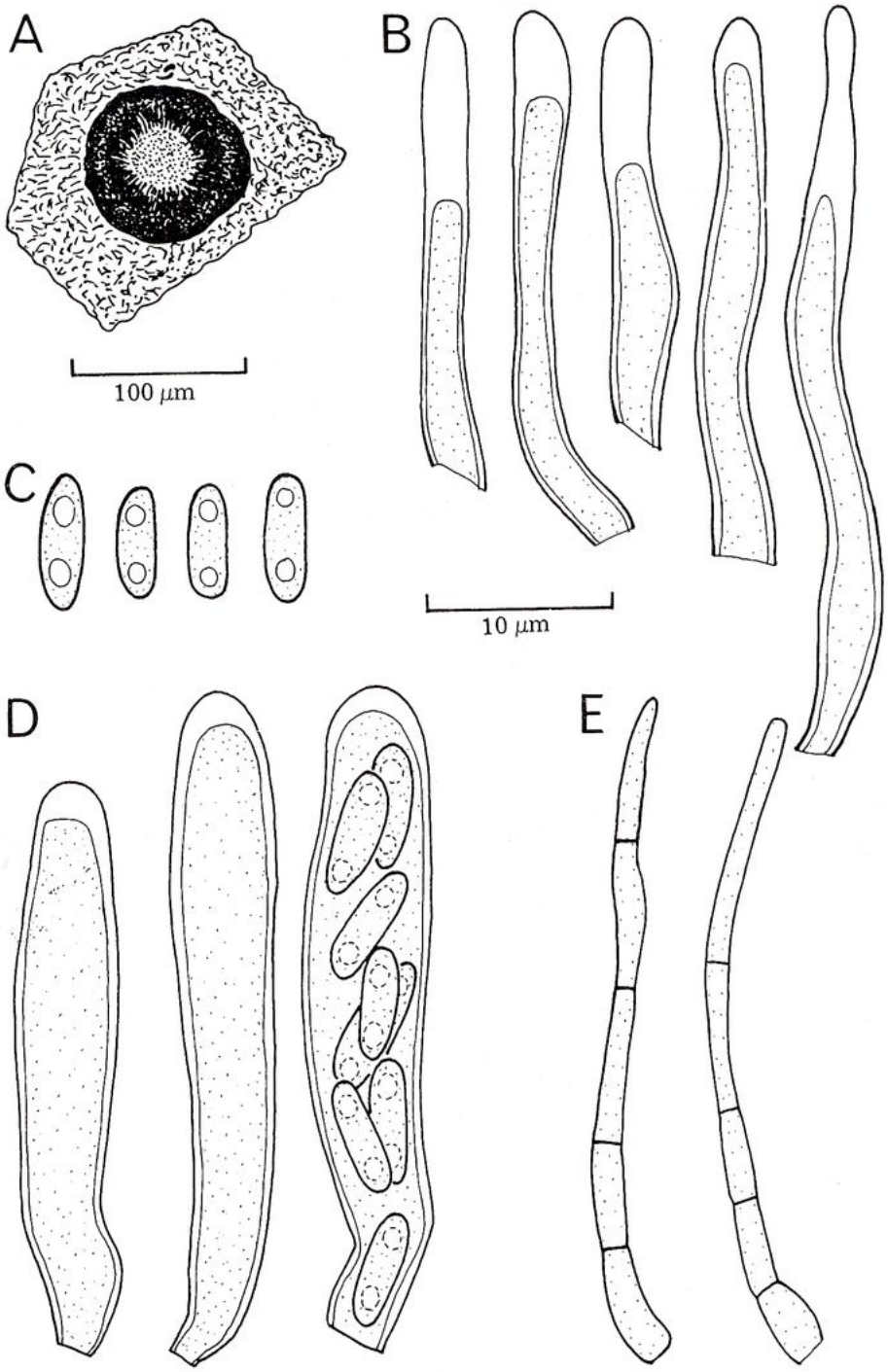

FIG. 9. *Skyttea spinosa*. A, apothecium on the host thallus; B, excipular hairs; C, ascospores; D, asci; E, paraphyses. From the holotype (E).

refractive, the thickened area without any apparent lumen to 15μm long, overall 20–35μm long, 3–3.5μm at the base and narrowing to 2–3μm wide at the apex. *Paraphyses* filiform, colourless, septate, unbranched or rarely branched near the base, 1.5–2μm thick. *Asci* subcylindrical to elongate-clavate, thick-walled, the apex most strongly thickened with the apical cap to 2μm thick visible in maturing asci but not markedly thickened in older asci, not reacting with iodine, 30–35 × 5–7μm, 8-spored. *Ascospores* distichously arranged in the asci, narrowly ellipsoid, non-septate, 2-guttulate, hyaline, 6–7(–7.5) × 1.5–2μm.

This new species is distinguished from the other seven species of *Skyttea* Sherw. et al. so far recognized (Sherwood et al., 1981) by the olivaceous tint of the excipulum, the particularly narrow ascospores (the narrowest in the genus), and further by the long hyaline excipular hairs which have a highly refractive elongated thickened apex. The original collection, which is growing parasymbiotically on a dark brown areolate *Verrucaria* (perhaps *V. viridula* (Schrader) Ach.), was too scant to permit a detailed anatomical study using microtome sections to be made.

The only other fungus with black discoid apothecia described from *Verrucaria* appears to be *Lecidea verrucariae Nyl. which had much larger* ascospores, 13–20 × 4.5–5.5μm, and occurred on *V. calciseda* DC. in France.

Skyttea viridis D. Hawksw. & Coppins, **sp. nov.** Fig. 10.

Ascomata apothecia, probaliter lichenicola, erumpescentia vel superficialia, poro late aperienti, urceolata, laxe aggregata, 120–340μm diam., excipulo olivaceo vel viridi, pseudoparenchymatico, cellulis 5–7 × 2.5–5μm, pilis glabris, hyalinis, 20–38 × 2–3μm, apicibus refractis absentibus, hymenio vivido-viridi. *Paraphyses* plusminusve filiformes, simplices, septatae, 1.5–2μm latae. *Asci* crassitunicati, 28–30 × 4.5–6μm, apice crassati ubi semi-maturitati, in iodo non caerulescentes, 8-spori. *Ascosporae* hyalinae, anguste-ellipsoideae, biguttulatae, non-septatae, 5–7 × 1.5–2μm. HOLOTYPUS. Scotia, Clackmannan, Alva, Silver Glen, probaliter in thallo *Micareae denigratae* in ligno *Fagi*, 23 viii 1981, *B. J. Coppins* 8631 (E).

Ascomata apothecia, erumpent and ± superficial at maturity, arising in small clusters, 120–340μm diam., round, black but with about 15 radiating fissures which appear whitish or pale greenish (due to the free ends of the marginal hairs), disc pore-like, deeply convex when dry, but expanding to 140μm diam., individual hairs not visible with a dissecting microscope or lens (× 50); ectal excipulum composed of olivaceous or greenish ± rectangular pseudoparenchymatous cells, becoming dull brownish in potassium hydroxide, cells 5–7 × 2.5–5μm; hairs hyaline, or with a greenish tinge near the base, smooth, simple or sometimes 1–2-septate, the apex lacking an internal refractive thickening, 20–38 × 2–3μm; hymenium c.30μm tall, bright green. *Paraphyses* ± filiform, sparingly septate, unbranched, 1.5–2μm thick. *Asci* subcylindrical, thick-walled, the apex strongly thickened in maturing asci but less so in fully mature asci, not reacting with iodine, 28–30 × 4.5–6μm, 8-spored. *Ascospores* rather irregularly arranged in the asci, narrowly ellipsoid, non-septate, 2-guttulate, hyaline, 5–7 × 1.5–2μm.

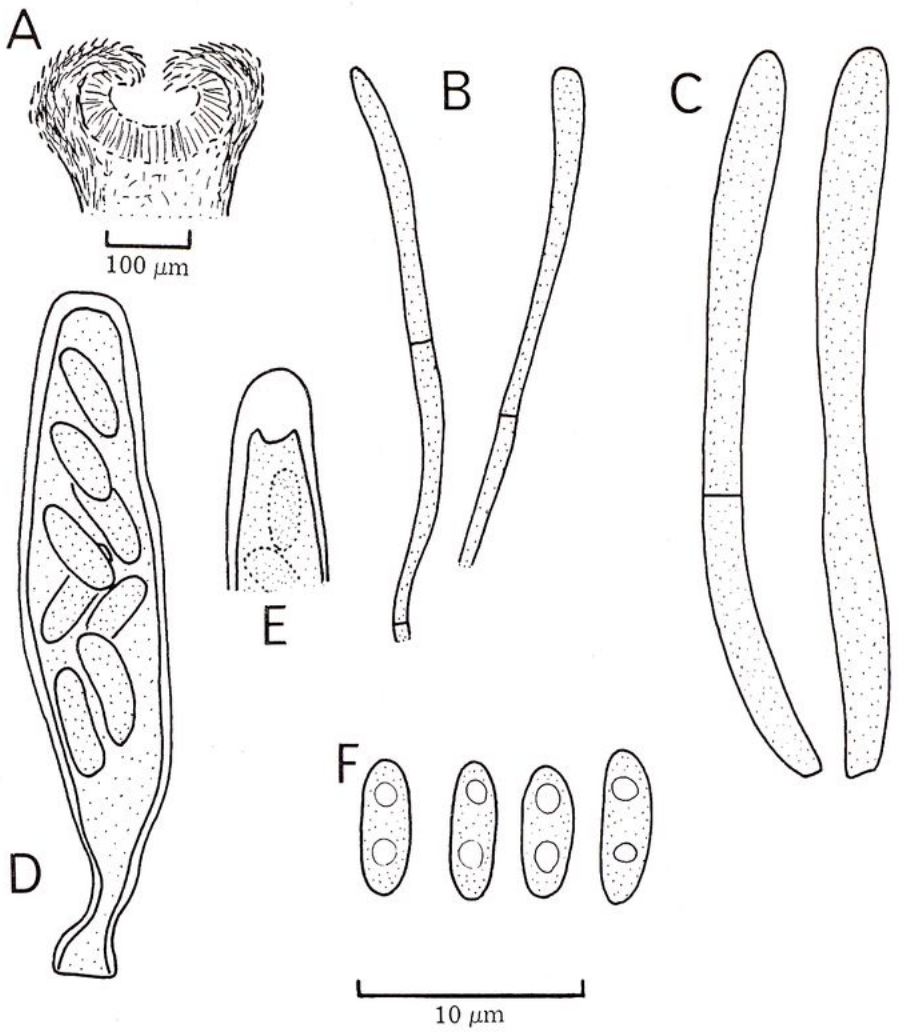

FIG. 10. *Skyttea viridis*. A, vertical section of apothecium (sketch); B, paraphyses; C, excipular hairs; D, mature ascus; E, maturing ascus showing the downward extension of the apical thickening; F, ascospores. From the holotype (E). Based on sketches by Mr B. J. Coppins.

Skyttea viridis is characterized by its bright green hymenium, olivaceous or green excipulum, long and slender excipular hairs, and narrow ascospores. The species is most similar to *S. spinosa* from which it differs in the much larger apothecia and the absence of thickened refractive apices to the excipular hairs.

All the species of *Skyttea* previously recognized are definitely lichenicolous but there is some doubt as to the biological status of this new species. The apothecia occur on a dark olivaceous scurfy depauperate crustose thallus of *Micarea denigrata* (Fr.) Hedl. invaded by several free-living algae and dematiaceous Hyphomycetes. While it is probable that *S. viridis* is lichenicolous on *M. denigrata,* further collections are required to establish this. Other lichens present on the holotype include *Lecidea granulosa*

(Hoffm.) Ach. s. lat. and *L. uliginosa* (Schrader) Ach. s. lat. (*L. icmalea* Ach.).

According to the original description, a further species requires transfer into *Skyttea,* **Skyttea lettaui** (Grumm.) D. Hawksw., **comb. nov.** (basionym: *Pyrenopeziza lettaui* Grumm., in Bot. Jb. 80: 140, 1960). This fungus occurs on *Evernia prunastri* and also has rather small ascospores, 6–8 × 3–3.5μm. In order to safeguard Grummann's epithet it is necessary to lectotypify *Lichen stictoceras* Sm. by the host rather than by the fungus attacking it.

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I am indebted to Mr B. J. Coppins for continuing to send me fascinating lichenicolous fungi, for the notes on *Bacidia beckhausii* and *Opegrapha pulvinata,* and for preparing a draft description of *Skyttea viridis.* Mr M. C. Clark, Mr D. S. Chapman, Professor B. W. Fox and Dr O. L. Gilbert have also sent me interesting collections which are reported here. Dr V. Wirth kindly sent me copies of the relevant pages of Friederich's thesis, Mr D. W. Fry is thanked for photographic assistance, and Miss C. Osborne for sectioning samples of several species. I am also grateful to the curators of the herbaria BM, E, K and L for allowing me to examine material in their care.

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