STUDIES OF CANADIAN THELEPHORACEAE

VI. THE *PENIOPHORA RIMICOLA* GROUP[1]

By H. S. Jackson[2]

Abstract

In the following contribution four species of *Peniophora* are described, illustrated, and discussed, which appear to represent a closely related group. These are *Peniophora rimicola* (Karst.) Höhn. & Litsch., *P. pruinosa* (Pat.) comb. nov., *P. pulverulenta* (Litsch.) comb. nov., and *P. praeterita* proposed as a new species. These species have several characters in common. All are mucous-gelatinous when fresh, drying to a vernicose film. In all of them simple, capitate, or apically lobed cystidioles are present and the spores show some degree of roughening when mounted in Melzer's solution. All but one, *P. pulverulenta*, have long emergent cystidia which may be slightly thickened at the base.

Introduction

For some years European students of the Thelephoraceae have recognized two species of *Peniophora* which possess characters indicating close relationship. These are *Peniophora rimicola* (Karst.) Höhn. & Litsch. and *P. chordalis* Höhn. & Litsch. They were included by Bourdot & Galzin (1) in subsection B, Ceraceae of their section Glœocystidiales, but appear to be quite unrelated to other species included in that section. Neither of these species had been recognized in North America at the time of Burt's (2) treatment of the genus. More recently Rogers (3) has correctly recorded *P. rimicola* from Missouri. A considerable number of collections have accumulated in the mycological herbarium at the University of Toronto, some of which are referable to one or the other of the two species listed above, or to two others that seem distinct but which have general characters suggestive of relationship. As a result of a careful study of all these collections, in comparison with type material and other specimens borrowed from various herbaria, it now seems possible and desirable to bring together a preliminary account of the species of this group.

P. rimicola and its immediate relatives, taken as a group, are unrelated to other species included in the genus *Peniophora* as that genus is ordinarily delimited. This group of species, however, because of the manner of growth and the characteristic method of the development of the basidia, often directly from the hyphae on the surface of the fructification, show close relationship to the more characteristic members included in the section Athele of *Corticium* as defined by Bourdot and Galzin. While the authors of this section included

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some species of doubtful relationship, typical members included there are *Corticium aurora* Berk. and *C. filicinum* Bourd. Species which have so far been recorded from North America, which belong in this relation, are *C. pseudotsugae* Burt (=*C. asserophilum* Litsch.), *C. tulasnelloideum* Höhn. & Litsch., and *C. subinvisabile* Rogers. Some of the species of *Corticium* included by Bourdot and Galzin in their section Ceracea, subsection c, may also properly belong here.

While this is not the place to discuss this group as a whole in any detail, it may be permissible to point out that these species of *Corticium* together with the related species of *Peniophora*, especially those discussed in this paper, possess common characteristics of such a distinctive and fundamental nature as perhaps to justify their ultimate segregation as a distinct genus* or even a group of genera. Judging from the writer's observations, it seems probable that the group will prove to be a large one. Many of the species are very inconspicuous and for this reason have been largely overlooked by earlier students of the group, particularly in North America. It is probable that a majority of the species which will ultimately be brought together in this relation are as yet undescribed.

The species which are to be considered in this contribution would normally be included in the genus *Peniophora* as at present artificially delimited. Three of the four have been previously, but inadequately described, one other is included which appears to be undescribed. Until such time as this group of four species can be considered in relation to the Athele group of Corticiums as a whole it seems best to retain them in *Peniophora*.

The four species have several characteristics in common. All produce fructifications which when fresh are mucous-gelatinous, often with a bluish tint and a pruinose surface suggestive of hoarfrost, finally drying to a hard grayish vernicose film. Sections reveal little character to the subiculum which appears as though made up for the most part of dead gelatinized hyphae, the fructifications perhaps being built up, except for an initial basal layer, by the successive development of more or less horizontal hyphae at the surface of the fructification from which the basidia, cystidia, and cystidioles are derived. In all the species considered, there is a tendency, not always evident in every collection, to the development of cordlike strands which ramify over the surface of the fructification or appear at the margin. The name *P. chordalis*, applied to one of the species, is descriptive of this feature.

Another characteristic common to all four of the species is that the spores, when mounted in water, in Melzer's solution, or in lactic acid, and carefully examined with an oil immersion lens, show some degree of roughening of the walls. This roughening, in all except *P. praeterita*, disappears quickly when potassium hydroxide is used in the mounting fluid and the spore walls appear smooth. Since the use of potassium hydroxide, in connection with the

* *Such a procedure has already been proposed by Dr. D. P. Rogers in an unpublished paper read before the Mycological Society of America at the Philadelphia meeting in 1940.*

examination of dried material of resupinate Basidiomycetes, has come to be a standard practice, this character of roughening of the spore walls has been overlooked by all previous students of the described species.

Still other notable features of this group of species are the variation in the number of sterigmata and spores borne on the basidia, the presence of cystidioles in all of them and typical long emergent cystidia in all but one.

The group as a whole is extremely difficult to study from dried material because of the gelatinous consistency when fresh and the vernicose character when dry. Unless collections are dried quickly and were in active sporulating condition when collected, the basidia are difficult to make out. One is seldom able to view complete basidia or to trace them to the hyphae from which they originate. Occasionally this is possible and then the basidia appear to arise directly from the hyphae (Figs. 3, 4).

The four species discussed may be distinguished by the following key:

Both cystidia and cystidioles present; spore wall markings not arranged in longitudinal spiral lines
- Cystidioles simple or capitate
  - Cystidia with thin walls throughout, basidia with 3–5 sterigmata, spores 5.5–9 × 4.8–7 μ, wall markings evident in KOH ..... *P. praeterita*
  - Cystidia thickened at base, basidia with 2–4 sterigmata, spores 8–10.5 × 4.5–7 μ, wall markings not evident in KOH ..... *P. rimicola*
- Cystidioles lobed at apex, basidia with 5–6 sterigmata, spores 5–7 × 3–4 μ ..... *P. pruinosa*

Cystidia lacking, cystidioles capitate, spore wall markings in longitudinal spiral lines, spores 8–12 × 4.5–6 μ ..... *P. pulverulenta*

Description and Discussion of Species

Peniophora rimicola (Karst.) Höhn. & Litsch., K. Akad. Wiss. Wien. Math.-Nat. Kl. Sitzungsb. 115, I; 1556. 1906; Bourd. & Galz., Hymén. de Fr. p. 281. 1928; Rogers, Univ. Iowa Studies Nat. Hist. 17 : 31. 1935. (Fig. 1).

Corticium rimicolum Karst., Hedwigia 35 : 45. 1896 (!!); Bidr. Känned Finl. Nat. Folk 62 : 93. 1903; Sacc. & Syd., Syll. Fung. 14 : 221. 1899.

Fructification widely effused, thin, when fresh mucous-gelatinous, hyaline or bluish gray, drying to a whitish or gray semitransparent vernicose film; surface pruinose under a lens due to cystidia and emergent basidia, usually firmly adnate, sometimes with mucous threadlike strands fertile on all sides, extending over the surface of the fructification or at the margin; subiculum somewhat obscure, lower hyphae more or less horizontal, parallel with substratum, upper hyphae interwoven, with clamps, both tending to become gelatinized; cystidia cylindric, 50–125 μ long by 4–6 μ wide in upper half, often broader below to 10–15 μ, walls thin above, usually appreciably thickened below, these thickened portions in old collections remaining as tubules; cystidioles few, cylindrical or slightly clavate, 25–35 × 2–3μ, simple or more commonly capitate at apex to 3–5μ; basidia cylindric or somewhat clavate, 15–25 × 7.5–8 μ, base usually obscure, sometimes bifurcate, bearing two, three, or four short, arcuate sterigmata, 3–4 μ long; basidiospores broadly ellipsoid,

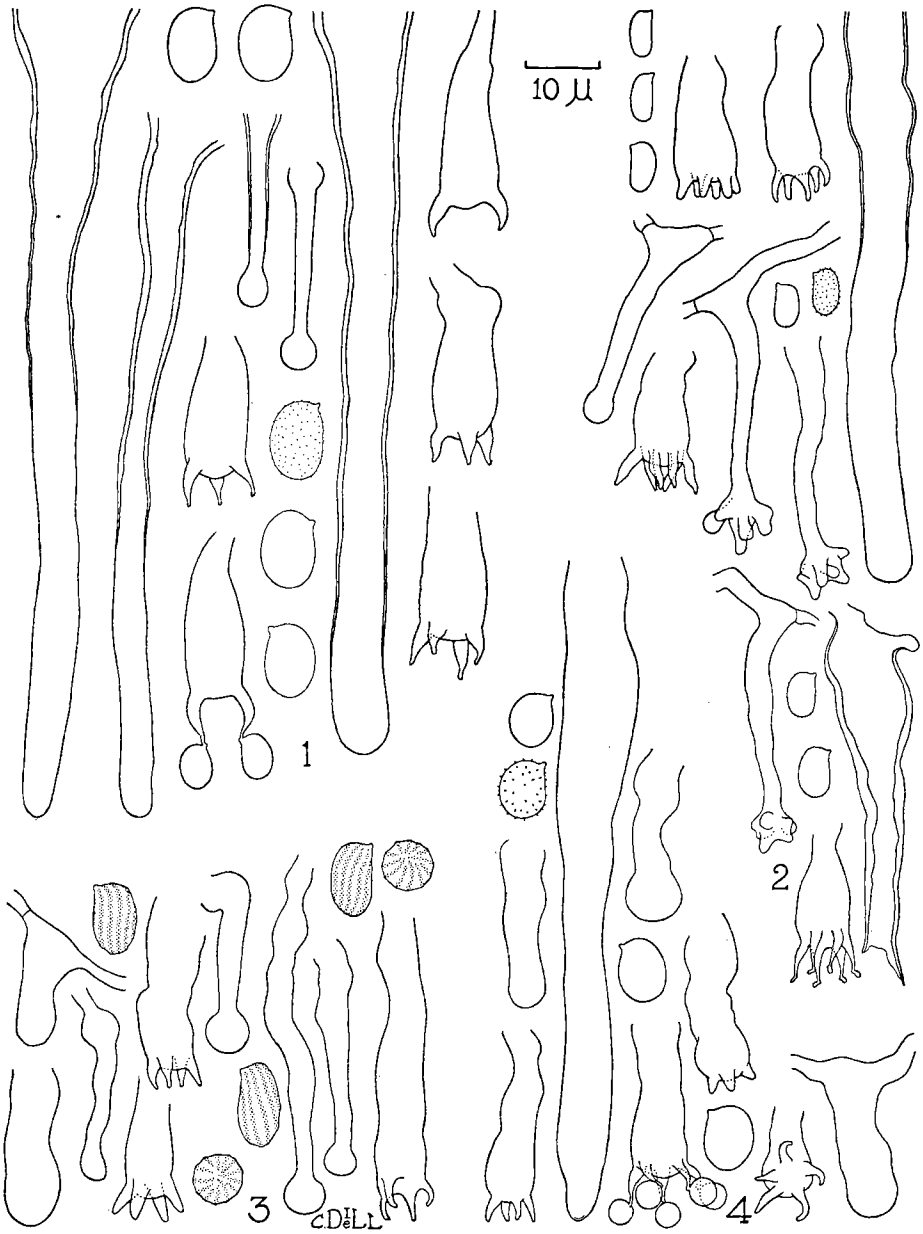

FIG. 1. Peniophora rimicola, *cystidia, cystidioles, and basidia to the left drawn from the type, those to the right from Ontario 14012.* FIG. 2. Peniophora pruinosa, *in part drawn from type of* P. subgelatinosa *and in part from Litsch. 27.* FIG. 3. Peniophora pulverulenta, *drawn from Ontario collections Nos. 17582 and 18720.* FIG. 4. Peniophora praeterita, *drawn from Ontario Nos. 17597 type, and 17599. Reproduced at a magnification of approximately 1000×.*

8–10.5 × 4.5–7 μ, slightly depressed on one side with lateral apiculus, walls smooth in potassium hydroxide but finely asperulate in water and Melzer's solution, nonamyloid.

Specimens examined:

Ontario:* On wood of *Fraxinus* and on *Fomes conchatus*, Bear Island, Lake Timagami, July 30, 1943, *18675*; on bark of *Populus*, R. Biggs. Aug. 5, 1935, *14012*; on deciduous wood, R. F. Cain, Aug. 28, 1935, *8956*; on stems *Rubus* sp., Hogg's Hollow, N. Toronto, Sept. 16, 1944, *19121*; on wood of deciduous tree, July 9, 1946, *20554*; on wood of *Salix*, Sunnybrook Park, Don Valley, Toronto, Sept. 29, 1942, *18213*; on *Alnus*, swamp N. of Mt. Albert, York Co., Sept. 25, 1936, *12499*; Upper Don Valley, Toronto, July 22, 1946, *20667;* on *Acer*, Nashville, York Co., R. F. Cain, Nov. 1, 1948, *23202*.

British Columbia: On wood of *Acer macrophyllum*, Beaver Lake, V.I., July 2, 1948.

Missouri: On decorticated *Ulmus*, Turner's Station near Springfield, A. M. Rogers, Oct. 2, 1933.

Oregon: On *Quercus Garryana*, Corvallis, A. M. & D. P. Rogers *817*, 1936; On *Acer macrophyllum*, D. P. Rogers *731*, Apr. 19, 1937.

Washington: On *Acer*, Lake Crescent, A. H. Smith *14302*, June 13, 1939.

Finland: Auf *Populus*, Rinde und Holz, Mustiala, Oct. 1895, P. Karsten, **type**, FH–H; in cort. *Populi tremulae*, Mustiala, P. Karsten, FH–B.

Brazil: Sao Leopoldo, Sept. 1932, J. Rick (as *Tulasnella metallica* Rick) MO *71742*.

P. rimicola is the first of the group of four species under discussion to have been described and appears to have a world wide distribution. The name evidently refers to the occurrence of the original specimen in cracks in the bark of *Populus*; though the species is more commonly encountered broadly effused on decorticated wood.

This species was first recorded from North America by Rogers (3, p. 31) based on a single collection made in Missouri. He included as synonyms *P. chordalis* Höhn. & Litsch. and *Tulasnella metallica* Rick. As noted below, we consider *P. pruinosa* (= *P. chordalis*) amply distinct. The specimen of *T. metallica* (MO, 71742) studied by Rogers and assumed, at the time, to be authentic proved later to be a misidentification by Rick and quite different from his type which is *Ceratobasidium atratum* (Bres.) Rogers (cf. Rogers & Jackson (4, p. 272)).

* *Unless otherwise noted collections were made by the author. All specimens recorded, other than the types of P. rimicola, P. pruinosa, and P. chordalis, and a few other extralimital collections, are represented in the mycological herbarium of the University of Toronto. The herbarium abbreviations, indicating where specimens are deposited, are as proposed in the report on the standardization of herbarium abbreviations, Chronica Botanica, 5 : 142–150. 1939. Numbers of Ontario collections are those of the University of Toronto Herbarium, TRT.*

In the Von Höhnel herbarium at the Farlow there is another specimen, in addition to those listed, which proves to be *P. rimicola*. This specimen, which is without data, is marked *Coniophora Kalchbrenneri* n.sp. Bres. in Herb. Berol.—ex herb. Winter—sub *Corticium atrocinereum*. On the packet is a note—"Ist ein *Peniophora* mit kugel sporen". We have been unable to determine that the species was ever published. According to Miss E. M. Wakefield (in litt. Dec. 31, 1946, Feb. 18, 1947) *Peniophora atrocinerea* Massee (= *Cort. atrocinereum* Kalch. MS) is a pale form of *Stereum Schomburgkii* Berk. and quite unrelated to *P. rimicola*.

The cystidia in *P. rimicola* are like those of *P. pruinosa*, tending to have thickened walls toward the base and in both species these thickened bases, in old collections, are retained as tubules after the thin upper portion of the cystidium has disappeared.

The number of spores on the basidia varies from two to four and there appears to be a correlation between spore size and the number of sterigmata. In the two Karsten collections the spores measure 8.5–10.5 × 6–7 μ and the sterigmata number from two to four with three as the most common number. A comparable collection is Ontario *8956* in which the basidia have two to three sterigmata most commonly, with spore size as in the type. American collections in general, however, have spores slightly smaller and narrower, 8–10 × 4.5–5.5 μ, and in many of these three to four spored basidia predominate. In contrast, *P. pruinosa* has basidia with five to six sterigmata and the spores are consistently smaller, 5–7 × 3–4 μ.

The cystidioles in *P. rimicola* are simple or more commonly capitate in contrast to the lobed cystidioles characteristic of *P. pruinosa*.

Peniophora pruinosa (Pat.) comb. nov. (Fig. 2)

Corticium pruinosum Pat., Cat. rais. pl. cell. Tunisie p. 60, 1897 (!!); Sacc. & Syd., Syll. Fung. 14 : 222. 1899.

Peniophora chordalis Höhn. & Litsch., K. Akad. Wiss. Wien Math.-Nat. Kl. Sitzungsb. 115, I : 1598. 1906 (!!); Bourd. & Galz. Soc. Mycol. Fr. Bul. 28: 382. 1913. Hymén. de Fr. p. 280. 1928.

Peniophora subgelatinosa Litsch., Österr. Bot. Zeitschr. 77 : 128. 1928 (!!).

The general features of the fructification and of the cystidia are essentially as described for *P. rimicola*; cystidioles cylindric or tapering gradually from base to apex, 25–45–(60) × 2.5–3.5 μ, wall slightly thickened below, apex occasionally simple or capitate when young, more commonly with three to five short blunt lobes; basidia cylindric or cylindric-clavate, 15–25 × 7.5–8 μ, with (four) five to six (seven) short sterigmata; spores ellipsoid, depressed and appearing straight on one side, 5–7 × 3–4 μ, walls thin, appearing smooth in potassium hydroxide but finely asperulate in water or Melzer's solution, non-amyloid.

Specimens examined:

New York: On *Platanus occidentalis*, King's Ravines, N. of Frontenac Point, W. side Cayuga Lake, H. S. Jackson, July 8, 1937.

Austria: Auf morscher Rinde (*Pinus* ?), in der Grossen Klause bei Aspang, Nieder-Österreich, Wechsel, June 2, 1906. FH–H. (**type** of *Peniophora chordalis* Höhn. & Litsch.); on *Quercus*, Georgesberg bei Pr. Kissdorf, Von Höhnel, 1903, FH–H; on *Fagus silvatica*, Lainzer-Tiergarten bei Wein, V. Litschauer, July 12, 1929, FH–B; an morschem Ast von *Quercus* sp., same locality, V. Litschauer *356*, July 7, 1930, ex UPS; on *Fagus*, Kranebittenklamm bei Innsbruck, Tirol, V. Litschauer *27*, Aug. 8, 1929; auf morschen Ast von *Salix caprea*, Ruezbachtal im Stubai, Tirol, V. Litschauer, March 28, 1923, ex herb. Litschauer *36* (**type** of *Peniophora subgelatinosa* Litsch.).

France: sur *Populus*, l'Aveyron, July 1915, Galzin *18291* ex herb. Bourdot *19509*, FH–B; May 1905, Galzin *905* ex herb. Bres. NY.

Tunisia: sur bois de Chène, El Fedja, Jan. 1893, N. Patouillard (**type** of *Corticium pruinosum* Pat.), FH–P.

Brazil: Sta. Maria, Rio Grande de Sul. Rick. 1936 (as *Kneiffia plumbicolor* Rick n.sp. ined?) FH.

Corticium pruinosum Pat. is quite certainly the same as *P. chordalis*. The cystidia of the two species are alike and the spore size and markings correspond. The type specimen is not in the best of condition but we have seen a few basidia with six sterigmata. Unfortunately we have not been able to demonstrate the presence of the lobed cystidioles but these are often very scarce and perhaps disappear in old specimens. We are quite convinced that the two species are the same and have provided the transfer above.

As noted in the discussion of *P. rimicola* this species differs in the size of spores, in the presence of cystidioles with lobed apex, and in the number of sterigmata and spores borne on the basidia. In. *P. rimicola* the number of sterigmata varies from two to four while in *P. chordalis* there are ordinarily five to six with only occasional ones with four or seven.

As noted above the characteristic lobed cystidioles are extremely scarce in some collections and have not been mentioned by previous authors, except by Litschauer for *P. subgelatinosa*. They have, however, been demonstrated in all the collections assigned to this species, except in the type of *Corticium pruinosum*.

P. chordalis was described and figured as having only four sterigmata. A careful study of the **type** has shown that the basidia for the most part have five sterigmata and one was seen with six. In another collection in the Von Höhnel herbarium the basidia are commonly with five sterigmata with occasional ones with six. While no four-spored basidia were noted in the collections in the Von Höhnel herbarium, a survey of all collections available shows that the sterigmata vary from four to seven. In some, five predominate and in others, six.

The spore wall appears smooth when potassium hydroxide is used in the mounting fluid and shows the least degree of roughening of any of the group when mounted in Melzer's solution. However, careful examination of mounts made in the latter solution shows that the walls are very finely and delicately asperulate.

Bourdot and Galzin give the spore measurement of *P. chordalis* as 6–9 × 3–5 μ which is larger than has been observed in any of the collections recorded above. We have found among specimens determined by Bourdot as that species, one collection referable to *P. pulverulenta*. The spores in the latter species are appreciably longer and this may account for the large measurement recorded by Bourdot and Galzin.

Peniophora subgelatinosa appears to be a form in which the lobed cystidioles are relatively more abundant than usual. Otherwise the characters are the same as here described for *P. pruinosa*. Litschauer gives the spore measurement as 5–8 × 3.5–4 μ. We have not found spores longer than 7 μ in the portion of the **type** of this species available to us and the majority are 6.5 μ or less.

Peniophora pulverulenta (Litsch.) comb. nov. (Fig. 3)

Corticium pulverulentum Litsch. Österr. Bot. Zeits. 88 : 112. 1939.

Fructification widely effused, when fresh mucous-gelatinous, hyaline or bluish gray, drying to a whitish, gray to cinereous semitransparent varnishlike incrustation, surface becoming pruinose and somewhat pulverulent under lens; subiculum thin, 20–30 μ, obscure, hyphae irregularly horizontal walls thin, soon gelatinizing; large cystidia absent; cystidioles few, simple, capitate, 16–25 × 3–3.5 μ, enlarged to 4.5–5 μ at apex, wall thin; basidia cylindric or broadly clavate, 20–25 × 5.5–8 μ bearing usually four, rarely two, three, or five subulate, arcuate sterigmata, 4–5 μ long; basidiospores ellipsoid, 8–12 × 4.5–6 μ, slightly depressed on one side with lateral apiculus, walls thin or slightly thickened, smooth in potassium hydroxide, in water, lactic acid, or Melzer's solution adorned with longitudinal markings 0.5–1 μ apart, arranged in a broad spiral, nonamyloid.

Specimens examined:

Ontario: On bark or wood of deciduous trees, Paradis' Bay, W. shore Lake Timagami, Aug. 7, 1937, *16698*; Woods W. of Maple, York Co., Oct. 28, 1939, *17710*, Oct. 11, 1941, *17582*, Oct. 9, 1943, *18720*, Sept. 21, 1947, *22437*, Nov. 6, 1948, *23200*; woods N. of Richmond Hill, York Co., Oct. 25, 1942, *18656*, Sept. 27, 1947, *22438*; on bark of *Tsuga canadensis*, woods near Sunnybrook Park, Toronto, Sept. 23, 1944, *19122*.

Austria: On morschem Laubholz (*Fraxinus excelsior* L.), Nied.-Österr., beim Lunzersea, Sept. 16, 1930. V. Litschauer, **type**.

France: On *Cornus* (cornouiller) Labastide-Pradines, L'Aveyron, June 5, 1913, M. Galzin *13127*, herb. Bourdot *13954*, Lloyd herb. *33472*, BPI (as *P. chordalis* Hohn. & Litsch.)

The proper determination of this species was long delayed and our Ontario collections have been carried for several years under an herbarium name. My associate, Miss E. R. Dearden, was responsible for calling to my attention the fact that the spores of *Corticium pulverulentum* Litsch. showed the spiral marking which was the chief characteristic of the supposed undescribed species. A careful examination of the **type** shows all the essential characters of the Ontario collections including the capitate cystidioles. The portion of the **type** available to me is very meager and the description and drawings have been made from Ontario collections.

The species is distinctive because of the spirally marked spores, the presence of capitate cystidioles comparable to those of *P. rimicola* and *P. praeterita*, and the absence of the large cystidia characteristic of the other three species. Neither the spiral marking of the spore wall nor the presence of the capitate cystidioles was noted by Litschauer. The former character is not evident if potassium hydroxide is used in making microscopic mounts and the cystidioles are not abundant and are easily overlooked.

Litschauer quite naturally described the species in *Corticium* and it could perhaps well be left there but to do so would separate it generically from what we believe are its immediate relatives. These clearly belong in *Peniophora* as that genus is at present delimited. For this reason the species is here transferred.

The collection from France is one from the herbarium of H. Bourdot in the Lloyd herbarium at Washington, D.C., labeled *Peniophora chordalis* Höhn. & Litsch. In the description of *P. chordalis* furnished by Bourdot and Galzin in their "Hyménomycètes de France", the spore size given (6–9 × 3–5 μ) indicates a longer measurement than I have found in any collection of that species. It seems possible that the spore measurement of the collection cited above may have been included in making up their description.

P. pruinosa = *P. chordalis* has not yet been encountered among collections made in Canada. The only North American collection we have seen is one collected by the writer in New York.

Peniophora praeterita sp. nov. (Fig. 4)

Fructificatio effusa, tenuis, 15–20 μ, viva mucoso-gelatinea, hyalina vel glauco-caerulea, sicca in glauca semi-translucida vernicosa membrana consistens, in superficie sub lente pruinosa; subiculum obscurum, hyphis 2–2.5 μ irregulariter paralleliter currentibus, tunicis tenuibus dein mox gelatineis, nodoso-septatis; cystidia cylindracea, subflexuosa, 60–80 × 6–8.5 μ, tunicis aequaliter tenuibus, projicientibus; cystidiola pauca, cylindracea, simplicia vel capitata, 12–25 × 3–5 μ; basidia cylindracea vel clavata, 18–25 × 6–8.5 μ, 3–5 subulatis, late divergentibus, ad 5 μ longis, sterigmatibus; basidiosporae late ellipsoideae vel subglobosae, 5.5–9 × 4.5–7 μ, tunicis tenuibus hyalinis, minute conspicueque verrucosis, non amyloideis.

Fructification widely effused, thin, 15–20 μ thick, when fresh mucous-gelatinous, hyaline or bluish gray, drying to a whitish gray semi-transparent

vernicose film, surface pruinose under a lens due to cystidia and emergent basidia, firmly adnate; subiculum obscure, thin, hyphae 2–2.5 μ wide, irregularly horizontal, with clamps, walls thin, soon gelatinizing; cystidia cylindrical, somewhat flexuous, 60–80 × 6–8.5 μ, walls uniformly thin, arising directly and at right angles from basal hyphae, projecting for nearly entire length; cystidioles few, cylindrical, simple or capitate, 12–25 × 3–5 μ; basidia cylindrical or clavate, 18–25 × 6–7–8.5 μ bearing three to five, rarely two or six subulate, widely divergent sterigmata to 5 μ long; basidiospores broadly ellipsoid or subglobose, 5.5–9 × 4.5–7 μ, laterally depressed, with prominent apiculus, walls thin or slightly thickened, hyaline, finely and sparsely but prominently verruculose, becoming slowly smooth in potassium hydroxide, nonamyloid.

Specimens examined:

Ontario: On decorticated wood of deciduous trees, including *Acer*, *Betula*, *Ulmus*, *Salix*, and *Populus*; New Durham, Brant Co., R. F. Cain, July 17, 1937, *13714*, Aug. 24, 1937, *13715*, Aug. 30, 1937, *13713*, *13716*; S. of Hatchley, Brant Co., R. F. Cain, Sept. 5, 1941, *18028*, Sept. 22, 1939, *15184*; Benwell Swamp, Gobles, Oxford Co., R. F. Cain, Sept. 24, 1939, *15126*; Silver Lake, Frontenac Co., R. F. Cain, Sept. 1, 1941, *17595*, *17596*, *17597*, **type**, *17598*, *17599*; woods W. of Maple, York Co., Oct. 9, 1943, *18835*; Upper Don Valley, Toronto, July 3, 1946, *20520*, July 22, 1946, *20674*; Camp Billie Bear, Bella Lake, Sept. 12, 1949, *23201*.

Connecticut: On wood of *Ulmus americana*, East Granby, H. G. Eno, Sept. 15, 1939, FP *84871* BPI.

P. praeterita differs from both *P. rimicola* and *P. pruinosa* in the size and shape of the spores and in the large cystidia which show no appreciable thickening at the base.

This is the only species of the four in which the spore markings are sufficiently prominent and persistent to be evident in mounting fluids containing potassium hydroxide. Even in this species the markings very slowly disappear in such mounts after standing for some time.

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