Lecania Massal.
(LECANORALES)

After various authors

Rev. November 9, 1997; still very preliminary!

Thallus crustose, thin to thick, continuous or of scattered granules, warted or areolate, rarely papillate or somewhat lobed (to fruticulose?); upper surface smooth to warted-papillate, occasionally with soralia or minute, granule-like outgrowths (blastidia or goniocysts), gray-white, white-yellow, to brown-black, sometimes ± pruinose. Upper cortex 3-4 cells thick, of anticlinal hyphae, occasionally densely crystalline or covered by an amorphous layer. Photobiont chlorococcoid.

Apothecia sessile, at first mostly flat, often becoming ± convex; disc 0.4-0.6(-1) mm diam., pale- to black-brown, to orange, sometimes pruinose. Thalline exciple usually present, rarely excluded, ± cellular or of hyphae arranged in a gelatinous matrix. True exciple sometimes developed, the cells at outer edge rounded, thick walled, elongate, thin walled below; consisting of few to many hyphae, the hyphae fairly abundantly furcate but non-anastomosed, with cell lumina narrowly cylindrical (1-1.5 um wide) in the interior but gradually thickenin towards the rim (up to 5 um wide), thus giving each hypha a characteristically club-shaped appearance. Hymenium colorless, K/I+ blue; epihymenium with yellowish, brown, or blue-green pigments that are often markedly unevenly distributed, giving the disc a characteristically "dotted" appearance when wet (not seen in pigment deficient specimens. Hypothecium colorless or pale. Paraphyses thick, simple, conglutinated, easily separated in K, gradually thickened upwards, sometimes submoniliform or with 1-2 terminal cells with dark pigmented cap, the terminal cell up to 5 um wide. Asci Biatora-type or Bacidia-type; tholus with a fairly low and blunt, more or less conical ocular chamber and a fairly high, conical axial body that is often but not always (often lacking in L. cuprea) surrounded by a heavily amyloid zone that is darker than the remainder or the d-layer. Spores 8(-16), ellipsoid, fusiform or bacilliform (or oval to elongate-ellipsoid?), often slightly (occasionally rather strongly) curved, rather thick-walled, colorless, without a thickened perispore, without ornamentation, (0-)1-3(-5)[-7?]-septate.

Pycnidia frequent in species on trees, very rare in saxicolous species. Microconidia strongly curved (or sometimes sigmoid in L. fuscella), 0.5-0.8 um wide, 0-1-septate. Macroconidia more or less curved, 1.0-2.0 um wide, 0-1-septate (5-7-septate in L. naegelii).

Mostly without substances; atranorin, chloratranorin, gangaleoidin and unidentified terpenes sometimes present.

On rock, soil, or bark. Most frequently associated with nutrient-rich or -enriched, ± basic substrata in inland and coastal sites.

Although the European species on rock have been monographed recent, this is a very difficult genus in North America, partly because it is often difficult to distinguish from other genera. In simplistic terms it's a Lecanora with septate spores, but...

Key to Lecania-like Genera

1. Apothecial discs bright red. Spores (1-)3-7-septate, fusiform to acicular or elongate-ellipsoid and curved. [If discs K+ violet and spores polarilocular, see Caloplaca]. ..... (see Haematomma and Ophioparma)

1. Apothecial discs at most reddish brown. Spores (0-)1-3(-5)-septate, mostly shortly ellipsoid, rarely ellipsoid to fusiform...... 2

> **2. Thallus with thamnolic acid, K+ persistently bright yellow, P+ yellow to orange. Spores to 3-5-septate** ..... (see Loxospora)
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> **2. Thallus without thamnolic acid, K-, K+ yellowish, or K+ yellow then red, P- or P+ yellow or orange.** 3

3. Spores mostly non-septate. (if growing on mosses, see Bryonora; if apothecia without algae, also see Lecidea and its segregates). 4

3. Spores mostly septate (sometimes indisinctly so in water). If apothecia without algae, also see Toninia, and various segregates of Bacidia and Catillaria). 9

> **4. Thallus usually distinctly greenish yellow to brownish yellow (at least under pruina), KC+ yellow (usnic acid or related substances).** ..... (Squamarina and Lecanora)
>
> **4. Thallus brownish to grayish or whitish, KC- or sometimes KC+ orange, red, or violet, without usnic acids.** 5

5. Thallus with dense pruina, appearing distinctly bluish. Thallus weakly and irregularly rosette-forming, the marginal lobes mostly short and indistinct. Discs blackish, densely and coarsely pruinose. Spores 6-10 x 3-4 um. Ascus type ?. Thallus K-, C-, containing unknown (grayish-) yellow 3&3A,5&5B,5,5,&2C] only. On rock, southern California, coastal. ..... [Lecanora? "caesiella" Ryan & Nash ined.]

5. Thallus pruinose or not, but if densely pruinose then appearing whitish, not at all bluish. 6

> **6. Asci Lecanora-type, with broad axial mass extending downward (usually reaching through the entire tholus) and well developed ocular chamber. Fulcra exobasidial; spermatia filiform or rarely bacilliform.** Spores sometimes appearing 1-septate. Chem.: atranorin, various phenolic substances or fatty acids, or no substances. ..... Lecanora (e.g., L. helicopsis)
>
> **6. Asci Bacidia-type or Catillaria-type.** Thallus tightly attached, not squamulose. On rock. 7

7. Asci Bacidia-type, with narrow, conical axial mass extending partway upwards from the endoascus. Thallus effuse, not lobed, creamy, whitish gray, or greenish gray. Thallus containing atranorin and stictic acid. Spores rarely appearing 1-3-septate. Pycnospores narrowly ellipsoid to bacilliform. ..... "Lecanora" tenera

7. Asci apparently Catillaria-type, the tips entirely I+ dark blue, without axial mass; ocular chamber absent or small. Thallus radiately lobed, densely white pruinose, appearing ± pure white. Thallus containing unidentified substances. (See under Solenopsora for more information on these species; the name and distinctions of the unpublished genus are tentative]. 8

> **8. Spores (11-)12-13(-18) x (3-)4-5 um. Coastal (Santa Catalina I., California).** ..... ["Lecanoroidea catalinae" Ryan & Nash ined.]
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> **8. Spores (6-)8-10(-12) x 5-6(-7) um. Inland (Hidalgo, Mexico).** ..... ["Lecanoroidea hidalgoensis" Ryan & Nash ined.]

9. On mosses, montane to alpine. True exciple with distinct, conglutinated cortex.

Ascospores thick-walled, ellipsoid-elongate to spindle-shaped. Pycnospores bacilliform. Asci with an I+ blue outer wall layer and a distinctly I+ blue tholus. Thalline exciple present, but apothecia appearing biatorine. Ascospores simple to 3(-5)-septate. ..... Bryonora

9. On other substrates, or if on mosses then spores thin-walled and other characters often different. 10

10. Asci Teloschistes-type, often distinctly narrowing towards the tips, the tips with a rather thin, not or scarcely amyloid layer above around the endoascus, but with distinct I+ dark blue outer coat. Spores usually polarilocular. Epihymenium often K+ violet. ..... Caloplaca

10. Asci otherwise, gradually rounded towards tips, the tips, with a large, distinct I+ dark blue tholus, with at most a very thin I+ blue outer wall layer. Spores not polarilocular. Epihymenium more often K-. 11

11. Asci Catillaria-type, the tips entirely I+ blue, without non-amyloid area and with scarcely protruding tip of inner sac. Fulcra Type VI of Vobis, pleurogenous. Pycnospores bacilliform. (If apothecia lacking algae, also see Catillaria s. lato). 12

11. Asci Bacidia-type or Biatora-type, with conical axial mass. Fulcra and pycnospores various. 13

12. Spores halonate, the perispore gelatinous, swelling markedly in K. Thallus crustose, effuse; upper cortex usually thin or indistinct. Fulcra enteroblastic, and arranged in branched chains. Chem.: atranorin (according to Mayrhofer?; argopsin according to Coppins), ± zeorin; surfaces often with brownish (K-, N-) or greenish (K-, N+ reddish) pigments. Apothecia sessile; thalline margin soon excluded. Paraphyses ± simple, with swollen, mostly dark brown, capitate apices. Spores 1-septate. On rocks or bark. ..... Halecania

12. Spores not halonate; perispore absent. Thallus squamulose or lobate; upper cortex distinct, well developed. Chem.: often terpenoids, often with pannarin (P+ orange) and various unidentified substances. Apothecia sessile; thalline margin present, sometimes becoming excluded. Paraphyses simple, 1.5-2 um wide, with swollen apices that often have an internally brown apical cap. Asci sometimes with a small ocular chamber. Spores always 1-septate (according to Purvis & James), ellipsoid to fusiform. Related to Lecania according to Purvis & James. On rocks and soil in crevices in coastal or sunny areas, predominantly Mediterranean. ..... Solenopsora s. lato (incl. Placolecania and perhaps an undescribed genus)

13. Asci Biatora-type, with darker staining central tube around the axial mass. Thalline exciple absent. Pycnospores bacilliform to filiform. On soil, moss, or rock. ..... Toninia

13. Asci Bacidia-type, the tips with narrow non-amyloid axial mass distinctly protruding papilla from the inner sac, without darker staining tube. Fulcra exobasidial (acrogenous, bearing the pycnospores at the apices), simple. Pycnospores sickle-shaped or curved-filiform. Surface cells and paraphyses tips without dark apical caps. Epihymenial pigment, when present, reddish brown, K+ purplish. Spores without thickened perispore. Chem.: (usually?) no substances; sometimes with terpenoids or "lecanin" ("neutral substance"; of unknown structure). (If apothecia lacking algae, also see Bacidia s. lato). On all substrates. ..... Lecania ± s. str.

I-A. On bark or wood
Spores 3-septate when mature.

1. Spores mostly 1-septate, 8-12(-16) per ascus. ..... (see L. cyrtella; the name L. sambucina has been applied to specimens with predominantly 12-16-spored asci)
1. Spores mostly 3-septate. 2
    2. Thalline margin absent. 3
    2. Thalline margin present at least in young apothecia. 4
3. Length of spores not exceeding 6 times the width. ..... L. naegelii
3. Length of spores exceeding 7 times the width. ..... L. stigmatella
    4. Apothecia large, conspicuously elevated on subpedicellate bases. S. California. ..... L. cyathiformis Szatala
    4. Apothecia small (to 0.8 mm diam.), adnate to ± sessile. 5
5. Spores 8 per ascus, 11-14 x 3.5-5.5 um. Mt. Shasta, California. .... L. shastensis Herre
5. Spores 8-16 per ascus, 12-21 x 4-6 um. ..... L. fuscella (Schaerer) Körber (syn. L. syringea)

I-B. On bark or wood.
Spores simple to mostly 1-septate.
Thallus not lobed.

1. Spores under 4 um wide. 2
1. Spores mostly 4 um or more wide. (This is a bad choice). 5
2. Spores 8-12(-15) x 2-3(-4) um, straight. 3
2. Spores 12-20 x 3-4 um, straight to slightly curved. 4
3. Spores 12-16 per ascus. Thallus inconspicuous or continuous, rather smooth. Apothecia discs pale pink to brownish or piebald. ..... L. cyrtella s. lato: L. cyrtellina (Nyl.) Sandst.
3. Spores 8 per ascus. Thallus rimose-areolate, uneven, verruculose here and there. Apothecial discs brownish black. ..... [L. "macounii" Ryan ined.]
4. Thallus yellowish white. Spores 13-20 x 3 um. On Thuja, Cascades of Washington state. ..... [L.? "thujicola" Ryan in herb.]
4. Thallus yellowish brown. Spores 12-16 x 3-4 um. On wood, Sierra Nevada of California. ..... L.? "desolationensis" Ryan in herb.
5. Spores 9-11 x 4-5 um, constricted in center. Discs black when dry, red-black when wet. On Populus. ..... L. constricta W. Weber
5. Spores mostly over 11 um long, not constricted. Discs ± brown. 6
6. Spores distinctly curved, bean-shaped, (10-)12-17 x (3-)4-6 um. Thallus thin, finely granulose, pale gray or ashy gray, ± greenish. Apothecia 0.2-0.5(-0.7) mm wide, discs epruinose, pale brown to reddish brown or blackish-brown, plane, soon or finally convex; margin brownish-white, thin, soon or finally excluded. Epihymenium almost hyaline. Paraphyses conglutinate. Spores often curved, bean-shaped, stubby, subellipsoid to oblong. On smooth bark of trees in mountainous districts. ..... L. dubitans (Nyl.) A. L. Sm. (syn. L. dimera)
6. Spores straight (to weakly curved). Hypothecium hyaline. Spores 8 per ascus. 7
7. Epihymenium with brown granules, otherwise pale. Paraphyses 1-1.5 um wide, the tips not thickened or pigmented. ..... [L. "wheeleri" Ryan ined.]
7. Epihymenium without granules, ± pigmented. Paraphyses over 1.5 um wide, the tips ± thickened and pigmented. 8
8. Thallus very thin, white to pale gray. Apothecia 0.2-0.4(-0.5) mm diam.; discs yellowish to pale pink, or more often yellowish-brown, reddish brown, or blackish-brown, epruinose. Spores 8-12(-16) per ascus, 10-12(-16) x (3-)4-5(-5.5) um, narrowly ellipsoid, 1(-3)-septate, generally curved when mature. On deciduous trees. Ontario, Michigan, S. Dakota, Washington, California. ..... L. cyrtella (Ach.) Th. Fr. (including L. cyrtellina, with spores 12-16 per ascus)
8. Thallus rather well developed, greenish tan to pale yellowish gray (yellowish color may be an artifact of "age" [i.e., in herbarium?]). Apothecia 0.5-0.8 mm diam.; discs constantly pale, flesh-tan to yellowish tan, lightly white pruinose. Spores 8 per ascus, 12-15(-17) x (3-)3.5-4 um, straight (according to Noble's description, but also bent according to her discussion). On conifers. British Columbia, rare. Ryan material from Santa Rosa I. also seems to fit here except that the spores are partly 5-5.5 um wide ..... L. cyrtella sensu Noble.

ADD:

Spores 1-septate, 10-14 x 3.5-4.5 um. Thalline margin greenish white; disc tan. Paraphyses tips not swollen. On Acer. Michigan. According to Noble, Harris reported L. cyrtella from Michigan; need to see how he distinguished this species from that one. ..... L. sp. (Harris, 1977)

II. On soil, mosses, plant remains, or other lichens

1. Parasitic on rock-dwelling lichens. Spores 2-celled, 15-18 x 6.5-8 um. Discs brown-black. Paraphyses capitate and branched. ..... (see Halecania alpivaga, syn. Lecania thallophila)

1. On mosses, plant remains or soil. (also see Bryonora). 2

2. Thallus crustose, granular or verrucose, pale. Spores 14-20(-28) x (2-)2.5-3 um, 3(-5)-septate. Thalline exciple absent. Pycnospores filiform, 31-55 x 1-1.5 um, mostly curved. On turf or clayey soil in nutrient-rich situations. ..... L. subfuscula

2. Thallus bullate to substipitate or ± squamulose. Spores over 3 um wide, 1-septate. Thalline exciple present at least in young apothecia. Pycnospores shorter. 3

3. Thallus Psora-like squamulose; squamules concave. Asci ± Catillaria-type. Pycnospores bacilliform. On soil over bricks and rocks, and on soft rocks. No N. American material yet seen by me. ..... (see Solenopsora holophaea (Mont.) Samp.)

3. Thallus not Psora-like squamulose. Pycnospores filiform. 4

4. Spores ± broadly ellipsoid (L:W usually < 2), mostly to 15(-16) um long and 6-8 um wide. Discs epruinose, somewhat nitid, medium reddish brown (often with hymenium missing and then appearing light brown to pale orangish yellow); thalline margin epruinose. Squamules to 3-4 mm across, substipitate, swollen, bullate squamules, strongly but coarsely crenate-lobed, pale gray to pale orangish yellow or grayish reddish orange to brownish pink. Pycnospores filiform (?). Chem.: unknown substances, bluish or purplish after charring. On soil or caliche, California and Baja California. ..... (see III-A-1: L. dudleyi group)

4. Spores oblong to subcylindrical (L:W ≥ 3), 15-20 um long. Squamules to 1 mm across, ± plane. Thalline margin often pruinose. 5

5. Spores subcylindrical (L:W = 3.7-4), 15-20 x 4-5 um. Discs epruinose to weakly pruinose, dusky grayish; thalline margin usually pruinose at first. Squamules to c. 1 mm across, roundish, angular or sinuate-lobate, concave, contiguous and subimbricate; upper surface ashy gray, the edges whitish. Pycnospores acrogenously formed, filiform, 16-20 um long. On clay, southern California. ..... (L. toninioides Zahlbr.)

5. Spores oblong (L:W = 3-3.3), 15-20 x 5-6 um. Discs epruinose, brownish black. Thallus warty-pruinose, light brown to light grayish brown. On soil, S. California. ..... [L. "acarosporoides" Ryan & Nash ined.]

III-A. On rock.
Thallus ± lobate, squamulose, or papillate.
Spores (0-)1-septate.
Coastal areas of California and Baja California.

1. Thallus clearly radiately lobed, tightly adherent to rock. Discs pruinose. 2

1. Thallus effuse, tightly to loosely adherent to rock or soil. Discs pruinose or not. 3

2. Thallus only weakly or spottily pruinose. Spores 6-10 x 1.5-2.5 um. Asci Bacidia-type. Containing unknown phenolic substances. Channel Islands, California. ..... [L. "brattiae" Ryan & Nash ined.]

2. Thallus densely pruinose throughout. Spores mostly over 3 um wide. Asci ± Catillaria-type. Pycnospores formed pleurogenously, bacilliform. ..... (see "Solenopsora" candicans group; if spores non-septate, see "Lecanoroidea" spp. under Solenopsora)

3. Thallus clearly squamulose or bullate-squamulose; squamules averaging over 1 mm wide and thick. Often containing terpenoids or other lichen substances with purplish or bluish colors after charring. Asci ± Catillaria-type. Pycnospores formed pleurogenously, bacilliform. 4

3. Thallus subsquamulose; squamules smaller and thinner. Mostly without lichen substances. 6

4. Thallus of concave squamules. Pycnospores formed pleurogenously, bacilliform. ..... (see Solenopsora holophaea)

4. Thallus of plane to convex or bullate squamules. 5

5. Discs ± densely pruinose. Pycnospores bacilliform. ..... (see Solenopsora crenata)

5. Discs epruinose or almost. Pycnospores filiform (?). ..... III-A-1: "L." dudleyi group

6. Spores oblong to subcylindrical (L:W = over 3), averaging over 15 um long. Hymenium over 70 um high. 7

6. Spores ellipsoid to oblong-ellipsoid (L:W = mostly under 3), or partly oblong but then averaging less than 15 um long. Hymenium height various. 9

7. Thallus whitish, composed of convex papillae aggregated into separate groups. Growing in Washington state. Spores subcylindrical [L:W = 4-5(-6.3)], straight or curved, 15-22 x 3-4(-5) um. Paraphyses tips hyaline. Apothecia sessile on tips of the papillae, 0.7-2.2 mm diam.; discs reddish brown, convex; thalline margin crenate, disappearing. On serpentine rocks in the lower supralittoral zone. ..... [L. "longispora" Ryan ined.]

7. Thallus grayish brown to blackish brown, composed of ± flattened subsquamulose areoles. Growing in southern California. 8

8. Thallus dark blackish brown, epruinose. Spores 15-20(-26) x 4.5(-6) um. Spermatia straight, 8-10 um long. Hypothecium to 300 um. Hymenium and asci I-(?). Hymenium to

85 um. Discs brownish black. On sandstone. .... "L." hassei

8. Thallus grayish brown; edges of areoles paler. Spores 15-20 x 4-5 um. Spermatia curved, 16-20 um long. Hypothecium to 75-100 um. Hymenium and ascus tips I+ blue. Asci Bacidia-type. Hymenium 100 um. Discs dark brown or black. On clay or rock. ..... III-A-2: L. toninioides group

9. Spores averaging under 13 x 4.5 um. 10

9. Spores averaging over 13 um long or over 4.5 um wide, or both. 11

10. Thallus pale gray or grayish greenish. ..... [L. "griseothallia" Ryan & Nash ined.](L. subdispersa sensu Hasse)

10. Thallus distinctly brown. Spores 7-12 x 3 um..... [L. "parvispora" Ryan & Nash ined.]

11. Thallus dark gray to blackish. Discs brownish black to black. Spores 12-17 x 5-5.5 um. Thallus of ± dispersed warts to flat-concave or rugose squamules with coarsely crenulate to lobate borders. Hymenium I+ blue. ..... L. fructigena

11. Thallus and/or discs at least partly paler or more deeply colored. 12

12. Thallus subunits ± convex. Spores 9-14(-16) x 4-6 um [L:W = 2.3(-2.7)]. ..... III-A-3: L. aipospila group

12. Thallus subunits plane to ± concave. ..... III-A-4: L. brunonis group s. lato

III-B. On rock.
Thallus crustose, effuse
Spores (0-)1-septate.
Distribution various.

1. Spores oblong (L:W = over 3), averaging over 15 um long. 2

1. Spores ellipsoid to oblong-ellipsoid (L:W = under 3), averaging under 15 um long. 5

2. Thallus rimose-areolate. Growing in inland areas. Areoles grayish yellowish brown; areoles 0.3-0.4 mm across. Discs black. Spores 13-20 x 5-6 um. On rock in sagebrush zone, central Washington state. ..... [L. "yakimae" Ryan in herb.]

2. Thallus verrucose or areolate. Growing in coastal areas. 3

3. Spores 11-15(-18) x 3-4 um. On serpentine rock in the supralittoral zone, Washington State. Thallus of contiguous, plane to slightly convex areoles 0.2-0.4 mm across, grayish brown, finely mottled. ..... [L. "serpenticola" Ryan ined.]

3. Spores over 15 x 4 um. On clay or rocks above the supralittoral zone, southern California. 4

4. Thallus of ± scattered verrucae ca. 0.2-0.3 mm across; upper surface yellowish gray to yellowish white. ..... III-B-1. Lecania subdispersa group

4. Thallus of contiguous or imbricate, plane to slightly convex or concave areoles ca. 0.3-0.5 mm across; upper surface brown to grayish brown. ..... (see III-A-2: Lecania toninioides group)

5. Thallus whitish, grayish, or yellowish, or absent. 6

5. Thallus ± distinctly brown or blackish. Spores averaging over 13 um long. .... (see III-A : L. fructigena, III-A-3: L. aipospila group, and III-A-4: L. brunonis group)

6. Apothecia to 0.2 mm diam., pale, wax-colored. Spores 7-12 um long, 1-2-septate. Thallus yellowish ashy, thin, chinky. Apothecia flat to convex. On granite, Massachusetts. ..... [L. flavens (Willey) ined.] (syn. Bacidia flavens) (possibly = L. erysibe)

6. Apothecia mostly larger and darker. Spores mostly longer, 1-septate. 7

7. Thallus blastidiate or sorediate. ..... III-B-2: L. erysibe group

7. Thallus not blastidiate or sorediate. 8

8. Discs ± distinctly pruinose. 9

8. Discs epruinose. 10

9. Spores 6-7 x 2.5 um. ..... [L. "microspora" Ryan & Nash ined.

9. Spores over 9 um long and over 5 um wide. ..... III-B-3: Lecania turicensis group

10. Spores distinctly constricted at septum, the cells ± globose. Thallus often with yellowish tinges. Paraphyses tips strongly thickened.Apothecial margin soon excluded. On calciferous rocks, Arctic or at least northern, and not primarily maritime. 11

10. Spores not or scarcely constricted at septum, the cells not globose. Thallus not yellowish. On various rock types. 12

11. Thallus yellow to grayish yellow. Paraphyses tips 7.5-8.5 um wide. Apothecia mostly 0.2-0.3 mm diam.; discs red-brown to black, paler reddish when wet (epihymenium reddish brown); thalline margin distinct when young. Spores (9-)11-14 x (5-)6-7.5 um. ..... L. flavescens

11. Thallus yellowish gray to yellowish white. Paraphyses tips 5-6(-7) um. Apothecia

mostly 0.5-0.6 mm diam.; discs black, unchanged when wet (epihymenium dark olivaceous); thalline margin scarcely evident, very soon excluded. Spores (8-)10-12(-15) x 4-5(-7) um. Arctic. ..... [L. groenlandica (Lynge) ined.]

12. Discs black, turning reddish when wet. Apothecia to 0.2-0.6 mm diam. Thalline exciple 0.1 mm wide, blackening next to disc. Growing on calcareous rock in Illinois. Asci apparently Catillaria-type, tips entirely I+ blue, without axial mass or ocular chamber, wall I+ blue; young asci with small I+ dark blue structure at tip, I+ moderate blue inner wall, and I+ pale blue outer coating. Spores 14-18 x 5-7 um. Spermatia bacilliform?. ..... "L." perproxima

12. Discs at least partly brown, or if black then with bluish cast, unchanged when wet, margin 0.2 mm wide and not blackening, and growing on soft crumbly caliche on the coast of southern California. 13

13. Discs black, with slightly bluish tinge. Spores 12-20 x 4-6 um. **Thallus rimose to partly subsquamulose, inconspicuous, yellowish white (light grayish brown when wet). Thalline exciple thick, persistent.** Containing unknown (yellow after charring, 5A,1B,3C). On soft, crumbly caliche, Coast of S California. ..... [L. "alboatra" Ryan & Nash ined.]

13. Discs at least partly distinctly brown. Spores rarely over 15 um long. 14

14. Spores averaging under 13 um long. .....III-B-4: L. "brevispora" group

14. Spores averaging over 13 um long. 15

15. Growing in California or Baja California. ..... III-B-5: [L. "riefneri" group]

15. Growing in SE Arizona. ..... [L. "chiricahuae" Ryan & Nash ined.]

III-A-1.
"L." dudleyi Group

1. Spores 12-15 x 5 um, ellipsoid to somewhat narrowly ellipsoid, [(2-)2.4-2.5(-3) times as long as wide]. Upper surface moderate yellowish brown to dark grayish yellow or light grayish olive. Baja California. Containing unknown blue-gray after charring 5A, 6BC, and terpenes (purplish brown after charring) 5ABC and 5C. Thalline margin 0.1-0.2 mm wide, persistent. Discs light to medium brown or dark grayish brown. Hymenium 100 um. Hyphae of apothecial margin unoriented, c. 2-3 um wide. Thallus K-, C-, KC-, P+ pale yellow. On rock.. ..... [L. "bajacalifornica" Ryan & Nash ined.]

1. Spores averaging over 5 um wide, ellipsoid to ovoid or broadly ellipsoid, [mostly 2 times as long as wide]. Upper surface with orangish or reddish cast, not olivaceous. California. 2

> **2. Containing unknown violet-gray to purplish brown after charring, UV*+ yellow 5-6,5,&54A, 5-6&5B, 6&6C; unknown UV*+ blue 7A; terpene? (substances different from those in the type of L. dudleyi). Discs somewhat nitid, moderate reddish brown (often with hymenium missing and then appearing light brown to pale orangish yellow).** Hymenium 75-80 um high. Upper surface pale gray to pale orangish yellow or grayish reddish orange to brownish pink. Thalline exciple persistent. Spores 10-15 x 6-8 um. Hypothecium to 150 um. Hyphae of apothecial margin unoriented, c. 5 um wide. Paraphyses 2-2.5 um thick. Asci apparently Catillaria-type. Upper cortex 30 um thick; epinecral layer 30 um, with 10 um thick surface layer of rather coarse crystals. Thallus K-, C-, KC-. On soil, San Nicolas I., California. ..... [L.? "venturae" Ryan & Nash ined.]
>
> **2. Containing unknowns blue-gray to greenish after charring. Discs matt, darkening to brownish black.** 3

3. Discs soon becoming protruberent and moderately convex to subglobose; thalline exciple soon excluded. Hymenium 80-95 um high. Spores 12-16 x 6-7.5 um. Upper surface pale orangish yellow or light yellowish brown, to medium, strong or deep brown. Discs brownish black to black (type) to reddish brown. Upper cortex 42 um; epinecral layer 35 um. Hypothecium 75 um. Hyphae of apothecial margin unoriented, c. 5-7 um wide. Paraphyses 2-3 um thick. Pycnospores (according to Wetmore) filiform, curved, 21 um long. Containing unknown bluish after charring 6 & 5 C. Asci apparently Catillaria-type. Thallus K-, C-, KC-. On rock, soil or clay, Santa Cruz Peninsula, California. ..... "L." dudleyi Herre

3. Discs plane or finally moderately convex; thalline margin persistent or finally excluded. On rock or caliche, Channel Islands of southern California..... 4

> **4. Hymenium 65 um. Upper surface light or pale yellowish orange, light yellowish brown, grayish yellowish brown, yellowish gray, light grayish brown or light brown. Thalline exciple persistent.** Containing unknown bluish after charring 6&5C. Spores (9-)11-13(-15) x (4.5-)5-7 um. ..... [L. "bulliformis" Ryan & Nash ined.])(= L. dudleyi sensu Hasse)
>
> **4. Hymenium 80 um. Upper surface deep brown to dark grayish reddish brown, or partly pale orange. Thalline exciple becoming excluded.** Containing unknowns blue-gray after charring, 6&6-7A, 6-7&7B, 6C. Spores 11-15 x 5-6 um. Hypothecium to 150 um thick. Hyphae of apothecial margin radiating, c. 2-3 um wide. Paraphyses 2-2.5 um thick. ..... [L. "glebulosa" Ryan & Nash ined.]

III-A-2.
L. toninioides group

1. Upper surface grayish brown to moderate yellowish brown, pale to dark grayish yellowish brown or light gray, pruinose, with light gray to yellowish white margins. Squamules mostly contiguous and discrete, separated by sharp, complete cracks, at most subimbricate, plane to slightly concave, with raised/thickened edges. Algal layer absent from apothecial margin. Paraphyses 2-3 um thick. Discs black or dusky grayish with a faint pruina, scarcely changed when wet, Thalline exciple thin, soon becoming excluded. Epinecral layer 56 um. Spores 15-21 x 4-5.6 um. Spermatia filform, often curved, over 16 um long. Asci Bacidia-type. Upper cortex 49-56 um, of vertical hyphae. On clay, bluffs near Santa Monica, S. California. ..... Lecania toninioides Zahlbr.

1. Upper surface strong brown, brownish orange, light brown, or light to moderate yellowish brown, mottled with yellowish white or light gray. Squamules ± plane, imbricate. Algal layer present in apothecial margin. Paraphyses 1.5-2 um thick. Discs dark brown, epruinose, reddish when wet. Thalline exciple thickish, ± persistent. Epinecral layer 28 um. Spores 16.8-18.2 x 4.2 um. Squamules 0.5-1 mm across. Santa Monica Mts., S. California. ..... [L. "pseudosubdispersa" Ryan ined.]

III-A-3.
L. aipospila group.

1. Thallus thin, areolate (to areolate-verrucose); areoles discrete, often angular. Apothecia to 0.5 mm diam. Thallus grayish yellowish brown to dark yellowish brown. Santa Barbara Island, coast of southern California. ..... Lecania aipospila v. spodophaeiza (Nyl.)

1. Thallus thicker, papillate or granular, the subunits discrete to contiguous, usually roundish, flattening towards the circumference and becoming indistinctly lobed. Apothecia over 0.5 mm diam. Thallus pale brown to gray-brown, or in part purplish or indigo-black. 2

> **2. Apothecia scarce, 0.9-2.0 mm diam. Spores 14-16(-18) x 5-6.5 um.** Often parasitised by a Catillaria species. On non-calcareous sandstone and igneous rocks in the supralittoral zone, British Columbia. ..... Lecania cf. aipospila sensu Noble (Lecania? sp. 1 of Ryan, 1988, from Washington state, is probably the same thing)
>
> **2. Apothecia usually frequent, 0.5-1 mm diam. Spores 9-14(-16) x 4-5 um.** Contains ± 2 unidentified terpenes. On weakly basic, neutral or acidic rock outcrops and cliffs (e.g., granitic and schistose), usually on or near nutrient-rich sites and associoated with seepage tracks in shletered to exposed, rocky coastal areas. 2

3. Thallus suborbicular or spreading irregularly, composed in the center of crowded angular or tuberculose papillae, which are smaller or flattened out towards the circumference, grayish or very dark brown; prothallus dark. Apothecia innate in the papillae. ..... Lecania aipospila v. aipospila

3. Thallus granular; the granules flattened, subcrenate at the circumferance, sometimes dark colored. Apothecia adnate on the granules; discs becoming immarginate. ..... Lecania aipospila v. maritima

III-A-4.
L. brunonis group s. lato

This group is presently a mess.

1. Thallus ± distinctly squamulose, somewhat loosely attached, thickish; areoles mostly 0.5-1 mm or more across, crenate, not composed of granules or verruculae. 2
1. Thallus granular, verrucose, areolate, or subsquamulose, rather tightly attached, thin; areoles < 0.5 mm across with entire margins, or if larger and crenate-lobed then composed of small confluent to imbricate granules or verruculae. 6

> **2. Squamules often concave or undulate, with edges often lifted off substrate.** 3
> **2. Squamules plane to convex, with edges mostly appressed to the substrate**. 5

3. Squamules mostly scattered to grouped, becoming distinctly concave when older; upper surface mostly strong brown to strong yellowish brown; edges often dark grayish brown. Spores (12-)15-18 x (4-)6-7 um, narrowly ellipsoid to oblong-ellipsoid [L:W = (1.7-)2.8-3(3.5)]. No substances. Santa Cruz Island,. California. ..... [L. "castaneoconcava" Ryan & Nash ined.]
3. Squamules mostly imbricate, at most slightly concave or undulate; upper surface light to dark grayish yellowish brown, deep yellowish brown or light to moderate or strong brown; edges concolorous or paler. Spores to 13-15(-17) x 5-6(-7) um, ± ellipsoid [L:W = c. 2]. Containing unknown substances. Apothecia to 1.5 mm acorss; thalline margin 0.1-0.2 mm wide, persistent. Discs light to moderate brown or brownish black. Santa Rosa Island, California. 4

> **4. Containing unknowns deep blue after charring 6C and pale blue after charring 6C. Thallus to 2 mm thick; surface light grayish yellowish brown, to yellowish gray or grayish yellow. Discs brownish black (to dark brown). Spores to 13 um long.** .... [L. "imbricata" Ryan & Nash ined.]
> **4. Containing pale unknowns 6,4,&3C. Thallus to 1 mm thick; surface light brown to strong brown, the edges of the squamules often light grayish yellowish brown. Discs light to medium brown. Spores often to 15(-17) um long.** ..... ["undulata" Ryan & Nash ined.]

5. Spores (9-)12-15 x 4-5 um, 0-1-septate. Squamules scattered to grouped, 0.5-1.5 mm across, convex, crenate. Discs brownish black, becoming convex. On rock, Baja California Sur. 6
5. Spores averaging over 5 um wide. 7

> **6. Thallus surface matt. Cortex c. 35 um thick, of unoriented, irregularly roundish cells with lumina c. 2-5 um across; epinecral layer c. 5 um thick.** Thallus surface yellowish gray, grayish yellowish brown, or medium brown. Apothecia to 1 mm diam., immersed then broadly sessile. Thalline exciple becoming excluded. Hymenium 60 um. ..... [L. "kalbii" Ryan & Nash ined.]
> **6. Thallus surface ± nitid. Cortex 50-60 um thick, of ± anticlinal hyphae with lumina 3-5 um long, c. 2 um wide; epinecral layer 25-30 um thick.** Thallus surface grayish yellow to dark grayish yellowish brown or light olive gray. Apothecia to 1.5 mm diam., adnate to ± broadly sessile. Thalline exciple ± persistent. Hymenium 45 um. ..... [L. "nitida" Ryan & Nash ined.]

7. Spores ellipsoid to narrowly ellipsoid [L:W = 2-2.5], 12-15 x 5-6 um, 1-septate. Thallus light to moderate brown, light grayish brown or light olive gray. Squamules ± convex but folded. Apothecia soon sessile; discs paler and reddish brown next to margin. On sandstone, coast of S. California. ..... [L. "brattiana" Ryan & Nash ined.]

7. Spores narrowly ellipsoid to oblong [L:W = 2.5-3], 11-15(-16) x 4-5(-6) um, simple to 1-septate. Upper surface dark grayish olive to moderate olive brown (or grayish yellowish brown to dark grayish yellowish brown, mottled whitish-grayish). Squamules plane to convex, not folded. Apothecia closely adnate; discs uniformly brownish black. No substances. Santa Rosa Island, S. California. ..... [L. "olivascens" Ryan & Nash ined.]

> **8. Spores ellipsoid to narrowly ellipsoid [L:W = 1.8-2.6], 12-13 x 5-7 um. Areoles 0.2-0.4 mm across, with even surface. Thalline exciple ± soon excluded.** Discs plane to moderately convex. Hymenium 65 um. Areoles plane to slightly convex or slightly to moderately concave or undulate, 0.2-0.4 mm across, roundish to irregular in outline with entire to sinuous margins, discrete, separated by broad fissures; surface grayish yellowish brown. Asci Bacidia-type. Spores (0-)1-septate. San Bruno Mtn, central Califonia coast. Some material from Baja California (Wetmore's "sp. 3", pr. p.) also seems to key out here. ..... Lecania brunonis (Tuck.) Herre s. str.
>
> **8. Spores often oblong-ellipsoid [L:W often > 2.6], averaging over 13 um long. Areoles coarser (mostly over 0.5 mm across), with uneven surface, composed of confluent or imbricated granules or verruculae. Thalline exciple only at length excluded.** ["L. sangabrielensis Ryan & Nash ined.]. 9

9. Discs plane to convex, or turgid. Areoles discrete, separated by broad fissures; surface pale to tawny brown and blackening. Spores narrowly ellipsoid to oblong-ellipsoid [L:W = 2.5-3], 12-18 x 4-7.3 um, or ellipsoid [L:W = 1.9-2.1], 15 x 7-8 um, 1-septate, or rarely oblong [L:W 2.9-3.5], 20-24.5 x 7 um and 3-septate. ..... L. brunonis sensu Herre (1912)

9. Discs concave to plane. Areoles contiguous to imbricate; surface greenish gray to greenish brown, darkening to dull greenish black [according to Hasse's description; however, in the specimens I have seen that were determined by Hasse (including his exsiccati), the surface is mostly grayish brown or medium brown, lacking any green tinges]. Spores oblong-ellipsoid [L:W = 2.8-3], 12-20 x 4-7 um [in specimens I've seen that were determined by Hasse, mostly 5-6 um wide, and often ± ellipsoid rather than oblong-ellipsoid]. Areoles plane to slightly convex [in specimens I have seen that were determined by Hasse, c. 1 mm across], roundish to crenulate. Hymenium 100 um. Spermatia hook-shaped, 16-24 um long. No lichen substances. On sandstone. Santa Monica Range, east to Riverside County, and on Santa Catalina Island. ..... L. brunonis. sensu Hasse (1910)

ADD?:

1. Apothecia soon sessile; discs light brown to light blackish brown, mostly paler towards margin, soon convex, occasionally becoming tuberculate; thalline exciple thin, crenulate. Spores oblong, (10-)12-16 x 4-5.5 um, [(2.2-)3-3.6(-4) times as long as wide], simple or 1-septate. Hypothecium dingy pale yellowish. Epihymenium dingy yellowish. Thallus of dispersed or loosely congregated, small (to 0.5 mm wide) squamules; light ash colored to whitish pulverulent. On calcareous sandstone, Santa Monica Mountains, and on bone, San Nicolas Island, S. California. ..... (Lecania erysibe sensu Hasse)

1. Apothecia closely adnate; discs dark red-brown or blackening, plane; thalline exciple thick, entire. Spores ellipsoid, 11-14 x 4-5.5 um, [(2-)2.5-2.8(-3.5) times as long as wide,

simple or indistinctly 1-septate. Hypothecium hyaline; epihymenium brownish or reddish. Thallus thin and of crumb-like granules, or of thick, fragile, deeply fissured areoles, with minutely and imbricately lobulate surface, sandy brown to olivaceous. On sandstone, Oakland Hills, 400 m. ..... (Lecania erysibe sensu Herre)

III-B-1.
L. subdispersa group

1. Spores only partly oblong and only partly over 15 um long. Thalline exciple persistent. Proper margin evident. Thallus areolate-subsquamulose; areoles scattered, 0.5-0.7 mm across, plane to slightly concave, irregularly roundish, light grayish yellowish brown. Discs brownish black. Santa Cruz Island. ..... [L. "santacruzensis" Ryan & Nash in herb.]

1. Spores entirely oblong and (almost all) over 15 um long. 2

2. Areoles mostly over 0.5 mm across, ± angular. Thalline exciple soon excluded. Areoles separated by wide cracks, plane to slightly convex, yellowish white. Proper exciple not evident. Discs brownish black. Spores (14-)15-20 x 4-5 um, [(3-)3.8-4(-5) times as long as wide]. Santa Rosa Island, California. ..... [Lecania "cherryensis" Ryan & Nash ined.]

2. Areoles to 0.3(-0.5) mm across, roundish. Thalline exciple persistent. 3

3. Spores oblong to subcylindrical [L:W = 4.3-5.5], 16-20(-22) x (3.5-)4-5 um. Discs deep or dark brown to brownish black. Thallus of ± scattered, convex verrucules. On sandstone, Santa Monica Mountains, California. ..... Lecania subdispersa (Nyl.) Hasse s. str.

3. Spores oblong-ellipsoid to oblong [L:W = (2.7-)3.2-3.8(-4.6)], 16-23 x 5-6 um. Discs mostly light to moderate brown, only occasionally blackening. Thallus of ± contiguous, ± plane but uneven areoles. Santa Rosa Island. ..... [Lecania "macrospora" Ryan & Nash ined.]

III-B-2.
L. erysibe group

This species has been very frequently misidentified even in Europe, and may not even occur in N. America. I need to study the N. American specimens more to decide what to do with them. The various "sensu" things probably belong in various other groups.

1. Discs pale, often slightly pruinose, becoming convex and sometimes tuberculate. Thallus subunits to 0.4-0.5 mm across, pale. Apothecia numerous, to 1-1.2 mm diam.; thalline margin crenulate, persistent or finally excluded. Thallus K-, C-. 2

1. Discs dark, orange-brown to brown-black, (usually?) epruinose. 3

2. Thallus of dispersed or loosely congregated, small squamules; surface light ash colored to whitish pulverulent. Discs light brown to light blackish brown. Hypothecium dingy pale yellowish. Spores (10-)12-16 x 4-5.5 um. On calcareous sandstone, S. California. ..... Lecania erysibe sensu Hasse

2. Thallus crustose, granulate; surface light greenish gray. Discs light yellow to flesh colored, with some portions brownish. Hypotehcium hyaline. Spores 12-13(-15) x 5-6 um. On the cementing substance of conglomerate (HCl- to HCl+ slowly in places), rare, British Columbia. ..... Lecania erysibe sensu Noble.

3. Apothecia often over 0.5 mm diam. (to 1 mm). Thallus not blastidiate or sorediate (?). 4

3. Apothecia to 0.4 mm diam. Thallus ± densely blastidiate, sometimes with soralia. Spores 9-15 x 3-5 um, In nutrient-enriched habitats, often on man-made or man-influenced substrates, e.g., brick, damp, ± basic rocks, asbestos-cement, farm-polluted limestones, monuments, very rarely decaying wood. ..... Lecania erysibe (Ach.) Mudd

4. Apothecial margin entire. Pacific coast. Spores 11-14 x 4-5.5 um. On sandstone, central California coast (Oakland Hills, 400 m). ..... Lecania erysibe sensu Herre (1912)

4. Apothecial margin becoming crenulate. Midwestern U.S. Spores 10-14 x 4-6 um. On rocks, Illinois, Iowa, and Minnesota. ..... Lecania erysibe sensu Fink

Group III-B-3.
L. turicensis group

1. Thallus scarcely developed. Spores mostly 10-12 x 3-4 um. Thallus K-, C-. Apothecia scattered. Thalline exciple whitish, disappearing. Paraphyses ± loose. On calcareous rock. 2

1. Thallus more or less well developed, distinct. Spores mostly somewhat larger. 3

2. Apothecia 0.15-0.4 mm, adnate; discs dirty brown, flesh brown to darker, slightly to moderately pruinose. Hypothecium to c. 100 um. Spores (8-)10-12(-13) x 3.5-4(-5) um. Coastal mountains of S. California. ..... Lecania californica (Zahlbr.) Fink

2. Apothecia to 1 mm diameter, substipitate; discs black, densely pruinose. Hypothecium 130-150 um. Spores 10-12 x 3-3.5 um. Meditteranean. Distribution in N. America = ?. ..... Lecania subcaesia (Nyl.) B. de Lesd.

3. Thallus effuse, thin, granular irregularly granular-areolate or areolate, whitish. 4

3. Thallus granular, areolate, or becoming small-squamulose or sometimes lobulate, distinctly grayish, brownish or olivaceous, not white. ..... see III-B-2: Lecania erysibe group

4. Apothecia to 0.1-0.25 mm diam., adnate. Spores 8-15 x 3-6.5 um [?--check Fink again]. Thallus creamy white. Ohio ("material doubtfully included"). .... L. turicensis sensu Fink (as L. albariella)

4. Apothecia to 0.8 mm diam., sessile. Spores 10.5-13 x 4.5-6 um. Thallus white, reddish white or white gray. ..... L. turicensis (Hepp) Müll. Arg. (syn.: L. albariella)

III-B-4.
L. "brevispora" group

1. Thallus yellowish white to light grayish yellowish brown. No lichen substances. Apothecia immersed then soon sessile, 0.8-1 mm diam.; discs plane to slightly convex, matt, moderate brown to grayish brown or dark grayish brown or brownish black; thalline margin thin, entire, ± persistent; proper margin evident or not. Thallus verrucose-areolate to subsquamulose; areoles scattered to contiguous. Spores 10-13(-15) x 3.5-5 um, [(2-)2.6-2.9(-3.7) times as long as wide, mostly 1-septate. Santa Cruz Island. ..... ([L. "fraserensis" Ryan & Nash ined.])

1. Thallus yellowish gray or grayish yellowish brown. With at least traces of lichen subtances. Proper margin evident. Santa Rosa Island. 2

2. Spores 10-13(-15?) x 3-4.5(-5?) um, [(2.2-)2.9-3.3(-4.3) times as long as wide]. Thalline exciple thickish. Containing trace of unknown (yellow after charring, 1B). Thallus rimose-areolate to ± verrucose-areolate, yellowish gray to light grayish yellowish brown. Apothecia to 0.8 mm diam.; discs plane, dark brown to brownish black or partly light grayish yellowish brown to light brown; thalline margin persistent or excluded. Spores simple to 1-septate. ..... [L. "lobosensis" Ryan & Nash ined.]

2. Spores 10-12 x 4.5-5 um, [(2-)2.2-2.4(-2.7) times as long as wide]. Thalline exciple thin. Containing unknown (pale yellow-gray after charring, 3C). Thallus verrucose-areolate, yellowish gray to light or dark grayish yellowish brown. Apothecia to 1 mm diam.; discs ± plane, dark grayish brown to brownish black; thalline margin persistent. Spores 1-septate. ..... [L. "brevispora" Ryan & Nash ined.]

III-B-5.
L. "riefneri" group

The distinctions among these "taxa" based on my scant notes on them are dubious.

1. Proper margin distinct. Areoles ± contiguous, thin, plane to slightly convex, roundish. Discs lightly pruinose. 2

1. Proper margin not evident. 3

2. Thallus grayish yellow, to yellowish gray or almost light yellow. Discs moderate to dark brown or light yellowish brown; thalline exciple thickish, entire, persistent. Apothecia to 0.8 mm diam., constricted at base; discs plane to slightly convex. Spores 12-15 x 5-6 um. Santa Rosa Island. No substances. ..... [L. "nigromontana" Ryan & Nash in herb.]

2. Thallus yellowish white. Disc dark grayish brown to brownish black. Thalline exciple narrow, entire, persistent. Apothecia to 1 mm diam. Discs plane. Spores 12-15 x 4-5 um. San Nicolas Island. ..... [L. "albobrunnea" Ryan & Nash in herb.]

3. Apothecia to 0.8 mm diam. Thallus epruinose. Discs dark grayish brown, plane to moderately convex; thalline exciple becoming ± excluded. Spores 1-septate. Thallus light grayish yellowish brown or yellowish brown, to dark grayish brown. Thallus rimose-areolate to verrucose-areolate. Spores 13-15 x 5 um. Santa Catalina Island. ..... [L. "catalinae" Ryan & Nash in herb.]

3. Apothecia to 0.5 mm diam. Thallus ± pruinose. Discs brownish black, plane; thalline margin persistent. Spores simple to 1-septate. Thallus light grayish yellowish brown to yellowish gray, ± pruinose. Thallus verrucose-areolate. Spores 13-15(-17) x 4-5(-6) um. S-central California coast. ..... [L. "riefneri" Ryan & Nash in herb.]

III-C. On rock or soil.
Thallus crustose, effuse.
Spores 3(-5)-septate.

1. Spores 12-16(-18) x 4-5 um, the ends abruptly rounded. Discs pruinose, under pruina black (to brown?). Thalline exciple distinct at least when young. Paraphyses tips brown. On maritime, mostly vertical or overhanging calcareous rocks. Iowa. ..... L. nylanderiana Massal.

1. Spores averaging over 16 um long and 4 um wide, the ends often ± narrowed. Discs epruinose, at least partly pale. Thalline exciple absent. True exciple colorless, or upper outer part pale to dark brown or pinkish brown and K+ purplish. Thallus pale, granular to verrucose..... 2

> **2. Paraphyses 1-1.5 um wide, tips to 3 um wide, colorless. Pycnospores 10-19 um long.** Discs pale beige, pale orange-pink, or pale to dark reddish brown. Spores 14-28 x 2-3(-3.5) um. On deeply shaded limestone rocks, mainly in dry underhangs and deep crevices. New York. ..... L. cuprea (A. Massal.) P. Boom & Coppins (syn. Bacidia cuprea)
>
> **2. Paraphyses 1.5-2 um wide, tipsto 5 um wide, often pigmented. Pycnospores 31-55 um long.** Discs pale, pinkish brown, gray-brown, or dark, red-brown to blackish. Spores 14-20(-28) x (2-)2.5-3 um. On rocks (often calcareours), turf or clayey soil in nutrient-rich situations, even on bird-lime, or bone. ..... L. subfuscula

ADD:

Spores 13-16 x 5-6 um. [May be more than one thing that fits here]. ..... [L. "quadriloculare" Ryan in herb.]

Detailed Descriptions

Lecania aipospila (Wahlenb.) Th. Fr.

Not definitely reported from N. America, but see under v. spodophaeiza and under "L. cf. aipospila sensu Noble]

Thallus papillate or granular, the subunits flattening towards the circumference. Thallus often forming extensive, coalescing patches, pale brown to gray-brown, or in part purplish or indigo-black, of scattered or ± contiguous, low to ± elevated, coarse, knobbly papillae and warts, often indistinctly lobed at the margin; prothallus sometimes ± distinct, pale. Apothecia 0.5-1 mm diam., usually frequent, sessile or somewhat immersed, often apical on the warts or papillae; disc red-brown, black-brown or black, reddish brown when wet, ± concave to weakly convex, not pruinose; thalline margin concolorous with thallus, persistent, or occasionally eventually excluded; otuer edge anatomically simlar to cortex of the papillae, with a colorless, superficial, amorphous layer above a single outer layer of isodiametric cells with brown-pigmented, thickened walls, within composed of a compact, short-celled, somewhat radiating pseudoparenchyma intermixed with photobiont cells; epihymenium brown, red-brown to orange, without granules; hymenium 65-90 um tall. Paraphyses slightly swollen and short-celled towards apices, sometimes almost moniliform. Contains ± 2 unidentified terpens. On weakly basic, neutral or acidic rock outcrops and cliffs (e.g., granitic and schistose), usually on or near nutrient-rich sites and associoated with seepage tracks in shletered to exposed, rocky coastal areas. 2

2. Thallus suborbicular or spreading irregularly, composed in the center of crowded angular or tuberculose papillae, which are smaller or flattened out towards the circumference, grayish or very dark brown; prothallus dark. Apothecia innate in the papillae, small, dark-brown or blackish, plane, becoming convex and immarginate; paraphyses widening towards tips; spores ellipsoid, 9-14(-16) x 4-6 um. ..... Lecania aipospila v. aipospila

2. Thallus granular; the granules flattened, subcrenate at the circumferance, sometimes dark colored. Apothecia adnate on the granules; discs becoming immarginate. ..... Lecania aipospila v. maritima

Lecania aipospila [v. spodophaeiza (Nyl.) ined.] (type, H-Nyl!)
[Description based on type--in brackets, and on A. L. Smith's description of British material]

Thallus granulose-verrucose or verrucose-areolate, in small, determinate patches, [thin]; [areoles 0.3-0.5 mm across, contiguous, sharply angular, plane to slightly convex], surface brownish [grayish yellowish brown to dark grayish yellowish brown or dark yellowish brown, matt, paler when wet]; prothallus white.

Apothecia to 0.5 mm diam.; discs dark red [dark brown to brownish black, redder when wet, shiny]; margin thick, subentire, [slightly raised, concolorous with thallus or slightly darker, persistent]; [cortex ca. 30 um thick]; [algal layer well developed in margin and below hypothecium, ± continuous, ca. 30-50 um]; [hypothecium brownish in thick section, ca. 50 um]; [hymenium brownish in thick section, ca. 50 um]; paraphyses rather thick [1.5-2 um; tips 3-4 um], loosely coherent; spores oblong-ellipsoid to fusiform-ellipsoid or fusiform-oblong, sometimes slightly curved, [(1.7-)2.5-3(-4.5) times as long as wide], becoming distinctly 1-septate, (9-)10-18 x 4-5(-6) um.

Santa Barbara Island, coast of southern California.

L. cf. aipospila sensu Noble [L. "papillata" Ryan in herb.]

Thallus crustose to minutely fruticose, consisting of tightly packed, upright papillae 0.2-0.4 mm wide and up to 2 mm tall, becoming tightly congested in groups and appearing cracked-areolate (the cracks often wide and through to the substratum), at the margin often only low papillose-verrucae which may be slightly lobed; individual papillae with gently rounded tips, ± very finely cracked, often becoming darkened in the cracks; surface matt, tan, (pinkish-) brown, darkening to brown-gray or blue-gray.

Apothecia scarce. terminal on the top of a papilla (although this is not often distinct), 0.9-2.0 mm wide; thalline margin regularly crenate, level to raised becoming flexuous with age, concolorous with thallus, matt, persistent; proper margin never exposed; disc round, often becoming lobate, plane to slightly convex or undulate, very constricted (= stipitate on a papilla), minutely roughened, matt, red-brown, brown, to blackening, epruinose. Hypothecium thick, inspersed with oil droplets, ± hyaline below, slightly yellowish towards hymenium, of tightly packed, thick-walled but small elongated cells; epihymenium dark brown, pale orange-brown below into the hymenium; paraphyses coherent, branched above; hymenium 60 um, hyaline below; spores 8, 1-septate, oblong-ellipsoid with equal cells, to tear-drop shaped with unequal cells, usually straight, 14-16(-18) x 5-6.5 um. Thallus K± pale, sordid orange, C-, KC-, P-. Hymenium I+ blue.

Often parasitised by a Catillaria species. On non-calcareous sandstone and igneous rocks in the supralittoral zone, British Columbia.

L. cf. aipospila ("Lecania? sp. 1" of Ryan, 1988; probably conspecific with Noble's material)

Thallus reddish brown to almost black. Spores oblong-ellipsoid to oblong [L:W = 2.5-3.3], (13.5-)15-18 x 4.5-6 um. Paraphyses tips red-brown. Thallus composed of papillae 0.2-0.5 mm across. Apothecia sessile on the tips of the papillae, 0.4-1.2 mm diam.; discs reddish brown to almost black, convex; thalline margin 0.05-0.2 mm wide, crenate, disappearing; hymenium 75-90 um; paraphyses coherent; asci 50 x 12 um; spores 1-septate. On serpentine rock on the seashore, Washington state.

[L. "bajacalifornica" Ryan & Nash ined.]

Squamules scattered to grouped, 0.5-1.7 mm across, 0.5-1 mm thick, irregularly roundish, becoming weakly crenate in places, plane to unevenly convex, becoming constricted at base, with margins occasionally free from the substrate. Upper surface moderate yellowish brown to dark grayish yellow or light grayish olive, slightly shiny, somewhat pitted (pits very shallow). Medullary hyphae 2.5 um wide, thin-walled.

Apothecia to 1.5 mm diam., borne on margins of the squamules, adnate to sessile, scarcely constricted; discs light to moderate brown to dark grayish brown, epruinose, matt; thalline margin 0.1-0.2 mm wide, entire to flexuous or subcrenate, ± level with disc, yellowish gray to light grayish yellowish brown or paler than light yellowish brown. Algal layer absent from margin, present below hypothecium, ± continuous, c. 50-75 um thick; hypothecium to 200 um thick; hyphae of hypothecium and apothecial margin unoriented, c. 3 um wide; lumina 3-10 um long, 1-2 um wide. Hymenium 100 um. Spores 12-15 x 5-6 um, ellipsoid to somewhat narrowly ellipsoid [L:W = (2-)2.4-2.5(-3)], 1-septate.

Thallus K-, C-, KC-, P+ pale yellow. Containing unknown blue-gray 5A, 6BC, zeorin, and unknown terpene.

On rock, Baja California.

NOTES: This taxon externally seems rather similar to forms of L. dudleyi, but the spores are narrower and more narrowly ellipsoid, and the hyphae of the apothecial margin are much thinner. The thallus surface has a more grayish or olivaceous tone. The chemistry also appears

to be somewhat different (?--need to co-TLC).

[L. brattiae Ryan & Nash ined.]

THALLUS: small (ca. 1-1.5 cm diameter), rosette-forming, closely appressed, thin (0.1-0.3 mm); **Thallus Center:** rimose-areolate; **Lobes:** contiguous, separated mostly only by incomplete cracks, plane (to occasionally strongly convex), ca. 2 mm long, 0.5-1.5 mm wide, entire and rounded or partly crenate-incised, the ultimate segments 0.3-0.7 mm wide; **Upper Surface:** partly pruinose, light grayish yellowish brown ( ), mottled with white, especially on marginal lobes, pale brownish grey ( ) or slightly yellowish when wet; dark grayish yellow (91) near lobe tips; **Upper Cortex:** 20-40 um thick, uniform, inspersed with refractive granules (insoluble in KOH) throughout or especially in upper part; outer 5 um colorless; inner part pinkish grey; cells not distinct, even in microtome sections stained with cotton blue; **Algal layer:** 30-35 um thick, continuous; tissues non refractive; algal cells 10-15 um, often clumped; **Medulla:** whitish, dense, filled with refractive granules (insoluble in KOH); hyphae 2-4 um wide, thin-walled, the lumina ca. 1-1.5 um wide; cells 4-8 um long; lower part sometimes reddish; **Lower Cortex** indistinct except near tips, non-refractive.

APOTHECIA: common, adnate, becoming narrowly sessile, crowded in thallus center, to ca. 1 mm diameter; **Discs:** plane to slightly concave, dark reddish brown ( ), medium to dark yellowish brown ( ), dark brown (59), or brownish black (65), at first bluish pruinose, appearing grayish brown (61) to whitish ( ), then naked; **Margins:** 0.1-0.2(-4) mm, persistent, more or less level with thallus, whitish, entire to sinuous or becoming unevenly broadened and crenate towards inside; proper margin not visible; **Cortex:** ca. 25 um thick in upper part, thinning slightly towards lower part, inspersed; **Algal Layer:** well developed in upper or outer part of margin and below hypothecium, where it is ca. 30-40 um thick and more or less interrupted; **medulla** filled with whitish granules; **Excipulum:** hyaline, conglutinate; hyphae randomly oriented, ca. 3-4 um wide, with threadlike lumina; **Hypothecium:** bowl-shaped to broadly conical, to ca. 50-75 um thick in center; **subhymenium** to ca. 100 um thick; **Hymenium:** (40-)55(-70) um high, I+ blue; **epihymenium** 15-20 um thick, inspersed with yellowish brown granules (mostly soluble in K); **Paraphyses:** simple, ca. 1.5 um thick below; tips clavate enlarged, 2.5-3.5(-5.0) um, the apical cell yellow-brown, darker at extreme tip, olive in K; **Asci:** narrowly clavate, 45-60 x 8-10 um; tips appearing entirely I+ blue; **Spores:** often immature, mostly oblong-ellipsoid or oblong-ovoid (L:W = (2-)2.5-3(-4), sometimes slightly curved, (6-)8-10(-11) x 2-3(-4) um, thin-walled, containing 1-septate, the septum indistinct in water but distinct in cotton blue; usually one oil drop per cell.

SPERMOGONIA: immersed, ca. 130 um deep, 80 um wide; ostiole dark red-brown; **Spermatia:** filiform, somewhat curved, (10-)12-15(-20) um. **Fulcra:**

SPOT TESTS AND CHEMISTRY: K-, C-, KC+ red-violet, containing only unknowns, SBR-1 (R_F 3A, 5BC) and SBR-2 (R_F 5BC), after charring, both are yellowish-gray and UV- (+ bluish gray in B).

DISTRIBUTION AND ECOLOGY: Coastal southern California, on the seashore.

DISCUSSION: This is a distinctive species, distinguished from other appressed rosette-forming saxicolous taxa by the weak thallus pruina, and other characters.

The Gittins specimen differs slightly from the others seen, in having rather broad and often convex lobes, rather densely and slightly yellowish pruinose discs, rather thick apothecial margins and somewhat higher hymenium, but does not seem distinct enough to recognize as a separate taxon.

[Lecania "brattiana" Ryan & Nash in herb.; will need new name if published]

Thallus light to moderate brown, light grayish brown or light olive gray. Squamules ± convex but folded.

Apothecia soon sessile; discs paler and redish brown next to margin. Asci narrowly clavate. Hymenium 65-70 um. Spores narrowly ellipsoid [L:W = (2-)2.4-2.5(-3)], 12-15 x 5-6 um, 1-septate.

On sandstone, coast of S. California.

[Lecania "brevispora" Ryan & Nash ined.]

Thalline exciple thin. Containing unknown (pale yellow-gray after charring, 3C). Thallus verrucose-areolate, yellowish gray to light or dark grayish yellowish brown.

Apothecia to 1 mm diam.; discs ± plane, dark grayish brown to brownish black; thalline margin persistent. Spores 10-12 x 4.5-5 um, ellipsoid to narrowly ellipsoid [L:W = (2-)2.2-2.4(-2.7)], 1-septate.

Santa Rosa Island, California.

L. brunonis (Tuck.) Herre (holotype, FH!)

Thallus areolate-subsquamulose; areoles c. 0.2-0.4 mm across, plane to slightly convex or somewhat concave, separated by broad fissures; surface grayish yellowish brown, moderate yellowish brown when wet. Upper cortex 30-40 um, yellow-brownish; epinecral layer 30 um; algal layer 80 um thick; algae 8-10 um.

Discs deep or dark brown or dark grayish brown, paler and redder when wet, slightly shiny; thalline exciple entire or finely toothed, concolorous with thallus, ± soon excluded; cortex ca. 30 um thick, of unoriented hyphae ca. 3-4 um wide with lumina elongated, ca. 1 um wide; algal layer filling the margin, ca. 75-100 um thick with uneven upper edge below hypothecium; hypothecium to 150 m in center, of unoriented hyphae; hymenium (65-)75 um; epihymenium 15-20 um, red-brown, non-inspersed; paraphyses tips clavate, to 4 um]. Asci Bacidia-type. Discs plane to convex or turgid. Spores ellipsoid to broadly ellipsoid [L:W = 1.9-2.6], 12-13 x 5-7 um, 1-septate.

San Bruno Mtn, central Califonia coast.

L. californica (Zahlbr.) Fink

Thallus scarcely developed, very thin, composed of minute, scattered, ashy white, soon disappearing granules.

Apothecia scattered, 0.15-0.4 mm diam., adnate; discs dirty brown, flesh brown to brownish black or black, redder when wet, slightly to moderately white-pruinose, giving a bluish appearance, plane to strongly convex; thalline exciple very thin, soon disappearing, whitish. Algae to 17 um. Apothecial cortex thin and indistinct; algal layer present in margin and below hypothecium, ca. 50-75 um. Hypothecium hyaline. Hymenium hyaline, 55 um; epihymenium 20 um, reddish brown, not inspersed; paraphyses ± loose, 1.5-2.5 um thick below, tips to 4-5 um, brown-capped; asci Bacidia-type. Spores (8-)10-12(-13) x 3.5-4(-5) um, ellipsoid to oblong [L:W = 2-3(-3.7)].

Thallus K-, C-.

On calcareous rock, coastal mountains of S. California.

[Lecania "catalinae" Ryan & Nash ined.]

Thallus rimose-areolate to verrucose-areolate, light grayish yellowish brown or yellowish brown, to dark grayish brown, epruinose.

Discs dark grayish brown, plane to moderately convex. Spores 13-15 x 5 um, 1-septate.

Santa Catalina Island.

[Lecania "cherryensis" Ryan & Nash ined.]

Areoles separated by wide cracks, plane to slightly convex, ± angular, yellowish white.

Thalline exciple soon excluded; proper exciple not evident. Spores (14-)15-20 x 4-5 um, [L:W = (3-)3.8-4(-5)].

Santa Rosa Island, California.

[L. "chiricahuae" Ryan & Nash ined.]

Thallus grayish yellow to pale yellow or grayish olive, rimose-areolate, the areoles contiguous, angular, ca. 0.5 mm across.

Apothecia adnate to broadly sessile; thalline margin concolorous with thallus, soon excluded; discs dark yellowish brown to dark grayish yellowish brown, plane to slightly convex. Algal layer 50 um thick, lower part of margin and below outer narrow part of hypothecium, continuous, absent around central deep part of hyptoehcium; hypothecium ca. 50 um laterally, to 150? um deep in center; hymenium 120 um; paraphyses 1.5 um; spores 13-17 x 6-8 um.

On shaded and seasonally irrigated rocks, Chiricahua Mountains, SE Arizona.

L. constricta W. A. Weber

Thallus gray, verruculose, continuous.

Apothecia sessile, to 0.5 mm diam.; disc plane to slightly convex, black (when dry) or red-black (when wet); thalline margin prominent; hymenium 60-70 um; epihymenium brown-violet, K- but color intensified, N+ red; paraphyses few-septate, 3-4 terminal cells bullate; spores 8, 9-11 x 4-5 um, bilocular, constricted at center, tips rounded.

Thallus K-, C-.

On bark, Colorado.

L. cuprea (A. Massal.) P. Boom & Coppins (syn. Bacidia cuprea, B. cupreorosella)

Thallus thin or rather thick, uneven, minutely and irregularly granular-warted or scurfy granular, but granules never discrete; surface pale gray to greenish gray to whitish, often overgrown by green algae. Photobiont cells 5-12 um diam.

Apothecia 0.2-0.4(-0.6) mm diam., plane to convex; discs pale beige, pale orange-pink, or pale to dark reddish brown; true exciple colorless, or upper outer part pale to dark pinkish brown and K+ purplish, hyphae narrow but often with expanded lumina, lumina ellipsoid and to 5 um wide towards outer edge; hymenium (35-)40-45(-50) um tall, colorless, or pale gray and K± purplish in dark apothecia; hypothecium colorles or pale straw; paraphyses 1-1.5 um wide, the apices to 3 um, colorless; ascospores narrowly fusiform, fusiform-ellipsoid to dactyliform, 14-28 x 2-3(-3.5) um, 3(-5)-septate.

Pycnidia immersed, whitish; conidia 10-19 x 0.8-1.2 um, strongly curved.

On deeply shaded limestone rocks, mainly in dry underhangs and deep crevices. New York.

L. cyrtella (Ach.) Th. Fr. s. str.

Thallus very thin, rather smooth, granular-uneven, occasionally finely scrufy-effuse or immersed, white to pale gray.

Apothecia very numerous to crowded, emergent to sessile, 0.2-0.4(-0.5) mm diam.; discs yellowish to pale pink, or more often yellowish-brown, reddish brown, or blackish-brown, epruinose, ± translucent when wet, flat to markedly convex; thalline margin very thin, smooth to crenulate, often becoming incomplete and excluded, white or pale gray. Spores 8-12(-16) per

ascus, 10-12(-16) x (3-)4-5(-5.5) um, narrowly ellipsoid, 1(-3)-septate, generally curved when mature.

Microconidia curved, 17-20 x 0.5 um.

On nutrient-rich bark of various deciduous trees, especially Sambucus, Fraxinus, and Acer, associated with Xanthoria communities.

L. cyrtella sensu Noble

Thallus rather well developed, effuse to almost determinate, thinnish, varying from continuous but finely cracked to effuse; granules plano-convex, corticate, ± shiny, greenish tan to pale yellowish gray (yellowish color may be an artifact of "age" [i.e., in herbarium?]); hypothallus absent.

Apothecia 0.5-0.8 mm diam., abundant, adnate, constricted, ± scattered; disc ± plane, finally convex, ± round, discs constantly pale, flesh-tan to yellowish tan, lightly white pruinose; thalline margin initially thick, raised, ± smooth, epruinose, sometimes a little shiny, concolorous with thallus, containing algae up to the edge of the rim, becoming excluded only at the very end or occasionally early; proper margin not evident. Hypothecium hyaline or pale yellow; paraphyses simple and free below, branched and more coherent above; epithecium yellow or pale yellow-brown; hymenium ± hyaline, 35-50 um high. Spores 1-septate, with cells equal or just as often with the longer cell narrower than the shorter cell; septum often the widest part of the spores. Spores 8 per ascus, 12-15(-17) x (3-)3.5-4 um, straight (according to Noble's description, but also bent according to her discussion).

Thallus K ± yellow, C-, KC-, P-. On bark of young conifer. British Columbia, rare.

L. cyrtellina (Nyl.) Sandst.

Thallus inconspicuous or contnuous, rather smooth or somewhat granular-rugose, whitish to pale green or dull greenish gray. Apothecia scattered or grouped, to over 0.4 mm diam., sessile; discs plane then convex, rimose, pale pink to brownish or piebald, translucent; thalline margin thin, finally excluded; proper margin dark; hypothecium hyaline; hymenium 30-35 um, I+ fleeting blue then wine-red; paraphyses coherent; asci elongated, only the tips I+ dark blue. Spores oblong, 8-12(16) x 2-3(-4) um, simple to 1-septate.

Microconidia (12-)14-16(-18) x 0.5 um, curved; macroconidia 10-15(-18) x 1.5(-2) um, 0-1-septate, curved, crescent-shaped.

Thallus K-, C-, KC-.

On basic bark (but not associated with Xanthoria communities associated with nutrient enrichment), especially on Sambucus. Colorado.

Very similar to L. cyrtella, and treated as a synonym of it by some authors

[L. "desolationensis" Ryan in herb.]

Thallus verrucose, light to moderate or deep yellowish brown, matt.

Apothecia to 0.7 mm diam., sessile; discs brownish black to deep brown, epruinose, plane to slightly convex, smooth, matt; thalline margin level or slightly raised, 0.1 mm wide, entire to flexuous, dark grayish yellowish brown to almost brownish black, or concolorous with thallus. Hypothecium hyaline; hymenium 35 um; epihymenium greenish black. Spores 1-septate, 12-16 x 3-4 um.

Pycnidia adnate, tiny, black.

On wood, montane, California.

L. dubitans (Nyl.) A. L. Sm.

THALLUS Thallus thin, effuse, finely granulose, gray-whitish, ashy gray, ± greenish, or sometimes disappearing.

APOTHECIA 0.2-0.5(-0.7) mm wide; discs reddish brown to brownish black or black, epruinose, soon or at least finally convex); margin whitish or brownish, thin, soon or at least finally excluded; epihymenium almost hyaline, Paraphyses coherent. Spores 8/ascus 1-septate, distinctly curved, bean-shaped, subellipsoid to oblong (10-)12-18 x (3-)4-6 um.

SPOT TESTS AND CHEMISTRY:

ECOLOGY AND DISTRIBUTION: On smooth bark of deciduous trees in mountainous areas.

DISCUSSION: Wirth (1980) suggested that this might be a synonym of L. cyrtella, the main difference being the spore shape.

L. dubitans sensu Hasse (as L. dimera)

Thallus thin, whitish, forming small, roundish, smooth patches 0.5-1.5 cm diam., occasionally finely granular, fringed by a pallid hypothallus.

Apothecia minute, biatroine; disc flattish to convex, light brown and darkening; epihymenium branulose, light brown; hymenium 60-64 um high, I+ blue; paraphyses free, non-septate, light brown at tips; asci narrowly clavate, 8-spored; hypotheicum colorless or faintly yellowish; spores oblong-ellipsoid, bilocular, straight or slightly curved, 12-16 x 4-4.5 um.

On smooth bark of Juglans californica, Santa Monica Range, California.

Hasse, Lich. S. Cal.

L. dubitans sensu Herre (as L. dimera)

Thallus effuse, very thin or becoming slightly thicker and minutely verrucose or areolate, but smooth to the naked eye; sometimes disappearing; surface brownish ashen, grayish white, or white; delimited by black hypothalline lines.

Apothecia small to very small, biatorine; disc plane or soon becoming convex, pale to dark brown or blackening, epruinose; margin thin, entire, excluded when the convex black aptohecia are quite lecideine in appearance; epihymenium broad, dark bluish- dusky or dusky-violaceous; paraphyses simple, free or more or less coherent, thread-like; asci narrowly clavate, 45-50 x 7-10 um; hymenium I+ deep indigo; spores bilocular, oblong, straight or slightly curved, 11-19 x 3-4.9 um.

Thallus K+ yellow or yellowish, C-.

On bark of Umbellularia californica, with "Lecidea tricolor" (= Cliostomum griffithii) and other lichens, apparently rare, but inconspicuous. Santa Cruz Peninsula, California.

"L." dudleyi Herre (isotype, MIN!)

[Description based on the isotype plus additional material

THALLUS of squamules (0.5-)2-3 mm across, to 0.5-1.5 mm thick, closely appressed, flattened to subglobose or difform and wartlike, irregularly convex to undulate or occasionally concave, roundish to irregular, becoming crenate to lobed when large, always rather sparsely distributed, sometimes ± contiguous but never forming a uniform crust; when growing on soil, base of squamules ± immersed in the substrate. Upper surface often rimose in places, sometimes warty, matt to slightly shiny, sometimes ± pruinose on raised parts or edges or covered with whitish dust when growing on caliche, yellowish gray (93), light grayish brown (60), grayish brown (61), light brown (57), grayish yellowish brown (80), light grayish yellowish brown ( ), pale orangish yellow (73) or light yellowish brown (76), to brownish orange (54), medium,

strong or deep brown ( ), or medium reddish brown (43) to grayish reddish orange (39) or dark grayish reddish brown (47); lower surface pale yellowish; black hypothallus ± evident. Upper cortex 42 um thick; cells roundish, c. 5 um across; epinecral layer 35 um; algae 7 um diam.

APOTHECIA often few or mostly immature, but sometimes numerous,1-5(-7) per thalline wart, borne laminally to submarginally, to 1(-2) mm diam., at first immersed (appearing as a small dark depression), then becoming adnate to sessile; disc brownish black (65) to dark grayish brown (62), dark brown (59), medium brown (58), deep brown (56), or occasionally light brown (57), sometimes moderate reddish brown next to the margin, epruinose but sometimes finally granulose, concave to plane then soon becoming moderately convex; thalline margin concolorous with thallus or sometimes whitish, or next to disc sometimes medium brown, 0.1-0.2 mm wide, entire to flexuous, level with disc, persistent or soon excluded. Apothecial margin in section hyaline to pale brownish, not inspersed but with some superficial granules, hyphae conglutinate, unoriented, c. 5-7 um wide, narrower towards inside; lumina c. 5-12 um long, 1-1.5 um wide. Algal layer absent from margin, forming a continuous layer c. 50 um thick below hypothecium. Hypothecium 75 um high, hyaline to slightly yellowish, of conglutinate, unoriented hyphae c. 3 um wide with lumina 3-10 um long, 1 um wide. Subhymenium indistinct, slightly yellowish-brownish, I+ violet. Hymenium 65-80 um high, I+ blue or violet, then red. Paraphyses 2-3 um thick, septate, the apical cell clavate to globose, 4-5 um wide, with thin red-brown pigmentation just inside the wall at the tip, coherent, free in K. Epihymenium c. 10-20 um thick, reddish brown, not inspersed, unchanged in K, darker in some places than others (interrupted), covered by c. 10-15 um thick hyaline layer above the pigmented part. Asci apparently Catillaria-type (Bacidia-type?). Spores (9-)11-15(-16) x (5-)6-7(-7.5) um, ellipsoid or ovoid [L:W = (1.6)2-2.1(-2.6)], (0-)1-septate, wall and septum c. 0.5-1 um thick.

PYCNIDIA Pycnospores (according to Wetmore) filiform, curved, 21 um long.

CHEMISTRY: Thallus K-, C-. Containing unknown substances (terpenes?), bluish or greenish after charring, 6 & 5 in C.

ECOLOGY AND DISTRIBUTION: On rock, clay, or caliche, above the sea. Associated lichens include species of Acarospora, Caloplaca, Lepraria, cf. Leproloma, and Xanthoria candelaria Often associated with cyanobacteria (e.g., Microcoleus spp.). Coast of California, from Pt. Lobos, San Francisco south to the Channel Islands.

NOTES: When sterile, this species can sometimes be superficially somewhat similar to the brown Acarospora that often occurs with it; however, the squamules of that species seem to always be very strongly rimose-warty and pruinose, lack the distinctly reddish tones commonly found in L. dudleyi, and do not contain lichen substances.

[Description based on the isotype only]:

THALLUS of squamules 2-3 mm across, to 0.5-1 mm thick, closely appressed, flattened to subglobose or difform and wartlike, roundish to crenate, always rather sparsely distributed, never forming a uniform crust. Upper surface rimose in places, matt to slightly shiny, pale orangish yellow or light yellowish brown, to medium, strong or deep brown; lower surface pale yellowish; black hypothallus ± evident. Upper cortex 42 um thick; cells roundish, c. 5 um across; epinecral layer 35 um; algae 7 um diam..

APOTHECIA 1-5 per thalline wart, to 0.7 mm diam., at first immersed (appearing as a small dark depression), then becoming adnate to sessile; disc brownish black (62), epruinose, concave to plane then soon becoming moderately convex; thalline margin concolorous with thallus, 0.1 mm wide, entire, level with disc, soon excluded. Apothecial margin in section hyaline to pale brownish, not inspersed but with some superficial granules, hyphae conglutinate, unoriented, c. 5-7 um wide, narrower towards inside; lumina c. 5-12 um long, 1-1.5 um wide. Algal layer absent from margin, forming a continuous layer c. 50 um thick below hypothecium.

Hypothecium 75 um high, hyaline to slightly yellowish, of conglutinate, unoriented hyphae c. 3 um wide with lumina 3-10 um long, 1 um wide. Subhymenium indistinct, slightly yellowish-brownish, I+ violet. Hymenium 80 um high, I+ blue or violet, then red. Paraphyses 2-3 um thick, septate, the apical cell clavate to globose, 4-5 um wide, with thin red-brown pigmentation just inside the wall at the tip, coherent, free in K. Epihymenium c. 20 um thick, reddish brown, not inspersed, unchanged in K, darker in some places than others (interrupted), covered by c. 10-15 um thick hyaline layer above the pigmented part. Asci apparently Catillaria-type (Bacidia-type?). Spores 14-16 x 6-7 um, ellipsoid or ovoid [L:W = 2-2.1], 1-septate, wall and septum c. 0.5-1 um thick.

PYCNIDIA Pycnospores (according to Wetmore) filiform, curved, 21 um long.

CHEMISTRY: Thallus K-, C-. Containing unknown substances (terpenes?), bluish or greensih after charring, 6 & 5 in C.

ECOLOGY AND DISTRIBUTION: On rock or clay above the sea. Associated with cyanobacteria and Lepraria sp. Pt. Lobos, San Francisco.

L. dudleyi sensu Hasse

Thallus 1-1.5 mm thick, verrucose; verrucae cartilaginous, coarse (1-2 mm across), semiglobular, roundish to crenate, grouped or dispersed; upper surface light brown to red-brown, brownish orange (54), epruinose.

Apothecia at first immersed in the warts, then innate-sessile ("forming a cupola to the thalline wart"); disc dark brown, papillate; proper margin indistinct; algal layer present below hypothecium; hypothecium hyaline; hymenium 95 um high, I+ dark blue; paraphyses coherent; spores bluntly ellipsoid, 1-septate, 12-16 x 6-7.5 um.

Containing unknowns (terpenes?) bluish after charring, 5-6 C (same as in the isotype of L. dudleyi)

On calcareous rocks on the beach, S California.

Lecania erysibe (Ach.) Mudd

Thallus thin, scurfy, ± cracked-areolate; areoles sharply angled, scattered or ± contiguous, delimited, ± densely blastidiate, greenish yellow to dirty greenish gray-brown. Some morphs have pale, ± discrete soralia.

Apothecia usually present, to 0.4 mm diam., adpressed to sessile, single and scattered or ± clustered; disc orange-brown to black-brown [epruinose or thinly to moderately blue-white pruinose when young, in Strasser specimen in W; epruinose according to Awasthi; pruinosity not mentioned by Mayrhofer, nor by James & Purvis], moderately to strongly convex; thalline exciple lacking a cortical layer, developing granule-like blastidia; true exciple often present; cell walls of [thalline? true?] exciple thick, bronwish towards external edge; epithecium yellow-brown, greenish dark brown ton black-brown; hymenium 50-70 um. Paraphyses mostly not widened or slightly clavate at apices. Spores 9-15 x 3-5 um, 1-septate, ellipsoid.

In nutrient-enriched habitats, often on man-made or man-influenced substrates, e.g., brick, damp, ± basic rocks, asbestos-cement, farm-polluted limestones, monuments, very rarely decaying wood.

Many specimens from various parts of N. America have been incorrectly identified as this species; I have not yet seen any correctly identified N. American material.

Lecania erysibe sensu Herre (1912)

Thallus effuse, thin, composed of crumb-like granules or of thick, fragile, deeply fissured areoles, with minutely and imbricately lobulate suface, the lobules with crenate margin; surface

sandy brown to olivaceous.

Apothecia 0.3-1 mm diam., closely adnate; discs plane, dark red-brown or blackening [epruinose?]; margin rather thick, entire, pale, sometimes disappearing; hypothecium hyaline; hymenium pale below, I+ blue then finally greenish; epihymenium brownish or reddish; paraphyses thick, ± jointed or septate; tips slightly enlarged, colorless or darkened; asci short, clavate; spores simple or indistinctly 1-septate, ellipsoid, 11-14 x 4-5.5 um.

Thallus K-, C-.

On sandstone, central California coast (Oakland Hills, 400 m).

Lecania erysibe sensu Hasse

Thallus of dispersed or loosely congregated, small squamules; surface light ash colored to whitish pulverulent; sqaumules to 0.5 mm wide. Apothecia numerous, scattered, sessile, 0.3-1 mm diam.; disc thinly pruinose ("with a delicate bloom"), light brown to light blackish brown, mostly paler towards the circumference [of the thallus? the disc?], plane, soon convex, occasionally tuberculate; thalline margin thin, crenulate, finally excluded; hypothecium dingy pale yellowish; hymenium 70-90 um, I+ blue; paraphyses subcoherent; epithecium subcontinuous, dingy yellowish; spores oblong, (10-)12-16 x 4-5.5 um, simple to 1-septate. Thallus K-, C-. On calcareous sandstone, S. California.

Lecania erysibe sensu Noble.

Thallus crustose, granulate; granules ± scattered, convex, corticate, 0.1-0.4 mm diam., the smaller ones loosely attached and easily dislodged; surface light greenish gray.

Discs light yellow to flesh colored, often becoming tuberculate, with some portions brownish; almost transparent, epruinose, or very lightly white pruinose, especially when young. Hypothallus absent. Apothecia abundant, ± scattered, constricted, adnate, 0.6-1.2 mm diam.; thalline margin concolorous with thallus, finely crenulate, initially raised, persistent, although occasionally excluded enough to expose the proper margin; proper margin thin, white or lighter yellow than the disc, only occasionally visible; disc ± round, plane becoming slightly convex or undulate to strongly convex. Hypothecium hyaline, I+ blue; epithecium ± hyaline to pale yellow; paraphyses branched and coherent; hymenium 70-75 um high; spores 8, hyaline, oblong to oblong-ellipsoid, straight, 1-septate or occasionally simple, the cells equal or unequal, the septum often a little irregular, 12-13(-15) x 5-6 um.

Thallus K-, C-, KC-, P-.

On the cementing substance of conglomerate (HCl- to HCl+ slowly in places), rare, British Columbia.

Lecania erysibe sensu Fink

Thallus thin, composed of rarely scattered, irregular, olive to greenish gray granules, or becoming scurfy or subareolate.

Apothecia 0.5-1 mm across, adnate; disk flat to ± convex, brown to blackish brown, epruinose; exciple concolorous with thallus, becoming crenulate and sometimes disappearing; spores ellipsoid, becoming 1-septate, 10-14 x 4-6 um.

On rocks, Illinois, Iowa, and Minnesota.

L. flavens (Willey) [ined.] (syn. Bacidia flavens)

Thallus yellowish ashy, thin, chinky.

Apothecia to 0.2 mm, flat to convex, wax-colored. Spores 7-12 um long, 2-3-celled.

On granite, Massachusetts.

According to Ekman, this taxon may be a poorly developed form of L. erysibe

L. flavescens Lynge

THALLUS thin, crustose, forming irregular patches 1-2 mm across, determinate, verrucose-granulose or when well developed rimose-areolate; areoles convex; surface yellow to grayish yellow [ochre, gray-brown to dark brown according to ?]; hypothallus thin, ± distinct, narrow, paler than thallus, visible at edge.

APOTHECIA immersed then broadly sessile, dispersed, solitary, to 0.2-0.3(-0.5) mm diam.; discs weakly to moderately convex, epruinose, red-brown to black, when wet paler red-brown; margin gray, narrow, entire, becoming excluded; excipulum lecanorine, with algae-rich medulla and narrow cortex, covered by epinecral layer; hypothecium hyaline; hymenium (45-)50-60 um, pale violet, I+ blue then wine red; epihymenium red-brown (violet-brown according to protologue), composed of dark pigment caps of paraphyses, K-, N-; epipsamma yellowish; paraphyses mostly unbranched, the tips strongly capitate-clavate swollen, 7.5-8.5 um wide, the cells set off from one another, the end cells with red-brown to black-brown pigment caps, thickest towards the top; spores 8, 1-septate, thin-walled, mostly constricted in the medulla, such that both cells sometimes appear globose, (9-)11-14 x (5-)6-7.5 um (4-5 um wide according to protologue)..

SPERMOGONIA spermatia filiform, arcuate, (11-)13(-15) um long.

SPOT TESTS AND CHEMISTRY: Medulla I-, K-.

On calciferous rocks, Italy, Switzerland, Spain, Nova Zemlya.

[Lecania "fraserensis" Ryan & Nash ined.]

Thallus yellowish white to light grayish yellowish brown. Apothecia immersed then soon sessile, 0.8-1 mm diam.; discs plane to slightly convex, matt, moderate brown to grayish brown or dark grayish brown or brownish black; thalline margin thin, entire, ± persistent; proper margin evident or not. Thallus verrucose-areolate to subsquamulose; areoles scattered to contiguous. Spores 10-13(-15) x 3.5-5 um, [(2-)2.6-2.9(-3.7) times as long as wide, mostly 1-septate. No substances. Santa Cruz Island.

L. fructigena Zahlbr.

Thallus ranging from small, more or less dispersed verruculose granules 0.2-1 mm across, to cracked-areolate and ± determinate, thin, P-. Apothecial margin usually becoming crenulate; disc often pruinose when young; spores oblong, some curved. Thallus surface somewhat shining, dark brownish (dark gray according to Fink), blackened on high points and lighter near the edges or crevices. Apothecia sessile to almost substipitate, 0.4-0.75(-1.0) mm diameter, sometimes clustered; discs plane to somewhat convex, brownish black to usually completely black; thalline margin (according to Fink) thin, colored like the thallus, appearing like a proper exciple, proper margin concolorous with disc, thin, finally excluded; epihymenium reddish brown to brown; asci clavate to subinflated-clavate; spores constantly 1-septate, 12-18 x 4-5.5 um, oblong to oblong-ellipsoid, sometimes slightly curved, the tips blunt or somewhat pointed. Thallus K+ sordid yellow, C-, KC-, P-. Hymenium I+ blue. On serpentine cliffs in spray zone, S. California; British Columbia. [According to Noble, who examined the type, the "plano-concave, rugose concave squamules with coarsely crenate to lobulate borders" mentioned by Hasse in all likelihood refer to the old apothecia, whre only the thalline tissue remains in roughly cup-shaped structures, which are abundantly present in the type.]

[Lecania "fusca" Ryan & Nash ined.]

Apothecial margin very thin, concolorous with disc, becoming excluded. Discs brownish black to black. Areoles ± dispersed, with ± even upper surface, not composed of granules, dark brown to dark grayish brown or almost black.

L. fuscella (Schaerer) Körber (syn. L. syringea)

Spores 8-16 per ascus, 12-21 x 4-6 um. Thallus whitish-greyish, thin, granular, effuse, containing numerous coarse crystal clusters. Apothecia 0.5-0.6 mm wide, ± sessile; disc flat then soon convex, pale brown, flesh-brown to dark brown, brown-black or bluish gray, naked or often ± patchily white or bluish pruinose; thalline margin definite at least at first, thin, sometimes excluded. Epihymenium ± pale to deep red-brown, K- or K+ deep purplish brown, N-; hymenium (45-)65-70 um. Paraphyses 2-2.5 um wide, simple or forked; apices ± slightly swollen. Spores 3-septate, straight or ± curved, fusiform-ellipsoid with abruptly rounded ends. On smooth, rarely roughened, bark, especially Acer and Populus. Resembling a small-fruited species of the Lecanora chlarotera group.

L. fuscella f. metabolica (Ach.) [ined.?] (syn. L. syringea f. metabolica (Ach.) A. L. Sm.

Apothecia smaller, more scattered, and darker, biatorine.

On bark of Acer macrophyllum in canyons of the San Gabriel Range, Califonria (Hasse, Lich. S. Calif.); on trees, chiefly maple, in maritime districts, British Isles.

L. fuscella sensu Hasse (as L. syringea)

Thallus whitish or grayish white, glaucous, smooth or finely rimose-areolate.

Apothecia adnate-sessile, 0.25-1 mm wide; disc flat to slightly convex, pale grayish flesh color with a bloom to almost black (a form occurs at Del Mar on dead bark of oak with a markedly pruinose disk); thalline margin moderately thin, entire, persistent; epihymenium subcontinuous, dull violaceous brown, gradually paling downward; hymenium 60-72 um high, hyaline, I+ blue; paraphyses subcoherent, non-septate, clavate and slightly colored at the tips; hypothecium hyaline; asci clavate; spores 8, oblong or ellipsoid-oblong, bilocular to quadrilocular (the former state more frequent in S. Calif.), 12-20 x 5-7 um, often slightly curved.

Thallus K-, C-.

Common in southern California.

[Lecania "griseothallia" Ryan & Nash ined.] (Lecania subdispersa sensu Hasse non Nyl.)

Thallus squamulose; upper surface pale gray or grayish greenish; squamules small, imbricated. Spores 9-13 x 3-4.5 um, oblong-ellipsoid, [(2-)2.8-3(-4.3) times as long as wide], 1-septate. Apothecia to 0.8 mm diam. Paraphyses loosely coherent, the tips clavate, brownish; asci narrowly clavate. Apothecia sessile; discs plane, dull reddish brown to blackish; margin paler, finally excluded; hypothecium hyaline to brown; epihymenium violet brown, the uppermost part light brown. Hymenium 60-70 um high. Spermatia filiform, slightly curved to arcuate. On sandstone, Santa Monica Mountains, California.

[L. groenlandica (Lynge) ined.] (syn.: Catillaria groenlandica Lynge)

THALLUS well developed, verrucose-areolate to rimose-areolate, or sometimes (including in the isotype in O) thin and inconspicuous; areoles subsquamulose, plane to slightly convex, crenate, (0.3-)0.5-0.8 mm across, discrete to contiguous, yellowish gray (93) to yellowish white, slightly shiny. Algae 12-15(-17) um.

APOTHECIA numerous but dispersed, (0.4-)0.5-0.6 mm diam., at first adpressed, then soon strongly elevated; discs plane, soon convex, black, slightly shiny, epruinose; margin very

thin, yellowish white, below the disc, soon disappearing. Algae frequent below hypothecium; excipulum with algae in basal part, or without algae, hyaline; hypothecium hyaline; hymenium 55-65 um; epihymenium unevenly and more or less intensely dark olivaceous; paraphyses easily free, simple to more or less branched, 2-2.5 um thick; tips strongly thickened, 5-6(-7) um thick, clavate to often capitate; asci saccate, 12-13 um thick; spores 8, hyaline, 1-septate, (8-)10-12(-15) x 4-5(-7) um, constricted at septum (in K). Hymenium I+ persistently blue, K-, N+ violet.

SPOT TESTS AND CHEMISTRY: Thallus P-.

On calcareous rock, Greenland, Sweden (Lappland).

[L. "harrisii" ined.]

Spores 1-septate, 10-14 x 3.5-4.5 um. Thalline margin greenish white; disc tan. Paraphyses tips not swollen. On Acer. Michigan. Not yet seen by me. According to Noble, Harris reported L. cyrtella from Michigan; need to see how he distinguished this species from that one. (Harris, 1977)

Lecania hassei (Zahlbr.) Noble

Thallus dark blackish brown, of small, ± imbricated, convex, irregularly lobed squamules, towards the circumference more distinctly lobed. Apothecia elevated, sessile; disc slightly concave to flat, at times becoming slightly rugose; thalline margin erect, prominent, persistent, entire to crenate. Spores 15-26 x 4.5-6 um, Thallus thick; squamules small, convex, irregularly lobed, often imbricated, shiny. Apothecia 0.4-1 mm diam.; disc dark brown to dull black; thalline margin thin, becoming crenate; hypothecium hyaline. Hymenium hyaline, 80-84 um.; epihymenium continuous, chocolate brown to reddish brown, gradually paling downwards; asci clavate, about equalling the hymenium in height. Spores 8, linear-cylindric (oblong to oblong-ellipsoid according to Fink), some slightly fusiform, simple to more frequently indistinctly 1-septate. Chem.: no substances. Sterigma remotely articulated; spermatia linear-straight, 8-10 um x ca. 1 um. On rock, maritime (but somewhat inland), in the Santa Monica Mountains, southern California. Noble, who examined the type of L. hassei, described her material from British Columbia as being identical to that species, which she treated as a (probable) synonym of L. dudleyi; however, the descriptions of the two species seem to differ rather considerably; further study is needed to determine if the apparent differences are real and consistent.

[Lecania "kalbii" Ryan & Nash ined.]

Spores oblong, [(2.2-)3.3-3.7(-4) times as long as wide, 10-12(-15) x 3-4.5 um. Thallus grayish yellow to dark grayish yellowish brown or light olive gray or moderate brown. Baja California. Apothecia to 1.5 mm diam.; discs plane to convex, finely roughened by protruding capitate brown paraphyses tips. Hymenium 60 um high. Upper cortical cells 3-5 um wide, unoriented. Thalline exciple moderate brown, becoming excluded. Thallus matt, partly moderate brown. Baja California Sur.

[Lecania "lobosensis" Ryan & Nash ined.]

Spores 10-13(-15?) x 3-4.5(-5?) um, [(2.2-)2.9-3.3(-4.3) times as long as wide]. Thalline exciple thickish. Containing trace of unknown (yellow after charring, 1B). Thallus rimose-areolate to ± verrucose-areolate, yellowish gray to light grayish yellowish brown. Apothecia to 0.8 mm diam.; discs plane, dark brown to brownish black or partly light grayish yellowish brown to light brown; thalline margin persistent or excluded. Spores simple to 1-septate. Santa Rosa Island, S. California.

[L. "longispora" Ryan in herb.]

Thallus composed of convex, contorted areoles or papillae 0.3-0.5 mm across, aggregated into separate groups 1-2 mm across; surface whitish, smooth.

Apothecia sessile on tips of the papillae, 0.7-2.2 mm diam.; discs reddish brown with granular-appearing surface, convex; thalline margin 0.1-0.2 mm thick, pale brown, crenate, disappearing. Spores subcylindrical [L:W = 4-5(-6.3)], straight or curved, 15-22 x 3-4(-5) um.

Thallus K-, C-, KC-.

On serpentine rock in the lower supralittoral zone, Washington state.

[Lecania "macrospora" Ryan & Nash ined.]

Spores oblong-ellipsoid to oblong [L:W = (2.7-)3.2-3.8(-4.6)], 16-23 x 5-6 um. Discs mostly light to moderate brown, only occasionally blackening. Thallus of ± contiguous, ± plane but uneven areoles, diry yellowish white to paler than yellowish gray. Areoles rounded, 0.2-0.4 mm wide. Thalline exciple thickish, entire, persistent. Spores 1-septate. Hymenium 65-70 um. Santa Rosa Island.

[Lecania "mexicana" Ryan & Nash ined.]

Areoles rounded, under-0.4 mm across. Thalline exciple becoming crenate. Growing in Mexico. Areoles scattered to closely contiguous. Thalline exciple thickish, persistent. Apothecia to 1 mm diam., constricted at base; discs ± plane. Discs moderate brown to brownish black. Spores 12-20 x 4-6 um, [(2-)3-3.3(-5) times as long as wide]. Thallus light yellowish brown, epruinose or pruinose. Baja California.

L. naegelii (Hepp) Diederich & P. Boom (syn. Bacidia naegelii)

Thallus green-gray, ashy or whitish, thin, granulose (granules scale-like, thickish, minute) or rimose, or occasionally thin; not sorediate.

Apothecia sessile, 0.5(-0.8) mm, yellowish rose or clouded flesh color, soon reddish brown to dark brown and then blackening, pale and translucent when wet, long remaining plane; margin often darker, thin, entire, scarcely evident, disappearing. Paraphyses distinct but coherent, slender; hymenium I+ blue. Epihymenium hyaline or greenish brown or violet brown, K-; hypothecium hyaline, K-. Spores 14-20(-25) x 4-6(-7.5) um, fusiform to ellipsoid or dactyloid, curved, almost reniform, 2-4-(-8)-celled.

L. naegelii sensu Harris and Noble

Thallus white. Apothecia usually green-black, less commonly mottled or pallid. Spores 15-18(-21) x (4.5-)5-5.5 um, 4-celled. On Populus, rarely Acer or Fraxinus.

[Lecania "nigromontana" Ryan & Nash ined.]

Areoles ± contiguous, thin, plane to slightly convex, roundish. Discs moderate to dark brown or light yellowish brown, lightly pruinose; thalline exciple thickish, entire, persistent; proper margin evident. Thallus grayish yellow, to yellowish gray or almost light yellow Apothecia to 0.8 mm diam., constricted at base; discs plane to slightly convex. Spores 12-15 x 5-6 um. Santa Rosa Island. No substances.

[Lecania "nitida" Ryan & Nash ined.]

Spores oblong, [(2.2-)3.3-3.7(-4) times as long as wide, 10-12(-15) x 3-4.5 um. Thallus grayish yellow to dark grayish yellowish brown or light olive gray or moderate brown. Baja

California. Apothecia to 1.5 mm diam.; discs plane to convex, finely roughened by protruding capitate brown paraphyses tips. Hymenium 45 um high. Upper cortical cells ca. 2 um wide, ± anticlinal. Thalline exciple grayish yellow to light olive gray, persistent. Thallus ± shiny, not becoming moderate brown. No substances (??). Baja California.

Lecania nylanderiana Massal.

Thallus wide-spreading, thin, areolate (granulose becoming chinky-areolate according to Fink); areoles sharply angled, whitish gray to pale brown. Apothecia (0.2-0.6 mm diam. according to Fink) sessile (adnate according to Fink), mostly crowded and deformed by mutual pressure; disc black (brown to brownish black according to Fink), when moist ± translucent with a dark-pigmented edge, pruinose, mostly flat, rarely convex; thalline exciple pale gray, swollen in flat apothecia, appearing narrower in ± convex apothecia (thin and often disappearing according to Fink); inner part algal-rich, outer part with a broad cortical zone of netted, ± radiating, threadlike hyphae in a gelatinous matrix, particularly well developed on lower part and sides of exciple; true exciple narrow to rather robust, the cell walls of the outermost hypahel cells lsightly to strongly brown-pigmented; paraphyses swollen towards apices, the terminal 2-3 cells with dark pigmented walls, some with a cap-like deposit of a dark brown pigment. Spores (oblong-ellipsoid according to Fink) 12-16(-18) x 4-5 um, (1-)3-septate, the ends abruptly rounded; thin-walled. On maritime, mostly vertical or overhanging calcareous rocks. Europe; Iowa.

[Lecania "olivascens" Ryan & Nash ined.]

Spores 11-15(-16?) x 4-5(-6) um, [(2.4-)3(-3.8) times as long as wide, simple to 1-septate. Upper surface dark grayish olive to moderate olive brown (or grayish yellowish brown to dark grayish yellowish brown, mottled whitish-grayish). Squamules plane to convex, not folded. Apothecia closely adnate; discs uniformly brownish black. No substances. Santa Rosa Island, S. California.

[L. "parvispora" Ryan & Nash ined.]

Spores ellipsoid to oblong-ellipsoid, [2.3-3(-4) times as long as wide], 7-12 x 3 um. Thallus moderate olive brown to moderate or deep yellowish brown, or partly paler than grayish yellow. Channel Islands (Santa Cruz Island), California. Apothecia to 1 mm diam.; discs ± plane. Thallus ± shiny. Hymenium 70 um. Thalline exciple thin, dark, becoming excluded. Containing unknowns (yellow after charring, 4-5,3,&2-3A; 6,5,&5BC). Material from Santa Rosa I. has a thinner thallus, matt surface, spores averaging longer, and contains numerous unknowns [at least partly different from those in Santa Cruz I. material].

L. perproxima (Nyl.) Zahlbr. (type, H-Nyl!)

THALLUS thin, minutely granulose, becoming chinky (rimose-areolate to areolate); areoles 0.3-0.5 mm across, roundish, plane to slightly convex; surfacematt, ashy white to grayish, moderate gray (265) to dark gray (266), ± mottled; upper cortex 30-40 um, upper 5 um reddish brown, lower part hyaline, cells rounded, ca. 4-5 um diam.; algal layer continuous, 50-60 um.

APOTHECIA very numerous, 0.2-0.6 mm diam., adnate; disc ± shiny, concave to plane or slightly convex, black, redder when wet, epruinose; exciple thin, colored like thallus, blackening near disc, rather distinctly raised, entire, becoming flexuous; algal layer well developed in margin and below hypothecium, ca. 50-60 um thick, interrupted; hyapothecium ca. 50 um; hymenium hyaline, 95 um; epihymenium gray-brown, non-granular, 15 um; paraphyses

rather loose, simple, 2 um below, tips dark, clavate-capitate, ca. 3 um; asci clavate, tips entirely I+ blue, without axial mass or ocular chamber, wall I+ blue; young asci with small I+ dark blue structure at tip, I+ moderate blue inner wall, and I+ pale blue outer coating; spores ellipsoid, becoming 1-septate, 14-18 x 5-7 um.

SPERMOGONIA? 170 um; spermatia? bacilliform, 3-4 um long.

With Caloplaca sp.

[L. "pseudosubdispersa" Ryan in herb.; will need better name if I publish it!]

Upper surface strong brown, brownish orange, light brown, or light to moderate yellowish brown, mottled with yellowish white or light gray. Squamules ± plane, imbricate. Algal layer present in apothecial margin. Paraphyses 1.5-2 um thick. Discs dark brown, epruinose, reddish when wet. Thalline exciple thickish, ± persistent. Epinecral layer 28 um. Spores 16.8-18.2 x 4.2 um. Squamules 0.5-1 mm across. Santa Monica Mts., S. California.

[Lecania "riefneri" Ryan & Nash ined.]

Discs brownish black, plane. Spores simple to 1-septate. Thallus light grayish yellowish brown to yellowish gray, ± pruinose. Thallus verrucose-areolate. Spores 13-15(-17) x 4-5(-6) um. S-central California coast.

[Lecania "sangabrielensis" Ryan & Nash ined.]

Discs epruinose, at least partly reddish brown to brown or dark brown. Thallus areolate; areoles ± dispersed or separated by ± broad cracks. Upper surface paler. Apothecia adnate to sessile, not substipitate. Growing at high elevations (above ca. 1000 m), over 30 km from the coast. Discs plane. Thalline exciple entire, persistent. Thallus dark grayish yellow to moderate olive brown or dark grayish yellowish brown. Spores oblong to oblong-ellipsoid, [(2.6-)3.2-3.3(-4) times as long as wide], 13-16 x 4-5 um, simple to 1-septate. Upper cortex 25-30 um thick, with ca. 5 um thick brown surface layer; algal layer ca. 300 um thick, continuous. Apothecial cortex 15-20 um, ± hyaline to pale brown; algal layer filling entire margin, continuous, ca. 75-100 um thick below hypothecium; hymenium ca, 100 um, I-. San Gabriel Wilderness, S. California.

[L. "santacruzensis" Ryan & Nash ined.]

Spores (13-)15-20 x 4-5 um., [(3-)3.8-4(-5) times as long as wide]. Areoles scattered, or separated by wide cracks, ± angular or irregular in outline, 0.5-0.7 mm diam. Thalline margin thin. Spores mostly 3.8-4 times as long as wide, simple to 1-septate. Discs brownish black. Areoles scattered, plane to slightly concave, irregular in outline, light grayish yellowish brown. Thalline margin persistent; proper exciple evident. Containing unknown (pale 5A,5-6BC). Santa Cruz Island.

[L. "serpenticola" Ryan ined.] (L.? sp. 2 of Ryan, 1988)

Thallus moderately thin, composed of contiguous, plane to slightly convex areoles 0.2-0.4 mm across; surface grayish brown, finely mottled, paler and yellowish when wet; with scattered black dots (0.05 mm diam.) sunken in thallus [= pycnidia?].

Apothecia sessile, 0.3-1.0 mm diam.; discs tan to brown or black, concave to plane, becoming convex; thalline margin 0.2 mm thick, entire, raised, sometimes disappearing. Hypothecium hyaline; hymenium 60-80 um; paraphyses free, septate, simple to furcate, tips with yellowish brown cap, 2-3 um wide; asci 50 x 14 um; spores subcylindrical [L:W = 3.7-3.8(-4.5)], 11-15 x 3-4 um.

On serpentine rocks in the upper supralittoral zone, Washington state.

"L." shastensis Herre

Thallus ashy grey to dusky, thin, effuse, of thin or thickly scattered, small, crumb-like granules. Photobiont apparently Nostoc.

Apothecia numerous, 0.3-0.8 mm wide, circular, adnate; disc flat to slightly convex, pale yellow to reddish (much like that of "Caloplaca gilva" [C. cerina]); thalline margin paler, entire, thin, often disappearing; very young apothecia with thickish margin and darker, pruinose disc; hypothecium broad, hyaline; hymenium I+ deep blue; paraphyses simple, non-septate, thread-like, subcoherent; apices not thickened; asci clavate to subcylindrical, 36-44 x 8-11 um; spores (6-)8 per ascus, 11-14 x 3.5-5.5 um, usually curved but also straight, 3-septate.

Thallus K+ yellowish, C-.

On bark of Aesculus, Mt. Shasta, California. Thallus blackened by a Scytonema.

L. stigmatella (Tuck.) S. Ekman (syn. Bacidia stigmatella)

Disc yellowish to reddish or finally leaden brown, plane to convex, the margin slightly darker, finally disappearing. Thallus powdery-granular, pale greenish to ashy., often disintegrating into goniocysts. Hypothecium hyaline. Spores 4(-8)-celled, 22-40 x 1.5-2.5 um. Conidia filiform, curved, 0-1-septate. Louisiana, Texas, Illinois.

L. subcaesia (Nyl.) B. de Lesd.

Apothecia to 1 mm diameter; discs black, densely bluish pruinose, at first plane and surrounded by a whitish thalline margin, later becoming convex and the margin becoming retrorse (crowded back?). Hymenium hyaline, 50-60 um, I+ blue in lower part, pale greenish in upper part; epihymenium fuliginous, gelatinous; hypothecium colorless, dense, 130-150 um; algal layer interrupted in the center. Parpahyses usually unbranched, septate, the two apical cells broader and shorter than the rest. Spores 10-12 x 3-3.5 um, 1-septate with thin septum. Apothecia numerous, scattered, loosely attached to substrate by short stalks. Thallus K-, C-. On calcareous rocks, Mediterranean areas of Eurasia and northern Africa; distribution in N. America = ?

L. subdispersa (Nyl.) Hasse

Thallus of ± scattered, convex verrucules ca. 0.2-0.3 mm across, rounded; upper surface light gray to yellowish gray.

Apothecia to 1.2 mm diam.; discs deep or dark brown to brownish black, slightly to moderately convex, matt, scarcely changed when wet, epruinose; thalline exciple yellowish white, level with or below the discs, entire to slightly flexuous or broken in a couple of places, 0.1-0.2 mm thick, persistent. Hymenium 75 um. Paraphyses 2-3 um thick, simple to furcate, tips brown, clavate, to 3 um wide. Spores oblong to subcylindrical [L:W = 4.3-5.5], 16-20(-22) x (3.5-) 4.5 um, 1(rarely 2)-septate, straight or slightly curved.

On sandstone, Santa Monica Mountains, California.

L. subfuscula (Nyl.) S. Ekman (syn. Bacidia subfuscula)

Spores 14-20(-28) x (2-)2.5-3 um, 3(-5)-septate, narrowly fusiform to ± bacilliform. Apothecia 0.2-0.6 mm, plane, soon ± convex, pale, pinkish brown, gray-brown, or dark, red-brown to blackish, at first with concolorous or pale to dark, thin margin, then immarginate. Thallus granular or verrucose, whitish, grenish white to pale buff; granules 40-200 um diam., discrete or more often coalescing to form a granular-warted crust. Photobiont cells 6-12(-16) x 6-12 um. Exciple hyaline except for upper outer edge and apex which may be brown and K+

purplish, mostly "cellular" with radiating ellipsoidal lumina 5-13 x 2.5-4.5(-7) um. Hymenium 40-50(-65) um, hyaline or upper part olive gray to pinkish brown, K- or K± purplish, N+ red. Hypothecium hayline or pale straw, K+ yellowish. Paraphyses 1.5-2 um wide, tips to 5 um, swollen, often pigmented. Epihymenium violet-brown, K-. Pycnidia immersed, walls colorless; pycnospores 31-55 x 1-1.5 um, mostly curved. On rocks (often calcareours), turf or clayey soil in nutrient-rich situations, even on bird-lime.

[L.?? "thujicola" Ryan ined.]

Thallus thin, verrucose-areolate, very smooth, epruinose, matt, yellowish white, scattered on thin, smooth, whitish hypothallus, with blackish prothalline line at edge.

Apothecia to 0.8 mm diam.; discs dark grayish brown to brownish black, epruinose, matt, smooth, plane to slightly convex; thalline margin 0.1 mm wide, entire, level, light grayish yellowish brown (79); hypothecium pale yellowish; hymenium 40 um; paraphyuses tips brown, globose, to 4 um wide; spores 1-septate, smooth to slightly curved, 13-21 x 3 um.

Pycnidia numerous, black, to 0.1-0.2 mm diam., sessile, irregularly globular, shiny; pycnospores ellipsoid, c. 3 x 1 um.

On Thuja plicata. With yellow Cyphelium. Montaine, Washington State.

Lecania toninioides Zahlbr.

Spores 15-20 x 4-5 um. Discs epruinose to weakly pruinose, dusky grayish, unchanged when wet; Spermatia filiform, 16-20 um long. Thallus closely adnate, squamulose-verrucose, more or less deep brown, often partly whitish pruinose. Apothecia scattered to grouped but not agglomerated, more or less circular in outline; thalline margin almost always pruinose at least at first, entire, at first thick, later thinner but persistent. Paraphyses tips slightly enlarged, more or less dark. Fulcra exobasidial; spermatia filiform. Apothecia to 1.5 mm diameter; discs becoming more or less convex; margins entire; hymenium to 90-95 um. Discs plane or slightly convex, at times slightly depressed in center; margin whitish, thin, becoming excluded; paraphyses coherent, appearing non-septate; spores oblong-fusiform. Thallus squamulose; squamules small, roundish, angular of sinuate-lobate, concave, contiguous and subimbricate; upper surface ashy gry, the edges whitish. On clay (rocks and soil according to Fink), southern California.

Lecania turicensis (Hepp) Müll. Arg. (syn.: L. albariella)

[Need to segregate out the Fink stuff and give his original description as L. turicensis sensu Fink]

Thallus effuse, thin, granular irregularly granular-areolate or areolate, white (farinose according to ?), reddish white or white gray (dirty creamy white according to Fink). Thallus mostly K-. Thallus sometimes with cortical zone of isodiametric cells overlain by a layer of dead cells. Apothecia to 0.8 mm diam. (0.1-0.25 mm according to Fink), sessile (adnate according to Fink), numerous to thickly crowded and deformed; discs flat to convex (according to Fink), reddish brown to black, pale gray-white (to bluish) pruinose, when moist becoming paler, with a dark-pigmented edge; thalline margin narrow, white (pruinose according to ?), often becoming excluded and disappearing completely, with an algal-containing medulla and in part, a narrow, algal-free cortical zone, overlain by layer of dead cells, at times overlain by a thick crystalline layer; hymenium 55-80 um, occasionally partly pigmented in upper part; paraphyses unbranched, discrete (according to ?); tips strongly swollen (only slightly thicker according to ?), the terminal 1-3 cells to 6 um wide with an external pigmentation (brown according to ?); spores ovoid-ellipsoid (according to Fink), (8-)10.5-13(-15) x (3-)4.5-6(-6,5) um, 1-septate, thin-walled, occasionally thinly pigmented. On calcareous and non-calcareous

rocks, also mortar. Ohio ("material doubtfully included", according to Fink).

[Lecania "venturae" Ryan & Nash ined.]

THALLUS bullate-squamulose; squamules substipitate, swollen, to (0.5-)1-3(-4) mm across, roundish to strongly but coarsely crenate-lobed; upper surface matt to slightly shiny, pale gray to pale orangish yellow, yellowish gray, light grayish brown, light grayish yellowish brown, light brown, light orange, or grayish reddish orange to brownish pink, sometimes with scattered tiny slightly raised patches of pruina; upper cortex 30 um thick; hyphae anticlinal to unoriented, conglutinate, c. 3-4 um wide, the lumina 2-5 um long, 1 um wide; epinecral layer 30 um; with 10 um thick surface layer of whitish crystals c. 3-5 um across; algal layer strongly interrupted, c. 50-75 um thick; algae 8-10 um diam.; medullary hyphae 2-3 um thick.

APOTHECIA to 1.5 mm diameter, immersed to adnate or broadly sessile; primordia light orange (52); discs medium brown, medium reddish brown, dark brown, deep brown, or brownish black (often with hymenium missing and then appearing light brown to pale orangish yellow), somewhat nitid; thalline margins 0.1 mm wide, entire, indistinctly delimited from thallus, soon scarcely raised, persistent, grayish reddish orange. Cortex c. 40-60 um thick, hyaline, hyphae conglutinate, unoriented, lumina 5-10 x 1-1.5 um. Algal layer present below hypothecium, 40-50 um, interrupted or continuous. Hypothecium to 150 um thick, hyaline, hyphae conglutinate, 2-3 um wide, unoriented, lumina c. 5 um long, 0.5-1 um wide. Hymenium 75 um, partly red-brown, gelatin I+ pale blue; epihymenium red-brown, not inspersed. Paraphyses strongly conglutinate, gelatinized, 2-2.5 um thick, thin-walled; tips red-brown, scarcely thickened, ca. 3 um wide; asci clavate, 60 x 13 um, the apices apparently Catillaria-type, the tholus appearing entirely I+ dark blue (or Bacidia-type, with conical, non-amyloid axial mass?), the lateral walls I+ pale blue; spores simple to 1-septate, rather broadly ellipsoid, (10-)12-14(-15) x (4/5-)6-7(-8) um, with one a few large oil drops; spores sometimes stuck together by gelatin after release from the asci.

CHEMISTRY: Thallus K-, C-, KC-, P-. Containing unknown violet gray to purplish brown after charring, UV+ yellow after charring, 5-6,5,&54A, 5-6&5B, 6&6C; unknown UV+ blue after charring, 7A; terpene?

ECOLOGY AND DISTRIBUTION: On soil on north facing mossy slope, San Nicolas Island, southern California.

NOTES: Externally this taxon is rather similar to forms of L. dudleyi, and the spores and other anatomical features also show similarities to that species, but the chemistry is different.

[L. "yakimae" Ryan in herb.]

Thallus thin, tightly attached, rimose-areolate, slightly uneven; areoles c. 0.3-0.4 mm across,; surface grayish yellowish brown.

Apothecia numerous, 0.3-0.5 mm diam., sessile; discs epruinose, matt, smooth, black; thalline margin < 0.1 mm wide, concolorous with thallus or slightly paler, ± persistent, entire. Hypothecium hyaline; epihymenium olive; paraphyses coherent; spores 0-1-septate, 13-20 x 5-6 um.

On basalt in sagebrush zone, Washington state.

Excluded

L. disceptans (Nyl.) Lynge (type, H-Nyl!) = Halecania alpivaga

L. pepegospora H. Magn. (holotype, UPS!) = Halecania sp. (H. spodomela?)

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ADD: (need spore measurements)

Discs moderate reddish brown to moderate reddish orange or dark grayish reddish brown; thalline exciple concolorous with thallus or paler and grayer Thallus verrucose-areolate to subsquamulose, light to moderate brown or light to moderate yellowish brown. Growing in the spray zone. Morrow Rock area, California. ..... [Lecania "morrowensis" Ryan & Nash ined.]

Areoles 0.8-1.5(-2) mm across, angular. Apothecia 0.8-1.3 mm diam. Discs often ± shiny, moderate to dark brown or grayish brown to dark grayish brown. Thallus yellowish gray to grayish yellow. Thalline exciple thickish, entire, persistent or excluded; proper margin not evident. Containing unknown (pale yellow-gray 3C). Santa Catalina Island. ..... [Lecania "macroareolata" Ryan & Nash ined.]

Thallus verrucose-areolate to subsquamulose; areoles ± contiguous, roundish to coarsely crenate, ca. 0.5-0.7 mm across, ± convex, uneven; upper surface matt to slightly shiny, dark grayish brown to grayish brown or partly moderate gray, light grayish yellowish brown, or light or moderate yellowish brown. Apothecia to 0.8 mm diam., constricted sessile; discs dark brown to brownish black or slightly reddish, ± plane, matt, epruinose; thalline exciple concolorous with thallus or slightly paler, ± entire, becoming excluded; proper margin often visible, concolorous with disc. Santa Catalina I. ..... [Lecania "cavernensis" Ryan & Nash ined.]