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of the
California Lichen Society



Volume 8

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The Bulletin of the California Lichen Society (ISSN 1093-9148) is edited by Darrell Wright with a review committee including Larry St. Clair, Shirley Tucker, William Sanders, and Richard Moe, and is produced by Darrell Wright. Bill Hill is Notes and News editor and assists with production. The *Bulletin* welcomes manuscripts on technical topics in lichenology relating to western North America and on conservation of the lichens, as well as news of lichenologists and their activities. The best way to submit manuscripts is by e-mail or on 1.44 Mb diskette in Word Perfect or Microsoft Word formats; ASCII format is an alternative. Manuscripts should be double-spaced. Figures are the usual line drawings and sharp black and white glossy photos, unmounted, and must be sent by surface mail. A review process is followed. Nomenclature follows Esslinger and Egan's 7th Checklist on-line at <http://www.ndsu.nodak.edu/instruct/esslinge/chcklst/chcklst7.htm>. The editors may substitute abbreviations of author's names, as appropriate, from R.K. Brummitt and C.E. Powell, *Authors of Plant Names*, Royal Botanic Gardens, Kew, 1992. Style follows this issue. Reprints may be ordered and will be provided at a charge equal to the Society's cost. The Bulletin has a World Wide Web site at <http://ucjeps herb.berkeley.edu/rlmoe/cals.html>.

With this issue of the Bulletin Darrell Wright transfers the managing editorship to Charis Bratt. Starting with the next issue, send submittals and correspondence to her at The Santa Barbara Botanic Garden, 1212 Mission Canyon Road, Santa Barbara, California 93105; e-mail: cbratt@sbbg.org.

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Front cover (fig. 1): *Sporastatia testudinea* (glossy brown) with *Pleopsidium* sp. (yellow) and *Rhizoplaca melanophthalma* (pale green), *J. and R. Robertson 7000*, Mendocino County, California. 1mm = — . See the article by Judith and Ronald Robertson. Photography by Ronald Robertson, digitizing by Richard Doell, and printing by Darrell Wright. Other figures accompanying this article are on the back cover.

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DNA Sequences Confirm that *Petroderma maculiforme* (Phaeophyceae) is the Brown Algal Phycobiont of the Marine Lichen *Verrucaria tavaresiae* (Verrucariales, Ascomycota) from Central California

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Abstract: *The brown algal phycobiont of the Californian marine lichen Verrucaria tavaresiae was isolated and cultivated without mycobiont. To confirm the identity of the alga, the DNA sequence of its nuclear ribosomal internal transcribed spacer 1 (ITS1) was determined and compared to the homologous sequence in a European isolate of the free-living brown alga, Petroderma maculiforme. The sequences were identical, indicating conspecificity.*

Introduction

The marine lichen *Verrucaria tavaresiae* R. L. Moe is endemic to central California where it occurs in the middle and upper intertidal zones of rocky shores. It is the only lichen known to harbor a brown alga as phycobiont (Moe 1997). Wynne (1969: 9) isolated an alga from the lichen into cultivation and identified it as *Petroderma maculiforme* (Wollny) Kuckuck, a marine crustose brown alga known from arctic and cold-temperate waters of both the Northern and Southern Hemispheres (Wilce et al. 1970). To confirm the identity of the phycobiont, we isolated the alga from the lichen into unialgal culture, extracted its DNA and compared part of its genomic DNA sequence to the homologous sequence in an isolate of *P. maculiforme* from the alga's type locality. For molecular comparison, we chose a sector of the nuclear ribosomal DNA cistron. It included the moderately to highly conserved 3'-end of the gene for the small ribosomal subunit (SSU), the entire internal transcribed spacer 1 (ITS1) which is highly variable and may in brown algae differ among species and even populations (Peters et al.

1997, Stache-Crain et al. 1997), and the highly conserved 5'-end of the gene for the 5.8S ribosomal subunit.

Material and methods

Free-living *Petroderma maculiforme* was collected by Peters in 1987 at its type locality on the North Sea island of Helgoland. It was isolated and maintained as clonal stock culture in Peters' culture collection. *Verrucaria tavaresiae* was collected by Moe on 21 May 2000 on Yerba Buena Island in San Francisco Bay. It was transferred to a zip-lock plastic bag, sent to Kiel on 22 May where it arrived on 8 June, surviving 17 days in the mail. There, fragments of the lichen were inoculated into Petri dishes containing sterile culture medium (half-strength Provasoli enriched seawater, prepared according to Starr and Zeikus [1993]). The isolates were cultivated at 15° C and illuminated by white fluorescent tubes at a 15-25 $\mu\text{mol}^{-2} \text{s}^{-1}$ photon fluence rate. Algal filaments growing out of the lichen fragments were sub-isolated into clonal cultures. One clone (henceforth referred to as "the phycobiont") was selected for further study.

DNA was isolated from actively growing cultures. In *Petroderma maculiforme* from Helgoland, this was done on 7 August 1995 in the molecular laboratory of the Department of Marine Science, University of Groningen, The Netherlands, following the protocol of van Oppen et al. (1993). DNA of the phycobiont was isolated on 9 September 2000 in the molecular laboratory of Peters at Kiel, using the DNeasy Plant Mini Kit according to the manufacturer's protocol (QIAGEN, Hilden, Germany).

In *Petroderma maculiforme*, the DNA sector of interest was amplified using the Polymerase Chain Reaction (Saiki et al. 1988) in November, 1995 at Groningen, as described in Peters and Burkhardt (1998). The oligonucleotide primer pairs employed were TW5-ITS2 and ITS1-ITS4 (van Oppen et al. 1993, Peters and Burkhardt 1998). In the phycobiont, amplification was done in October, 2000 at Kiel, using the primer pair TW5F-5.8S1R (Peters and Burkhardt 1998). PCR products from at least two independent PCR reactions were pooled before sequencing.

The sequences of *Petroderma maculiforme* and of the phycobiont were determined for both DNA strands (GenBank accession AJ300489/90). *P. maculiforme* was sequenced manually in November, 1995, as described in Peters et al. (1998), using the primers TW7F, JO3R, JO3F, ITS1F, and ITS2CR (van Oppen et al. 1993, Peters and Burkhardt 1998). The sequence of the phycobiont was determined commercially (MWG-Biotech, Ebersberg, Germany) on an ABI PRISM 3700 automated sequencer, using the internal primers JO3CSF (Peters and Burkhardt 1998) and 5.8S4R (GCTGCGTTCATCGTTG) which anneals at position 31-49 inside the 5.8S gene.

Results

A single species of brown alga grew out of the inoculated fragments (Fig. 1) of the lichen and developed into tufts of branched filaments 5-10 μm in diameter. The cells contained one lobed plastid without pyrenoid. In an aged culture, the algal filaments produced a small number of hyaline hairs with a basal sheath (Fig. 2). The DNA sequence determined for both *Petroderma maculiforme* and the phycobiont was 680 bp, of which 374 bp belonged to the 3'-end of the 18S gene, 290 bp represented the internal transcribed spacer 1, and 16 bp formed the 5'-end of the 5.8S gene. There was sequence identity between *P. maculiforme* and the phycobiont.

Discussion

The morphological characteristics of the cultivated phycobiont as well as its ITS1 sequence provide firm evidence that the main alga contributing to the lichen symbiosis in *Verrucaria tavaresiae* is *Petroderma maculiforme*, confirming the identification by Wynne (1996) of the material isolated by him. In the lichen phycobiont, each cell has a single plastid without pyrenoid as in *P. maculiforme* (Kawai 1992). Hyaline hairs were not reported by Wynne (1969) for any of his material, free-living or phycobiont, but have been described from European field material of *P. maculiforme* (Waern 1949, cited in Wynne 1969).

ITS1 is a fast evolving sector of the brown algal genome and identity in this region indicates conspecificity. The ITS1 sequence identity between the Helgoland isolate of the alga and the phycobiont from California came as a surprise, because, normally, ITS1 of amphioceanic brown macroalgae show differences at a small number of positions between North Pacific and North Atlantic isolates, e.g., *Chorda filum* (L.) Stackhouse (Kawai et al. 2001), *Desmarestia aculeata* (L.) Lamouroux (Peters et al. 1997), and *Ectocarpus siliculosus* (Dillwyn) Lyngbye (Stache-Crain et al. 1997). We can exclude contamination due to handling during isolation and molecular work as an explanation for the sequence identity, because the culture of *P. maculiforme* was not removed from the stock culture when the phycobiont was isolated from Californian *V. tavaresiae*, and the DNA of the two isolates was amplified and sequenced five years apart in two different laboratories.

The genetic similarity of the phycobiont of *Verrucaria tavaresiae* to Atlantic *Petroderma maculiforme* and the similarity of temperature conditions on the European West Coast to those in central California raise the question of why no *V. tavaresiae* has been found on the shores of the well-investigated Atlantic Ocean. In parts of the distribution area of *P. maculiforme* which have been less intensely studied, the lichen may have been overlooked. Alternatively, differences in substratum, tidal regime, or accompanying organisms may be responsible for restriction of *V. tavaresiae* to California.

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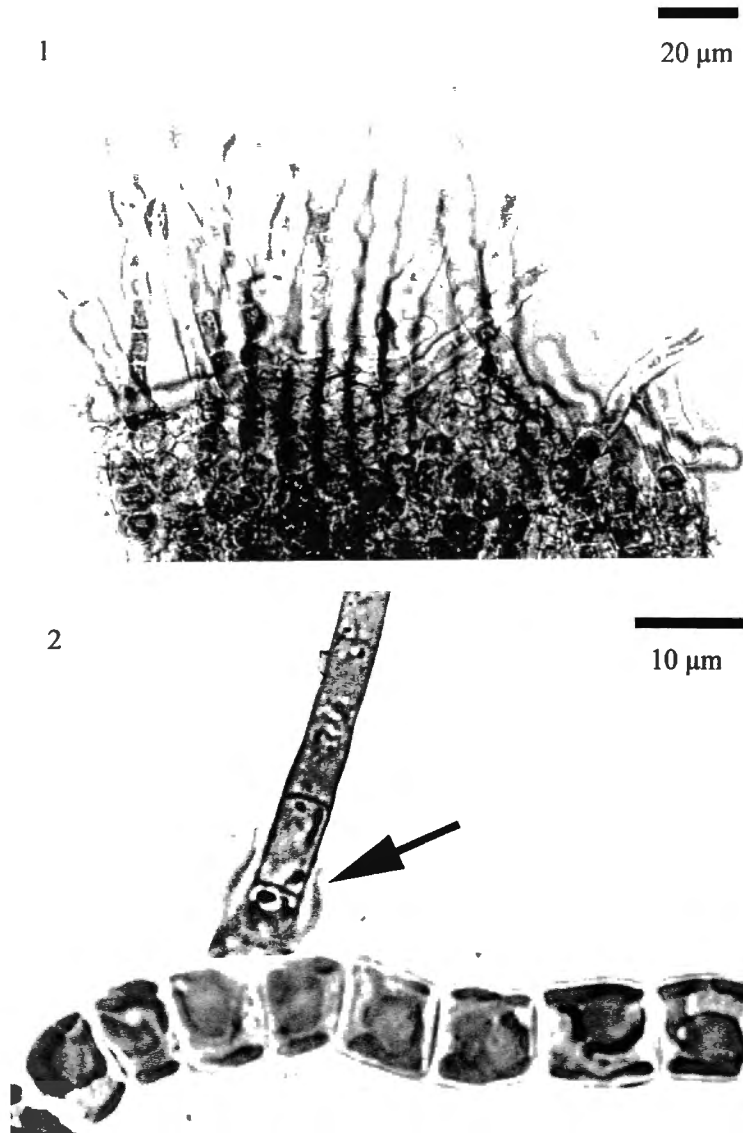


Fig. 1. Fragment of *Verrucaria tavaresiae* inoculated into culture medium with outgrowing filaments. Fig. 2. Filament of the phycobiont showing the plastids and the sheathed base of a phaeophyceyan hair (arrow).

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San Francisco Watershed Lichens – A More Comprehensive List

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Abstract: *One hundred and eighty seven lichen species in 61 genera known from the San Francisco Watershed, San Mateo County, California, are listed with annotations. The list includes 61 taxa reported as new to the Watershed since the preparation in 1968 of W.P. Jordan's unpublished master's thesis on the corticolous and lignicolous species. Nearly all the new reports are from recent California Lichen Society forays.*

Dr. Harry Thiers took his mycology and lichenology students on many field trips. One of the more memorable places close by San Francisco State University was the San Francisco Watershed in San Mateo County, California (fig. 1). In 1966 I went along on those trips and here include some of my determinations at that time. I also identified San Francisco Watershed lichens for the Frederick Burke Foundation in 1966 (unpublished). Collection numbers are only included when verified by re-examining the specimen. They are followed by "- 66". One of Dr. Thiers' specimens is also included.

In 1968 William Jordan produced a master's thesis at San Francisco State University treating the corticolous and lignicolous lichens of the Watershed (Jordan 1968, unpublished). His reports are included here, and an excerpt of his description has been added where no one has subsequently collected that lichen. Otherwise, WJ has been added to the list of collection numbers when others have also found it. However, Jordan's thesis cited no collection numbers, and to find those listed and deposited in the San Francisco State University Herbarium would mean looking through hundreds of collections for those made between June and November of 1967 (Jordan 1968, p. 5). Therefore, no one has as yet re-verified Jordan's identifications (during work on the thesis John Thomson checked a number of collections). The nomenclature of the lichens listed by Jordan has been brought up to date according to the seventh on-line checklist of North American lichens (Esslinger 1997).

In early 1998 the California Lichen Society (CALs) began a series of three trips to identify lichens at the watershed, as follows:

Watershed I, January 31 1998: Mikki McGee reported on this first trip in the Bulletin of the California Lichen Society (McGee 1998). These collections are included without

numbers except for a few of my own with the number of the location where found (McGee 1998) and the initials of the collector. The area explored was entered from Canada Road in the southeast part of the watershed, next to the Edgewood Preserve in western Redwood City.

Watershed II, January 23, 1999: We entered at the Cahill Gate and quarry at the southern end of Lower Crystal Springs Reservoir, just beyond where Highway 92 crosses Junipero Serra Freeway and becomes Highway 35. Eighteen people were present, 6 of whom were members of CALs. The others were associated with the California Native Plant Society or with the California Academy of Sciences. CALs members and associates were Doris E. Baltzo, Susan Crutchfield and friend, Bill Hill, Barbara Lachelt, and Judy and Ron Robertson. Others were Adah Bakalinsky, Helenjean Bowie, Phillip Gerrie, Tom Griggs, Daniel Jacob, Les Loeder, Greg Maffei, Marck Mencke, Mary Mitchell, Jean Ouellette, and Gary Weiss.

Dr. Bill Freedman let us through the Cahill Gate of the Quarry at the south end of Crystal Springs Reservoir. Collection of lichens started at the gate's surrounding vegetation, which included *Baccharis* (Coyote Brush), *Umbellularia californica* (California Bay), *Salix* (willow), long-needle *Pinus* spp. (pines), *Toxicodendron diversilobum* (Poison Oak) and an evergreen *Quercus* sp. (Live Oak). We proceeded to some old corrugated metal roofs with beautifully developed and abundant lichens, and then to the crumbling walls of the quarry, all at 24 to 30 m elevation. The walls were black, probably with the lichen *Placynthium nigrum*. Going uphill, we passed through a planted forest of *Cupressus macrocarpa* (Monterey Cypress), then through oaks and finally pines, as we walked to the top of Cahill Ridge to the gravel parking area at about 300 m elevation. This area was formerly densely forested. Colorful and abundant non-lichen fungi were observed along the way. Lichens listed include identifications with voucher specimens and collection numbers. Notation of only the collector's initials indicates either no voucher specimen or no number is available.

Watershed III, January 29, 2000: Thirty-three persons were present and several affiliations were represented, including CALs, the California Native Plant Society

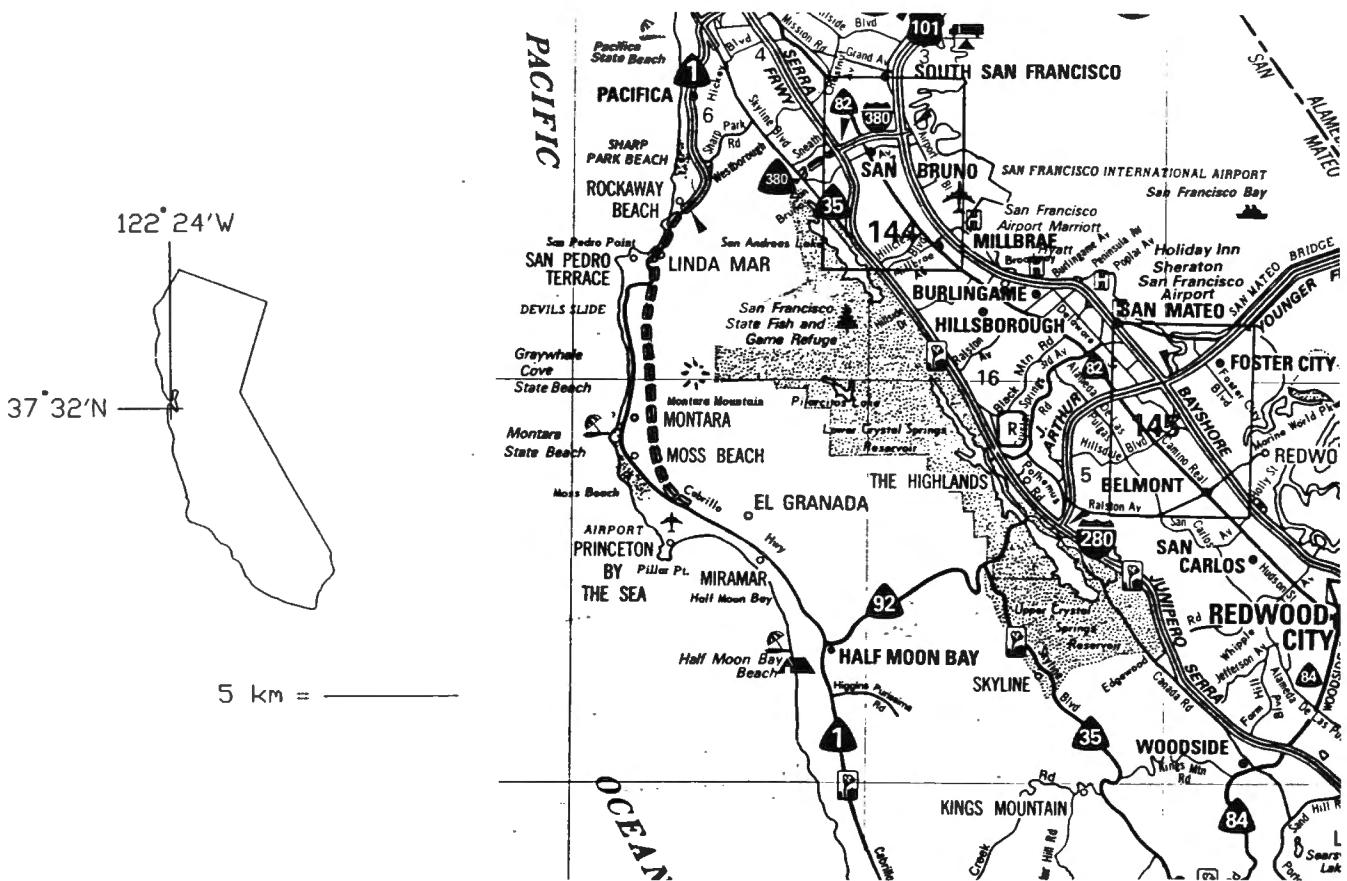


Fig. 1. Map of the southern San Francisco Bay Area showing the San Francisco Watershed (shaded and labelled as "San Francisco State Fish and Game Refuge"). Used by permission of Thomas Bros. Map Co., San Francisco, California.

(CNPS), the Mycological Society of San Francisco (MSSF), San Bruno Mountain Watch (SBMW), and Midpeninsula Regional Open Space District (MROSD). Members of CALS were Doris E. Baltzo, Ali Brian, Martha Breed, Janet and Richard Doell, Bill Ferguson, Stevie Ferguson, Bill Freedman, Bill Hill, Lori Hubbard, Greg Jirak, Mikki McGee, Marck Mencke, Judy and Ron Robertson, David Schooley, Mary Simpson, and Chris Wilson. Others were Tony Alexander, Loren Bialik, Leanne Bryan, Tom Cochrane, Karen Rongey Conner and Michael Conner, Lilli Ferguson, Louise Freedman, Jobyna Kingsburg-Gankin and Roman Gankin, Elaine Ginnold, Katherine Greene, Joyce and Ed Lehmann, and Carol and Guenther Machol.

From the parking lot Dr. Bill Freedman led us along Skyline Boulevard to Sneath Lane and west to the entrance at the end of Sneath Lane, where we crossed the San Bruno-Pacific boundary and entered the Golden Gate

Recreation Area. The road went up past Sweeney Ridge, to another gate into the San Francisco Fish and Game Refuge-Watershed proper, turned onto Portola Road and then down Pilarcitos Road (alongside San Mateo Creek) to "Five Corners" (a meeting point of five ridges), where we parked. From there we walked downhill approximately 3.7 km to the shore of Pilarcitos Lake and further down to Stone Dam, with Pilarcitos Creek to the west. The area is west of Cahill Ridge, whereas the Watershed II trip the previous year was east of Cahill Ridge. Lichens were collected as we walked uphill between Stone Dam and "Five Corners" and along Sweeney Ridge.

Total species listed: 183

Total genera: 81

Total of William Jordan's species listed: 122

614 SEE ABSTRACT

Reports new since Jordan's thesis: 58 species. An asterisk has been placed next to these to indicate the new report.

Symbols used and collection numbers:

- WJ** A record from William Jordan's master's thesis.
WS William Sanders
DEB Doris E. Baltzo I: 11686-11723; II: 11880-11932; III: 12065-12091. In 1966: 412-66 through 439-66.
JRR Judith Robertson II: 2036-2074; III: 2863-2883.
MM Mikki McGee II: ?; III: 404-443.
BH Bill Hill
JD Janet Doell
BL Barbara Lachelt
CB Charis Bratt
DT David Toren

Collections identified to genus only have been omitted.

Amandinea punctata (Hoffm.) Coppins & Scheid. – WJ, as *Buellia punctata* (Hoffm.) A. Massal.; II, DEB 11890a, on *Baccharis*: thallus a pale gray to dirty green crust; hypothallus a thin, dark ring; apothecia black to dark brown, insect damaged; spores 1-septate, dark brown, 6-11 x 11-17 µm; hypothecium dark brown; JRR 2054c, apothecia black, lecideine; spores brown, 1-septate.

Anisomeridium biforme (Borrer) R.C. Harris – WJ, as *Arthopyrenia biformis* (Borrer) A. Massal.: thallus thin; photobiont *Trentepohlia*; perithecia with 1-septate spores, 11-18 x 5-7 µm; pseudoparaphyses I-; on decorticated wood.

Arthonia excedens Nyl. – WJ: thallus thin, grayish; apothecia black, irregularly rounded, reddish when wet; photobiont *Trentepohlia*; spores faint, brownish, 5-septate, 8-11 x 27-34 µm.

**Arthothelium orbilliferum* (Almq.) Hasse – III, DEB 12073p: thallus thin, dirty green to pale olive gray with dark margin; K-; apothecia black, irregular, without margin; spores muriform, colorless, to 25 µm long; photobiont chroococcoid in sparse, yellow-green clusters; on *Alnus*.

**Aspicilia cf. caesiocinerea* (Nyl. ex Malbr.) Arnold. – I, 4 MM, det. B. Ryan, on fragment of serpentine.

**Bacidia heterochroa* (Müll. Arg.) Zahlbr. (not *B. laurocerasi* [Delise ex Duby] Zahlbr.) – I, JRR 2063b, det. I. Tavares: thallus thin, green, cracked; hypothallus black;

apothecia dark red-brown, to 0.5 mm in diameter, plane to slightly convex; hypothecium yellowish; epithecium brown, K+ violet, I+ blue; hymenium I+ blue; spores acicular, 7-10 septate, 3 x 54 µm. According to Ekman (1996), neither *B. laurocerasi* subsp. *laurocerasi* nor *B. laurocerasi* subsp. *idahoensis* occurs in California. Ekman mentions a black prothallus for *B. heterochroa*.

Bacidia laurocerasi (Delise ex Duby) Zahlbr. – WJ, as *B. atrogrisea* (Delise ex Hepp) Körber, a synonym of *B. laurocerasi*, but see note under *B. heterochroa*: thallus dirty green; apothecia black with proper margin only; hymenium K+ violet; spores acicular, septate; on bark.

Bacidina californica S. Ekman – WJ: based on Jordan 822 from the S.F. Watershed, cited in Ekman (1996).

Bacidina phacodes (Körber) Vězda – WJ, as *Bacidia albescens* (Kremp.) Zwackh, but the collection is probably *Bacidina californica*; see Ekman (1996): thallus greenish, granulose; apothecia yellow to flesh-colored; hypothecium colorless; spores 3-7 septate, 35-51 x 3-4 µm.

Bryoria furcellata (Fr.) Brodo & D. Hawksw. – WJ, as *Alectoria nidulifera* Norrlin: soralia +/- rimmed with spinules, P+ red; medulla K-, P+ red; on *Alnus*.

Bryoria implexa (Hoffm.) Brodo & D. Hawksw. – WJ, as *Alectoria implexa* (Hoffm.) Röhl.: thallus to 6 cm long, pale, regularly dichotomously branched; K+ faint yellow, C-, KC+ reddish and fading, P- or P+ yellow, then red; soredia lacking; on large *Pseudotsuga* on Cahill Ridge. (However, *B. implexa*, a species with psoromic acid, was never observed to be KC+ by Brodo and Hawksworth (1977), who examined at least 18 specimens, nor did they have it in the western U.S. from further south than Idaho. One might suspect Jordan's material was *B. pseudocapillaris*, but that species, according to Brodo and Hawksworth, is C+, confirmed by D. Glavich for the California and Oregon material with which he worked. Jordan's collection may be *B. capillaris*, also in section *Implexae*, which was found once at Pt. Reyes in Marin Co., D. Wright 3727, 3728 [Ed.]

**Bryoria pseudocapillaris* Brodo & D. Hawksw. – III, MM 423; det. D. Glavich: thallus small, subpendent, pale brown to badius (=reddish brown [Ed.]) or yellowish; branches irregular in cross section; pseudocyphellae long, straight; some sulci (longitudinal furrows or grooves) present; K+ yellow, C+ red; on deadfall twigs north of maples and horse trough, south of the dam.

**Buellia cf. lepidastr* (Tuck.) Tuck. – I, 7 MM: on pebble with *Leptochidium*.

Baltzo: San Francisco Watershed Lichens

Buellia oidalea (Nyl.) Tuck. – *WJ*: thallus K+ yellow; disk not pruinose; spores muriform.

**Buellia stellulata* (Taylor) Mudd – *DEB* 443-66: thallus an areolate, unmarginated crust; apothecia black; spores brown, septate, 10 x 6 µm; on serpentine.

**Buellia triseptata* A. Nordin (as *Buellia cf. vernicoma* [Tuck.] Tuck. in Watershed I list; see Nordin [1999].) – *I*, *WS*, det. I. Tavares: thallus grayish, thin; apothecia 0.2-0.7 mm in diameter; spores dark, 3-septate.

**Caloplaca atosanguinea* (G. Merr.) Lamb – *III*, *DEB* 12073o, confirmed by Wetmore: thallus pale, thin, cream-white, not cracked; hypothallus +/- black; apothecia with dark rust-brown to black disk and orange proper margin, 0.5-0.6 mm in diameter; K+ fuchsia, dissolving into the reagent; epihymenium brown to gold in water; spores 17-20 x 8 µm, isthmus 8 µm; on *Alnus*.

Caloplaca cerina (Ehrh. ex Hedwig) Th. Fr. – *WJ*: hypothallus blue-black; apothecia yellow to orange with lighter proper margin and persistent thalline margin; *II*, *DEB* 11891, as *C. cf. cerina*.

Caloplaca citrina (Hoffm.) Th. Fr. – *WJ*: thallus yellow, granulose to squamulose, K+ purple.

Caloplaca ferruginea (Huds.) Th. Fr. – *WJ*: thallus whitish-gray, thicker than in *C. cerina*, K-; hypothallus blue-black; disk dark orange to rusty red or purple with a concolorous proper margin, K+ deep violet.

Caloplaca flavovirescens (Wulfen) Dalla Torre & Sarnth. – *WJ*, as *C. aurantiaca* (Lightf.) Th. Fr.; *II*, *JRR* 2067: thallus yellowish, thin to verrucose; hypothallus black; disk and margin yellow; spores 7-8 x 14-18 µm; isthmus 4 µm.

Caloplaca holocarpa (Hoffm. ex Ach.) M. Wade – *WJ*: thallus varies from gray to yellow to disappearing, K-; apothecia K+ deep red.

**Caloplaca cf. squamosa* (de Lesd.) Zahlbr. – *I*, 15 *MM*; on serpentine.

**Candelaria concolor* (Dickson) Stein – *I*, 8 *DEB* 11686c, 11692c, 11699g, 11708b; 2 *JRR*; 9, 14 *MM*; 9 *BH*: thallus foliose, lemon to greenish yellow with narrow lobes and yellow soredia; K-; on bark.

Chaenotheca chrysocephala (Ach.) Th. Fr. – *WJ*: thallus yellow; apothecia (mazaedia) and stalks yellow-pruinose; spores brown, non-septate.

Chaenotheca furfuracea (L.) Tibell – *WJ*, as *Coniocybe furfuracea* (L.) Ach.: thallus thin, powdery; stipes long (to 0.5 cm), slender, yellow pruinose; spores hyaline in a brown mass; near Stone Dam.

Chaenotheca trichialis (Ach.) Th. Fr. – *WJ*: thallus white or disappearing; apothecia and stalks white pruinose.

Chrysothrix candelaris (L.) J.R. Laundon – *WJ*, as *Lepraria candelaris* (L.) Fr., K+ red; *III*, *DEB* 12067b, on *Pseudotsuga*; *JRR* 2878: a thin layer of bright yellow *Lepraria*-like granules less than 0.1 mm in diameter; K+ brownish-orange; no lobes seen; on *Pseudotsuga*.

Cladonia chlorophea (Flörke ex Sommerf.) Sprengel – *WJ*: cups short, P+ orange; *DEB* 425-66; *I*, 5 *DEB*.

Cladonia coniocraea (Flörke) Sprengel – *WJ*: podetia P+ orange, K-; apothecia and pycnidia brown.

Cladonia fimbriata (L.) Fr. – *WJ*; *I*, 4 *DEB*; 5 *JRR*: podetia taller than 0.5 mm, with small cups; P+ orange.

Cladonia furcata (Hudson) Schrader – *WJ*: podetia abundantly branched; pycnidia brown, K-; *I*, 7, *JRR*; 11, *BH*.

**Cladonia macilenta* Hoffm. var. *bacillaris* (Genth) Schaerer – *III*, *DEB* 12081b: K-, P-; on *Pseudotsuga*.

Cladonia macilenta Hoffm. var. *macilenta* – *WJ*: K+ red; *II*, *JRR* 2040a; *III*, *JRR* 2866, on decaying log: thallus K+ yellow, P+ yellow; primary squamules small; podetia simple; apothecia red; at base of *Pinus*.

**Cladonia ochrochlora* Flörke – *III*, *DEB* 12076b: primary squamules sorediate, K-; podetia pointed, K+ gold; on *Pseudotsuga*.

*?*Cladonia cf. pyxidata* (L.) Hoffm. – *III*, *JD* 2169, as keyed in Hammer (1993), McCune & Geiser (1997) and Hale & Cole (1988): podetia about 0.5 cm high; squamules conspicuous, small squamules and soredia (?) inside of cup; on bank beside road. Hammer (1995 and pers. comm.) has not seen this species from central California but does not rule out that it may be at the Watershed. Unfortunately, the collection has been misplaced and cannot be verified.

**Cladonia transcendens* (Vainio) Vainio – *I*, 5 *MM*.

Cliostomum griffithii (Sm.) Coppins – *WJ*, as *Catillaria griffithii* (Sm.) Malme: thallus green-brown; apothecia black; hypothecium green-black; spores 1-septate, hyaline.

Collema furfuraceum (Arnold) Du Rietz – WJ: isidia styliiform (probably means "cylindrical" in this case. [Ed.]); III, DEB 12078b, on dead branch: thallus with upper surface pustulate, ridged; isidia globose at first and then cylindrical; photobiont blue-green.

Collema nigrescens (Hudson) DC. – WJ: globose isidia present or lacking (see also Brodo et al. 2001); I, 10 JRR. According to Goward et al. (1994), this lichen lacks isidia.

Cresponea chloroconia (Tuck.) Egea & Torrente – WJ, as *Lecanactis premnea* (Ach.) Wedd. var. *chloroconia* Tuck. Thallus a thin crust; photobiont *Trentepohlia*; apothecia with black proper margin; hypothecium black to brown; spores hyaline, 3- or more septate; on *Calocedrus*.

**Dermatocarpon miniatum* (L.) W. Mann – DEB 427-66: on serpentine off Sawyer Camp Road; I, 1 JRR.

Dimerella lutea (Dickson) Trevisan – WJ: thallus a greenish crust; apothecia yellow; on mosses on *Quercus* sp. and *Cupressus macrocarpa*.

Diplotomma alboatrum (Hoffm.) Flotow – WJ, as *Buellia alboatra* (Hoffm.) Branth & Rostr. (= *B. alboatra* [Hoffm.] Th. Fr.? [Esslinger 1997]): thallus bright white; apothecia white pruinose, flat to convex; spores muriform, dark.

**Endocarpon pusillum* Hedwig – I, 4 JRR: on soil among liverworts.

Evernia prunastri (L.) Ach. – WJ, on *Quercus*; I, 3, 7 DEB; 9 MM; 6 BH; II, JRR 2057; III, DEB 12069a, on *Pseudotsuga*: thallus fruticose, soft, not brittle, pale yellow-green to almost whitish-green with a white underside; all chemical reactions negative (except for the atranorin containing K+ yellow cortex [Ed.]); common; MM 426, on deadfall twigs with borers.

Flavoparmelia caperata (L.) Hale – WJ, as *Parmelia caperata* (L.) Ach.: medulla P+ red, C-; I, 3 JRR; 3 DEB; 9 BH; II, DEB 11880c, 11892, on corrugated metal roof, more abundant on the south side of the green painted metal roof; BL: sorediate, medulla C- (observations by JRR); III, JD 2158: a tiny fragment, ridged but without surface cracks or soredia; DEB 12075a, with apothecia, on *Pseudotsuga*; DEB 12076a: thallus foliose, of broadly rounded, pale yellow-green lobes; soredia on the upper side; black below with brown edges.

Flavopunctelia flaventior (Stirton) Hale – WJ, as *Parmelia flaventior* Stirton: medulla P-, C+ red; I, 2, 7 DEB; II, DEB 11880e: thallus pale to darker bluish yellow-green;

pseudocyphellae usually near the broad lobe tips on the upper side; soralia at margins and on laminae; lower side dark black to brown, paler at margin; medulla C+ red; on corrugated metal roof; BL.

**Fuscopannaria leucostictoides* (Ohlsson) P.M. Jørg. – I, 10, JRR: not sorediate, according to Jørgensen (2000).

Fuscopannaria praetermissa (Nyl.) P.M. Jørg. – WJ, as *Parmeliella praetermissa* (Nyl.) P. James: thallus squamulose to foliose, with upper cortex only; hypothallus dark; apothecia without thalline margin; spores simple, hyaline; the blue-green photobiont is *Nostoc*.

Gyalecta herrei Vězda – WJ; II, JRR 2052, det. Vězda: thallus a granular, green crust; apothecia with orange disk which appears translucent, margin irregular; hymenium I+ blue; spores muriform, hyaline, 14-16 x 27-38 µm; on north side of *Cupressus* trunk.

Hafellia disciformis (Fr.) Marbach & H. Mayrhofer (Syn. *Buellia disciformis* [Fr.] Mudd) – WJ: spores 6-8 x 16-26 µm; I, JRR 2064: thallus grayish white, moderately thick, cracked-areolate, K+ yellow; hypothallus black; apothecia black, plane, becoming convex, 0.5-2.0 mm in diameter, some in small clusters; hymenium I+ blue; spores brown, 1-septate; on *Quercus* sp. (Live Oak).

Heterodermia leucomela (L.) Poelt – WJ, as "*Anaptychia leucomelaena*": medulla K+ yellow to red; I, 2, 7, 8 DEB; 6, 14 MM; II, JRR 2041, on *Baccharis*; DEB 11889c on *Quercus*, 11893 : thallus foliose (may appear fruticose), gray to whitish, with long black cilia on the margins; lower side white, without cortex; sorediate on the lower side at the lobe tips; BL; III, JD 2159: lobes 0.5 – 1.5 mm in diameter, windfall; JRR 2864; DEB 12080d, chaparral, top of Sweeney Ridge; MM 408, in moss with a cyanolichen; MM 428, on bark.

**Hypogymnia apinnata* Goward & McCune – III, MM 443, on *Pseudotsuga*; det. D. Glavich: thallus with black interior; upper cortex K+ yellow, containing crystals; all other spot tests negative (Goward and McCune 1993).

Hypogymnia enteromorpha (Ach.) Nyl. – WJ: thallus often with apothecia; soredia lacking; III, JD 2164: a small fragment but with the flattish, short, inflated lobes, small side lobes, and dark medulla characteristic of this species; windfall.

Hypogymnia imshaugii Krog – I, 3, JRR; II, JRR 2056; III, JD 2161: thallus whitish gray above, black below; medulla all white, KC-; apothecia usually present; windfall.

Baltzo: San Francisco Watershed Lichens

**Hypogymnia inactiva* (Krog) Ohlsson – II, *JRR* 2035; III, *DEB* 12087a, on ground, det. I. Tavares: thallus with slender, isotomic dichotomous lobes, without bud-like marginal lobes; roof and floor of cavity dark; medulla KC+ pink, P-.

**Hypogymnia cf. metaphysodes* (Asah.) Rass. – I, 3 *MM*: possibly a new species, according to B. Ryan.

Hypogymnia physodes (L.) Nyl. – *WJ*: soredia on ruptured lobe tips; II, *DEB* 11889b: thallus with short, rounded lobes; soredia on underside of lobe tips; medulla white to brown; on white corrugated metal roof; *JRR* 2058.

Hypogymnia tubulosa (Schaerer) Hav. – *WJ*: soredia in ball-shaped, apical soralia; medulla and cortex P-.

**Hypotrachyna revoluta* (Flörke) Hale – II, *DEB* 11880h: thallus a dirty gray-white green; soredia diffuse on the upper side just behind the narrow, eciliate lobe tips; sorediate lobes curling so as to appear almost tubular; some rhizines dichotomously branched; medulla K-, C+ red; on white corrugated metal roof; *JRR* 2050, 2049: medulla C+ pink to red; rhizines branched.

Kaernefeltia californica (Tuck.) Thell & Goward – *WJ*, as *Cornicularia californica* (Tuck.) Du Rietz; *DEB* 421b-66: thallus fruticose, tufted, greenish black; apothecia terminal; spores simple, colorless.

**Kaernefeltia merrillii* (Du Rietz) Thell & Goward – *DEB* 422a-66: thallus foliose, olive-black; lobes 1-2 mm in diameter, paler below; on *Arctostaphylos*.

Lecania dubitans (Nyl.) A.L.Sm. – *WJ*, as *L. dimera* (Nyl.) Th. Fr.: thallus a white crust with black hypothallus; spores 1-septate.

Lecanora albella (Pers.) Ach. var. *albella* – *WJ*, as *L. pallida* (Schreber) Rabenh.: thallus green to white; apothecia pruinose; K+ yellow to red; I, 12, *JRR*.

Lecanora allophana Nyl. – *WJ*, as *L. subfusca* (L.) Ach.: thallus K+ yellow, C-; apothecia brown with white thalline margin; III, *DEB* 11920a, on *Baccharis*.

**Lecanora caesiorubella* Ach. subsp. *merrillii* Imshaug & Brodo – I, *DEB* 11693, as *L. cf. caesiorubella* subsp. *merrillii* in McGee (1998): spores 14 x 7 µm; II, *JRR* 2062: thallus gray-white, thick, cracked to warty; C-, K+ yellow to red; apothecia flesh-pink, very pruinose, to 2 mm in diameter, with crenate margins; spores simple, hyaline, 8-9 x 12-14 µm; on *Quercus* (Live Oak).

Lecanora hagenii (Ach.) Ach. – *WJ*: apothecia small, brown; K- to K+ faintly yellow; II, *JRR* 2054a.

Lecanora pacifica Tuck. – *WJ*: thallus K+ yellow, C-; pruina white or green; I, 9 *BH*: apothecia to 1.2 mm, pruina lacking, crystals present (*MM*); det. B. Ryan; II, *JRR* 2068: thallus grayish white, K+ yellow; apothecia with large hyaline crystals in the thalline rim and under the hypothecium; spores 9 x 14-15 µm; on *Baccharis*; III, *DEB* 12073a: thallus a very thin, cream colored, K+ yellow crust; apothecia pale tan or mostly darkening to green-black, to 1.2 mm in diameter, not pruinose, the margin with large crystals; spores 6 x 14 µm; on *Alnus*.

**Lecanora pinguis* Tuck. – *DEB* 438-66: thallus thick, chalky, P-; apothecia flesh-colored, partly pruinose; on serpentine off Sawyer Camp Road at 30-150 m elevation.

Lecanora symmicta (Ach.) Ach. – *WJ*: thallus C+ orange, K+ yellow (KC+ yellow, C-; disks sometimes C+ orange [Brodo et al. 2001] [Ed.]); apothecia yellow to flesh-colored.

Lecidea plebeja Nyl. – *WJ*: thallus a thick, areolate to squamulose crust, K-, C-; apothecia black or, if brown, then thallus not granulose; hypothecium light brown; spores hyaline, non-septate.

Lecidella euphorea (Flörke) Hertel – *WJ*, as *Lecidea euphorea* (Körber) Nyl. (= *L. euphorea* [Flörke] Nyl.? [Esslinger 1997]): thallus thin, brown-green, C-; apothecia black; paraphyses brown-tipped; hypothecium dark brown; hymenium I+ blue.

**Lepraria lobificans* Nyl. – I, *JRR* 2047: thallus composed of soredia; K+ yellow, C-, P+ orange.

Leproloma membranaceum (Dickson) Vainio – *WJ*, as *Lepraria membranacea* (Dickson) Vainio: K-, C-; II, *DEB* 11914, 11915, on *Cupressus macrocarpa*: thallus pale cream with very sorediate, rounded lobes, K+ yellow, C-, P+ red-orange; *BL*; *BH*; III, *JD* 2163: thallus bluish-green, granular; on roadside bank.

**Leptochidium albociliatum* (Desmaz.) M. Choisy – I, 5?, 7 *DEB* 11703h; *WS*; 7 *MM*.

Leptogium californicum Tuck. – *WJ*: thallus shiny; margins entire to lobulate; tomentum lacking below.

Leptogium corniculatum (Hoffm.) Minks – *WJ*, as *L. palmatum* (Hudson) Mont.; III, *DEB* 12075h: thallus dark brown with curled lobe tips; apothecia red-brown; spores

(when present) muriform, colorless; on rock, Lake Pilarcitos Service Road; *MM* 417, on *Acer macrophyllum*.

Leptogium lichenoides (L.) Zahlbr. – *WJ*, *II*, *JRR* 2045: thallus strongly lobed, surface wrinkled, margins fringed; lobules without isidia.

"*Leptogium pseudofurfuraceum* P.M. Jørg." – *WJ*, as *L. furfuraceum* (Harm.) Sierk, but this is not in North America according to Esslinger (1997): thallus with periclinal wrinkles (+/- parallel to the edge) on the upper surface, long white tomentum below.

Leptogium subtile (Schrader) Torss. – *WJ*, as *L. minutissimum* (Flörke) Fr.: thallus minute, smooth or occasionally with lobules.

Leptogium tenuissimum (Dickson) Körber – *WJ*: thallus tiny, paraplectenchymatous; coralloid outgrowths above.

Letharia vulpina (L.) Hue – *WJ*: thallus fruticose, yellow-green: a stunted specimen at the south end of the watershed.

Lobaria pulmonaria (L.) Hoffm. – *WJ*, *III*, *DEB* 12071, on *Aesculus*: thallus pale brown to greenish, turning green when wet; soraliolate; no lobules on margins; *JRR* 2865; *MM* 414, on *Acer macrophyllum*; *JD*.

Lobaria scrobiculata (Scop.) DC. – *WJ*: thallus smooth above; soredia abundant; small bald spots below "which may be confused with the cyphellae of *Sticta*" (Jordan).

Megalania laureri (Th. Fr.) Hafellner (Syn. *Catinaria laureri* [Hepp ex Th. Fr.] Degel.) – *WJ*, as *Catillaria laureri* Hepp ex Th. Fr.: thallus green-brown; apothecia black; hypothecium green-black; spores 1-septate, hyaline.

Melanelia multispora (A. Schneid.) Essl. – *WJ*, as *Parmelia multispora* A. Schneider: apothecia present; spores more than 8 per ascus; medulla C-.

Melanelia subaurifera (Nyl.) Essl. – *WJ*, as *Parmelia subaurifera* Nyl.: medulla C+ red; *I*, 2 *DEB* 11698i, 11699d; 7 *DEB* 11707f, on *Baccharis*, 11708g; *DEB* 12090i: isidia and soralia small; *II*, *JRR* 2048, medulla KC+ red; on corrugated roof.

Mycocalicium albonigrum (Nyl.) Fink – *WJ*, as *Calicium albonigrum* Nyl.: thallus appearing as a whitish discoloration of the substrate; apothecia (mazaeidia) black, stalked; spores to 8 µm long; among thalli of *Lepraria*.

Mycocalicium subtile (Pers.) Szat. – *WJ*, as *Calicium subtile* Pers.: spores 8 µm or more long; on decorticated wood.

Nephroma laevigatum Ach. – *WJ*; *DEB* 434-66, on *Adenostoma*: thallus with smooth lower side; medulla yellow, K+ purple; photobiont blue-green; *III*, *DEB* 12078a: brown above, pale below; on dead branch.

Nephroma resupinatum (L.) Ach. – *WJ*: whitish tubercles (Wetmore [1960]: "papillae". [Ed.]) scattered throughout the dense tomentum below.

**Niebla homalea* (Ach.) Rundel & Bowler – *DEB* 426-66: thallus in fruticose tufts; branches yellow-green, flattened, rigid, and cracked. On rock near *Toxicodendron* off Sawyer Camp Road.

**Normandina pulchella* (Borrer.) Nyl. – *I*, 9 *DT*; 11 *BH*; *III*, *DEB* 12078d: thallus tiny, ear-like, pale yellow-green.

Ochrolechia oregonensis H. Magn. – *WJ*: hymenium 300-400 µm thick; on bark of conifers, *Pseudotsuga* in this instance; Cahill Ridge.

"*Ochrolechia pallescens* (L.) A. Massal." – *WJ*: thallus KC-; apothecial margin K+ and KC+ red; disk radially dissected. Not in North America, according to Brodo (1991).

Ochrolechia subpallescens Vers. – *WJ*: thallus KC+ red; hymenium 150-240 µm; *I*, 3 *JRR*; 3, 9 *MM*; 9 *BH*.

Opegrapha glaucomaria (Nyl.) Källsten – *WJ*, as *Leciographa glaucomaria* (Nyl.) Smith (= *L. glaucomaria* (Nyl.) H. Oliv.? [Esslinger 1997]): thecium I+ slowly bright orange-red; epithecium immediately I+ blue; parasitic on *Pertusaria amara*, no photobiont.

Opegrapha protuberans Zahlbr. – *WJ*, as *O. prosiliens* Stirton: apothecia lirelline, black; spores 3-septate, the second cell largest, with gelatinous halo; common.

Opegrapha rupestris Pers. – *WJ*, as *Leciographa parasitica* (Flörke) A. Massal.: thecium I+ blue-green; spores smaller than in *O. glaucomaria*; parasitic on *Ochrolechia*, no photobiont.

Pannaria rubiginosa (Ach.) Bory – *WJ*: thallus light colored; margin sorediate; apothecia reddish, abundant; photobiont *Nostoc*.

Parmelia sulcata Taylor – *WJ*: medulla K+ yellow to red, C-; *I*, 3 *JRR*; 3, 4 *DEB*; 9 *BH*; *II*, *DEB* 11880d, on corru-

gated roof; *JRR*; *BH*; **III**, *DEB 12069h*, on *Pseudotsuga*: thallus gray-white above, black below; pseudocyphellae long, in a pattern of netted cracks which frequently produce soredia, soredia also on the margins; rhizines crowded; *JRR 2871*; *MM 425*, deadfall.

Parmotrema arnoldii (Du Rietz) Hale – *WJ*, as *Parmelia arnoldii* Du Rietz: thallus gray to green; medulla K-, KC+ red-orange; **II**, *DEB 11880i*: thallus gray-white above, black below, with long, black cilia on the margins; pseudocyphellae and ridges lacking; on white corrugated metal roof; *BL*.

Parmotrema chinense (Osbeck) Hale & Ahti – *WJ*, as *Parmelia perlata* (Hudson) Ach., medulla K+ yellow, KC-, P+ orange; *DEB 433-66*; **I**, 10 *JRR*; 6 *DEB*; *WS*; **II**, *JRR 2051*, on *Baccharis*; *DEB 11889a*, on *Quercus*; *BL*; **III**, *DEB 12073h*, on *Alnus*; *12086c*: thallus gray-white, short ciliate; soralia submarginal, causing the lobe tips to turn down; *JD 2160*: blue-gray-green thallus, black below with brown margin; *JRR 2863*.

Parmotrema stuppeum (Taylor) Hale – *WJ*, as *Parmelia stuppea* Taylor: medulla K+ yellow becoming red; **II**, *BL*; *JD 2156*: thallus gray-green; black below except for the brown edges; windfall; **III**, *DEB 12083a*: long ciliate, sorediate lobes upturned; cortex K+ yellow, medulla K+ yellow to blood red.

Peltigera canina (L.) Willd. – *WJ*: upper surface tomentose, appressed hyphae on surface of veins and rhizines below. Thallus brown-gray, remaining brown when wet; apothecia dark and usually abundant. **I**, 7 *JRR*.

Peltigera collina (Ach.) Schrader – *WJ*, as *P. scutata* (Dickson) Duby: thallus with sorediate margins; *DEB 418-66*; **II**, *BH*; **III**, *JD*: thallus gray when dry, very dark when wet; lower surface with distinct but pale, flattish veins; apothecia black on erect lobe tips; *DEB 12068a*, det. A. Vězda: upper surface scabrid at tips; margins with tufts of short, white rhizines; unusual in that soredia were lacking; on moss on *Quercus* (Live Oak); *DEB 12081a*: thallus pale blue-gray, scabrid; on *Pseudotsuga*.

Peltigera membranacea (Ach.) Nyl. – *WJ*: upper surface of lobes tomentose; rhizines and veins covered with protruding hyphae; **III**, *JRR 2873*: thallus very thin; upper surface and veins on lower surface tomentose; on moss on soil bank.

Peltigera polydactylon (Necker) Hoffm. – *WJ*, as *P. polydactyla* (Necker) Hoffm.: apothecia on narrow lobules; rhizines and veins covered with protruding hyphae.

Pertusaria cf. albescens (Huds.) M. Choisy & Werner – **III**, *MM 442*: thallus white, sorediate; K- to pale yellow, det. *DEB*.

Pertusaria amara (Ach.) Nyl. – *WJ*: thallus whitish, sorediate, with bitter taste, KC+ orange or red (*DEB* and *JRR* found it to be KC+ purple; see also Brodo et al. [2001]); *DEB 415-66*; **I**, 3 *DEB*; 3 on *Quercus*, 7 on *Aesculus*; *JRR*; **II**, *JRR 2060*, on *Quercus* (Live Oak); **III**, *JRR 2868*; *JD*.

Pertusaria hymenea (Ach.) Schaerer – *WJ*: thallus with faint yellow tinge, K+ yellow to red; asci 8-spored.

Pertusaria lecanina Tuck. – *WJ*, as "*P. lecania* Tuck.": thallus K- or faintly yellow, C+ orange; apothecia, when moistened and rubbed, become flesh-colored; asci 2-spored.

Pertusaria leioplaca DC. – *WJ*, on *Quercus*; **II**, *JRR 2061*, on *Quercus* (Live Oak): thallus greenish white, thin, smooth; apothecia in raised warts; ostioles black, one to many per wart; spores up to 5 per ascus, thick-walled, 31-40 x 63-68 µm. Verified by I. Tavares.

"*Pertusaria multipuncta* (Turner) Nyl." – *WJ*: misidentifications for North America according to Esslinger (1997).

Pertusaria subambigens Dibben – *WJ*, as *P. ambigens* (Nyl.) Tuck.: apothecia with two or more thalline exciples; spores less than 30 µm long, 8 per ascus; K+ yellow-brown (it is not certain from Jordan's description which tissue is reacting, but, judging by the color obtained [Dibben 1980], it would be the medulla); on bark of *Pseudotsuga*. Jordan's description is a good fit with the description given by Dibben, who cites a record from coastal Sonoma Co.

Pertusaria velata* (Turner) Nyl. – **II, *JRR 2069*; det. I. Tavares.

Phaeographis dendritica (Ach.) Müll. Arg. – *WJ*: apothecia lirelline, black, variable; spores brown, 3- to many septate.

Phaeophyscia orbicularis (Necker) Moberg. – *WJ*, as *Physcia orbicularis* (Necker) Poetsch: thallus brownish, epruinose, K-; it seems at least some of Jordan's material was *f. albociliata* with small, white hairs on the margins.

Phlyctis argena (Sprengel) Flotow. – *WJ*: the muriform spores resemble an ear of corn.

**Phylliscum demangeonii* (Moug. & Mont.) Nyl. – *Thiers 15283* (herb. *DEB*), on old granite.

Physcia adscendens (Fr.) H. Olivier – WJ; II, DEB 11895, on *Baccharis*; JD: thallus gray-white; upper cortex K+ yellow, unlike that of somewhat similar looking *Waynea californica*; soredia on underside of hooded lobe tips; K+ yellow.

Physcia aipolia (Ehrh. ex Humb.) Fűrnr. var. *aipolia* – WJ: thallus whitish, non-sorediate; apothecia numerous.

**Physcia dubia* (Hoffm.) Lettau – I, 1 BH, MM.

**Physcia tenella* (Scop.) DC. subsp. *tenella* – I, 3 JRR; II, BL: soralia on lower side of flattened lobe tips.

Physcia tribacia (Ach.) Nyl. – WJ, as *P. callosa* Nyl.: thallus whitish; soredia under the (down)rolled margins; DEB 436-66, on serpentine; II, DEB 11896: soredia granular on upper lobe tips and margins; medulla K-; on green painted corrugated metal roof. What Thomson (1967) called *P. callosa* was actually the *tribacia* part of the type collection, according to Moberg (1997).

"*Physconia grisea* (Lam.) Poelt" – WJ, as *Physcia grisea* (Lam.) Zahlbr.: thallus brownish; lobes white pruinose; soredia on margins, brownish; "the most common of the dark-colored Physcias". Misidentifications for North America (Esslinger 1997). Jordan's description suggests his collection was *Physconia isidiigera*.

**Physconia isidiigera* (Zahlbr.) Essl. – WJ?: see under *P. grisea*; I, 8 JRR; 2, 3, 14 MM.

"*Physconia pulverulenta* (of authors, not Schreber) Poelt" – WJ, as *Physcia pulverulenta* (Schreber) Hampe (= *P. pulverulenta* of authors, not [Schreber] Fűrnr. [Esslinger 1997]): misidentifications for North America, according to Esslinger. Jordan's description suggests his collection was *Physconia californica* Essl. (Esslinger 2000) or possibly a *Phaeophyscia*.

Placynthiella uliginosa (Schrader) Coppins & P. James – WJ, as *Lecidea uliginosa* (Schrader) Ach.: thallus dark brown, granulose to subcoralline; apothecia concolorous or slightly darker than the thallus; spores 10-14 x 5-8 µm; ascus clavate, I+ blue; paraphyses I-; on bark; det. J. Thomson.

**Placynthium nigrum* (Hudson) Gray – II, DEB 11884, 11886b, 11897a: thallus of irregular, dark brown squamules with coralloid isidia; prothallus blue-black; apothecia black; exciple black; epihymenium blue to blue-green; spores hyaline, 2- to 3-celled, 4-6 x 12-17 µm; JRR 2042. It is this lichen which causes much of the black appearance of the excavated quarry walls.

Platismatia glauca (L.) Culb. & C. Culb. – WJ, as *Cetraria glauca* (L.) Ach.: thallus gray-white; lobes wider than in *P. herrei*; soredia on margins; medulla I-; I, 12 JRR.

Platismatia herrei (Imsh.) Culb. & C. Culb. – WJ, as *Cetraria herrei* Imsh.: lobes narrow; medulla I+ blue; III, DEB 12085b, 12085e: thallus light gray-green; isidiate/lobulate; pale to dark brown below; on *Pseudotsuga*.

Pseudocyphellaria anomala Brodo & Ahti – WJ: thallus with faintly reticulate, gray-sorediate upper surface; I, 8 JRR; WS; 8 MM, on moss.

Pseudocyphellaria anthraxis (Ach.) H. Magn. – WJ: thallus weakly ridged with small white pseudocyphellae below; apothecia usually present; soredia lacking; laminal pycnidia present; DEB 435-66, on *Adenostoma*; II, JRR 2042, verified by I. Tavares; on moss on *Quercus*; III, JRR 2874; MM 415, on *Acer macrophyllum*; MM 418.

Pseudocyphellaria crocata (L.) Vainio – WJ: thallus brown above; medulla white; soredia yellow; rhizines short; photobiotic blue-green; III, DEB 12078e; on downed branch.

Punctelia borreii (Sm.) Krog – WJ, as *Parmelia borreii* (Sm.) Turner: thallus black below; medulla C+ red, K-; II, JRR 2049, on corrugated roof.

**Punctelia stictica* (Duby) Krog – II, DEB 11880j: thallus brown and with whitish pseudocyphellae above, black below; on white corrugated roof.

Punctelia subrudecta (Nyl.) Krog – WJ, as *Parmelia subrudecta* Nyl.: thallus gray-white above, pale tan below; I, 3 JRR; 3 DEB.

Pyrrhospora elabens (Fr.) Hafellner – WJ, as *Lecidea elabens* Fr.: thallus whitish-granulose, C+ orange; hypothecium pale; on dead wood.

Pyrrhospora querneae (Dickson) Körber – WJ, as *Lecidea querneae* (Dickson) Ach.: thallus C+ orange; apothecia red-brown, K+ dark red; III, DEB 12069c: soredia gold to ochraceous; on *Pseudotsuga*; JRR 2879, on *Pseudotsuga* at Five Corners.

Ramalina farinacea (L.) Ach. group (Bowler and Rundel 1978) – WJ: thallus fruticose; branches flattened; soralia marginal, rounded; I, 6, 7 DEB; 6 JRR; 4, 9, 14 MM; 9 BH; II, DEB 11913c; BL; III, DEB 12069b; 12070, on *Aesculus*; 12073g, on *Alnus*; JD 2162: thallus fine, 2-3 cm long;

Baltzo: San Francisco Watershed Lichens

MM 440 (uncertain determination).

Ramalina dilacerata (Hoffm.) Hoffm. – WJ, as *R. minuscula* (Nyl.) Nyl.: thallus small, hollow, perforated; apothecia abundant; soredia lacking.

Ramalina leptocarpha Tuck. – WJ, as *R. menziesii* Tuck., not Taylor; I, 6, 11 BH; DEB 11898: apothecia along the sides of flattened branches.

Ramalina menziesii Taylor – WJ, as *R. reticulata* (Nöhden) Kremp.; I, 6 JRR; 14 MM; 7 DEB; II, JRR 2066, on *Baccharis*; DEB 11882c; III, DEB 12073i, on *Alnus*; DEB 12082: thin, with apothecia; JD 2153; JRR 2869; MM 433, in *Pseudotsuga* area; MM 441, north of and along lake dam: thallus of long, flattened nets; abundant.

Ramalina pollinaria (Westr.) Ach. – WJ: soralia terminal and subterminal; on *Aesculus*; I, 6 JRR; II, DEB 11883: tips minutely sorediate; on ground under *Cupressus*. Jordan's description of bluish soredia more closely fits *Vermilacinia cephalota*: see below.

**Ramalina puberulenta* Riefner & Bowler – I, 2, 4 DEB; 2, 14 MM: thallus covered with minute hairs.

Rinodina exigua (Ach.) Gray – WJ: apothecia black, 0.6 mm in diameter; on *Pseudotsuga*; I, 3 JRR.

Rinodina hallii Tuck. – WJ: apothecia to 1.0 mm in diameter; disk brown to black with dense white pruina; spores gray-brown or black, 1- to 3-septate, usually polarilocular; on *Quercus*.

Roccellina franciscana (Zahlbr. ex Herre) Follmann – WJ, as *Schismatomma cupressum* Herre: thallus a white to gray crust, K+ faint yellow, C+ orange, P-; disk flesh-colored and pruinose; spores 3- to 4-septate, hyaline; hymenium I+ blue; photobiont *Trentepohlia*.

Sphaerophorus globosus (Huds.) Vainio – WJ: thallus fruticose, brittle, whitish; medulla I+ blue; apothecia globose with black spore mass (mazaedium).

Sticta fuliginosa (Hoffm.) Ach. – WJ; I, WS; III, JD 2165: thallus foliose, dark brown; lobes ca. 1 cm across; isidia very small, abundant; cyphellae in thick tomentum below; photobiont blue-green.

Sticta limbata (Sm.) Ach. – WJ: soredia marginal; cyphellae below; II, JRR 2036, on *Quercus*; III, DEB 12078f, on downed branch.

**Teloschistes chrysophthalmus* (L.) Th. Fr. – II, JRR 2034; collected by Les Loeder on dead *Cupressus*; DEB 11898, on green corrugated roof; DEB 11922, on *Baccharis*; BH, on roof: thallus short-fruticose, orange; cilia on apothecial margin.

Teloschistes flavicans (Sw.) Norman – WJ; DEB 429-66, on chaparral shrubs; II, JRR 2038, on *Baccharis*; DEB 11900: thallus tiny, somewhat flattened, sorediate; III, DEB 12080a: round to flattened; sorediate; on *Baccharis*, top of Sweeney Ridge; MM 434, on *Baccharis* in parking lot between Cahill Ridge and Sweeney Ridge to the north. Usually round in cross section and sorediate.

Tephromela atra (Hudson) Hafellner – WJ, as *Lecanora atra* (Hudson) Ach.: thallus white, C-, K+ faint yellow to green; apothecia black with white margin; paraphyses K+ violet; DEB 453-66: thallus crustose, gray; apothecia black; epihymenium black to blue-green; spores 14 x 8 µm, simple; I, 4 JRR; 7 DEB.

Thelomma californicum (Tuck.) Tibell – WJ, as *Cyphelium californicum* (Tuck.) Zahlbr.: thallus marginally lobed, K-, KC+ rose; apothecia mazaediate; spores brown, 1-septate.

**Thelomma occidentale* (Herre) Tibell – I, 2 MM, verified by B. Ryan.

**Topelia californica* P.M. Jørg. & Vězda – II, DEB 11887, 11916a, det. R.C. Harris: thallus crustose, smooth, thin, gray-white to greenish; disk buff to flesh-colored, concave with small aperture; spores colorless, muriform; on *Cupressus macrocarpa*.

Tuckermannopsis chlorophylla (Willd.) Hale – WJ, as *Cetraria scutata* (Wulf.) Poetsch (*C. scutata* of authors? [Esslinger 1997]): thallus brown above, pale below; margins white to gray, sorediate; I, WS.

Tuckermannopsis orbata (Nyl.) M.J. Lai – WJ, as *Cetraria orbata* (Nyl.) Fink: edge same color as upper surface (cf. *T. chlorophylla*); DEB 421a-66; II, DEB 11901, fallen beneath *Cupressus macrocarpa*: thallus green-brown above, white below; apothecia marginal, brown; JRR 2870; III, MM 424, 430, on dead twigs of *Pseudotsuga*, det. D. Glavich.

Usnea arizonica Mot. – WJ, thallus generally fruiting; medulla K+ red; I, 2 DEB, sterile; 3, 4 DEB; 9 BH.

**Usnea californica* Herre – I, WS; 7 DEB 11694, on *Sequoia*; 9, 11 BH; II, DEB 11907: short specimen; axis pink, fallen beneath *Cupressus macrocarpa*; JD 2155:

thallus sturdy, 11.0 cm long; cortex rigid with many cracks; **III**, *DEB 12066a*: small specimen; axis pink; *DEB 12083a*: small specimen; medulla appearing dense, pink near axis; cortex not glossy; cortical cell 14.0 µm in diameter with a thick wall surrounding a narrow 1.4 µm lumen; *JRR 2867*: axis pink; *JRR 2876*: lumina of the cortical cells apparently 1.2 to 1.5 µm; *MM 436*, deadfall; *MM 437*. No evidence has been presented to indicate that *U. ceratina*, which has wider cortical cell lumina than *U. californica*, occurs in California. According to I. Tavares (pers. comm.) all specimens collected in California that she has checked show the narrower lumina, as contrasted with specimens from other regions.

Usnea cavernosa* Tuck. – **III, *DEB 12088a*, on the ground: thallus pendent; branches foveolate and with irregular cross section; soredia, isidia, and papillae lacking.

Usnea filipendula* Stirton – **I, 7 *DEB*: the papillae are small on this morphologically distinct, isidiate material; on *Sequoia*; **II**, *DEB 11908*, *11911*: thallus pendulous; fibrils short and numerous, isidiose; papillae narrow, very sparse to absent; axis wide; on *Quercus* sp.; **III**, *DEB 12086a*: thallus long, thin; papillae narrow, cylindrical; fibrils abundant, short; medulla narrow; no inflation.

Usnea fragilescens* Hav. ex Lynge – *U. cornuta* Körber group – **II, *DEB 11906a*, *11913d*: thallus inflated; cortex brittle; axis narrow; medulla wide and loose; soralia and isidia present; *JRR 2071*, *2072*, *2073*; **III**, *DEB 12086b*: cortex shiny, inflated, rigid; papillae low, rounded; medulla sparse, white; axis white, narrow; soralia raised, isidiose.

Usnea fulvoreagens (Räsänen) Räsänen – *WJ*, as *U. fulvoreagens* (Räsänen) Mot. (see Clerc [1987]): thallus with one main branch (anisotomic); papillae short; soredia abundant, rarely isidiose. Thalli found by *WJ* with red spots may be *U. wirthii*: see below.

Usnea glabrata* (Ach.) Vainio – **I, 7 *DEB 11688a*, *11695*: thallus tiny, delicate, shiny, inflated; axis narrow; papillae lacking; on *Quercus* sp.

Usnea kujalae* Räsänen – **I, 7 *DEB 11700*, thallus pale; inflated; papillae few, small to medium; soralia minute; isidia lacking; medulla lax with long, radiate hyphae; axis narrow; % CMA 7/40/10; P+ orange on soredia and in medulla.

Usnea pendulina* Mot.-*U. graciosa* Mot. group – **II, *DEB 11909*: branches inflated; cortex rigid, dark green with white tubercles; isidia in clusters; papillae low and hard to see; medulla white, sparse; dense outer medulla

present; axis narrow, white; on *Quercus*; *JRR 2043*, windfall.

Usnea rubicunda Stirton – *WJ*; **II**, *DEB 11881*, *11910*, seen on corrugated metal roof, chaparral shrubs, and *Salix*, cortex orange-red in many places; sorediate; axis very wide; medulla dense; *JRR 2037*, on fallen *Baccharis*; *BL*; **III**, *DEB 12081c*, on *Pseudotsuga*; *JD 2154*, thallus short, to 2 cm; axis white; cortex rusty red in part.

Usnea scabiosa* Mot. – **I, *WS*: branches regularly rugose, with flat shallow depressions having somewhat sharp-edged sides, occasional ecorticate ridges joining short rows of papillae (ecorticate ridges are lacking in *U. scabrata*, where there are deep, flat-bottomed depressions with blunt edges (I. Tavares, pers. comm.); papillae short, thin, cylindrical, or slightly tapered; fibrils sparse; isidiate soralia often abundant; % CMA 7/29/28; medulla loosely interwoven, with dense outer layer (description from Tavares [1997]).

Usnea scabrata Nyl. – *WJ* described the collection to which he applied this name as long pendulous, varying from straw to dark green; apothecia to 15 mm in diameter, with marginal fibrils up to 2 mm. He does not mention pits or rugae. I. Tavares (1997) describes *U. scabrata* as follows: branches not evenly terete, with deep, flat-bottomed rugae with blunt edges forming on branches as they elongate; papillae broad, tall, sometimes irregular in shape, moderately large papillae extending on narrow branches almost to the apices; long, pendent parallel branches bear few fibrils; %CMA 6/29/30; medulla with interwoven hyphae of medium density with many small interhyphal spaces; denser outer medullary layer. The papillae of *U. scabrata* are broader, more rounded apically, and taller than those of *U. scabiosa* (I. Tavares, pers. comm.). Comparison of isotype material of *U. scabiosa* with well developed *U. scabrata* from the Austrian Alps shows clear differences in form and appearance of rugose depressions, as well as in shape and size of papillae (I. Tavares, pers. comm.). The following table summarizes the differences between *U. scabrata* and *U. scabiosa*:

	<i>U. scabrata</i>	<i>U. scabiosa</i>
Flat-bottomed pits:	edges blunt	edges sharp
Papillae:	broad, tall	thin, short
Ecorticate ridges:	lacking	occasional
Interhyphal spaces:	narrow	wide

Usnea subfloridana* Stirton – **I, 3, 7 *DEB 11695b*, *11698f*, thallus short, not inflated; papillae short, rounded; % CMA 12/13/50; medulla dense.

Baltzo: San Francisco Watershed Lichens

**Usnea substerilis* Mot. – I, 3, 7 *DEB* 11690, on bark of twig; *DEB* 11704, thallus short, dull, uninflated; papillae large and broad; medulla loose; % CMA 12/23/30; II, *BL*; III, *MM* 439, on twig north of dam.

Usnea wirthii Clerc – *DEB* 424-66, *DEB* 432-66; I, 3, 7 *DEB*, thallus small, inflated; branches with (or without) small, wine red spots, foveolate; papillae very low to barely visible; medulla next to axis pale gold in color; base black; 6 *JRR*; II, *DEB* 11911a, on *Salix*; *JRR* 2070; *BL*, det. *DEB*; III, *DEB* 12070a, on *Aesculus*; *DEB* 12073f, on *Alnus*; *MM* 435, deadfall south of dam; *MM* 438, 0.8 km north of Stone Dam. *WJ* probably had this in part under *U. fulvovireagens*.

Vermilacinia cephalota (Tuck.) Spjut & Hale (Syns. *Niebla cephalota* [Tuck.] Rundel & Bowler, *Ramalina cephalota* Tuck.) – I, 6, 7 *DEB*; 6 *MM*; II, *DEB* 11912, on *Cupressus macrocarpa*, branches round in cross section, the tips blunt; soralia large, round, protruding, often bluish to blackening; *JRR* 2039, on *Quercus*; *BL*; *BH*; III, *JRR* 2883, on wooden sign at the top of the hill at Five Corners.

**Vermilacinia combeoides* (Nyl.) Spjut & Hale (syn. *Ramalina combeoides* Nyl.) – *DEB* 439-66: thallus fruticose, short; apothecia terminal; on rock.

**Waynea californica* Moberg – I, 8 *JRR*; *WS*; 8 *MM*; 8 *BH*, thallus squamulose; soredia in raised, "cup-like" structures (Moberg 1990); spores 2- to 3-septate; cortex and medulla K-. Seen on their sides, the "cups" may appear hooded, so that they could be mistaken for the soralia of a tiny or damaged *Physcia adscendens*. That taxon, however, has a K+ yellow cortex.

**Xanthoparmelia lineola* (E.C. Berry) Hale – III, *DEB* 12077, on road cut, thallus tan to pale brown below, tightly affixed to soil and broken rocks; apothecia brown; medulla quickly K+ red.

Xanthoria candelaria (L.) Th. Fr. – *WJ*; *DEB* 445-66, 446-66, 473-66; I, 3, 6, 7, 8 *DEB*, thallus foliose, orange; soredia on lobe margins.

**Xanthoria fallax* (Hepp) Arnold var. *fallax* – I, 3 *JRR*, lobe margins with labriform soralia.

**Xanthoria cf. fulva* (Hoffm.) Poelt & Petutschnig – I, 2, 3, 14 *MM*, thallus fertile, with rhizines (as opposed to hapters; see Lindblom [1997] [Ed.]); soredia (=blastidia) terminal and sub-terminal soralia.

**Xanthoria hasseana* Räsänen – I, 6 *JRR*; II, *DEB* 11922d, on *Baccharis*: lobes narrow, yellow-orange above,

white below; apothecia present; rhizines long, sparse; *JRR* 2046.

**Xanthoria parietina* (L.) Th. Fr. – *DEB* 11903, *DEB* 11922a, on *Baccharis*, ends of lobes broad, rounded, with a slightly raised margin resembling a low street curb; apothecia present.

Xanthoria polycarpa (Hoffm.) Th. Fr. ex Rieber – *WJ*; I, 3 *JRR*; 4 *DEB*; 9 *BH*; 6 *JRR*; II, *DEB* 11880f, *DEB* 11904: thallus with short, truncate convex lobes obscured by the apothecial cushions; on white corrugated metal roof; *JD*.

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New and Interesting Records of Lichens from California

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Abstract: *The following are reported, with annotations: new state records for Anaptychia, Chromatochlamys, and Verrucaria; new county records for Lobothallia, Pilophorus, Protoparmelia, Solenopsora, Sporastatia, Tremolecia, and Vermilacinia; and range extensions for Heppia and Heterodermia. Other collections of interest are discussed. Figures referred to are on the covers of this issue.*

New State Records

Figures referred to are on the covers of this issue.

***Anaptychia setifera* Räsänen** - MARIN CO. Mt. Tamalpais State Park, rocky headlands along Hwy 1, 5 km S of Stinson Beach, elevation 60 m, on a north-facing rock, JRR 5702. Easily overlooked as it grows sparsely in small pockets and crevices protected from the coastal winds. Reported from the immediate coast of Oregon. Confirmed by T. Esslinger.

***Chromatochlamys muscorum* (Fr.) H. Mayrh. & Poelt var. *muscorum*.** Syn. *Microglæna muscorum* (Fr.) Th. Fr.

- LAKE CO. Guenoc Winery, encrusting mosses in chaparral, JRR 3676. *Microglæna* was divided on structure of the ascus tip into three genera: *Chromatochlamys*, *Protothelenella*, and *Thelenella* (see Mayrhofer and Poelt 1985). Confirmed by I. Brodo.

***Verrucaria sphaerospora* Anzi s.l.** - MARIN CO. Mt. Tamalpais State Park, JRR 4512. Known in North America from British Columbia and Colorado (as *Catapyrenium globosum* Thomson). Identified by O. Breuss.

Interesting Records

***Cetraria muricata* (Ach.) Ekefeldt** Syn. *Coelocaulon muricatum* (Ach.) J.R. Laundon - MARIN CO. Pt. Reyes National Seashore, on soil with moss and grasses, JRR 4682; Mt. Tamalpais State Park, 5 km S of Stinson Beach, on thin soil, JRR; SONOMA CO. Chanslor Guest Ranch, on thin soil with moss and grasses, JRR 2965. We searched the previously known Marin Co. locality (5 km S of Stinson Beach) for some time before finding a population on patches of thin soil covering small rock outcrops. This locality on State Park property is fairly well protected from

foot traffic by dense growths of poison oak (*Toxicodendron diversilobum*). Other Marin Co. populations we have seen are all subject to likely extirpation from heavy trampling by hikers and dairy cattle. Although *C. muricata* is reported for California by McCune and Goward (1994) and McCune and Geiser (1997), documentation has been lacking.

***Endocarpon pulvinatum* Th. Fr.** – MONO CO. Hwy 108, 3 km NW of Sonora Junction, Sonora Bridge Campground, in drainage channels, *JRR 6467*. Although this lichen has been recorded from the Sierra Nevada (Ryan and Nash 1991), we wish to call attention to this very accessible site where lichenologists can find extensive growths on the steep drainage surfaces on the outcrop behind the campground. Likely to be found at higher elevations in the Sierra Nevada.

***Heppia conchiloba* Zahlbr.** – SOLANO CO. N side of Putah Creek below Monticello Dam, elevation 210 m, on steeply sloping sandstone outcrops on a S facing slope, with *Peltula* species, *JRR 5520*. Commoner in the Southwest. San Bernardino Co. was formerly the northernmost record. Confirmed by B. Ryan.

***Heterodermia namaquana* Brusse** – MARIN CO. Mt. Tamalpais State Park, rocky headlands along Hwy 1, 3 km S of Stinson Beach, elevation 90 m, on dead *Artemisia* twigs, *JRR 5451* (fig. 4); Point Reyes Peninsula, S of the Drakes Bay parking area, on *Baccharis*, *JRR 6923*. Herre (1910) reported it from Pt. Lobos, San Francisco Co. More recent collections range from the Channel Islands north to San Mateo Co. on the mainland. This record extends the known distribution north of San Francisco Bay. Confirmed by T. Esslinger.

***Japewia tornoënsis* (Nyl.) Tønsberg** Syn *Lecidea tornoënsis* Nyl. – SONOMA CO. 8 km NW of Cazadero, on *Pseudotsuga*, *JRR 2458*; MARIN CO. Mt. Tamalpais State Park, Verna Dunshee Trail, NE side of East Peak, elevation 700 m, on *Adenostoma* twigs, *JRR 5391*. The thick-walled spores help confirm this species. Infrequently collected in California. Confirmed by I. Brodo

***Lobothallia alphoplaca* (Wahlenb.) Hafellner** – KERN CO. 2.9 km W of Miracle Hot Springs, on granite, *JRR 1761*. The following are new county records: SONOMA CO. Rockpile Road N of Warm Springs Dam, on volcanic rock, *JRR 1279*; NAPA CO. Robert Louis Stevenson State Park, Palisades Trail, on volcanic rock, *JRR 1158*; MARIN CO. Mt. Tamalpais State Park, 0.4 km S of Rock Spring parking lot, on graywacke, *JRR 4145*.

***Maronea constans* (Nyl.) Hepp** – SANDIEGO CO. Daley Ranch, southern mixed chaparral, on *Adenostoma*, *JRR*

6100. Originally reported by H. Hasse (1913); few subsequent records exist for the state. Confirmed by I. Brodo

***Pilophorus acicularis* (Ach.) Th. Fr.** – MARIN CO. Trail NW of the parking area at the Lake Alpine dam, mixed conifer woodland, on vertical rock, *JRR 6868*. First Marin Co. record. Commoner north of the Bay Area with scattered records from Sonoma and Mendocino Counties.

***Protoparmelia badia* (Hoffm.) Hafellner** – MARIN CO. Mt. Tamalpais State Park, serpentine outcrops near West Peak, *JRR 5049*. First record for the Coast Ranges north of San Francisco Bay. Previously collected in El Dorado, Inyo, Tulare, and Ventura Counties. Confirmed by S. Tucker

***Rimularia insularis* (Nyl.) Rambold & Hertel** – MARIN CO. Mt. Tamalpais State Park, slopes 1.5 km E of intersection of Panoramic Hwy and Hwy 1, silica rock outcrops in coastal chaparral, elevation 215 m, *JRR 5118* (fig. 2), common at this site. Parasitic on *Lecanora rupicola* (L.) Zahlbr.

***Sclerophyton cerebriforme* Egea & Torrente** – MARIN CO. Mt. Tamalpais State Park, rocky headlands along Hwy 1 about 3 km S of Stinson Beach, elevation 90 m, on a shaded rock face, *JRR 5436*, covering more than a square meter of vertical north-facing rock. It has been collected on Santa Catalina Island in Los Angeles Co. and near the Diablo Canyon nuclear power plant in San Luis Obispo Co. Identified by B. Ryan.

***Solenopsora crenata* (Herre) Zahlbr.** – SONOMA CO. The Cedars, 11 km N of Cazadero, chaparral with *Cupressus sargentii*, on serpentine rock, *JRR 3451*; MARIN CO. Mt. Tamalpais State Park, rocky headlands along Hwy 1 about 5 km S of Stinson Beach, elevation 60 m, on shaded serpentine, *JRR 5686* (fig. 3); NAPA CO. Robert Lewis Stevenson State Park, Palisades trail, *JRR 1315*; LAKE CO. Guenoc Winery, on rock in chaparral, *JRR 3710b*. Previously known only from the type collection by Herre (1910, as *Placolecania*) from Point Lobos, San Francisco Co. We have found it to be somewhat common on shaded serpentine in the North Bay Area. In the field it has the appearance of a diminutive, pale green *Psora*. Identified by B. Ryan.

***Sphinctrina tubiformis* A. Massal.** – SONOMA CO. Jack London State Park, on *Pertusaria* sp., *JRR 3578*. Parasitic mostly on *Pertusaria* species (Purvis et al. 1992; Wirth 1995). Herre (1910) recorded it on *P. pustulata* on oaks in Santa Cruz Co.

Sporastatia testudinea (Ach.) A. Massal. – LAKE CO. Hull Mountain Road, 8 km S of summit, on silica rock, *JRR 1780*; MENDOCINO CO. Anthony Peak, 39°50'46" N, 122°57'53" W, 2120 m elevation, *JRR 7000* (fig. 1, front cover, glossy brown). Although this is recorded from the Sierra Nevada (Anderson 1965; Ryan and Nash 1991; Brodo et. al. 2001), these are the first records for the Coast Ranges.

Tremolecia atrata (Ach.) Hertel – GLENN CO. Black Butte, on granite, *JRR 6985*; NAPA CO. Robert Louis Stevenson State Park, Palisades Trail, chaparral, in a shaded crevice in volcanic rock, 700 m elevation, *JRR 3020*. New county records. We reported this lichen as new to CA with records from Lake and Marin Co. (Robertson and Robertson 2001). It is more typically arctic-alpine. At the Glenn Co. site *T. atrata* is very common on smooth, north-facing vertical surfaces. It is easily separated from the superficially similar *Rhizocarpon oederi* (Weber) Körber and *Lecidea lapicida* (Ach.) Ach. by spore and ascus characters.

Vermilacinia procera (Rundel & Bowler) Spjut Syn. *Niebla procera* Rundel & Bowler – MARIN CO. Mt. Tamalpais State Park, rocky headlands about 3 km S of Stinson Beach, elevation 60 m, *JRR 5247* (fig. 5), on steep cliffs with *Niebla homalea*, *Vermilacinia combeoides*, *V. ceruchoides*, and *V. laevigata*. Recorded also from Monterey, San Luis Obispo, and Santa Barbara Counties. Identified by Charis Bratt.

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**New Reports or Divergences in Range for Lichens of California, Based on *Lichens of North America*
by I. Brodo, S. D. Sharnoff, and S. Sharnoff, 2001.**

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Abstract: Both taxa newly given for California by Lichens of North America and taxa known to occur in the state but not given for it in that work are critically discussed. A large bibliography documenting most of the California occurrences is provided.

Lichenologists, both professional and amateur, will welcome publication of "Lichens of North America" by Ernie Brodo and Sylvia and Steve Sharnoff. It should awaken the public to the beauty and diversity of lichens on this continent. Its large format (even larger than the recent *Jepson Manual* of the higher plants of California) and numerous superb color photographs would make it a "coffee table book", but its outstanding and up-to-date scientific content will merit constant reference in laboratories and herbaria. The last attempt at a national lichen flora was Bruce Fink's posthumously published *The Lichen Flora of the United States* (1935). That book has been of little use in recent years, because most of the scientific names of lichens have changed, and a great deal of new information has accrued since it was published. Hence the new book by Brodo and the Sharnoffs is especially welcome. It covers 1500 lichen species with color photographs of 804 taxa. A total of 427 species are mentioned as present in California.

The book opens with several informative and well-written chapters on lichen form, reproduction, symbiosis, growth and physiology, chemistry, ecology, substrates, distribution, environmental monitoring, and classification. Helpful advice for collecting is offered for beginners. The systematic section occupies most of the book, beginning with ten keys to genera of lichens based on form of the thallus. For most genera, a few representative species are discussed and illustrated, and a key is provided to common species. It is not meant to be comprehensive, and will not supplant monographs or regional floras.

Known ranges are shown on small maps for the major lichen species discussed in this book. The map information is limited in that no specific collections or locations are reported, but is helpful in showing general distributions. The authors say that "extensions or adjustments will surely be possible" on the maps as more information on distribution of individual species becomes available. This article does not consider the many lichen species for which we

have California reports, that are either not mentioned in *Lichens of North America* or for which the book is not precise about range.

The helpful comments of Isabelle Tavares on this manuscript are acknowledged with thanks.

Author codes are:

ES = Esslinger, T., A cumulative checklist for the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada, on-line, 1997.

TJ = Tucker, S., and W. Jordan, A catalog of California lichens (1979).

Bolded numbers are pages in *Lichens of North America*.

Postal codes used as abbreviations for the names of states and provinces are:

AK, Alaska; AZ, Arizona; BC, British Columbia, Canada; CA, California; CO, Colorado; FL, Florida; MT, Montana; NM, New Mexico; NWT, Northwest Territories, Canada; OH, Ohio; OR, Oregon; TN, Tennessee; TX, Texas; UT, Utah; WA, Washington; WV, West Virginia; WY, Wyoming.

Arthonia caesia (Flotow) Körber – Distribution includes the north-central and northeastern parts of the U. S. and a small area around Los Angeles, CA, 164. A first indication of this species in CA.

Bacidia sabuletorum (Schreber) Lettau – Extending from OR into northernmost coastal CA, 172. A new report for CA; = *Mycobilimbia sabuletorum* (Schreber) Hafellner in ES. According to Ekman (1996, p. 46) the species of the *Bacidia sabuletorum* group appear to represent a separate genus.

Buellia stigmaea Tuck. – "Common in southeastern U. S.", 188, no map. Represented, however, by several Ryan collections from southern CA. Closely resembles *B. spuria*, which is also in southern CA.

Caloplaca feracissima H. Magn. – In north-central and northeastern U. S. and the central Sierra Nevada, 199. First mention for CA. Collections include *Wetmore 50760* (Sequoia National Park, Tulare Co. [MIN]); *Tucker 35815B, 35882b* (Santa Barbara Botanical Garden, Santa Barbara Co., SBBG); *Tucker 36435* (Refugio Beach State Park, Santa Barbara Co., SBBG).

Caloplaca flavovirescens (Wulfen) Dalla Torre & Sarnth. – Widespread in the eastern U. S. and inland west including AZ and UT, but not on the west coast, 201. Reported for CA, however, as *C. erythrella* var. *rubescens* (Hasse 1911), and as *Pyrenodesmia flavovirescens* (Wulf.) E. Rud. (Rudolph 1955, based on Hasse, Santa Monica Mountains [NY]). Arup (1992) noted that *C. flavovirescens* is similar to *C. stantonii* W. A. Weber ex Arup, a coastal species. Hasse's collection should be checked against *C. stantonii*.

Caloplaca verruculifera (Vainio) Zahlbr. – NW corner of WA and BC, and Mendocino Co. coast in CA (difficult to see on map, 205); Arup (1994, 1995) reports it for CA. Arup's record (1994, p. 391) is supposedly based on a specimen in the herbarium in Lund, Sweden, but Kärnefelt may not have seen it there, since it was not included in Wetmore and Kärnefelt (1998).

Candelariella spraguei (Tuck.) Zahlbr. – Only in CO, not CA, 208, no map. Reported by Hasse (1898) under the synonym of *Lecanora spraguei* Tuck.; the specimen cited by Hasse should be located and verified.

Catapyrenium psoromoides (Borrer) R. Sant. – CA only, rare, 571, no map. Reported for CA by Breuss and Bratt (2001) and Robertson and Robertson (2001).

Cetraria aculeata (Schreber) Fr. – WA and north on west coast, not CA, 215. TJ, however, listed reports of *Cornicularia aculeata* (Schreber) Ach. (Tucker and Kowalski 1975, based on *Tucker 11036*, ~0.5 mi. from Dillon Beach, Marin Co., 1973, verified 2001). Other verified collections include *M. A. Howe*, 1895, Ocean View, Orange Co. (herb. Tucker); *Herre 1944*, based on a collection by Herre from 3 mi. SE of Stinson Beach, Marin Co.).

Chaenotheca brunneola (Ach.) Müll. Arg. – East central CA, 222, presumably based on the Calaveras Co. report by Pinelli and Jordan (1978), listed in TJ. A recent collection is *Wetmore 50721*, Sequoia National Park, Tulare Co., 1984 (MIN). Tibell (1980) reported it only from OR and WA.

Chaenotheca furfuracea (L.) Tibell – Western CA from north of San Francisco Bay to Mexico, 222. First published

indication under this name for CA. Synonyms: *Coniocybe furfuracea* (Herre 1910; Jordan 1968; Pinelli and Jordan 1978; Tibell 1975).

Cladina portentosa (Dufour) Follmann subsp. *pacifica* (Ahti) Ahti. Syn. *Cladonia pacifica* Ahti – West coast from northern CA northward, 225, the second report for CA under this name. Ahti (1984) was the first to report it for CA, as *Cladina portentosa* subsp. *pacifica* (Ahti) Ahti f. *pacifica*. In TJ it was listed as *Cladina impexa* de Lesd. and *Cladonia impexa* (Harm.) de Lesd. (Tucker 1973), based on *Tucker 6454*, Del Norte Co., and *Bunnell*, 1967, Mendocino Co., along with a report by Malachowski (1975) also from Mendocino Co. Collections identified as *Cladonia mitis* Sandst. (Herre 1945) are probably this species. Ahti's (1984) report was based on the same specimens.

Cladina stellaris (Opiz) Brodo – Only CO and MT in the western U. S., 228. Listed in TJ under the synonyms *Cladina alpestris* (L.) Nyl. (Lindsay 1973) and *Cladonia alpestris* (L.) Rabenh. (Thomson 1967). (Lindsay's KC+ yellow collection from the Samoa Peninsula is probably the locally common and morphologically somewhat variable *C. portentosa*: *C. stellaris*, which lacks usnic acid, would be KC- [Ed.]

Cladonia cenotea (Ach.) Schaerer – Northern North America, reaching south into the Rocky Mountains, not CA, 245. See also Hammer (1995). The report for CA by Tucker and Kowalski (1975) was based on a misidentification.

Cladonia conista R. Evans – East temperate U. S., on soil, 247. However, reports for CA are in Hammer (1995) and Wright (1997). This discrepancy apparently results from the fact that CA material differs chemically from eastern material, and lichenologists differ in their concept of this species: Ahti (2000) put *C. conista*, *C. conoidea*, and *C. humilis* var. *bourgeanica* into synonymy with *C. humilis*, but Hammer (1995) considered *C. conista* a separate species (see the following taxon).

Cladonia deformis (L.) Hoffm. – Central CA near the OR border, 251. First published indication for CA; previous record was in an unpublished mimeographed report by Sue Sweet (1983, not seen). Hammer (pers. comm.) doubted it for CA (the Sweet record, however is from the same part of the state mapped for this species in *Lichens of North America*; her collection should be checked [Ed.]). One collection by Herre labeled *Cladonia deformis* (L.) Hoffm. (*Herre 1174a*, Mountains E of Los Gatos, Santa Cruz Mtns., Santa Clara Co., CA, Nov. 29, 1907, CAS) has been re-determined as *Cladonia conista* (Ach.) Robbins by S. C. Tucker.

Cladonia phyllophora Hoffm. – WA northward on the west coast, 265. Previous reports from CA are in TJ and Hammer (1989), but Hammer (pers. comm.) later indicated that these were misidentifications.

Cladonia pyxidata (L.) Hoffm. – The northwest corner of CA, 267. Previous reports are in TJ; Hale and Cole (1988); Hammer (1989); Bratt (1993, 1999); Hill (1997); and Robertson et al. (1998), but Hammer (pers. comm.) later advised that it is not in CA. (However, new questions about its presence in CA have arisen, and Hammer does not rule it out for the state; see the article by Baltzo in this issue of the Bulletin [Ed.]).

Cladonia symphyrcarpia (Flörke) Fr. – Mostly boreal, on the west coast in WA north to AK and in the vicinity of San Francisco Bay, 274, first published report for CA. If in sterile condition as shown in *Lichens of North America*, it could be widespread but unrecognized and under-collected. The species epithet is spelled "*symphyrcarpia*" in *Lichens of North America* and in Ahti (2000), "*symphyrcarpa*" in ES, McCune and Geiser (1997), and Thomson (1967, 1984).

Cliostomum griffithii (Sm.) Coppins – Central and coastal CA, 279. The first report for CA under this name was by Bourell (2000) from San Simeon State Park and Hearst Castle. Earlier reports are in TJ as *Biatora mixta* Fr. (Hasse 1896), *Catillaria griffithii* (Sm.) Malme (Merrill 1923, Volk 1963, Jordan 1968), and *C. tricolor* (With.) Th. Fr. (Herre 1910, Hasse 1913).

Coccotrema pocillarium (Cummings) Brodo – Synonym: *Ochrolechia pacifica* H. Magn. Lane Co., OR north to AK, 281; see also Brodo (1973). Reported for CA, however, by Riefner et al. (1995), based on his collection from Sonoma Co., and Magney (1999), based on a collection near Fort Ross, Sonoma Co. Magney does not provide collection information.

Collema pulcellum Ach. – Eastern U. S. only, 286. The map apparently includes both var. *leucopeplum* (Tuck.) Degel. and var. *subnigrescens* (Müll. Arg.) Degel., which have variably pruinose apothecia but otherwise closely resemble *C. nigrescens* (Hudson) DC. *Collema pulcellum* var. *leucopeplum* is cited for CA as *C. nigrescens leucopipta* Tuck. (*sic*) by Hasse (1903). This collection should be checked.

Collema subflaccidum Degel. – BC north on the west coast and eastern U. S., not CA, 286. There have been no recent reports for CA, and that in TJ was based on an error.

Dermatocarpon luridum (With.) J. R. Laundon – First published mention for CA under this name, 297. Reported

for CA as *D. aquaticum* (Weiss) Zahlbr. (Herre 1906, 1950; Fink 1935), *D. fluviatile* (Weber) Th. Fr. (Herre 1910), *D. weberi* (Ach.) W. Mann (Hale and Cole 1988).

Diploschistes actinostomus (Ach.) Zahlbr. – Eastern U. S. only, on noncalcareous rock, 305. TJ, however, list reports by Herre (1910), Hasse (1913), Thomson and Ketchledge (1958), Volk (1963), Baltzo (1970); more recently by Weber et al. (1987), Wright (1997); Bratt (1999); Tucker (1999); Robertson (2001), and in unpublished keys by B. Ryan. One Herre collection (Herre, 1945, Jasper Ridge, 5 mi. W of Stanford University, CA, July 19, 1945, CAS) has been verified by S. C. Tucker. The apothecia are completely buried in *D. actinostomus*, and the black ostiole has radiating cracks. Spore length in western U. S. specimens should be checked against *D. scruposus* (Schreber) Norman.

Ephebe lanata (L.) Vainio – Northern OR, WA, adjacent BC, NWT, and northeastern U. S., but not CA, 309. The listing in TJ is based on the map in Hale (1969), which shows *E. lanata* throughout the northern half of the state, presumably based on old reports by Herre, some of whose material has been re-identified as *Spilonema revertens* (I. Tavares, pers. comm.). A recent collection, *Shevock 13883*, First Dinkey Lake, Fresno Co., 9250 ft. elev. (UC, CAS) was reliably identified by Bruce Ryan.

Flavopunctelia praesignis (Nyl.) Hale – AZ, NM, and TX, not CA, 318. Reported for CA, however, as *Parmelia caperata* var. *incorrupta* (J. Moore) E. C. Berry (Herre 1942b) and as *Parmelia praesignis* Nyl. (Herre 1946). These coastal collections by Herre may have been misidentified and should be checked.

Flavopunctelia soledica (Nyl.) Hale – Southwestern CA, 319, agrees with reports by Riefner et al. (1995), Bratt (1999), and Robertson (2001). There are many reports in TJ under the synonym *Parmelia soledica* Nyl., mostly by Herre but also by Culberson (1955) and in the Santa Cruz peninsula foray report by Thomson and Ketchledge (1958).

Fulgensia fulgens (Swartz) Elenk. – Rare in North America, 319, 320, no map. Reported for CA by Rudolph (1955) based on *Hasse 1420*, collected near Palm Springs, Riverside Co. (FH). This collection should be checked against *F. subbracteata* (Nyl.) Poelt and *F. desertorum* (Tomin) Poelt from the southwestern U. S.

Fuscopannaria leucophaea (Vahl.) P. M. Jørgensen – Throughout AZ and most of CA north to BC as well as eastern U. S., 321. Jørgensen (2000) reported it as a saxicolous species of cold temperate eastern North America, south in the Rocky Mountains to AZ, but not CA.

Reported for CA, however, by Sigal (1989) and Bratt (1999), and listed in TJ under *Pannularia microphylla* Nyl. (Hasse 1898) and *Parmeliella microphylla* (Sw.) Müll. Arg. (Hasse 1913, Herre 1910). These earlier records should be checked. *Lichens of British Columbia* (Goward, 1994) does not mention *Pannaria leucophaea*. Jørgensen (2000) suggests that spore size will distinguish *F. leucophaea* (13-15 µm x 5-6 µm) from several similar species: *F. californica*, *F. coralloidea*, *F. crustacea*, *F. leucostictoides*, and *F. pacifica* (ca. 14-25 x 7-10 µm). The collection cited by Sigal (1989) is probably *F. thiersii* (see Jørgensen 2000).

***Fuscopannaria saubinetii* (Mont.) P. M. Jørgensen** – "Pacific Northwest", 324, no map. Jørgensen (2000) gives its distribution as humid lowlands along the Pacific coast north to BC without mentioning CA specifically. He says (pp. 686, 688) that many collections referred to *F. saubinetii* are misidentifications of *F. pacifica* P. M. Jørg. Previous reports are listed in TJ under the synonyms *Pannaria saubinetii* (Mont.) Nyl. (Weber 1963) and *Parmeliella saubinetii* (Mont.) Zahlbr. (Volk 1963; Lindsay 1973; Ohlsson 1973) and should be checked.

***Heppia adglutinata* (Kremp.) A. Massal.** – AZ east to TN, not CA, 333. Henssen (1994) says that some reports of *Heppia lutosa* (Ach.) Nyl. from CA might be either *H. adglutinata* (Kremp.) A. Massal. or *H. conchiloba* Zahlbr.; they are more likely to be the latter, based on distributions in *Lichens of North America*.

***Hubbsia californica* (Räsänen) W. A. Weber** – Coastal southern CA from Santa Barbara Co. south, including the Channel Islands, 341. Incidentally, Judy and Ron Robertson have collected *Hubbsia parishii*, only slightly less rare, at Pt. Reyes, Marin Co. (and Rick Riefner has found it on Mt. Tamalpais [Ed.]

***Hypogymnia duplicata* (Ach.) Rass.** – North coastal CA north to BC, 348. However, Wright (2001a) has refuted the only CA record (Lindsay 1973) known to us, saying that the Lindsay collection at Humboldt State University is *H. heterophylla* L. Pike. Bruce McCune (pers. comm.) says he knows of no collections of *H. duplicata* from CA.

***Icmadophila ericetorum* (L.) Zahlbr.** – North coast of CA north to BC and the Arctic, 360. This conspicuous crust with pink apothecia, found on stumps and rotten logs in humid forests, has rarely been reported from CA. The Sharnoffs' handsome photograph (361) should help to identify it at sight. Tucker and Kowalski (1975) reported a collection, *Kowalski 12048*, from Prairie Creek State Park, Humboldt Co., and Hale and Cole (1988) mention it for the state.

***Imshaugia aleurites* (Ach.) S. F. Meyer** – Eastern and northeastern U. S., more or less across Canada, and the southern Rocky Mountains, not CA, 361. However, Robertson and Robertson (2001) report it from Sonoma Co. based on *Robertson 3955*, verified by S. C. Tucker.

***Ionaspis lacustris* (With.) Lutzoni** – Northern OR north along the coast to northern BC, as well as widespread in the eastern U. S. and Canada, not in CA, 363. An early report as *Lecanora lacustris* (With.) Nyl. from southern CA is in Hasse (1915a) and should be checked.

***Lecanactis abietina* (Ach.) Körber** – Mainly OR north to BC along the coast, extending into CA as two tiny blue dots (detected by the sharp eyes of I. Tavares!), 369. TJ cites a number of early reports for CA: Tuckerman (1872, 1888), Willey (1873), McClatchie (1897), Hasse (1898), and Orcutt (1907). These early reports, mostly from southern CA, should be checked.

***Lecania dubitans* (Nyl.) A. L. Sm.** – Southeastern UT, BC, Canadian Rocky Mountains, central and eastern Canada, not CA, 370. Listed, however, in TJ as *L. dimera* (Nyl.) Th. Fr. (Herre 1910, Hasse 1913, Merrill 1923, Jordan 1968, Lindsay 1973) and as *Lecania syringea* (Ach.) Th. Fr. var. *dimera* (Nyl.) H. Olivier (Fink 1935). A recent report is by Wright (1997).

***Lecanora strobilina* (Sprengel) Kieffer** – The eastern half of the U. S., not CA, 388. However, Sliwa and Wetmore (2000) cite it for CA as well as BC.

***Lepraria lobificans* Nyl.** – The eastern half of the U. S. and almost the entire coast of CA, 396. No previous published records for this species in CA are known to me.

***Leprocaulon microscopicum* (Vill.) Gams ex Hawksw.** – Mainly on the OR and WA coasts, not CA, 398. Reported, however, from CA by Lamb and Ward (1974), Bratt (1993, 1997), Bowler et al. (1996), and Hill (1996).

***Leptogium gelatinosum* (With.) J. R. Laundon** – North central CA north to BC, 405. Hill (1997) reported it from the Wantrup Preserve, Napa Co. Listed in TJ under the synonyms *L. scotinum* (Ach.) Fr. (Tuckerman 1872; Willey 1873; Herre 1906, 1910; Fink 1935), and *L. sinuatum* (Huds.) A. Massal. (Sierk 1964). I know of at least one additional collection: *W. Russell*, 1965, Sonoma Co. (UCD).

***Leptogium polycarpum* P. M. Jørg. & Howard** – Northern CA north along the coast to BC, 408. First published report for CA. *Lichens of North America* characterizes this

species as similar to *L. californicum* Tuck. but differing in apothecial characteristics and number of spores per ascus.

***Leptogium pseudofurfuraceum* P. M. Jørg.** – Southern CA, AZ, TX, and the southern Rocky Mountains, 408. The name *L. furfuraceum* (Harm.) Sierk was misapplied to this long unrecognized taxon recently named by Jørgensen (1997). Reports of "*L. furfuraceum*" that will need correcting are in Doell and Wright (1996) and Tucker and Bratt (1996).

***Lichinella nigrütella* (Lettau) Moreno & Egea** – The southern two-thirds of CA, reaching into the northern Sierra Nevada, 414. Supported by several recent reports (Bratt 1999, Doell et al. 1999, Tucker 1999).

***Lobothallia alphoplaca* (Wahlenb.) Hafellner** – Through-out inland CA, 422. This report may be partly based on a previous one under this name from the CALS field trip to the Granite Mountains, San Bernardino Co. (Doell et al. 1999). Previous collections were listed in TJ as *Lobothallia melanaspis* (Ach.) Ach. (Fink 1935), *Lecanora melanaspis* (Ach.) Ach. var. *alphoplaca* (Wahlenb.) Th. Fr. (Hasse 1912, 1913), and *Lecanora thamnoplaca* Tuck. (Tuckerman 1884, Hasse 1911, Fink 1935, Herre 1945).

***Lobothallia praeradiosa* (Nyl.) Hafellner** – Southern CA extending into the central transmontane Sierra Nevada, 423. Reported for CA by Doell et al. (1999).

***Megalaria laureri* (Hepp) Ekman & Tønberg** – Northeastern U. S. and Eastern Canada, 429, not in CA, nor is it cited for CA by Ekman and Tønberg (1996). Earlier collections cited for CA in TJ should be checked against *M. columbiana* (G. Merrill) Ekman. Synonyms: *Biatora laureri* (Hepp) Tuck. (Tuckerman 1888, p.30) and *Catillaria laureri* Hepp ex Th. Fr. (Herre 1912, Fink 1935, Volk 1963, Jordan 1968, Lindsay 1973). Noble (1982, p. 45) says that *Catillaria columbiana* (Merr.) Noble, which she says occurs from CA northward, has often been misidentified as *C. laureri*.

***Melanelia hepatizon* (Ach.) Thell** – Mainly arctic-alpine, WA north along the coast to AK, NWT, Rocky Mountains, northeast U. S. and Canada with a small area in the Sierra Nevada, 435. First report for CA.

***Melanelia olivacea* (L.) Essl.** – Mainly in Canada and northeast U. S., not CA, 437. TJ indicated that the following reports were misidentifications: *Parmelia olivacea* (L.) Ach. (Tuckerman 1866; Bolander 1870; McClatchie 1895, 1897; Hasse 1895, 1898, 1905; Herre 1906, 1910, 1945, 1946, 1950; Thomson and Ketchledge 1958; *Physcia olivacea* Ach. (Orcutt 1885).

***Melanelia panniformis* (Nyl.) Vainio** – OR north to BC on the west coast, not CA, 437. Esslinger (1977) indicated a similar range. However, Tucker 35502 (Bloody Rock trailhead, vicinity of Lake Pillsbury, Lake Co., CA) has been identified by Esslinger as this species. Earlier reports in TJ may be misidentifications. Synonyms: *Parmaria olivacea* (L.) Ach. var. *panniformis* Nyl. (Hasse 1906), *Parmelia prolixa* (Ach.) Carroll var. *panniformis* Nyl. (Hasse 1906).

***Melanelia sorediata* (Ach.) Goward & Ahti** – Southern OR to AK on coast, in the Rocky Mountains, not in CA, 438. Reported from CA, however, under the synonyms *Melanelia sorediosa* (Almb.) Essl. (Ryan and Nash 1991) and *Parmelia sorediata* (Ach.) Röhl. (Herre 1906, 1946; Fink 1935).

***Melanelia stygia* (L.) Essl.** – WA north, CO, NM, not CA, 439. Reported for CA, however, by Ryan and Nash (1991) and listed in TJ as *Parmelia stygia* (L.) Ach. (Hasse 1903, Herre 1946).

***Melanelia tominii* (Oksner) Essl** – Most of CA, primarily inland, 441. Second published report for CA under this name; the first was by Doell et al. (1999). Reported by Ryan and Nash (1991) as *M. substygia* (Räsänen) Essl. A Brooks Lake collection from the Ryan and Nash study is at UC.

***Nephroma bellum* (Sprengel) Tuck.** – Southern OR north including Cascade Ranges, not in CA, 452. A collection of *N. bellum* by H. Thiers, San Francisco Watershed, San Mateo Co., CA, Nov. 3, 1979 (CAS), has been verified by S. C. Tucker. The only previous published indication for CA known to me is the small map in Hale (1979, p.135), where *N. bellum* is shown for the northernmost counties.

Niebla – *N. cephalota*, *N. ceruchoides*, *N. combeoides*, *N. laevigata*, and *N. procera*, now frequently referred to the new genus *Vermilacinia*, are retained by *Lichens of North America* in *Niebla*, although the text states that the genus can be divided into the two genera based on anatomy and chemistry.

***Ochrolechia trochophora* (Vainio) Oshio** – North central and northeastern U. S., not CA, 468; Brodo 1991. Reported previously as *Lecanora pallescens* (L.) Schaerer var. *rosella* Tuck. (Tuckerman 1882, Hasse 1908), *Ochrolechia rosella* (Müll. Arg.) Vers. (Lindsay 1973), *O. pallescens* (L.) A. Massal. var. *rosella* (Tuck.) Zahlbr. (Howard 1970); these early collections should be checked.

***Ochrolechia upsaliensis* (L.) A. Massal.** – Extending south into CA from eastern OR, 468. Previous publications

have not definitely stated its presence in CA. Brodo (1991) primarily treated corticolous species and only incidentally referred to *O. upsaliensis*, found on moss and soil, saying that Herre's collections on bark might be either *O. farinacea* Howard or *O. szatalaënsis* Vers. TJ listed reports by Herre (1910), Volk (1963), and Howard (1970). One collection, *Herre 747*, Castle Rock, Santa Cruz Mts., CA, June 16, 1906 (UC), labelled *O. upsaliensis*, is depauperate but contains a few apothecia resembling those of *O. oregonensis* H. Magn. (identified by S. C. Tucker).

Ophioparma rubricosa (Müll.Arg.) S. Ekman – Coastal CA north to WA and BC, 473. The second report for CA under this name after Wright's (1997) report for Lake Co. Listed in TJ under the synonyms *Bacidia herrei* Zahlbr. (Zahlbruckner 1908; Herre 1910, 1945; Fink 1935), *Haematomma californicum* Sigal & Toren (Sigal and Toren 1975), and *H. pacificum* Hasse (Hasse 1910).

Pannaria pezizoides (Weber) Trevisan (now treated by Jørgensen and Ekman as *Protopannaria pezizoides* [Weber] P. M. Jørg. & S. Ekman [Ed.]) – Southern OR north along the coast, Rocky Mountains and south to AZ, not CA, 477. Listed by TJ (Hasse (1913) and by Wright (1997) with a "?". Jørgensen (2000) gives the West Coast range as WA northward.

Parmelia omphalodes (L.) Ach. – WA north to AK and the Canadian Arctic, eastern U. S., not CA, 482. Listed by TJ based on Herre (1910) as *P. saxatilis* var. *omphalodes* (L.) Herre and by Herre (1946) as *P. omphalodes* (L.) Ach. These Herre collections should be checked.

Parmotrema praesorediosum (Nyl.) Hale – Southeastern U. S. and a tiny area in central inland CA, 499. This CA report is a somewhat unlikely range extension, and it would be helpful to check the collection on which it is based.

Peltigera malacea (Ach.) Funck – Widespread in arctic regions of AK and Canada, south in the Rocky Mountains to NM and AZ, not CA, 513. The map in Hale (1979, p. 52) shows its distribution from northernmost CA north to BC, in the Rocky Mountains, and the eastern half of Canada.

Peltigera neopolydactyla (Gyelnik) Gyelnik – Extending from northern CA north to BC and AK, 516. I know of no previous published reports for CA. B. Ryan identified *Bratt 6105*, Monterey Co. (SBBG) as this species.

Peltigera polydactylon (Necker) Hoffm. – BC, AK, AZ, NM, north central and northeastern U. S., not CA or any adjacent state except AZ, 517. TJ listed many early reports for *P. polydactyla*, and Hale and Cole (1988) also reported

it for CA. Many of the early collections were probably misidentified.

Peltigera ponojensis Gyelnik – Northern CA north to BC and AK on the coast, 518. Previous reports for CA have been in floras for other states or regions: McCune and Geiser (1997, p. 216) and Goward et al. (1994).

Peltula cylindrica Wetmore – Central TX, southern Appalachian Mountains, and in the San Francisco Bay area, CA, 523. First published report for CA. A verified collection is *W. P. Jordan 3208*, Pine Flat, NNE of Geyserville, Sonoma Co., CA, Sept. 29, 1979 (MIN).

Peltula patellata (Bagl.) Swinscow & Krog – Southern CA, AZ, NV, UT, 524. Cited for CA under this name by Bratt (1999) and Robertson (2001). Reported many times previously under synonyms: *P. polyspora* (Tuck.) Wetmore (Wetmore 1970), *Heppia leptopholis* Nyl. (Hasse 1898, 1913; Nylander 1900; Orcutt 1909; Merrill 1923; Fink 1935); *H. polyspora* Tuck. (Hasse 1898, 1913; Orcutt 1909; Fink 1935); *H. terrena* Nyl. (Hasse 1897, 1898, 1913; McClatchie 1897; Orcutt 1909; Fink 1935).

Pertusaria subambigens Dibben – Southern CA north along the coast through BC, 532. The second published report for CA under this name after Dibben's monograph (1980, p. 71). It had mistakenly been called *P. ambigens* (Nyl.) Tuck. in early papers listed in TJ: Hasse 1903, 1906; Fink 1935; Jordan 1968.

Pertusaria velata (Turner) Nyl – Eastern U. S., not CA, 534. Reports in TJ for CA were presumably misidentifications: Bolander 1870, Herre 1910, Fink 1935. A later Herre collection labeled *P. velata* (*Herre, 1930*, Devil's Canyon, Peter's Creek, Santa Cruz Mts., Santa Clara Co., CA, Aug. 27, 1930, CAS) has been re-determined by S. C. Tucker as *Pertusaria albescens* (Huds.) Choisy.

Placidium squamulosum (Ach.) Breuss – Common in the western states but only mentioned for CA and without range, 570, no map. Reported for CA, however, by Doell et al. (1999), Breuss and Bratt (2001), and Robertson (2001).

Placidium tuckermanii (Rav. ex Mont.) Breuss – North coastal CA from SF Bay region through Mendocino Co., central and eastern U. S., 570. Reported previously for CA only by Thomson (1987).

Placopsis lambii Hertel & V. Wirth – North coast of CA north to AK and the Canadian arctic, 572. First published report for CA. On rock.

Polychidium dendriscum (Nyl.) Henssen – Southeastern AK, not in CA, 579. A collection by Malachowski from Mendocino Co. (Malachowski 1975), identified as "*Dendroscocaulon intricatum* Henssen ined." with *Leptogidium dendriscum* Nyl. (= *Polychidium dendriscum*) given as a synonym, is being checked.

Protoparmelia badia (Hoffm.) Hafellner – Southwest OR, WA and north to Canadian arctic, not in CA, 586. Reported for CA, however, by Ryan and Nash (1991), Riefner et al. (1995), Bratt (1999), and Magney (1999). TJ lists reports by Hasse (1896), Orcutt (1907), and Herre (1912) under the synonym *Lecanora badia* (Hoffm.) Ach. A collection of this taxon, *A.W. Herre 9*, December 23, 1910, Oakland Hills, behind Oakland, CA (CAS), has been verified by S. C. Tucker.

Psilolechia lucida (Ach.) Choisy – North central and northeastern U. S. and with remote outliers, one in the vicinity of Los Angeles, CA, 596. This may be the first report for CA under this name. Herre (1944) reported it from central CA under the synonym *Lecidea lucida* Ach.

Psoroma hypnorum (Vahl) Gray – Southern OR to AK, northern Canada, Rocky Mountains, not CA, 604. It was not mentioned for CA by Jørgensen (2000). The map in Hale (1979, p. 232) shows it in far northern CA.

Punctelia bolliana (Müll. Arg.) Krog – Midwest and eastern U. S., not CA, 606. Reports in TJ of this species for CA were based on Culberson and Culberson (1956) and Culberson (1962).

Punctelia borreri (Sm.) Krog – A rare species confined to OH and WV, not CA, 610. However, CA collections have been reported recently by Riefner et al. (1995), Bowler et al. (1996), Doell and Wright (1996), and Wright (2001a). Earlier CA listings in TJ under the synonym of *Parmelia borreri* (Sm.) Turner were based on Herre (1907, 1910, 1946), Berry (1941), Culberson (1962), and Jordan (1968). Both old and new collections from CA should be checked for color of lower surface: *P. borreri* is black and *P. subrudecta* (Nyl.) Krog is pale brown. The species of *Punctelia* known from CA are readily separated by the key in Wright (2001a).

Punctelia perreticulata (Räsänen) Wilhelm & Ladd – The older opinion is given that this is limited to the southern interior U. S., not CA, 610, no map. More recently, Adler and Ahti (1996) give its distribution as not only in southeastern U. S. but also throughout temperate eastern North America, extending to CO and CA. Wright (2001a) reported it from CA.

Pyrenopsis polycocca (Nyl.) Tuck. – Mostly north central and northeastern U. S., not CA or adjacent states, 611. The sole CA record, a Thiers collection from Trinity Co. (at SFSU?), should be checked.

Pyrrhospora russula (Ach.) Hafellner – Southeastern U. S., not CA, 615. TJ lists reports of *Lecidea russula* by Hasse (1915b, Herre 1942a) and more recent ones by Wright (1997) and Magney (1999), but all of these are probably *P. cinnabarina* (Sommerf.) Choisy. Both species have brilliant red-orange apothecia, but *P. cinnabarina* is often soreciate while *P. russula* is not.

Pyrrhospora varians (Ach.) R. C. Harris – Northeastern U. S., not CA, 615, no map. Reports listed in TJ under the synonyms *Biatora varians* Ach. (Hasse 1896, McClatchie 1897, Orcutt 1907) and *Lecidea varians* Ach. (Hasse 1898, 1913; Herre 1944) should be checked.

Ramalina complanata (Sw.) Ach. – Southeastern U. S. west to southwestern TX, vicinity of San Diego, CA, 623. This may be a new report for CA, using the name in the broad sense, although, of course, no collection that could be checked is specified. Early reports listed in TJ were indicated with a "?" as possible misidentifications: Eckfeldt (1893); Hasse (1903, based on collections from the Santa Monica range). A Palmer collection from 3–4 km W of San Diego may be the basis for the Eckfeldt (1893) report and perhaps also for that in *Lichens of North America*. A collection by *Dr. E. Palmer 205*, 1888, San Diego, CA (US, now at CAS) was labeled as *Ramalina complanata* but has been tentatively re-determined by S. C. Tucker as *Ramalina leptocarpha*; it is not *R. complanata*.

Ramalina dilacerata (Hoffm.) Hoffm. – Southeastern OR north to AK on the coast, not CA, 623. Reported for CA, however, by Hale and Cole (1988, p. 162) and Bowler and Riefner (1995). Early reports were under the synonyms *R. minuscula* (Nyl.) Nyl. (Jordan 1968) and *Fistulariella minuscula* (Nyl.) Bowler & Rundel. Verified collections include *Marshall Howe*, 1894, Olema, Marin Co. (UC); *Tavares 1465*, Willits, Mendocino Co., 1963 (UC); *Wright 6204*, Highway 299 W of Willow Creek, Humboldt Co. (herb. Wright); *Wright 7099*, Elk River Rd. SE of Arcata, Humboldt Co. (herb. Wright).

Ramalina peruviana Ach. – Southern TX and FL, not CA, 628. Reported for CA, however, by Bowler and Riefner (1995) and Riefner et al. (1995).

R. sinensis Jatta – AZ, UT, NM, TX, MN and eastward, not CA, 630. Reported for CA, however, by Bowler and Riefner (1995) and Riefner et al. (1995).

Ramalina thrausta (Ach.) Nyl. – Central OR north to BC and eastward, not CA, 630. Reported, however, from Sonoma Co., CA, by Sanders (1997).

Ramalina usnea (L.) R. Howe – Subtropical, in CA, FL and TX, 620 (key), 625, 626. The second published report for CA after Hale (1979, p. 208). (It is not clear if anyone has actually seen *Ramalina usnea* from California. Rundel [Lichenologist 10, 1974, p. 151] listed it for the U.S. as in FL and TX only. He gives it also as in Sinaloa, Mexico, suggesting that it might be expected in southern California. The matter requires investigation [Ed.]).

Rhizocarpon obscuratum (Ach.) A. Massal. – Northeastern U. S. and CO, not CA, 637. Two reports of this species for CA should be checked: Riefner et al. (1995) based on Riefner's San Luis Obispo Co. collection, and a collection by D. Kowalski from Butte Co. identified as the synonymous *R. albineum* (Tuck.) Fink.

Rimelia cetrata (Ach.) Hale & Fletcher – Southeastern U. S., not CA, 642. A previous CA report in TJ was based on Herre's collections including *Herre 516* from Pilarcitos Creek Canyon identified as *Parmelia herrei* Zahlbr. (Herre 1906, 1907, 1910, 1946; Fink 1935, Berry 1941; the latter two references based their accounts on reports by Herre). One Herre collection lacked soredia, isidia, and apothecia (Herre 1910). I. Tavares (pers. comm.) suggests that these collections should be checked against *Rimelia reticulata* (Taylor) Hale & Fletcher.

Rinodina polyspora Th. Fr. – CA, WA, and the northeastern U.S., 647, no map. This is the only published report for CA known to me. J. Sheard (pers. comm.) has seen *R. polyspora* from Calaveras Co. (*I. Tavares 299*, Lich. Exs. Colo., 1.5 mi. SW of Arnold, 1959, WIS); Lake Co. (*Tucker 28807*, Bartlett Springs Rd. near the north end of Clear Lake, SBBG); Sonoma Co. (*I. Tavares 324*, UC); and Los Angeles (*Hasse, 1912*, FH).

Solorina crocea (L.) Ach. – Northern OR north on the coast to BC and AK; Rocky Mountains, not CA, 655. This striking arctic-alpine lichen is shown beautifully in the Sharnoffs' photograph. Given for CA by McCune and Goward (1995) and McCune and Geiser (1997).

Solorina spongiosa (Ach.) Anzi – Arctic-alpine; Rocky Mountains north to BC and AK with outliers in CO, NM, and TX, not CA, 656. However, Bruce Ryan has identified a collection from Inyo Co. as *S. spongiosa*: *Shevock 12531*, South Lake Rd., 0.7 mi. below South Lake, Lodgepole Pine forest (UC, CAS).

Sporastatia polyspora (Nyl.) Grunmann – Arctic-alpine in CO and northward in the Rocky Mountains to northern Canada, not CA, 660. The listing in TJ was based on Herre (1950) as *Biatorella cinerea* (Schaerer) Th. Fr.; this specimen should be checked.

Staurothele diffractella (Nyl.) Tuck. – Central and northeastern U. S., not CA, 661. The sole report for CA was tentative (Wright 1997).

Stereocaulon sasakii Lamb – Central CA on the coast north to BC and AK, 667, no variety specified. Lamb (1977), however, reported *S. sasakii* var. *tomentosoides* Lamb for CA.

Stereocaulon tomentosum Fr. – Boreal and arctic-alpine in northern OR north to AK; CO, NM, WY, not CA, 669. Reported, however, for Sonoma Co. by Tucker (1973) based on *Tucker 5425* in part, 10 mi east of Stewart's Point, det. I. M. Lamb; Lamb (1977) based on *Sipe*, Clear Lake, Modoc Co., and Hale and Cole (1988).

Stereocaulon vesuvianum Pers. – Northern OR north to AK, transarctic, not CA, 670. The listing in TJ was based on reports by Riddle (1910) and Fink (1935) as *S. denudatum* Flörke (= *S. vesuvianum* Pers. var. *denudatum* [Flörke] Lamb). If vouchers can be located, they should be checked.

Thamnolia vermicularis (Swartz) Ach. ex Schaerer – Northern OR and northward on the Pacific coast to the western Arctic, the Rocky Mountains, not CA, 677. However, Wright (1992) found this distinctive species in Marin Co.

Tuckermannopsis sepincola (Ehrh.) Hale – Northeastern and north central CA, WA north to AK, across Canada, 696. First report for CA since those listed in TJ, which were thought to be possible misidentifications. Synonyms: *Cetraria sepincola* (Ehrh.) Ach. (McClatchie 1897, Hasse 1913) and *Platysma saepincola* Hoffm. (Hasse 1898, Orcutt 1909). I have verified the following as this species: *E. B. Copeland, 1942*, near Jonesville, Butte Co., det. Herre (CAS).

Umbilicaria deusta (L.) Baumg. – Northern OR north to AK on the Pacific coast, not CA, 702. Reported, however, for CA by Sigal and Toren (1975), Wetmore (1983), and Hale and Cole (1988, p. 116).

Umbilicaria proboscidea (L.) Schrader – OR north to AK along the Pacific coast, Canadian Arctic, not CA, 707. Reported, however, for CA by Ryan and Nash (1991).

Tucker: New Reports for California in *Lichens of North America*

Umbilicaria rigida (Du Rietz) Frey – Northwest corner of CA, WA north to AK, arctic Canada, 707. The CA report is probably based on *E. Peterson*, Del Norte Co., CA (Peterson 1997). Goward and McCune (1994) give it as no further south than WA, while McCune and Geiser (1997) give it as south only to the OR Cascades. The map in *Lichens of North America* shows it much west and south of the Cascades.

Umbilicaria vellea (L.) Hoffm. – Mainly arctic-alpine, no map, 699. Early reports listed in TJ (Llano 1950, Pinelli and Jordan 1978) should be checked, as well as a post-TJ report by Smith (1980). Poelt and Nash (1993) distinguished between low-altitude collections, probably *U. americana* Poelt & T. H. Nash, and high-elevation collections, *U. vellea* s. str. The two differ in rhizine structure.

Usnea ceratina Ach. – North coastal CA north to WA, north-central and northeastern U. S., 715. Reported for CA by Clerc and Herrera-Campos (1997) and Wright (2001b). Tavares (1997, p. 22) however considers CA material to be *U. californica* Herre, which she regards as distinct from European *U. ceratina*. While both have pink color in the medulla and/or axis, the cortex and axis of *U. californica* tend to be narrower than in *U. ceratina* of Europe, and the cortical cells have narrower protoplast-containing lumina and thicker walls. The statement in *Lichens of North America* that the cortical cells of *U. californica* are very small is incorrect; it is the lumen of the cortical cells (the volume of the cell inside the wall) that is smaller. Early reports of *U. ceratina* in CA listed in TJ include those by Hasse (1913), Herre (1945), and Lindsay (1973).

Usnea cornuta Körber – Southeast AZ, NM, BC, eastern U. S., not CA, 715. Reported for CA, however, by Clerc and Herrera-Campos (1997), Halonen et al. (1998), Bourell (2000), and Wright (2001b). Morphotypes intermediate between *U. cornuta* and *U. fragileszens* Havaas ex Lynge were reported for CA by Tavares (1997).

Usnea hesperina Mot. – Central coastal CA north to BC, eastern U. S., 720. This, together with Wright (2001b) is one of two published reports for CA under this name in 2001. = *U. subgracilis* Vainio. Tavares reported the *U. subgracilis* group for CA (1997), and discussed it further in Tavares (1998). *Usnea subgracilis* was described earlier than *U. hesperina* and hence has priority, if the two are considered synonymous. Dr. Tavares accepts this synonymy at present. Motyka (1936-1938), eminent Polish expert on *Usnea*, considered them distinct on the basis that *U. hesperina* is densely fibrillose whereas *U. subgracilis* has more slender, less fibrillose branches.

Usnea scabiosa Mot. – Southwestern U. S. including CA, 724, no map. Reported for CA by Motyka (1936-38), Tavares (1997), and Wright (1997).

Vermilacinia – all *Vermilacinia* species cited are put in *Niebla*, 457, although the authors state that *Niebla* can be divided into these two genera based on chemistry and anatomy.

Vestergrenopsis isidiata (Degel.) E. Dahl – WA north to AK, not CA, 729. Listed by TJ based on a collection identified as the synonymous *Pannaria isidiata* Degel. (Thomson and Ketchledge 1958). This collection was later re-identified as *Koerberia sonomensis* (Tuck.) Henssen (correspondence between I. Tavares and W. A. Weber).

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Tucker: Lichens on Automobiles

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Lichens Growing on an Automobile in Santa Barbara, California

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What would a taxonomist do if his type locality for a lichen were on the roof of an automobile that was in daily use? This provocative question came up when a colleague brought this car, parked on the university campus, to my attention, and I found about ten species of lichens including a peculiar-looking *Xanthoria* abundantly present on its roof.

The well-used 1982 Toyota Landcruiser, owned by Dr. Sam Sweet, herpetologist in the Biology Department at the University of California, Santa Barbara, has its roof covered with lichens. Acquired in 1986, the car had been previously used in the Carlsbad area of northern coastal San Diego County. Apart from a trip to Cabo San Lucas, Baja California, Mexico, in the winter of 1986, the car had not been much beyond San Luis Obispo to the north, the Carrizo Plain to the northeast, and the San Fernando Valley to the southeast. It had been in essentially daily use around Santa Barbara. Dr. Sweet first noted the lichens on returning from Australia in September, 1994. The car had

been parked in a driveway on the east side of his house for a year, where it got sun for perhaps one to two hours in late morning. It was never washed. Since April of 1995 it has been parked where shaded by an ash tree (*Fraxinus* sp.) most of the day. It experienced frequent fog drip from this tree overnight. The auto roof is white fiberglass with a matte surface scratched from being scraped by tree branches along back-country roads. These irregularities probably have sheltered the lichen propagules and served as a reservoir. Dr. Sweet drives it to campus daily.

The lichens present include large colonies (up to 5 cm in diameter) of *Flavopunctelia flaventior* and *Flavoparmelia caperata*. Also present were numerous smaller colonies of *Physcia adscendens* (under 1 cm in diameter), *Physcia* sp., a sterile gray *Parmotrema*, *Xanthoria* sp. (sorediate), *Xanthoria* sp. (fertile), *Buellia* sp., and *Caloplaca* sp. with a dark grey-green crust and orange apothecia. Most specimens were too small to identify to species. The biome on the car roof also harbored a yellow aphid-like insect

amid the gold *Xanthoria* thalli. The large foliose species of lichens are common on bark in canyons and woodlands in the upper foothills in the Santa Barbara area. The most interesting was the fertile *Xanthoria*, which did not seem to key to anything familiar.

The fertile *Xanthoria* formed numerous hemispherical rosettes up to 1 cm wide, gold-orange in color, consisting mostly of stalked apothecia, but with occasional lobed sterile branches around the base. The colonies were concentrated near the front of the roof, suggesting they had better adhering properties than the large *Parmelias*, which were near the rear window. The *Xanthoria* colonies were easily detached, so they and the abundant propagules of the *Flavopunctelia* and *Flavoparmelia* must have been forming a plume behind the vehicle as it was driven. The lichens must have logged thousands of road miles on the roof of Dr. Sweet's Landcruiser.

I sent a collection of the odd *Xanthoria* to Dr. Louise Lindblom, international expert on this genus. She identified it as the quite common species, *X. polycarpa*. Its stressful wind-tunnel-like environment may have been responsible for the atypical growth form atop the car. While my dream of finding a place for the Landcruiser in the herbarium was dashed (and Dr. Sweet may have sold the car by now, complete with its rooftop biome), it was still intriguing to find that lichens would grow in such an inhospitable location, especially in the occasionally rather arid climate of southern California.

I was curious about whether others had noticed lichens on cars, and placed an inquiry on the lichen list server operated by Cliff Smith in Hawaii. There must have been about 25 responses!

Recent published reports of lichens on cars include one by Jeremy Gray (1999) of a rich growth of lichens on a Lada Riva automobile being driven around Penzance in south-western England. After an exciting car chase through the town, Mr. Gray was able to convince the owners of his good intentions, and make a thorough study of the lichens present. He reported 21 (!) species of lichens growing on rubber, chrome, paint, and glass surfaces, including a number of species familiar to North Americans: *Hypogymnia physodes*, *H. tubulosa*, *Parmelia caperata* (*Flavoparmelia caperata* in America), *P. (Melanelia) subaurifera*, *P. sulcata*, *P. perlata* (*Parmotrema chinense*), *P. (Punctelia) subrudecta*, *Physcia tenella*, *Xanthoria parietina*, and *X. polycarpa*. Fruticose species included

Evernia prunastri, *Ramalina farinacea*, and *Usnea subfloridana*. Crusts present were *Lepraria lobifcans* and *Scoliciosporum umbrinum*. The car was 12 years old, was usually parked outside the owner's house, and had not been washed in eight years. In 1973 Mr. Brightman (Brightman and Seaward 1977) observed lichens growing on a 1960 Vauxhall Victor car, abandoned for at least four years near Glenbarr, Kintyre, Argyllshire, Scotland. It had thalli of *Hypogymnia physodes*, *Parmelia (Melanelia) exasperata*, and *Parmelia (Melanelia) subaurifera* on the painted, pitted metal surfaces of its roof, hood (bonnet), and trunk (boot).

An article by Malcolm and Galloway (1996) described a Morris Minor car from New Zealand, pictured with a *Parmelia* covering windows and chassis. Several people reported seeing and/or photographing autos with lichens attached: in western Ireland (Mark Seaward and D. Richardson); *Lecanora muralis* on an old pickup truck in Iowa (Sharon Eversman); and *Punctelia rudecta* on an antique Cadillac in Baltimore County, Maryland (Carl Darigo). Several people have seen autos bearing lichens on CALS field trips such as that to Lake Pillsbury, Lake County, California (Micki McGee), and in Napa County, California (Doris Baltzo). Steve and Sylvia Sharnoff photographed *Evernia* and *Candelariella* on a Plymouth auto in Mariposa, California; this photograph can be seen on p. 52 in the book, *Lichens of North America*, by I. Brodo and the Sharnoffs. Mona Bourell reports having photographed lichens on cars, trucks and camper shells in California. The most remarkable report, perhaps, is that of *Physcia caesia* on the tire of an abandoned Harrier jet fighter plane in Leicestershire, England (Pedley, 2000).

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Report from the "Lichens and Air Quality" Conference, Arizona State University

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While I was in the Tempe Arizona area on October 2 and 3, 2001, I had the opportunity to attend the "Lichens as Indicators of Air Quality on Federal Lands" conference at Arizona State University, organized by Linda Geiser and Pam Corey of the USDA Forest Service, Peter Neitlich lichen indicator co-lead for the national Forest Health Monitoring program, and Tom Nash and Corinna Gries of ASU. The conference was deftly facilitated by Rebecca Reynolds from Rebecca Reynolds Consulting Inc., who did a tremendous job in preparation for the workshop and on the final report. Of the 30 participants, there were familiar "lichen folk" faces such as Roger Rosentreter, Sherry Pittam, Karen Dillman, and several unfamiliar ones such as folks involved with NRIS (Natural Resource Information System) like Pam Corey from Sandy, OR, and Brad Smith from Bend, OR, and "air quality" folks like Tamara Blett from Lakewood, CO, and John Graves from Phoenix, AZ. Among those listed for participation, but unfortunately unable to attend with their expertise, were Larry St. Clair of Brigham Young University and Linda Davies, air pollution coordinator from London England.

It was an intense two days packed with interchange, new connections, and discoveries between participants, the

impact of which will surely help bring lichens a step closer to consideration as important ecological factors in wiser management of our forests, public lands, and perhaps development in general. The main outcome of the conference was better communication and coordination between lichenologists (the source of the information), air quality and forest service managers (the users of the information), and ecological database developers (who are trying to make a seamless' connection for data flow and effective sharing of information).

A multi-agency data co-op and clearinghouse was proposed, perhaps supported by the Northwest Alliance for Computational Science and Engineering (NACSE), using Ecological Metadata Language (EML) as the recommended metadata standard. NRIS would be a repository for much of the data (especially in the interpreted form needed by air managers) with linkages to other databases. A mailing list, airlichen@nacse.org, has been started for the group by Sherry Pittam. Visit <https://www.NACSE.ORG/mailman/listinfo/airlichen> to request a subscription to the list. A summary report of the conference prepared by Linda Geiser can be found at <http://www.nacse.org/lichenair/>. Click on the sidebar button for literature and reports.

Notes and News

A Good Bye and a Welcome to CALS Bulletin Editors

Darrell Wright could be considered the founder of the CALS Bulletin. In 1994, when CALS was formed, Darrell brought California lichens to the attention of lichenologists in our state and beyond with the production of the first CALS Bulletin. From that time he has served as scientific and/or production editor for every issue. He has always been dedicated to the finest quality and utmost accuracy of its contents. Darrell has contributed many articles to the Bulletins as well. Explanation of spot tests, cautions of lichen preservation techniques, field trip reports, a Report on the Lichens of the Record of Decision, and his Keys to the Macrolichens of California have increased our knowledge of California lichens. With this issue Darrell will be retiring as the CALS Bulletin Editor. Thank you Darrell, for the time and resources that you have contributed to this task and for your many years of commitment to excellence.



Our new editor will be Charis Bratt, with Richard Doell as Production Editor. Charis is also a CALS Founding Member. She has brought California Lichens into the forefront with her work on the lichens of the Channel Islands. She has hosted lichenologists from around the world to the islands, and their findings have greatly increased our knowledge of California lichens. She serves as curator of the Santa Barbara Botanical Gardens Lichen

Herbarium and will now be our CALS scientific editor. Richard Doell, whose photographs have been featured on many of our bulletin covers; who has produced, with his wife, Janet, the CALS Mini-guide; and has served as Bulletin Production Editor in the past, will be our CALS Production Editor. Welcome to Charis and Richard.



Election Time!

CALS officers serve a two year term beginning in January. January 2002 will be the beginning of the 5th term of officers. We are pleased to announce the proposed slate. You will find a flyer in this bulletin for you to cast your vote. Please return the ballot with your membership dues. No vote cast will be considered an affirmative vote for the following slate:

President	Bill Hill
Vice President	Boyd Poulsen
Secretary	Mikki McGee
Treasurer	Stephen Buckhout
Members at Large	CALS Bulletin Editors

It's Time to Renew your Membership!

CALS dues are payable for the period December 31 to March 31. Dues categories are:

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Benefactor	\$100
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An addressed envelope with a short form to complete is included with this Bulletin. Thank you for your support.

CALS Student Grants Fund

In an effort to encourage lichen research in California, CALS is pleased to announce the establishment of a Student Grants Fund. The Society will be awarding \$500 to \$800 to a student currently enrolled in an academic institution and selected by the CALS Board after review by a team of professional lichenologists. If you are interested in being considered, please send a detailed description of your project, outlining your methods and goals. Explain how your project will help you reach these goals, and why it is important to lichenology in California. The recipient of this award will be expected to contribute an abstract of the project or an article based on it for publication in the CALS Bulletin.

Please send your completed applications to the secretary-elect:

Mikki McGee
3 Inyo St. #3
Brisbane, CA 94005

Sonoran Desert Lichens Calendar

Frank Bungartz, CALS member at Arizona State University in Tempe, AZ, has created a calendar, "Lichens of the Sonoran Desert

Region" for the year 2002. Some California lichens featured include *Xanthoria elegans*, *Lobothallia alphoplaca*, *Caloplaca ignea*, *Flavopunctelia flaventior*, *Diploschistes scruposus*, and *Ramalina menziesii* festooning a Bojum Tree (*Fouquieria columnaris*). CALS is printing a limited edition of the Calendar, and it is available for \$25. You may see a picture of it at the CALS web page <http://ucjeps.berkeley.edu/rlmoe/cals.html>. To order a copy, email Bill Hill at aropoika@earthlink.net, and send your payment to the California Lichen Society, P. O. Box 472, Fairfax, CA 94930.

CALS Conservation Committee

As you may know, CALS has a Conservation Committee with Charis Bratt and David Magney as co-chairs. The California Native Plant Society (see <http://www.cnps.org>) has for some time been developing guidelines and protocols for vascular plant conservation. Also the Northwest Lichenologists (see <http://www.proaxis.com/~mccune/nwl.htm>) have done much work in the Pacific Northwest, particularly regarding forestry practices. The flora/habitats/climate/ issues are somewhat different in general for California where the lichen flora of southern California and northern California are quite different, and the issues of logging in northern California present different problems than the development problems of southern California. Several CALS members have recently been active in various aspects of lichen conservation, including determining which species are endangered and developing guidelines for adequate surveys. A preliminary Red List of California lichens can be found on our website at <http://ucjeps.berkeley.edu/rlmoe/cals.html>. We are searching for more members to help here, especially those with expertise in conservation (but not limited to them!), and would like to hear from you if you think you can help. We walk a fine line in preserving our lichen heritage in the presence of a growing population and its pressures, and, of course, we must maintain scientific integrity in our surveys and published data.

Fairs, Meetings, and Fieldtrips

CALS Fall Workshops, 2000

"Hands-On" Lichen Basics, September 20, 2001

'Hands On Lichen Basics' was the theme of the first fall CALS workshop, hosted at San Jose State University. Barbara Lachelt, a founding member of the Society, led us through a hands on approach to learning about lichens. She has developed a 'teaching set' of lichens illustrating their basic morphology, color, and growth habit. The participants spent the morning learning the terms and matching them with the examples. In the afternoon, we had the opportunity to use what we had learned to key out some unknown specimens. We also talked about lichen collection, preparation and preservation. Attending were Don Mayall, Tony Alexander, Lee Hixson, Bill Ferguson, D. Gail DeLalla, Barbara Lachelt and Judy Robertson. Special thanks to Bill Ferguson for organizing this workshop on the San Jose State Campus. The beautiful 'scopes were a pleasure to use.

Judy Robertson

Introduction to Lichens, October 22, 2001

'Introduction to Lichens' was the title of this CALS workshop held in the Jepson Herbarium at the University of California, Berkeley. Janet Doell, a CALS founder, began the day talking about the nature, history and uses of lichens. She explained lichen morphology using specimen samples in small brown bags which each participant could examine and then take home for further reference. She talked about spot tests used to identify lichens, and collecting, preparing and storing lichens. In the afternoon we keyed unknowns or worked on specimens participants had brought for identification. Attending were John Nixon, Kathy Moody and Twyla Miller from Yreka, Al Liu, Irene Winston, and Judy Robertson

Judy Robertson

LICHENS OF NORTH AMERICA: Book Signing and Slide Show, September 18, 2001

On Sunday, September 18, Steve Sharnoff showed marvelous slides of some of the many pictures that did not get into the magnificent work, *Lichens of North America* by Brodo and the Sharnoffs. There were a number of reasons why they didn't, but none were excluded because of poor quality.

Some of the pictures were about the shooting of the pictures themselves. We saw pictures of the camera setup used to make the lichen pictures, and heard Steve discuss the evolution of that setup. There were other pictures, including one of Steve partway up the framework of the great Canopy Crane, pictures of the Sharnoffs' snowbound camper vehicle, and many pictures of material that was not included in the book. We heard of the evolution of the book itself and had a chance to marvel at the acumen, determination, and courage of the photographers and lichenologists who made it: Irwin Brodo, and Sylvia and Steve Sharnoff. After knowing more of the history of its making as well as those who made it, we all felt that the book now carried a deeper meaning.

After the slide show, Steve signed copies of *Lichens of North America* brought by the participants.

Lichens of North America is truly a marvelous book. It is far too heavy to be carried in the field, weighing some eight pounds, but it covers in grand detail the most common lichens of North America, most of them illustrated. The photographs, of course, are stunning.

Several members of CALS attended, along with others. Refreshments were served. Some people traveled for many miles and even from other states to be present for the event, yet the meeting was small enough that several people got to discuss the mechanics of making such pictures

Notes and News

with Steve, to the edification of all who listened. It was a heterogeneous group, including bryologists and Native Plant Society members, with some very lively discussions after the meeting.

Mikki McGee and Judy Robertson

Annual MSSF Fungus Fair, Dec 8 - 9, 2001

'Uses of Lichens, Past and Present' was the theme of the CALS exhibit at the Annual Fungus Fair sponsored by the Mycological Society of San Francisco and held at the Oakland Museum this year. Our display was designed in a wheel shape with seven categories of lichens making up the outer circle. The uses of the highlighted lichens were dyes, poisons, medicines, decoration, perfumery, pollution monitoring, and a category called 'other'. This included some historical uses for lichens. Much of the inspiration for the exhibit came from the

great Sharnoff website www.lichen.com/people.html. Members tended the exhibit, answering questions for visitors, which kept them busy non-stop from beginning to end.

Once again we had a table with microscopes to peer at the wonders of lichens close-up. This was a "hands-on" exhibit especially for the kids – stretching damp *Usnea* to see the rubber-band central cord, and then seeing the cross-section under a microscope. They saw the stark changes in the color of *Lobaria* between dry and bright green wet, and learned that the dull, opaque, dry cortex protects the alga. They saw lichen structure close up – "that (white) rock from the Sierras is all brown because it is completely covered by (live) lichens, see the green algae just under the surface where it is cut?" If we are the spark that turns on just one kid to a career in nature study, we have done our job for lichen conservation, outreach, and education. The microscope exhibit is absolutely essential in this.

Bill Hill and Judy Robertson

Upcoming Events

CALS Annual General Meeting and 'Birthday' Celebration

Point Richmond, January 26, 2002 8am. to 3pm.

Join us to celebrate CALS' Eighth 'Birthday' with a field trip to Brooks Island Regional Park off the coast at Point Richmond. For the field trip we will meet at 8 a.m. (due to the tides) at the Richmond Yacht Club on Brickyard Cove Road in Pt. Richmond. Meet at the flagpole in front of the clubhouse. Richmond Yacht Club members will ferry us to the island where we will survey the lichens. It is about a fifteen minute ride out to the island. We will return to the mainland at noon, and those not going to the field trip may meet us then for our General Meeting and pot luck lunch at the Brickyard Landing Clubhouse, as guests of the Doells. This is more or less across the street from the

Yacht Club. Finally after the general meeting we will have an organizational meeting to discuss the direction of our Conservation Committee. For more information or questions, please contact Janet Doell at doell4@attbi.com or 510-236-0489.

Upcoming Workshops

February 22 - 24, 2002 – Bryophytes and Lichens of Southwestern California

Instructors: Charis Bratt and Dan Norris

Location: Santa Barbara and surrounding areas

In the counties of southwestern California (Santa Barbara, Ventura, Los Angeles, Orange, Riverside, and San Diego) bryophytes and lichens form an inconspicuous but quite diverse

assemblage. New distribution records are continuously found. In an effort to encourage further collection and study, we offer a course in identification and field exploration. This weekend course will utilize freshly collected material illustrating most of the common species in this six-county area. Preparation and laboratory examination involve techniques not often used by vascular plant taxonomists. Keying of specimens will involve close supervision by the two instructors. Specimens of lichens used in class will be made available to the students for private reference collections. After laboratory instruction, there will be a field trip to nearby areas where instruction will be given on the search techniques required for finding a maximum diversity of these plants. February study allows finding of a maximum number of the very small and ephemeral mosses and liverworts.

Advance registration is required. For more information please contact Staci Markos at 510-643-7008, smarkos@socrates.berkeley.edu.

An Introduction to the Foliose and Fruticose Lichens

Darwin Hall, Room 207,
Sonoma State University
February 9, 2002, 10 a.m. to 4 p.m.

Foliose and fruticose lichens will be the emphasis of this workshop. We will discuss the nature and history of the lichens and then learn basic lichen morphology, using prepared specimens as examples. Spot tests will be demonstrated. Collection, preparation and preservation of specimens will be discussed. We will use a variety of keys to identify unknown specimens or specimens brought by the participants. Please bring a lunch. Coffee and tea will be provided.

An Introduction to the Crustose Lichens Hensill Hall, Room 401, San Francisco State University

April 13, 2002, 10 a.m. to 4 p.m.

Judy Robertson will lead us through a Saturday workshop introducing the beginner to identification of crustose lichens. Using a "teaching set" of prepared crustose specimens, participants will learn how to section apothecia, identify various kinds of spores, stain ascus tips, and use keys to identify the specimens. Coffee and tea will be provided. Please bring a lunch.

Ongoing Lichen Identification Workshops

Darwin Hall, Room 201, Sonoma State University
The 2nd and 4th Thursday of every month, 5 pm. to 8:30pm.

Join us every 2nd and 4th Thursday of each month for these Lichen ID sessions at SSU. We bring our specimens and use the classroom dissecting and compound 'scopes and a variety of keys to identify the lichens. We help one another at difficult places in the keys and get feedback about our methods. This is a great time to work on those specimens you have collected but have not had time to ID, and those that you have had difficulty identifying, or to just learn more about the lichens. We have snacks and enjoy hearing about the latest good collecting spot. There is no cost for our workshops but be prepared to pay a \$2.50 parking fee, or park on the street outside the front entrance.

If you are interested in the above workshops, or would like more information, contact Judy Robertson at jksrr@aol.com or 707-584-8099.

Upcoming Field Trips and Other Events

Lichens of the Pygmy Forest

Mendocino County

March 16, 2002, 10 a.m. to 4 p.m.

The pygmy forests of Mendocino County represent a unique ecosystem, sharply differentiated from the neighboring forests. They are dominated by Pygmy Cypress, Bolander Pine, and dwarfed Bishop Pine. Also present are California Azalea, manzanita, and huckleberry, all in the Heather Family, whose members are fond of acid soils such as these. Join CALS on this Saturday to explore the lichen flora of this unique habitat. Collecting specimens will be limited to one voucher specimen per species for the field trip record. We will not make personal collections.

Northwest Scientific Association Annual Meeting

Boise, Idaho, March 27-29, 2002

Join the NW Lichenologists as they participate in the annual meeting of the Northwest Scientific Association. The usual format is a day for the presentation of papers, a lichen workshop day, and a day featuring a field trip to a nearby area. The lichenologists usually have meals together as well. For more information visit the NW Lichenologists' web site at <http://www.nwlichens.org>.

Santa Margarita Ecological Reserve

Riverside County, April 19-21, 2002

The Santa Margarita Ecological Reserve (SMER) is a field station of the California State Universities administered by San Diego State University. SMER, established in 1962, has a

total area of 4344 acres. It is located about 3 km south of Temecula, Riverside County, CA, off of Interstate Highway 15. CALS will host a weekend field trip to this area and will provide the station with a list of the lichens present. Facilities will be dormitory style, and the cost will be minimal. Friday evening we will meet to plan the Saturday and Sunday field trips. For more information about the Reserve, visit their web site at <http://www.sci.sdsu.edu/BFS/>.

If you are interested in the above workshops, or would like more information, contact Judy Robertson at jksrr@aol.com or 707-584-8099.

Channel Islands

Summer 2002

CALS hosted a field trip to Santa Cruz Island, one of the Channel Islands, in September 1997, and we are planning another trip for the summer of 2002. There will be more information in upcoming mailings and on our CALS Website, <http://ucjeps.herb.berkeley.edu/r/moe/cals.html>.

American Bryological and Lichenological Society Meeting

Storrs Connecticut, July 23-30, 2002

The American Bryological and Lichenological Society is planning to hold its 2002 meeting in Storrs, Connecticut, on the campus of the University of Connecticut. The meeting will be held July 23-30, prior to the Botanical Society of America meeting. It will probably feature two field trips, one of which will be in Maine after the meeting. For more information visit the ABLs website at <http://www.abls.org>.

President's Message

Hello CALS Members,

This will be my last message as President of the California Lichen Society. It has been a pleasure to serve you for the last four years. I have learned so much about myself, about lichens, about CALS, and about you. I started quite green, having been a member of the society only one year before assuming this responsibility. Janet Doell has been my mentor and teacher, and with her husband, Richard, is still a very integral part of the Society. There would not be room here to express the many thanks to each of you for your unique contribution to CALS nor to recount the many pleasant memories I have accumulated over the last four years.

What I want to leave with each of you is my hope for your continued commitment to increasing the knowledge about lichens in California and a renewed commitment to our Society. Although our organization has grown, our future is vitally dependent upon your participation and support. With your endorsement, I am pleased to turn over the leadership of our society to a fine team of officers. Bill Hill is a Charter member of CALS. There is no better choice for President than someone with his experience and dedication to our society. Boyd Poulsen will bring the enthusiasm of a new and committed member. He is determined to learn lichens and has attended most every workshop and field trip to do so and organized a great CALS field trip to Calaveras State Park this summer. Mikki McGee has been another longtime member of CALS. She has led many workshops and field trips over the years. Her consistent dedication will make her an ideal secretary. Stephen Buckhout has been one of those people behind the scenes, always there for support, and will make a welcome new treasurer. Cherie Bratt and Richard Doell will make an excellent team

to take over as CALS Bulletin Editors as Darrell Wright ends his term.

What can you do? Renew your membership in CALS, make a donation to the Student Grant fund, bring a friend to the next workshop or field trip, set up a lichen corner at your CNPS or mycological group meetings, make a lichen display for your child's classroom, volunteer to organize the next fungus fair. Your actions will determine our future.

In collecting lichens with my husband Ron, we often challenge ourselves to find a new lichen on the next rock outcrop, the next oak. We look with new eyes and are rewarded with surprises. Challenge yourself to do one thing new for CALS this year and be surprised by the rewards.

Judy Robertson



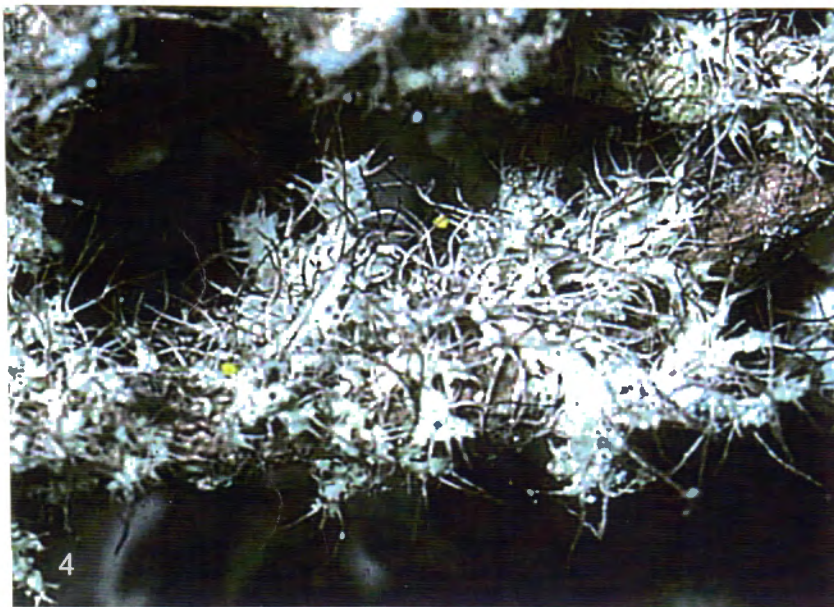
The Bulletin of the California Lichen Society

Vol. 8, No. 2

Winter, 2001

Contents

DNA Sequences Confirm that <i>Petroderma maculiforme</i> (Phaeophyceae) is the Brown Algal Phycobiont of the Marine Lichen <i>Verrucaria tavaresiae</i> (Verrucariales, Ascomycota) from Central California	Akira Peters and Richard Moe	41
San Francisco Watershed Lichens – A More Comprehensive List	Doris E. Baltzo	44
New and Interesting Records of Lichens from California	Judith and Ronald Robertson	56
New Reports or Divergences in Range for Lichens of California, Based on <i>Lichens of North America</i> by I. Brodo, S. D. Sharnoff, and S. Sharnoff, 2001	Shirley Tucker	59
Lichens Growing on an Automobile in Santa Barbara, California	Shirley Tucker	71
Report from the "Lichens and Air Quality" Conference, Arizona State University	Bill Hill	73
Notes and News		74
President's Message		80



**New and Interesting Records of Lichens
from California**

2. *Rimularia insularis* (on *Lecanora rupicola*), J. and R. Robertson 5118. 5 mm = _____
3. *Solenopsora crenata*, J. and R. Robertson 5686.
5 mm = _____
4. *Heterodermia namaquana*, J. and R. Robertson 5451.
1mm = _____
5. *Vermilacinia procera*, J. and R. Robertson 5247.
1 cm = _____

Collections made near Stinson Beach, Marin County. See the article by J. and R. Robertson in this issue.

**Bulletin of the California Lichen Society
Volume 8, No. 2, Winter, 2001**