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Contents

This issue of the Bulletin of the California Lichen Society (ISSN 1093-9148) was edited by John Villella (Editor-@californialichens.org) and was produced by Tom Carlberg (tcarlberg7@yahoo.com).

The Bulletin welcomes manuscripts on technical topics in lichenology relating to western North America and on conservation of lichens, as well as news of lichenologists and their activities. The best way to submit manuscripts is by e-mail attachments in the format of a major word processor (DOC or RTF preferred). Use italics for scientific names. Please submit figures in electronic formats with a resolution of 300 pixels per inch (600 minimum for line drawings). Email submissions are limited to 10MB per email, but large files may be split across several emails or other arrangements can be made. Contact the Interim Editor, Tom Carlberg, at tcarlberg7@yahoo.com, for details of submitting illustrations or other large files. A review process is followed. Nomenclature follows *A Cumulative Checklist for the Lichen-forming, Lichenicolous and Allied Fungi of the Continental United States and Canada,* Vers. 19 at http://www.ndsu.edu/pubweb/~esslinge/chcklst/chcklst7.htm. The editors may substitute abbreviations of authors names as appropriate from *The International Plant Names Index* - www.ipni.org/index.html. Style follows this issue. Electronic reprints in PDF format will be emailed to the lead author at no cost. Photographs are by the author(s) unless otherwise noted. ***The deadline for submitting material for the Summer 2015 CALS Bulletin is 1 April 2015.***

The California Lichen Society is online at: www.californialichens.org/ and has email discussions through ht-tp://tech.groups.yahoo.com/group/CaliforniaLichens/.

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Front cover: *Umbilicaria nodulospora* McCune, Di Meglio and Curtis at Lava Beds National Monument. Photograph by Steve Sheehy.

A Pleistocene relic in the San Bernardino Mountains: a new record of *Solorina spongiosa*

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During the Pleistocene, southern California was not an arid Mediterranean desert, but had summer and winter rains and fir trees growing at an elevation of two thousand feet. There were five glaciers in the San Bernardino Mountains. The Pacific Ocean was much lower and the north Channel Islands were a single island with dwarf mammoths. The Mojave was a savanna with perennial lakes where Native Americans fished and swam and giant sloths ate the fruit of Joshua Trees.

The glacial maximum covered the northern latitudes with ice and lichen species common now in Canada and Pacific Northwest moved south into California and Arizona. As the Pleistocene came to an end, the Pacific rose to its current level and summer rains disappeared. Fir trees moved up slope to above 6000 feet. The glaciers in the San Bernardino Mountains melted. Lichen species like *Bryoria fremontii*, for instance, "moved" over 400 miles north to San Luis Obispo County and the Sierra Nevada Mountains, its current southern limits. Lichens which needed higher relative annual humidity like *Bryoria fremontii* were extirpated in southern California and only small populations survived in favorable microhabitats during the Holocene. The last known population of *Bryoria fremontii* in the dry southern California Mountains was documented in 1904 by H.E. Hasse in the San Jacinto Mountains. It did not disappear because of air pollution. It was extirpated by the effects of climate change.

Solorina spongiosa (Ach.) Anzi, which we refuse to call by the clunky artificial name "fringed chocolate chip lichen" was probably common throughout California in the Pleistocene as it is in Canada now. With the vast change of climate in the late Pleistocene and the beginning of the Holocene, it was extirpated from most areas of California. It is currently known from Inyo County (where Jim Shevock first collected it and which Cheryl Beyer recently relocated) and six locations in Yosemite (Hutten et al. 2013). We expect more records from the Sierra Nevada Mountains, vast areas of which are unexplored for lichens.

The range of *Solorina spongiosa* is now extended in California to southern California with the discovery of a new population in the San Bernardino Mountains. A population of at least 15 "individuals" in the San Gorgonio Wilderness, approximately 3 air km ESE of San Gorgonio summit, occurs in a fen in an unnamed drainage that flows into the North Fork of the Whitewater River. This area is among the moistest habitats in the San Bernardino Mountains. The population is in a

wilderness area and is unthreatened except by possible catastrophic fire. This scattered distribution of *Solorina spongiosa* in California is typical of Pleistocene relics. Pleistocene relics throughout California are threatened by the long term effects of rapid human-caused climate change. The species is currently a CALS Lichen of Conservation Concern (for more information see http://www.rareplants.cnps.org/detail/3813.html and http://californialichens.org/Sponsorships/Solorina_spongiosa.pdf).

Specimen examined: CALIFORNIA. San Bernardino County, San Bernardino Mountains, San Bernardino National Forest, San Gorgonio Wilderness, conifer forest, growing among thin layers of moss or on soil in rock crevices in fen, 2598 m, August 25, 2014, *M. Crawford 1* (UCR).

Acknowledgment

The work of Kerry Knudsen was financially supported by the grant "Environmental aspects of sustainable development of society" 42900/1312/3166 from the Faculty of Environmental Sciences, Czech University of Life Sciences Prague.

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Unknown squamulose lichen on rock in Potter Valley, CA. Photograph by Tom Carberg

Scratching the surface of the lichen diversity at Lava Beds National Monument

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Lava Beds National Monument is located in northeastern California at the intersection of Siskiyou and Modoc counties and the Oregon border. It is made up of approximately thirty-two different types of basalt and andesite flows, along with some glacial deposits, rhyodacite tuff, lacustrine deposits, palagonite tuff deposits and talus (NRCS 2014). Rocks here range in age from four hundred fifty thousand years to a mere eleven hundred years (KellerLynn 2014). The park covers just less than seventy-three square miles. The lava flows make for a desolate looking landscape (Figure 1), but venturing into the flows, one is greeted with an overabundance of lava tube collapses, caves, stubborn plants and trees, mammals and birds, AND LICHENS.

Crustose lichens are the dominant form, *Umbilicaria hyperborea* is probably the next most common. You can hardly step onto a piece of lava that you're not crunching *U. hyperborea*. *Umbilicaria phaea* is common and a few of the red *coccinea* variety (Figure 2) have been found, this is close to the eastern extent of its known range.

Figure 1. Ross Chimneys.

Figure 2. *Umbilicaria phaea* var. *coccinea*.

Umbilicaria nodulospora McCune, Di Meglio and Curtis (Figures 3 & 4), a new species (McCune et al. 2014), was discovered here in two thousand twelve, which I personally have not found on rock less than thirty-six thousand years of age. Most of the junipers, especially the ones growing in the flows, are covered in *Letharia columbiana. Letharia vulpina* grows on trees, bushes, and rocks. In the Callahan Lava Flow, which is only eleven hundred years old, there are almost no trees or shrubs, yet *Letharia vulpina* abounds (Figure 5).

The shaded sides of tube collapses offer a smorgasbord of lichen species. It seems every foot you move down and across the tube the lichens change. Sometimes you look at a black rock only to find it is actually red; so covered in dark crustose lichens, it only appears black. The three biggest craters in the park are: Mammoth, three hundred thirty feet deep and nearly a quarter mile across; the no name crater north of Mammoth, at just over a tenth mile across and one hundred twenty five feet deep; and Modoc Crater at one tenth of a mile across and one hundred seventeen feet deep. These craters have interesting microclimates that influence the lichen species found in them. A large crack that runs north and south on the eastern edge of the monument, brings its own microclimate into play, including a thallus of the normally epiphytic *Evernia prunastri*, growing on a west wall, about ten feet down.

In January of two thousand twelve, when we initiated our lichen survey of the Lava Beds National Monument (Figure 6), the NPLichen database showed occurrence records for only nineteen species in thirteen genera, at the Lava Beds (NPS 2012). At the time of writing this article, we have identified one hundred thirteen

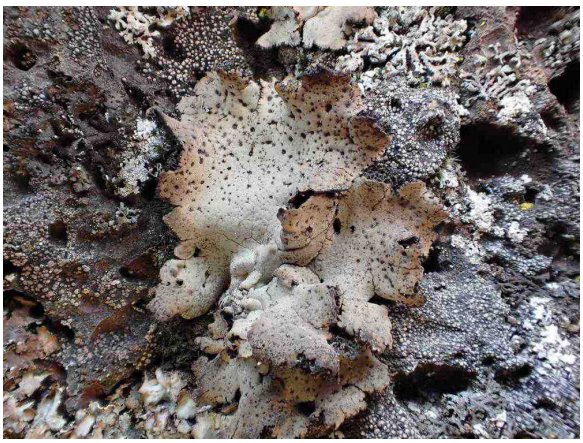

Figure 3. *Umbilicaria nodulospora*.

Figure 4. *Umbilicaria nodulospora* rhizines.

Figure 5. *Letharia vulpina* on rock.

species in fifty-four genera, with one new to science species, *Umbilicaria nodulospora* (Table 1). Names in the list follow Esslinger (2014).

All the collected specimens are housed at the headquarters, in either envelopes for fruticose or foliose lichens and boxes for soil crusts and crustose specimens on rocks. While *Lecanora* seems to be the most collected genus with ten species, *Umbilicaria* is a close second, with nine. Despite much searching, no *Usnea* has yet been found in the Lava Beds. *Peltigera* needs more research. *Peltigera ponojensis* should be present also. Despite nearly two years of "lichenizing", with the terrain and sheer number of lichens to inspect and collect, less than two of the seventy-three square miles of the park have been searched. The two thousand fourteen permits expire at the end of December and hopefully, the park and my body willing, this study will be ongoing for years to come.

Preliminary list of the lichens of Lava Beds National Monument

Acarospora badiofusca (Nyl.) Th. Fr.
Acarospora schleicheri (Ach.) A. Massal.
Ahtiana sphaerosporella (Müll. Arg.)
Alectoria sarmentosa (Ach.) Ach.
Aspicilia cinerea (L.) Körber
Aspicilia pacifica Owe-Larsson & A. Nordin
Bryoria pseudofuscescens (Gyelnik) Brodo & D. Hawksw.
Buellia badia (Fr.) A. Massal.
Caloplaca epithallina Lynge
Caloplaca saxicola (Hoffm.) Nordin
Candelariella efflorescens R. C. Harris & W. R. Buck
Candelariella rosulans (Müll. Arg.) Zahlbr.
Carbonea vitellinaria (Nyl.) Hertel
Chrysothrix chlorina (Ach.) J. R. Laundon
Cladonia chlorophaea (Flörke ex Sommerf.) Sprengel
Cladonia coniocraea (Flörke) Sprengel
Cladonia fimbriata (L.) Fr.
Cladonia gracilis (L.) Willd.
Cladonia pocillum (Ach.) O. J. Rich.
Cladonia pyxidata (L.) Hoffm.
Cladonia verruculosa (Vainio) Ahti
Dermatocarpon bachmannii Anders
Dermatocarpon reticulatum H. Magn.
Diploschistes muscorum (Scop.) R. Sant.
Diploschistes scruposus (Schreber) Norman
Evernia prunastri (L.) Ach.
Flavoplaca citrina (Hoffm.) Arup, Frödén & Søchting
Hypogymnia imshaugii Krog
Kaernefeltia merrillii (Du Rietz) Thell & Goward
Lecanora albellula Nyl.
Lecanora bicincta Ramond
Lecanora laxa (Śliwa & Wetmore) Printzen
Lecanora muralis (Schreber) Rabenh.
Lecanora persimilis (Th. Fr.) Nyl.
Lecanora phaedrophthalma Poelt
Lecanora polytropa (Ehrh. ex Hoffm.) Rabenh.
Lecanora reagens Norman
Lecanora rupicola (L.) Zahlbr.
Lecanora swartzii (Ach.) Ach.
Lecidea atrobrunnea (Ramond ex Lam. & DC.) Schaerer
Lecidea confluens (Weber) Ach.
Lecidea lapicida (Ach.) Ach.
Lecidea tessellata Flörke

Lepraria neglecta (Nyl.) Erichsen
Lepraria subalbicans (I. M. Lamb) Lendemer & Hodkinson
Lepraria vouauxii (Hue) R. C. Harris
Letharia columbiana (Nutt.) J. W. Thomson
Letharia vulpina (L.) Hue
Melanelixia subaurifera (Nyl.) O. Blanco et al.
Melanohalea elegantula (Zahlbr.) O. Blanco et al.
Melanohalea exasperatula (Nyl.) O. Blanco et al.
Melanohalea multispora (A. Schneider) O. Blanco et al.
Melanohalea subolivacea (Nyl.) O. Blanco et al.
Miriquidica garovaglii (Schaerer) Hertel & Rambold
Montanelia disjuncta (Erichsen) Divakar, A. Crespo, Wedin & Essl.
Montanelia panniformis (Nyl.) Divakar, A. Crespo, Wedin & Essl.
Montanelia sorediata (Ach.) Divakar, A. Crespo, Wedin & Essl.
Nodobryoria abbreviata (Müll. Arg.) Common & Brodo
Nodobryoria oregana (Tuck.) Common & Brodo
Ophioparma ventosa (L.) Norman
Parmelia saxatilis (L.) Ach.
Parmelia sulcata Taylor
Parmeliopsis ambigua (Wulfen) Nyl.
Parvoplaca tiroliensis (Zahlbr.) Arup, Søchting & Frödén
Peltigera canina (L.) Willd.
Physcia biziana (A. Massal.) Zahlbr.
Physcia caesia (Hoffm.)
Physconia enteroxantha (Nyl.) Poelt
Physconia isidiigera (Zahlbr.) Essl.
Physconia muscigena (Ach.) Poelt
Physconia perisidiosa (Erichsen) Moberg
Placynthiella uliginosa (Schrader) Coppins & P. James
Platismatia glauca (L.) W. L. Culb.. & C. F. Culb.
Pleopsidium flavum (Bellardi) Körber
Polycauliona candelaria (L.) Frödén, Arup, & Søchting
Polychidium muscicola (Sw.) Gray
Protoparmelia badia (Hoffm.) Hafellner
Pseudephebe pubescens (L.) M. Choisy
Psora cerebriformis W. A. Weber
Psora globifera (Ach.) A. Massal.
Psora nipponica (Zahlbr.) Gotth. Schneider
Psora tuckermanii R. A. Anderson ex Timdal
Rhizocarpon disporum (Nägeli ex Hepp) Müll. Arg.
Rhizocarpon eupetraeum (Nyl.) Arnold
Rhizocarpon geographicum (L.) DC.
Rhizocarpon grande (Flörke ex Flotow) Arnold
Rhizoplaca chrysoleuca (Sm.) Zopf
Rinodina bolanderi H. Magn.
Scytinium lichenoides (L.) Otálora, P. M. Jørg. & Wedin
Staurothele areolata (Ach.) Lettau
Toninia ruginosa (Tuck.) Herre
Trapeliopsis glaucopholis (Nyl. ex Hasse) Printzen & McCune
Trapeliopsis granulosa (Hoffm.) Lumbsch
Trapeliopsis steppica McCune & Camacho
Tuckermannopsis chlorophylla (Willd.) Hale
Umbilicaria americana Poelt & T. H. Nash
Umbilicaria hyperborea (Ach.) Hoffm.
Umbilicaria nodulospora McCune, Di Meglio and Curtis
Umbilicaria phaea Tuck.
Umbilicaria phaea var. ***coccinea*** Llano
Umbilicaria polaris (Schol.) Zahlbr.
Umbilicaria polyphylla (L.) Baumg.
Umbilicaria torrefacta (Lightf.) Schrader
Umbilicaria vellea (L.) Ach.
Vahliella leucophaea (Vahl) P. M. Jørg.
Xanthomendoza fulva (Hoffm.) Søchting, Kärnefelt & S. Y. Kondr.
Xanthomendoza mendozae (Räsänen) S. Y. Kondr. & Kärnefelt
Xanthoparmelia coloradoënsis (Gyelnik) Hale
Xanthoparmelia conspersa (Ehrh. ex Ach.) Hale
Xanthoparmelia cumberlandia (Gyelnik) Hale
Xanthoparmelia plittii (Gyelnk) Hale
Xanthoparmelia verruculifera (Nyl.) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch
Xanthoria elegans (Link) S. Y. Kondr. & Kärnefelt

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NRCS web soil survey. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx Accessed on 09/15/2014.

Figure 6. Team Lichen. From the left are Ranger Katrina, Ranger Megan, Ranger Jesse, Steve, and Ranger Amy.

Island tree mallows and lichens

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The eight Channel Islands off the coast of southern California are rich in biodiversity. Over one third of the lichen species reported for California occur on the Channel Islands, including eight species endemic to the islands as well as many species only known in California from the islands (Knudsen & Kocourková 2012; Tucker 2014.) We are still discovering new species of lichens on the islands. They are rich in endemic plant and animal species too (for overview see Schoenherr et al. 1999). They are truly the Galapagos of California.

All of the islands were devastated by the introduction of non-native herbivores – sheep, goats, pigs, and cattle as well as game animals like deer and elk. These feral grazers almost wiped out many shrubs and trees as well as smaller plants and grasses. Introduced non-native grasses and weeds like thistles, fennel, and horehound went viral, replacing native grasslands and invading eroded land denuded of coastal sage shrubs, maritime chaparral, oaks

Restoration site on San Clemente Island. Island mallow in center of picture suppressing growth of non-native vegetation. Photograph by Emily Howe.

and ironwoods. After decades of overgrazing, extensive eradication programs have removed non-native herbivores from all of the islands except Santa Catalina. The native vegetation and the many organisms that rely on it are recovering with the help of restoration projects and invasive plant eradication programs.

On all the islands lichens survived the feral grazers on rocks. But lichens on plants and soil were heavily impacted by grazing, erosion, and invasive plants, losing hundreds of square miles of available substrate. Many bark-loving lichens are known from just a few collections. Soil crusts were destroyed by trampling. Lichens on wood were also heavily impacted by the use of wood for fuel and can only be found now on the decaying fence posts of the old ranches (Knudsen 2014).

Lichens that grow on the bark of native vegetation like maritime chaparral and coastal sage shrubs as well as native trees generally do not grow on introduced trees and cannot grow on non-woody plants. The restoration of the native shrubs and trees on the islands is also the restoration of native lichen communities. On San Clemente Island, we saw an excellent example of the recovery of lichens on a decade old plot of island tree mallows.

Island tree mallow, *Malva assurgentiflora* (until recently *Lavatera assurgentiflora*), is a soft woody shrub with large green leaves and beautiful purplish flowers. It is a popular native ornamental well-adapted to coastal gardens. But the island tree mallow barely survived the feral grazers. On San Clemente Island forests of island tree mallow covered the stabilized dunes and marine terraces on the northwest end of the island based on early reports (Schoenherr et al. 1999). Now most of the area is covered with non-native grasses, and only three natural occurrences of the once extensive forest remain. San Clemente Island is administered by the Navy and is not open to the public. The Navy is actively engaged in the protection and restoration of the native flora and fauna. The story of the island tree mallow is an example of the success of their ecological programs.

On a cool overcast April morning we drove out to the north end of San Clemente Island to see one of the last relic stands of island tree mallow. Against a slope were about a dozen island tree mallows. It is a relatively short-lived shrub and several plants had died, their leafless branches collapsing and covered by lichens. We collected samples of dead branches festooned with lichens. It was sad to reflect that this was all that remained of the once extensive mallow forests that covered the northwest end of the island. Thankfully seeds from these plants are regularly collected for revegetating the island, and fifteen of the nearly 30 restoration sites established over the last 14 years have included Island tree mallow plantings. Many of these restoration sites have many large island tree mallows which are producing new plants and new populations across the island.

Island mallow in summer during drought of 2014, naturally semi-deciduous during dry periods
Photograph by Emily Howe.

Based on these old branches, the island tree mallow was covered with *Caloplaca stipitata* Wetmore and *Niebla ceruchis* (Ach.) Rundel & Bowler. *Lecanora horiza* Ach., which is common on Santa Barbara Island on the soft wood of the giant island Coreopsis, was probably also a dominant, though now it is rare

on the island. Blanche Trask collected *Xanthoria parietina* (L.) Th. Fr. in 1903 on island tree mallow (ASU). It is not currently known from the island and rare in coastal southern California (though common in Europe and parts of North America). It was probably a dominant too. There may have occurred other dominants on island tree mallow like *Candelaria pacifica* Westb. & Arup, common on the coast on coastal sage shrubs and chaparral, but never collected on San Clemente Island.

In undisturbed habitats, on the bark of the native plants, the dominant lichen species usually cover most of the plant, but are associated with a diverse group of usually rare or infrequent crustose species as well as non-lichenized *Arthonia*. A forest of island tree mallow possibly supported 20 or more crustose

Lichens growing on smooth stems of island mallow. Photograph by Emily Howe.

species. Some of these species may even be extinct, like *Bacidia jacobi* (Tuck.) Hasse, known from a single collection from San Diego maritime chaparral and collected by Palmer in the 19th century. On the dead branches we collected there was some evidence of crusts but nothing fertile or identifiable.

After looking at the small stand of remaining island tree mallow, we drove to a restoration site. Island tree mallows were planted ten years ago on the weed-infested

Lichens growing on branch of island mallow. Photograph by Emily Howe.

stabilized dunes with several other native shrubs. They had been watered just the first year to get established. Several mallows had died in the ten years, but about 30 plants were doing fine and some were at least 4 feet high. Dead or alive, in just ten years they were clothed with lichens: *Caloplaca stipitata* with its blue hypothallus, young *Niebla*, and areas of crustose thalli. Lichens had rapidly colonized the new substrate.

Once the island tree mallow and the other planted native shrubs were established at the restoration site, they overshadowed and squeezed out the non-native grasses and weeds.

Typical lichen growth on island mallow with abundant growth of *Caloplaca stipitata.* Photograph by Emily Howe.

Dozens of seedlings from the planted shrubs were coming up all around the site. It is possible that someday San Clemente Island will have island tree mallow forests again.

As we drove across the northwest end of the island we noted how much of it is covered with dead grasses. It was a dry year. Amid the sea of dry, brown, non-native grasses, the island tree mallow and other native plants at the restoration site remained green, and some of the plants were still flowering. Animals that are mostly absent from the non-native grasslands, such as Allen's hummingbirds and the federally threatened San Clemente sage sparrows, find plentiful forage and cover in this restored area. The native species and habitats have significantly recovered since the Navy removed the feral grazers in 1991. With time and sound management from the Navy, the native habitats and species will continue to expand. The island tree mallow will continue its remarkable recovery, and its distinctive smell will fill the air with its rich odor.

And there would be lichens everywhere on the Galapagos of California.

Acknowledgments

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Damp *Peltigera collina* on moss on rock in Potter Valley, CA. Photograph by Tom Carlberg.

Lichen numbers from California counties

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The online Consortium of North American Lichen Herbaria (CNALH) at http://lichenportal.org has multiple uses for lichenologists. This database began at Arizona State University (ASU) under the direction of Dr. Tom Nash. The Santa Barbara Botanic Garden lichen herbarium (SBBG) was the second to be included. As the database grew exponentially, it was eventually taken over as the Consortium, now based at the University of Wisconsin, Madison (WIS). The number of reporting institutions is currently 58, including many of the major university herbaria and botanic garden herbaria. The holdings at ASU include large numbers of lichens from California, as the result of Tom Nash, Bruce Ryan, and their colleagues at ASU collecting extensively in California. Data from the University of California at Berkeley (UC) has recently been added, providing a huge increase in available knowledge of California lichen collections. The University of California, Riverside lichen herbarium (UCR), with about 15,000 lichen collections, is databased separately, at http://www.herbarium.ucr.edu. The lichen information from UCR is not included in Table 1.

The CNALH database currently includes 78,685 lichen collections from California. Note that this number is not synonymous with number of species. The California lichen flora at present includes 1,869 species based on data in the newest revision of the California lichen catalogue (http://ucjeps.berkeley.edu/constancea/85/index.html).

Table 1 gives the number of California lichen collections from three herbaria with large holdings of California material: Santa Barbara Botanic Garden (SBBG), Arizona State University (ASU), and University of California, Berkeley (UC). In the fourth column is lichen numbers for 25 counties in articles by Carlberg & Doell (2008) and in Madera Co. (Tucker 2013). The figures in Table 1 do not show the number of species for each of the 58 counties. That information would require considerably more work to assemble. Also, other out-of-state herbaria contain California collections, and are responsible for the difference between each total and the numbers from the three herbaria in the Table.

The total number of collections from southern California would be considerably greater than the figures in the Table, if comparable numbers from UCR (Riverside; K. Knudsen's collections) were available for all counties. Some totals from UCR include Los Angeles Co.: 823; Orange Co.: 722; Riverside Co.: 2835; San Diego: 1038; Santa Barbara: 1812; Ventura Co.: 779. The California Academy of Sciences in San Francisco also has a lichen collection, although it has not yet been databased. It includes over 15,500 specimens, with at least 200 (and probably many more) of those from California (personal communication, J. Shevock).

The highest numbers of collections cluster around areas of active collectors, past and present: the Bay Area (Marin, Contra Costa, Alameda, to San Mateo, Santa Cruz, & Monterey counties), Santa Barbara & Ventura County (including the Channel Islands), and the

County	Total Records	SBBG	ASU	UC	Articles
Alameda	416	2	8	304	31
Alpine	653	28	66	450	
Amador	551	51	45	319	
Butte	253	101	43	35	
Calavares	256	22	4	179	
Colusa	67	29	2	10	
Contra Costa	1549	6	32	1438	92
Del Norte	551	70	87	94	
EL Dorodo	824	225	377	90	59
Fresno	283	11	100	56	
Glenn	180	63	1	73	
Humboldt	1271	97	74	516	
Imperial	24	17	10	0	
Inyo	1052	39	675	152	74
Kern	821	240	322	106	
Kings	1	0	0	1	
Lake	737	260	84	294	100
Lassen	81	15	4	32	18
Los Angeles	7448	1480	3161	564	124
Madera	680	126	402	18	13
Marin	3228	191	162	2251	250
Mariposa	470	21	31	100	10
Mendocino	1878	234	384	679	170
Merced	110	7	78	10	
Modoc	448	10	4	368	25
Mono	907	171	159	503	
Monterey	2691	951	719	334	95
Napa	402	60	11	250	65
Nevada	132	14	3	80	

County	Total Records	SBBG	ASU	UC	Articles
Orange	321	20	105	17	
Placer	68	1	3	47	
Plumas	395	190	56	61	
Riverside	2177	104	677	56	
Sacramento	165	2	2	131	
San Benito	928	506	113	146	180
San Bernadino	1313	227	492	281	38
San Diego	2175	380	903	223	60
San Francisco	295	9	53	109	
San Joaquin	41	1	1	27	
San Luis Obispo	3291	2070	501	133	92
San Mateo	1479	207	165	412	210
Santa Barbara	14706	7793	4620	380	21
Santa Clara	477	14	58	106	13
Santa Cruz	911	219	53	243	156
Shasta	525	24	178	172	24
Sierra	400	51	12	290	
Siskiyou	1505	55	765	475	
Solano	369	78	9	195	
Sonoma	1812	159	59	1329	93
Stanislaus	34	4	9	15	
Sutter	308	7	5	289	97
Tehama	101	9	28	26	
Trinity	182	29	8	63	
Tulare	2222	290	305	19	
Tuolumne	1133	127	561	153	
Ventura	3059	1455	983	162	
Yolo	114	13	5	60	
Yuba	126	62	1	21	

greater Los Angeles area (including Los Angeles, Riverside, San Bernardino, Orange, & San Diego counties). Even for these areas there are puzzling questions. For example, San Francisco County has a total of 295 collections, but only 171 of these in the three herbaria in the Table. Is urbanization the reason that lichens in this county have been so little collected? Many SF collections are old: (M. A. Howe (1892), H. Bolander at Mission Dolores, or "coastal rocks" (1862), Herre (1906), or from almost inaccessible locations (H. Thiers, Farallon Islands), plus more recent collections by collectors including L. Bonar, D. Baltzo, S. Hammer, and N. Hillyard, at Land's End, Fort Point, Point Lobos, Fort Funston, San Bruno Mountain, Golden Gate Park, and the Presidio. I suspect that many more collections from San Francisco County are to be found at institutions in San Francisco with lichen collections not yet databased, such as California Academy of Sciences (CAS) and San Francisco State University (HDT).

Carlberg and Doell (2008) compiled numbers of lichen species reported in the *Bulletin of the California Lichen Society* for 25 California counties, and these are shown in the last column of the Table. An article by Tucker (2013) listed the lichen species collected by Bruce Ryan in Madera County at the southern end of the Sierra Nevada, a significant area but neglected by collectors. Ryan collected 172 species; Arizona State University where Ryan's collections are deposited lists 402 Ryan collections from Madera Co., but this number of course includes multiple collections of some species.

The table reveals other counties that have been neglected or overlooked by lichen collectors, especially in the central valley where agriculture dominates: Imperial (24), Kings (1), San Joaquin (41), and Stanislaus (34). Sacramento County would have been in this list neglected by collectors, except for Judy and Ron Robertson, who collected 111 lichen species at Deer Creek Hills Preserve; these are deposited as 131 collections at UC, part of the 165 total for Sacramento county. The totals for Sutter and Modoc counties were also hugely increased due to field trips to these counties encouraged and participated in by the Robertsons.

What can we learn from the CNALH database? One can limit a search for a species to a geographic region (country, state, county, or specific place), by collector, or by herbarium.

I'll give three examples. In 2000, Judy and Ron Robertson identified a collection (#4390) from Mt. Tamalpais, Marin County, as *Physcia erumpens* Moberg, a species not in any American keys or publications up to that time. T. Esslinger has verified the identification, and the name is now accepted in the California catalogue (Tucker, 2014). R. Moberg in Sweden described the species in 1986. It has been re-collected in California several times, is represented by 23 collections in CNALH, and is now known from a few locations in Monterey, Santa Cruz, and San Mateo counties. The database shows that an earlier collection of *P. erumpens* by C. C. Kingman in "Santa Rogue Canyon", Santa Ynez Mts., Santa Barbara Co. in 1910; the database also shows that the identification was made by T. Esslinger in 2010. From CNALH one can find out that *P. erumpens* also occurs in Arizona, Texas, and Mexico so the California collections represent a range extension but not an unreasonable one.

A second example is a collection by H. Bolander from the Geysers, Sonoma County from about 1860 (Harvard herb.) that George Llano (1950) described as *Lasallia pensylvanica* (Hoffm.) Llano. The genus *Lasallia* is distinguished from *Umbilicaria* by having a pustulate thallus; no other reports of any *Lasallia* are known from California. CNALH lists no such collection but does list four Bolander collections under *Umbilicaria*. Two are from Bear Valley (probably Mariposa Co.; Fremont named it in 1848), the third collection from the entrance to Yosemite Valley, and the fourth, Bolander 410, has no location listed. Bruce McCune identified *Bolander 410* as

Umbilicaria semitensis Tuck., so it is likely that this is the collection that Llano thought was *Lasallia pennsylvanica*. CNALH lists sixteen Bolander collections of various species of *Umbilicaria*, but the location data do not fit any except *Bolander 410* by default. On this basis, we probably can omit *Lasallia pensylvanica* from the California checklist.

A third example of the usefulness of CNALH data is *Rhizocarpon alpicola* (Wahlenb.) Rabenh., based on an I. A. Lapham collection from Sierra Nevada at 7,000 ft. elev., 1 April, 1870. This species is more common in Scandinavia & Russia. CNALH has no reports of the species in North American herbaria. The only Lapham collection from the Sierra Nevada in CNALH is one from Alpine Co., 1 Apr. 1870, identified as *Rhizocarpon. riparium* by J. Lendemer. So the report of *R. alpicola* for California is probably a misidentification.

Not all lichen problems are resolved, even with the abundant information in CNALH. For example, Dr. T. Elliot Weier, a botany professor at University of California Davis, devoted his retirement years (around 1970-1982) to collecting crustose lichens from the Sierra Nevada. His specimens are models of the ideal specimen – he used rock-cutting equipment to shape each collection. He died in 1991, and his numerous collections (approximately 1200 from California) are deposited in the UC herbarium. For most determinations there is no problem, but he identified a few with names that are otherwise European or very rare in the U.S., such as *Aspicilia rolleana* Hue, *Discothecium gemmiferum (*Tayl.) Vouaux, *Porpidia flavocaerulescens* (Hornem.) Hertel & A. J. Schwab (= *P. flavicunda*,), *Protoparmelia montagnei* (Fr.) Poelt & Nimis, & *Rinodina teichophila* (Nyl.) Arn. These each represent the only reports from California. Where did Dr. Weier get these names? He might have used European floras, or sent material to European lichenologists for identification, or followed W. Weber's usage for Colorado material in some cases. Resolving these records by Professor Weier will require sending these specimens to experts for each genus.

Finally, there is a caveat in using CNALH. Species determinations are those of either the collector or someone else who examined the specimen later. CNALH provides the name of the determiner if it is someone other than the collector. It is preferable if the collector was known to be experienced or if an expert examined the specimen. But even a collection by a novice may turn up something new to an area, so unusual reports in CNALH may indicate a specimen needing to be examined first-hand for verification or re-determination.

CNALH data will help by indicating if the species has been previously collected in the area, how often, and whether by reputable collectors. Another caveat is that many species names in CNALH records are out-of-date synonyms. The California catalog of lichens (Tucker 2014) lists all synonyms (and their equivalents) that have been reported from California.

Finally, the records in CNALH can stimulate further collecting, in showing rarities to be sought in a region, or showing areas that have been inadequately collected. With some work, species lists by county can be obtained which will show gaps – species that are probably present but have never been collected there.

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Book Review: A Field Guide to California Lichens, by Stephen Sharnoff

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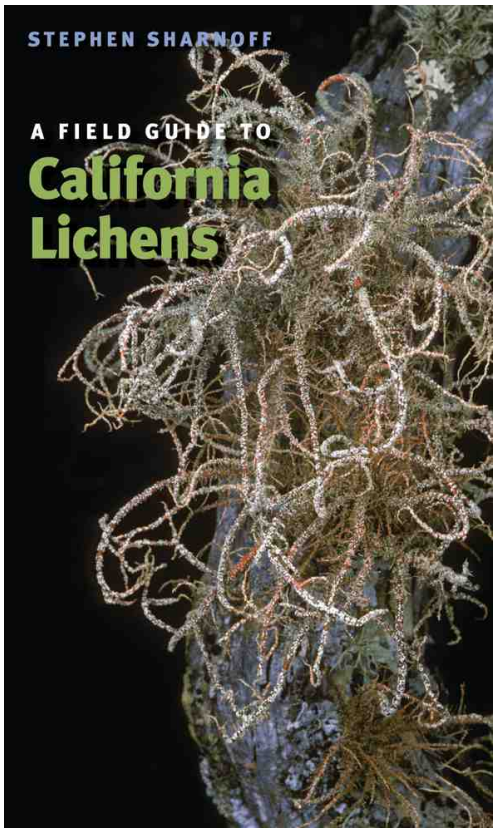
A Field Guide to California Lichens, by Stephen Sharnoff
ISBN 978-0-300-19500-2
Paper - Flexibound: Alk. paper US $32.50 405 pp.
Yale University Press, New Haven. 2014.

Lichenologists in California are thrilled at last to have in hand the new lichen field guide by Stephen Sharnoff. Previously they have had to use a combination of references for identification: books covering either the entire country (Brodo et al., 2001; Hale, 1969), the northwest coast (McCune & Geiser 2012), or southern California (Nash et al. 2002, 2004, 2007). The previous California lichen guide by Hale and Cole (1988) is completely out of date. Sharnoff's new guide combines superb color photographs with concise descriptions, and is a handy size (9.25 x 5.5 inches) to take in the field. It describes and/or pictures 707 species of lichens with about 500 color photographs.

The species covered are mostly macrolichens that can be identified with a hand lens in the field, but also includes a sizeable complement of crustose species. Arrangement is by form into foliose, fruticose, and crustose groups, and then alphabetical by genus in each of these categories. Within each genus the most common species are described and pictured, with additional information for each on chemistry, substrates, spore details, and frequency and geographic distribution in California. Comparisons are made with similar-appearing species. Colors in the photographs are true; for example the distinction is evident between two varieties of the common *Caloplaca luteominia*: rose-colored apothecia in var. *bolanderi* vs. bright orange ones in var. *luteominia* (p. 244). Photographs were taken in California where possible, but the location is given for each illustration.



Common names are provided; these are not

actually in common use among lichenologists, but they may aid the amateur with such striking names as Blister lichen, Firedot, and Fogfingers.

The Latin names in the book are up to date, and Sharnoff shows familiarity with the most current lichen literature. In the Introduction, he discusses the difficulties of lichen identification, particularly for crustose species. Although many of those in the book can be identified simply by comparison with a photograph, for others a compound microscope to see ascocarp and ascospore structure may be necessary even to determine genus.

Two years ago Kerry Knudsen previewed the Sharnoff lichen book (Knudsen, 2012) while it was still in preparation. Kerry had tales to tell of helping Steve search for certain rare species to photograph, and of how Steve determined which species to include in the book. The importance of vouchers for each photograph was emphasized; those taken with Kerry are at the UC-Riverside herbarium; most others are at the Canadian Museum of Nature. If there is any question of the validity of identification, the original specimen can be borrowed and studied.

Sharnoff tackles some difficult genera such as *Caloplaca* (35 species described and/or pictured), *Lecanora* (28 species), and *Usnea* (22 species). Color photographs of many of these are often the easiest way to identify some crustose forms. Inclusion of common but difficult crustose genera on rock will be especially helpful; examples are six species of *Acarospora*, seven of *Aspicilia*, and seven of *Buellia.* The 28 species of *Lecanora* pictured and/or described are especially useful. Species determination in *Lecanora* ordinarily requires detailed study of ascocarp sections, type and location of polarizing crystals, and spore measurements, but the color photographs herein will immediately cut the number of possibilities. Amateur collectors often do not collect crusts, particularly on rock, which are difficult to remove and to identify. The *Aspicilia* species pictured will be especially instructive to collectors, as this genus is very common, but is rarely included in picture guides. A few species of crustose genera such as *Buellia* and *Lecidea* are included, but the descriptions make it clear that identification to their species is likely beyond the intent of this book.

The author shows some remarkable images; for instance, he compares *Dendrographa leucophaea*, a coastal fruticose lichen, in the unparasitized form with the same species parasitized by a lichenicole, *Trimmatothele dendrographae,* which changes its morphology dramatically (p. 174). He mentions some rarities to be sought, such as *Calicium sequoiae*, a species on redwood that has only recently been reported in California. He points out the erratic nature of distribution of some lichens – abundant in one locality but rare or absent generally in the state. He gives an example of *Ahtiana pallidula* abundant in Butterfly Valley, Plumas County (where I also collected it many years ago). I know of a similar example in *Coenogonium luteum* (formerly *Dimerella lutea*). My California collections of this species, with its tiny orange apothecia and velvety green crust, were limited to small colonies in Mendocino and Monterey Counties. Then on a CALS field trip to the campus of the University of California at Santa Cruz, we encountered a whole monoculture of it in a patch of madrone trees. The *Coenogonium* was by far the most abundant lichen present.

Deficiencies are few: there are no scale bars on the photographs, but the text gives dimensions that are helpful. There are no authorities for Latin names. The labels on the photographs can be misleading because the genus name is abbreviated. For instance, the description of *Protoparmelia badia* is followed by the photograph of *P. crustulata* (actually a *Porpidia*).

Readers should pay particular attention to Appendix 2, which lists new names for some familiar lichens better known by "old" synonyms. The old names are not in the index,

so it may be mystifying to locate some familiar species that are now under new names. For example, *Cladonia cervicornis* subsp. *verticillata* is a common species, but is now *Cladonia concinna*. Some common *Fuscopannaria* species are now under the new genus *Vahliella*.

This new lichen guide belongs on the shelf of everyone interested in California biology. It makes it possible to identify easily most of the common lichens, and some of the more difficult ones. The price is modest, and the book's small size fits it in a pocket or backpack.

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From left to right: *Ramalina pollinaria* (from Mt. Burdell), *R. leptocarpha,* and *R. canariensis* (from Marin Headlands). *R. pollinaria* is commonly reported from northern & southern CA; *R. leptocarpha* reaches its northern extent in central CA, and *R. canariensis* is common in southern CA and Baja California. Photographs by Tom Carlberg and Sarah Minnick.

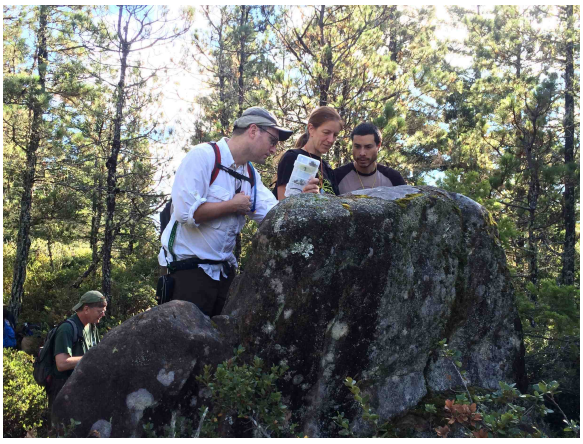
News and Notes

Demystifying the lichens of David Arora's Property

David Aurora "demystified" mushrooms for many in his well-known books *Mushrooms Demystified* and *All that the Rain Promises and More*..., but he's still learning about lichens. At his home on over 100 acres of coastal woodland overlooking the Pacific Ocean near Gualala, CA, David probably knows exactly which mushrooms will pop up and where. However, the lichens – each species characterized by its own unique fungus – are much more of a mystery. Or at least they were until the California Lichen Society stopped by for a visit.

On the weekend of October 18-19, 2014, a few fans of lichens and mushrooms came together to explore, collect, and identify the lichens of David Aurora's property. We gathered at David's home, known as Casa Madera, around lunch time on Saturday. After some food and a round of tea, we went off lichen exploring. As a side note, tea is a central theme in David's life—it was hard to tell which he likes more, tea or mushrooms.

The lichen walk took us through several habitats including mixed hardwood-conifer forest with an understory of evergreen huckleberry, a stand of shore pine and maritime chaparral on nutrient-poor podzol soil, a couple of interesting sandstone outcrops within the chapparal, an old apple orchard, and a stately coast live oak and redwood tree at the edge of the meadow near the house.



Miko Nadel, Rikke Næsborg, and Cameron Williams lichenize a sandstone outcrop in the shore pine/maritime chaparral community.

We also examined fences and the sides of buildings – both the out-sides and the in-sides. You might wonder what a lichen enthusiast is doing looking at the inside of a building. Well, for one, we all needed to sleep somewhere, and just as a mycobiont houses a photobiont, David kindly offered to put us up for the night in one of the many nooks and crannies on his property. So we toured the forest trails, simultaneously inventorying lichens and sleeping spots in the various outbuildings.

The second reason a lichenologist might look at the inside of David Aurora's walls is for lichens – what else?! It is true that lichens are seldom found on interior walls, but you could hardly call David's walls normal. They are adorned with treasured teas and tea pots, mason jars of mushrooms, and an array of interesting articles from around the world. And in some places, wall décor in the form of lichens came with the wood paneling.

David carefully selected salvaged boards with lichens and used them to build the pool hall and bath house. These "lichen boards" were so hard to come by that David once considered trying to farm them on his property. "I wanted to maxify my lichenage," he said with a sly smile. I can imagine a crop of boards, dotting the meadow, neatly arranged into rows with each board propped at the ideal slope and aspect for lichen growth. But for now, the meadow is empty of lichen boards.

Knowing full well what is expected when you get into a symbiosis with a fungal partner who puts a roof over your head, this group of

From the tub, Shelly Benson examines lichens on the bathhouse wall: *Evernia prunastri, Chrysothrix xanthina, Flavoparmelia caperata*, and several crustose species.

Lichen identification session (note the tea pouring station in the lower left corner of the photo). Pictured from left to right: Loriel Caverly, Lish Hoyt, Tom Carlberg, Cameron Williams, and Miko Nadel.

visitors came prepared to work and produce some food! Some serious lichen identification commenced at the kitchen table (and there was more tea, of course). Meanwhile, a small group of mushroom hunters went off in search of tasty treats in the nearby woods.

By dinner time, we had a list of lichens, specimens observed on the property or tucked away in packets for David's perusing pleasure, and a few freshly-picked edible mushrooms. The feast was a potluck of fine foods, handmade artisanal wine, and mushrooms à la David Arora. We dined on coccora (*Amanita calyptrata*) and porcini (*Boletus edulis*). Then, for breakfast, we broke out the fly agaric (*Amanita muscaria*). [Note: This mushroom is toxic if eaten raw and requires boiling in several changes of water to leach out the toxins before cooking and eating]. About half of the group declined to taste the *A. muscaria* but the adventurous foodies present reported that it was tasty and they'd likely only eat it again if David was the chef.

Enthusiasm around fungi may seem a bit mushroom-centric, but about 20% of fungi are lichenized. A true connoisseur like David Arora can appreciate the lichen's contribution of beauty and diversity to the world of fungi. After a final round of tea, the visitors departed Casa Madera well-fed and with better knowledge of both the lichens and mushrooms in the area. For his own edification, David now has the beginnings of a lichen inventory, as well as a set of reference specimens. And we all know which poisonous lichens we should not eat and which toxic mushrooms we can! In the end, we made new friends and everyone came away a little less mystified about Kingdom Fungi.

Reported by Sarah Minnick
Species list compiled by Tom Carlberg

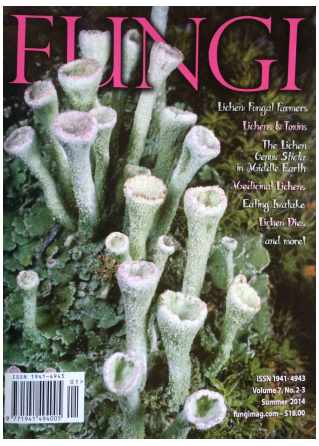
Lichen species identified at Casa Madera

Many species of *Bryoria*, *Cladonia* and *Usnea* were observed but not identified. Unusual finds are in **bold** type.

Bryoria furcellata (Fr.) Brodo & D. Hawksw.
Cladonia pyxidata (L.) Hoffm.
Cladonia transcendens (Vainio) Vainio
Cladonia verticillata (Hoffm.) Schaerer
Diploschistes muscorum (Scop.) R. Sant. ssp. *muscorum*
Flavoparmelia caperata (L.) Hale
Fuscopannaria californica (Tuck.) P. M. Jørg.
Fuscopannaria pacifica P. M. Jørg.
Hypocenomyce castaneocinerea (Räsänen) Timdal
Hypogymnia apinnata Goward & McCune
Hypogymnia enteromorpha (Ach.) Nyl.
Hypogymnia heterophylla L. Pike
Hypogymnia inactiva (Krog) Ohlsson
Hypogymnia physodes (L.) Nyl.
Hypogymnia tubulosa (Schaerer) Hav.
Hypotrachyna afrorevoluta (Krog & Swinscow)
Imshaugia aleurites (Ach.) S. F. Meyer
Kaernefeltia californica (Tuck.) Thell & Goward
Lobaria hallii (Tuck.) Zahlbr.
Lobaria pulmonaria (L.) Hoffm.
Mycoblastus sanguinarius (L.) Norman
Nephroma laevigatum Ach.
Nephroma resupinatum (L.) Ach.
Normandina pulchella (Borrer) Nyl.
Parmelia hygrophila Goward & Ahti
Parmelia squarrosa Hale
Parmelia sulcata Taylor
Parmotrema arnoldii (Du Rietz) Hale
Parmotrema crinitum (Ach.) M. Choisy
Peltigera collina (Ach.) Schrader
Peltigera ponojensis Gyelnik
Placidium sp. A. Massal.
Placynthiella icmalea (Ach.) Coppins & P. James
Platismatia glauca (L.) Culb. & C. Culb.
Platismatia herrei (Imshaug) Culb. & C. Culb.
Protopannaria pezizoides (Weber) P. M. Jørg.
Pseudocyphellaria anomala Brodo & Ahti
Pseudocyphellaria anthraspis (Ach.) H. Magn.
Ramalina farinacea (L.) Ach.
Sphaerophorus tuckermanii Räsänen
Sticta limbata (Sm.) Ach.
Trapeliopsis glaucopholis (Nyl. ex Hasse) Printzen & McCune
Tuckermannopsis orbata (Nyl.) M. J. Lai
Usnea ceratina Ach.
Usnea filipendula Stirton
Vulpicida canadensis (Räsänen) J.-E. Mattsson & M. J. Lai
Xanthoparmelia cumberlandia (Gyelnik) Hale
Xanthoparmelia lineola (E. C. Berry) Hale

After careful preparation to leach out the toxins, these *Amanita muscaria* were a tasty component to our Sunday brunch.

Group photo at David Arora's, starting from the left: Loriel Caverly, Cameron Williams, and Rikke Reese Næsborg scan the volumes of lichen trivia inside Tom Carlberg's head; front & center: Danny Newman; back center: Kathy Faircloth; and then Lish Hoyt, Miko Nadel, Sarah Minnick, David Arora, and Shelly Benson. Not pictured: Megan Arauzo, Sophie Drucker, and Wendy So. Photograph by Miko Nadel.



Mystery Photo

Do you know where to find this lichen-covered stone face? The first person to answer correctly will win a copy of the recent lichen-centric issue of FUNGI magazine. Submit your answers to CALS secretary secretary@californilichens.org

Upcoming Events

California Native Plant Society 2015 Conservation Conference: Celebrating 50 Years of Progress and Promise

Date: January 15–17, 2015
Location: San Jose, CA.
Fee: $180–$435, depending on registrant status

The conference will be held January 15-17 at the Double Tree by Hilton in San Jose. The 2015 Conference will kick off a yearlong celebration of the California Native Plant Society's (CNPS) 50th anniversary. The CNPS Conservation Conference is unique in bringing together leaders, researchers, practitioners and enthusiasts from many different disciplines and organizations. The attendees share common goals of conserving and restoring our native flora and habitats. Over 300 presenters (oral and poster) from universities, agencies, consulting firms, and non-profit organizations, will share current information on a broad spectrum of issues critical to plant conservation.

At this year's conference, there will be a session on the biogeography and conservation of lichens and bryophytes. The session will be co-chaired by CALS Conservation Committee Chair Eric Peterson, and bryologist and naturalist Ken Kellman. California's floristic diversity is not restricted to vascular plants - our floristic province has a wealth of lichen and bryophyte diversity as well! From hypercoastal salt-spray habitats to boreal disjuncts in the high mountains, this session will explore the biogeography of our lesser-explored photosynthetic biota and the resulting implications for conservation. Two more lichen presentations and one poster are scheduled for additional sessions.

CALS will also have an information table in the lobby, so stop by and say 'hello' to us! For more information go to http://cnps.org/cnps/conservation/conference/2015/sessions.php.

Lichen Dye Workshop at SOMA Camp

Instructors: Sara Minnick and Shelly Benson.
Date: January 18, 2015
Location: Sonoma Mycological Association (SOMA) Camp, Occidental, CA.
Fee: Workshop requires camp registration for full weekend (Jan. 17–19). $340 (includes lodging, meals, and all events); $290 without lodging.

CALS members Sarah Minnick and Shelly Benson will be teaching a workshop on lichen dyes at the Sonoma County Mycological Association's (SOMA) winter gathering known as SOMA Camp. This fungus-centric event takes place at a wooded retreat center outside of Occidental, CA, during the Martin Luther King Jr. holiday weekend (January 17-19, 2015). It offers lectures, workshops, forays, food, and hob-nobbing. SOMA Camp is known for its fiber arts workshops, and Sarah and Shelly are proud to bring several colors to the dyers palate that the mushroom dyes rarely produce. For more information about the lichen dyes workshop and SOMA Camp, go to http://www.somamushrooms.org/camp/. Many of the workshops at camp fill up quickly, so register for camp and classes early to reserve your space.

Course Description:

An overview and history of lichen dyes will be presented, followed by information on the methodologies of creating lichen dye baths. We will heat up some dyes and add fiber samples (provided). While the dye lichens are doing their work, Shelly will lead class participants on a walk in the surrounding area to look for lichens in the wild. We will learn some common lichen species and the characteristics that help identify those good for dyeing. After the walk we'll see what colors have developed in the dye pots. Participants will take home instructions for dyeing with lichens as well as the samples they dyed.

Sarah Minnick has been experimenting with natural dyes for a number of years and has a special interest in using found lichens as a dye source. She presented her work at an annual meeting of the California Lichen Society and has collaborated with the Society to develop sustainable collection practices for dye lichens. Sarah studied mathematics and wetlands conservation and is currently a restoration ecologist working to protect and restore natural systems in Marin County.

Shelly Benson is the president of the California Lichen Society (CALS) and has been studying lichens for the past 16 years. She received a Master of Science degree in 2001 from the University of Northern British Columbia, Canada, where she studied lichen ecology in the canopy of old growth forests in the Canadian Rocky Mountains. She worked on several lichen inventories in the San Francisco Bay Area and has led numerous lichen walks for CALS. Shelly is interested in using lichens as indicators for air quality and climate change.

Silk handkerchiefs dyed with lichens *Flavopunctelia flaventior* and *Parmotrema perlatum*. Photo by Sarah Minnick.

CALS 2015 Annual Meeting

Date: January 31, 2015
Location: field trip at Edgewood Park and Natural Preserve, meeting location TBA
Fee: Free

As is tradition, the annual meeting is held the last Saturday in January (Jan 31st, 2015) and includes a lichen walk followed by an informal meeting of the membership, a pot-luck dinner and guest speaker. The lichen walk will be held at Edgewood Park and Natural Preserve, Redwood City, CA.

Edgewood Park supports a diversity of habitats including wetland, serpentine grassland, oak woodland, and chaparral. The cool, wooded gullies of the eastern slope of the park are rich in ferns and mosses, and a thick layer of woody and herbaceous plants. Sounds like great habitat for *Cladonia, Peltigera,* and *Leptogium*! The central portion of the park is dominated by a prominent ridge about 800 feet in elevation, affording outstanding views of Skyline Ridge, Huddart Park, the San Andreas Gulf Zone, the Crystal Springs Lakes and the San Francisco Bay. The warmer west-facing slope of the ridge supports chaparral and the cooler east-facing slope hosts oak woodland. We'll explore the difference in the lichen communities along the ridge.

Tom Carlberg, CALS Vice-president, will be our evening speaker. He will talk about his work with California's hypermaritime foliicolous lichen communities. The schedule for the day's events is still being worked out, so keep an eye on the CALS web page (www.californialichens.org) or Yahoo! group for more specific details.

Field Trip: Lichens of the Presidio

Sponsored by: Yerba Buena Chapter of the California Native Plant Society
Instructor: Shelly Benson
Date: February 14, 2015 10am-1pm
Location: Pershing Square, Presidio of San Francisco
Fee: Free

Lichens grow practically everywhere, even on concrete and metal surfaces far from natural settings, but are mostly unobtrusive and usually go unnoticed. Shelly Benson of the California Lichen Society will lead us on an exploration of lichens and their habitats in this urban national park. A lichen is a composite life form, a combination of a fungus with an alga or, in some cases, with a cyanobacterium. In addition to the marvel of their symbiotic nature, the diversity and beauty of lichens' colors, shapes, and patterns present endless opportunities for gazing, wondering, and learning. Shelly has been studying lichens for 16 years and has a particular interest in how they serve as indicators of air quality and climate change. She teaches lichen biology and ecology, as well as workshops on using lichens for dyeing fiber, and will welcome your curiosity and questions. Bring a handheld magnifying lens if you have one. Meet in Pershing Square, on Arguello Blvd at the south end of the Main Post. The PresidiGo shuttle lines stop at the Transit Center (215 Lincoln Blvd) at the Main Post, and the Muni 43 bus stops nearby on Presidio Blvd. If there's significant rain, we'll try again on February 28. Contact: Gail Wechsler, wechslerifolia@ gmail.-com.

Biological Soil Crusts of Joshua Tree National Park

Instructors: Nicole Pietrasiak, Kerry Knudsen, Theresa Clark
Date: March 14-15, 2015
Location: Oasis Visitor Center, 74485 National Park Drive, Twentynine Palms, CA 92277
Fee: To be determined; please contact http://www.joshuatree.org/desert-institute if you are interested in attending

This popular class returns next spring. It can also be taken for a UC credit. The desert floor may look like dirt and sand but it is full of living microscopic organisms vital to the park's ecosystem. Many of these organisms live in biological highly active soil crusts that cover the first inch of the desert soil surface. In this field class Nicole Pietrasiak and Kerry Knudsen will introduce crypto-biotic soil crusts with an emphasis on soil algae and lichens. Participants will study the secret life of these microscopic organisms as they demystify this thin layer of soil. Nicole and Kerry will discuss the components of crusts such as cyanobacteria (one of the oldest known life forms on earth), green algae, diatoms, bacteria, fungi, and lichens. Theresa Clark will provide information on the mosses of Joshua Tree National Park. The instructors also present on why these organisms are important. During the lab session, participants will see the biodiversity of the park's crusts up close through two different types of microscopes. The second day, the class will go into the field to identify and assess the conditions of some of the algal and lichen soil crusts found in JTNP.

Mosses Lichens and Liverworts of the Ancient Forest

Instructor: John Villella
Date: April 18-19, 2015
Location: Opal Creek Ancient Forest Center, Willamette National Forest, OR
Fee: $160; includes food and lodging

Non-vascular plants such as mosses, lichens, and liverworts are drawing increasing attention for their importance as indicators of forest health, air quality and environmental integrity. From air quality indicators and natural water filters to nesting material for birds and mammals, mosses, lichens, and liverworts are invaluable to Pacific Northwest forest ecosystems. John Villella will lead us on a journey through the little known non-vascular

plant kingdoms of the Opal Creek Wilderness. Opal Creek is home to hundreds of species, many of which are only found in the ancient forests of the Pacific Northwest. Many rare lichen species will be encountered during guided forays into the wilderness. including *Peltigera aquatica, Pilophorus nigricaulis, Pseudocyphellaria rainierensis, P. mallota,* and *Sticta weigelii* among others. This course is especially helpful for agency personnel who are conducting forest health surveys throughout the state.

Psoroma hypnorum from Black Butte in Siskiyou County, CA. Photograph by Tom Carlberg.

President's Message

The California Lichen Society needs your help!

The California Lichen Society (CALS) is a volunteer operated organization. All that we have accomplished over the past 20 years is the result of motivated lichen enthusiasts who have stepped up to share their diverse skill sets including: event organization, education, public outreach, graphic design, web design, accounting, database management, environmental policy, writing and editing, publishing, photography, and illustration.

CALS strives to provide a variety of opportunities to inform people about lichens. In order to keep this up, we need continual support from our community in the form of volunteer time. Several specific areas we are looking for extra help include:

- Events coordinator: schedules field trips and coordinates volunteers for staffing the CALS table at events such as fungus fairs
- State lichen campaign: an effort to get lace lichen (*Ramalina menziesii*) adopted as the CA state lichen; we're looking for people with political knowledge to join the effort
- Lichen finder project: an illustrated key to the lichen genera of the central CA coast; we're looking for writers to compile content such as genus descriptions, key characters, and fun facts about species

If you'd like to get involved, contact Shelly Benson, CALS President at President@californialichens.org.

Shelly Benson
President@californialichens.org

California Lichen Society

PO Box 472, Fairfax, California 94978

The California Lichen Society seeks to promote the appreciation, conservation, and study of lichens. The interests of the Society include the entire western part of the continent, although the focus is on California.

Members receive the Bulletin of the California Lichen Society (print and/or online access), voter rights in Society elections, access to the CALS community, and notices of meetings, field trips, lectures and workshops.

Membership Dues (in $US per year)
Student and fixed income (eBulletin only) - $10
Regular - $20 ($25 for foreign members)
Family - $25
Sponsor and Libraries - $35,
Donor - $50
Benefactor - $100, and Life Members - $500 (one time)

Membership dues can be made payable to:
California Lichen Society, PO Box 472, Fairfax, California 94978.

To join or renew online, please visit www.californialichens.org/membership

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Back Cover:
1. Shonchin Flow, Lava Beds National Monument. Photograph by Steve Sheehy.
2. Peltula euploca at Sutter Buttes. Photograph by Tara Collins.
3. Parmelina coleae at Sutter Buttes. Photograph by Judy Robertson.
4. Foliicolous lichen habitat in a hypermaritime willow bog at Tolowa Dunes State Park. Photograph by Tom Carlberg.


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