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Front cover: *Acarospora thelococcoides* (Nyl.) Zahlbr. Riverside County, Southern California.
1x. Photography by Jim Rocks. (See article on page 36 by Knudsen)

Bulletin of the California Lichen Society

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Distributions and Habitat Models of Epiphytic *Physconia* in North-Central California

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Abstract:-I examined the distributions of eight *Physconia* species in northern and central California: *Physconia americana*, *P. californica*, *P. enteroxantha*, *P. fallax*, *P. isidiigera*, *P. isidiomuscigena*, *P. leucoleiptes*, and *P. perisidiosa*. Distributions are based upon lichen community data collected for the Forest Inventory and Analysis Program in over 200 permanent plots. *Physconia californica* was not found while *P. leucoleiptes* was infrequent across the landscape, occurring sporadically around the periphery of the Central Valley. *Physconia isidiomuscigena* occurred only once in the study plots, growing on *Quercus* sp. in Stanislaus county. This site is unusual in that this species is often saxicolous and known primarily from southern California. The remaining *Physconia* species were more frequent across the landscape with distributions centered in the Central Valley. I derived habitat models for these more common species using nonparametric multiplicative regression to help explain how distributions relate to environmental variables. Distributions of *P. enteroxantha*, *P. isidiigera*, and *P. perisidiosa* were well described by one or more environmental gradients while *P. fallax* and *P. americana* were only weakly associated with single predictors. Considering that many *Physconia* species are considered nitrophilous (nitrogen-loving), the habitat models would probably be better had an estimate of ammonia deposition been included. There are not, however, any comprehensive estimates of ammonia deposition for the study area.

INTRODUCTION

Epiphytic *Physconia* species are common, conspicuous components of the lichen flora in northern and central California yet we know surprisingly little about their distributions and ecology. Several species, such as *P. americana*, *P. enteroxantha*, *P. isidiigera*, and *P. perisidiosa*, are characteristic of hardwood stands in the Central Valley and Sierra Nevada foothills, although distributions in surrounding regions like the Modoc Plateau, northwest coast, and central California coast are less clear. We know even less about the regional distribution of *P. leucoleiptes*, a species common in eastern North America, and the three most recently described species, *P. californica*, *P. fallax*, and *P. isid-*

iomuscigena (Esslinger 2000). Distribution maps for the latter three species were published for southern California (Esslinger 2001) although distributions for northern and central California, north of Ventura, remain largely unexplored. *Physconia fallax* is reported for northern California and Washington while most known *P. isidiomuscigena* and *P. californica* sites are reported from relatively dry Southern California counties (Los Angeles, Tulare, San Diego, and Riverside; Esslinger 2000).

Our first objective was to describe the distributions of eight epiphytic *Physconia* species in northern and central California using a large database of lichen community surveys. These species include *P. americana*, *P. californica*, *P. enteroxantha*, *P. fal-*

lax, *P. isidiigera*, *P. isidiomuscigena*, *P. leucoleiptes*, and *P. perisidiosa*. Secondly, I used nonparametric multiplicative regression (NPMR) with a local mean estimator to build habitat models describing which climatic, topographic, and stand description variables best explain the distributions of the most common *Physconia* species. These models will provide a valuable first step towards understanding *Physconia* ecology in the region. As habitat modeling with NPMR methods is uncommon, the process will be briefly described in this paper although a more rigorous background can be found at <http://oregonstate.edu/~mccuneb/NPMR.pdf> and in the work of McCune et al. (2003), which describes a related form of NPMR.

METHODS

Distribution maps were derived from two databases of lichen community surveys conducted for the USDA Forest Inventory and Analysis program (FIA). Because of their usefulness as bioindicators, the FIA program collects extensive data on epiphytic lichens in forested areas throughout the United States. Field crews collected vouchers and estimated the abundance of each epiphytic macrolichen species occurring above 0.5 m on woody species or in the litter. Lichen community surveys lasted a minimum of 30 minutes and a maximum of two hours (methodology detailed in Jovan 2002 & McCune et al. 1997). To characterize forest stand structure, crews measured total basal area, basal area of hardwoods, basal area of softwoods, stand age, overstory species diversity, and dominant tree species at each plot. Climatic variables were extracted from the Precipitation-Elevation Regressions on Independent Slopes Model (PRISM; Daly et al. 1994, 2001, 2002), which included mean annual dew temperature, maximum annual temperature, mean annual precipitation, mean number of wet days per year, mean annual relative humidity, and minimum annual temperature.

The larger of the two databases consists of 207 plots surveyed in 1994 and from 1998-2001. Sites covered all of northern and central California except the Great Basin region. Plots were located on a permanent sampling grid and were typically 27 km away from their nearest neighbor. Plots were not sampled in non-forested areas, causing lower plot densities in some parts of the study area such as the

southern San Joaquin Valley. The second database consists of 33 additional plots surveyed in 2002. Plots were located in urban parks throughout the greater Central Valley, which encompasses the Central Valley, greater Bay area, northern central coast, and Sierra Nevada foothills.

I re-examined all *Physconia* vouchers for *P. fallax*, *P. californica*, and *P. isidiomuscigena*, as most collections were identified before description of these species, and all three look similar to other species in the genus. I did not include data from other studies or herbaria, because environmental data needed for the models would not be available. However, plots in the two databases are well distributed over the study area and span a wide range of environmental conditions. Thus, the maps should approximate the larger distribution trends in northern and central California.

Habitat Modeling

I used NPMR with a local mean estimator to investigate how distributions of the most abundant *Physconia* species are associated with environmental gradients. Single-species habitat models were developed using the NPMR add-in module for the PCORD statistical software package (McCune & Mefford 1999). NPMR is a form of nonparametric regression. In essence, this method analyzes environmental data from sites where the target species occurs to build a habitat model. The models work by estimating species occurrence for new sites based upon the proportion of occurrences at known sites with similar environmental conditions.

Model building is an iterative process in which NPMR searches through all possible multiplicative combinations of environmental variables to determine which are the best predictors of a target species occurrence. I used a Gaussian kernel function in which weights between 0 and 1 were assigned to all data points (Bowman & Azzalini 1997). Thus, for a given point, not all known sites contributed equally to the estimate. The more similar the environmental conditions of the known sites are to the new site, the higher it is weighted in the model for that new site. The form of the Gaussian function used for weighting is based upon the standard deviation ("tolerance") of each environmental variable.

Model quality was appraised with leave-one-out cross validation: (1) one data point was removed from the dataset; (2) the dataset (minus the removed site) was used to estimate the response for that point, using various combinations of environmental variables and tolerances; (3) model accuracy was determined by comparing estimates of species occurrence at that site to actual species occurrence at that site; (4) this process was repeated for all plots in the dataset and; (5) a Bayesian statistic, the logB, was used to compare the accuracy (performance) of each model to the performance of a naïve model. In the naïve model I used, probability of occurrence at a given site equals the overall frequency in the study area. According to Kass and Raftery (1995), a model with a logB greater than 2 performs decisively better than a naïve model.

The *Physconia* habitat models were based upon all sites included in the distribution maps. The models were used to generate univariate species response curves that depict the probability of a species along an environmental gradient. These models may be used in the future to estimate species occurrence at other sites if the same environmental variables are provided.

RESULTS AND DISCUSSION

Species Distributions

Physconia isidiomuscigena and *P. leucoleiptes* were rare across the landscape while *P. californica* was absent. *Physconia isidiomuscigena* was found in only one site (specimen resides with author), growing epiphytically on *Quercus* sp. in Stanislaus county (Figure 1a). The collection was unusual in that

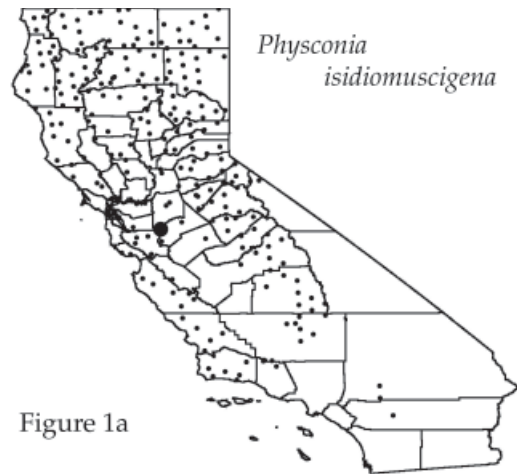


Figure 1a

this species is typically saxicolous and has been collected only a couple times in California from more southern locales near Los Angeles. *Physconia leucoleiptes* occurred in low abundance at 8 sites widely distributed around the periphery of the Central Valley, occurring in the Sierra Nevada foothills, as far south as Kern county, and as far north as Tehama county (Figure 1b). This species is known

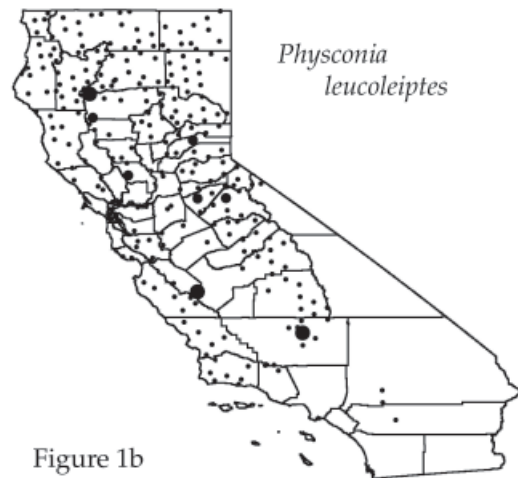


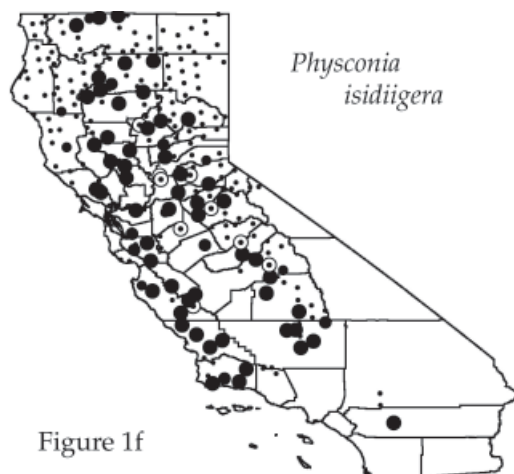
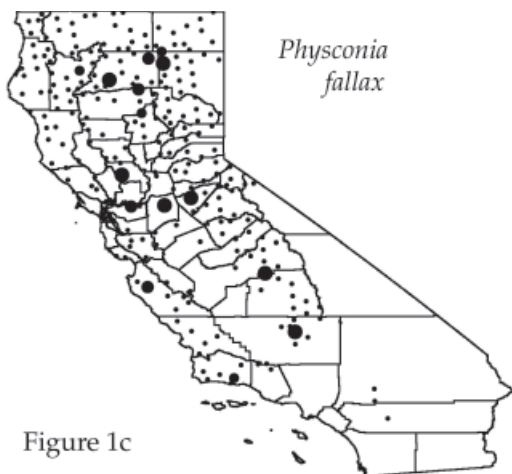
Figure 1b

Caption for distribution maps for *Physconia* species (Figures 1a through 1g). Abundance at each site is indicated by symbol size.

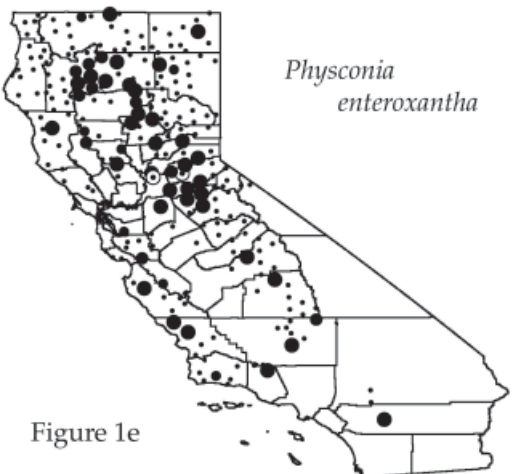
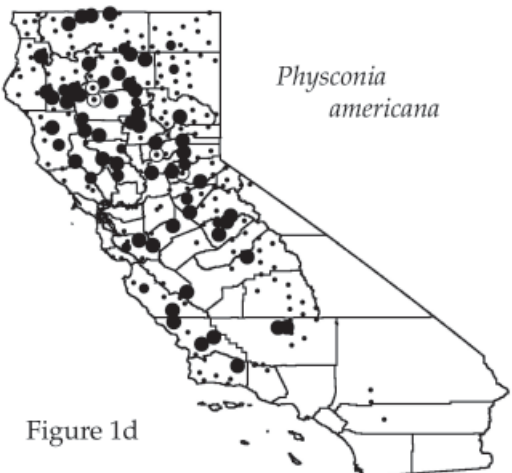
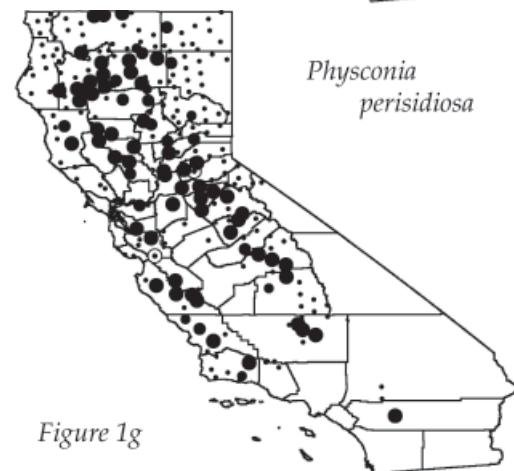
- None
- Rare (3 thalli or less)
- Uncommon (4-10)
- Common (>10 but not found on more than 50% of all boles and branches)
- ⊙ Abundant (found on more than 50% of all boles and branches)

to be much more common in the eastern United States so its low frequency is not surprising.

Physconia fallax was occasional within the study area but where it occurred it was typically abundant (Figure 1c). In 10 of the 15 sites I estimated there were over 10 thalli on the plot. The sites were widely spaced in the greater Central Valley, extending into the dry region of Lassen and Modoc counties. *Physconia fallax* was absent on the immediate coast but did occur within 15 miles of the ocean in a montane, *Quercus douglasii* stand in Los Padres National Forest.



Physconia americana, *P. enteroxantha*, *P. isidiigera* and *P. perisidiosa* were more common in the study area, having distributions centering in or near the Central Valley (Figure 1d, e, f & g). All species were sparse in high elevation plots and in the relatively



cool Modoc Plateau and northwest coast. Distributions of these species were generally similar although modest variation is evident in figure 1. Most notably, *P. enteroxantha* and *P. americana* seem less common south of the Bay area than in the north. *Physconia americana* also appears to be more common in the northern California Coast Ranges than the other species I examined. *Physconia isidiigera* occurred in all urban plots, including parks in downtown Fresno, Merced, and San Jose where epiphytic lichen species richness was low, ranging from 3 to 7 species. Usually, however, multiple *Physconia* species were found on the same plot, often intermixed on the same tree. In the greater Central Valley urban plots where substrate data was collected, all four species occurred on a wide range of hardwood substrates but were consistently absent on coniferous trees.

Species Response Curves

Habitat models were constructed for the 5 most

Table 1: Summary of NPMR habitat models. Tolerances are reported for the multivariate models.

Response Variables	logB	Variable	Tolerance	Variable	Tolerance	Variable	Tolerance
<i>P. americana</i>	9.2	Elevation (m)	1137.36	Humidity (%)	2.16	*	*
<i>P. enteroxantha</i>	5.7	Elevation (m)	473.90	*	*	*	*
<i>P. fallax</i>	0.8	Max. Temperature (°C)	27.88	*	*	*	*
<i>P. isidiigera</i>	22.7	Dew Temperature (°C)	14.76	Max. Temperature (°C)	9.84	*	*
<i>P. perisidiosa</i>	19.6	Hardwood Richness	0.84	Humidity (%)	4.32	Mean Temperature (°C)	3.22

common species: *Physconia americana*, *P. enteroxantha*, *P. fallax*, *P. isidiigera*, and *P. perisidiosa* (Table 1). The distributions of most *Physconia* species were relatively well described by NPMR habitat models with high logB statistics (Table 1; Kass and Raftery 1995). Nonparametric multiplicative regression identified elevation as the best predictor of *P. enteroxantha* and maximum temperature as the best predictor for *P. fallax*. The remaining species were better described by more complex models: relative humidity and elevation were the best predictors of *P. americana* occurrence, dew temperature and

maximum temperature were the best for *P. isidiigera*, and mean temperature, relative humidity, and diversity of hardwood species were the best predictors of *P. perisidiosa*.

Species response curves for each predictor are shown in Figure 2. Any given response curve necessarily shows only the relationship between a species occurrence and a single environmental gradient. While the full multivariate NPMR models are useful for estimating occurrence across the landscape, the complex multiplicative relation-

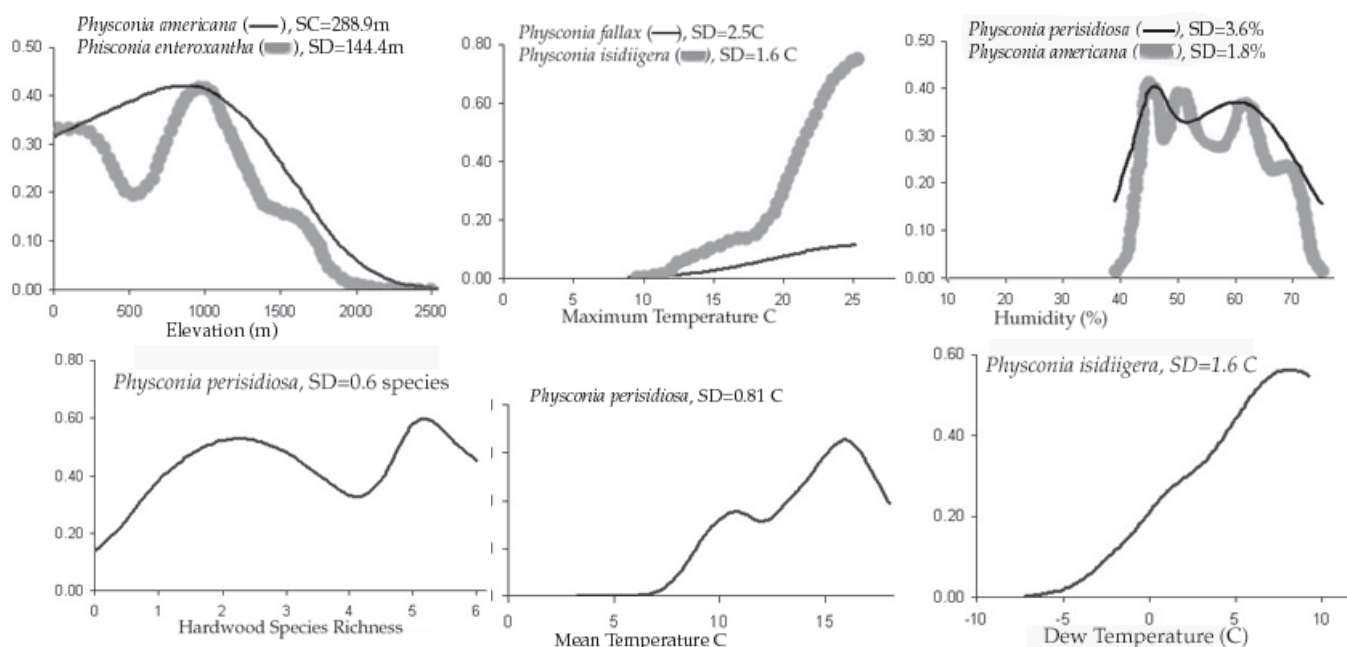


Figure 2: Species response curves from NPMR habitat models. Each species has 1-3 response curves. SD = standard deviations (tolerances) for univariate models.

ships between environmental predictors are difficult to visualize and interpret as graphics. Thus, for example, the response curve for *P. americana* and humidity does not account for the effects of elevation on occurrence. When the NPMR model is used to estimate *P. americana* occurrence at a particular site, however, both variables are considered simultaneously.

Interpretation of the single-gradient response curves is relatively straightforward. For example, the curves for *P. americana* would be interpreted as follows: relative humidity is a moderately strong predictor of *P. americana* occurrence and the probability of finding this species is relatively high (0.27-0.40) for humidity levels between 48-64%. The probability steeply declines at a relative humidity below 42% and above 69%. Elevation is also a moderately strong predictor of *P. americana* incidence. At elevations between 518-1097 m, incidence is expected to be high (0.40-0.41). Probability of *P. americana* is less than .05 at elevations over 2042 m. All response curves should be read in this fashion. Small fluctuations in the response curves (i.e. the response curves for *P. americana* and humidity) probably result from noise in the dataset or the action of other factors not accounted for in the analysis.

The *P. fallax* model was relatively weak as evidenced by the low logB and lack of strong environmental predictors (Table 1). There are two probable explanations: 1) the model was based upon relatively few sites and 2) I did not provide NPMR with the most relevant, defining habitat characteristics for this species. The number of *P. fallax* sites may be underestimated since most lichen community surveys were conducted before this species was described. Due to its yellow soralia, field workers could have easily overlooked this species as *P. enteroxantha*.

CONCLUSIONS

While climate and stand structure are typically important factors influencing lichen distributions, one can't conclude that the environmental predictors identified by NPMR are the cause of species presence or absence. A predictor may instead be a correlate of the actual causal factor that determines habitat suitability. However, the models inspire

many questions about *Physconia* ecology. For instance, are *P. americana* distributions limited by atmospheric moisture as suggested by the habitat model? If that is the case, what morphological and physiological aspect of this species makes it so? Why do distributions of many of the other common species seem more related to temperature? These habitat models may also be used in practical applications like estimation of species occurrence across the landscape and identification of areas where each species is most likely to occur.

Understanding the distribution of *Physconia* species across the landscape is particularly important because of their potential utility as indicator species. Past research has shown it is possible to map NH₃ with the distributions of nitrophilous ("nitrogen-loving") species (van Herk 1999 & 2001). *Physconia enteroxantha* and *P. perisidiosa* are generally considered nitrophilous while *P. americana*, *P. fallax*, and *P. isidiigera* may also be nitrophilous or at least tolerant to high levels of NH₃ deposition. In this study, all five species seemed more abundant in areas where one would expect high NH₃ deposition, such as on wayside trees near livestock enclosures and near areas of high automobile traffic. A logical extension of this work would be to examine the relative influences of NH₃ deposition and climate on *Physconia* distributions, which would be an invaluable step towards realizing the full indicator potential of these species.

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Type Specimens: Investigations and Observations

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When a lichen is described and published as a new taxon, the author designates as holotype a specimen by collector, collection number, and the herbarium where it is deposited. This holotype should be an average specimen. The description of the taxon should contain information on the full range of variations that naturally occur in the species as well as a list of other specimens examined. That's ideal. Sometimes a new taxon is described from a single or a few collections. There can only be one holotype. Any other specimen collected on the same day at the same place is an isotype. These are duplicates. For various reasons one might designate a new collection as being representative of the original type specimen and that's called a lectotype. There are legal conventions, agreed on by all, and enshrined in the Code of Botanical Nomenclature that govern these matters, including the name of the taxon.

The holotype and its description should serve to verify any future determination of a collection of that lichen. A good taxon is verifiable by repeated application to living specimens. If problems arise in applying the taxon to reality, then eventually a taxon needs to be revised or even eliminated.

That's how we do it now. In the past things were a bit looser.

Recently at the University of California herbarium at Riverside (UCR) I had the pleasure of examining some "types" of several specimens collected by Herman Hasse on loan transfer from the Arizona State University lichen herbarium (ASU) and from the Botanical Museum of Helsinki, Finland (H). I'd like to share this experience because it is an excellent example of the problems faced in the taxonomic revision of lichens. It illustrates the problems involved in using the old lichenological literature. And proves the value of types and herbaria.

Recently I had collected a terricolous lichen in Riverside and San Diego Counties in California. It was *Acarospora thelococcoides* (Nylander) Zahlbruckner with globular spores 10-13µm in diameter. I used Bruce Ryan's CD to determine it because there is no current flora which includes it in the keys.

Reading about *A. thelococcoides* in the old literature, I found Fink's flora (1935) considers *A. pleiospora* and *A. pleistospora* of Hasse's flora (1913) synonymous with *A. thelococcoides*. Reviewing Hasse's descriptions, I saw that *A. pleiospora* with spores 10-13µm in diameter and an IKI+ red hymenial reaction is synonymous with *A. thelococcoides*. But *A. pleiospora* with spores 3-4 µm and an IKI+ blue reaction would seem to be another species, contrary to Fink's claim that it is same as *A. thelococcoides*. I wondered if maybe a small-spore species existed but got lost somewhere in this taxonomic tangle.

I did not find a small-spored *Acarospora* in the Santa Monica Mountains or in the Verdugo Mountains where Hasse collected *A. pleistospora*.

I examined Hasse's exsiccati of *A. pleiospora* and *A. pleistospora*. They both turned out to have 10-13µm spores though they had various hymenial reactions to IKI. I examined more recent collections of *A. thelococcoides* too. I came to the conclusion there was only this one species, *A. thelococcoides*, with a hymenium that could test IKI+ blue or red or both! And with spores 10-13 µm. I believe reports of small-spore specimens were based on immature spores and poor microscopes.

To test my conclusions I first examined the "isotype" of *Lecanora pleistospora* which Hasse cites as the type of *A. pleistospora* (Hasse, 1913.) It was from the National herbarium (US) and is part of the Smithsonian collections. It was actually a lectotype collected at a different location and time and chosen by Hasse as same as the type.

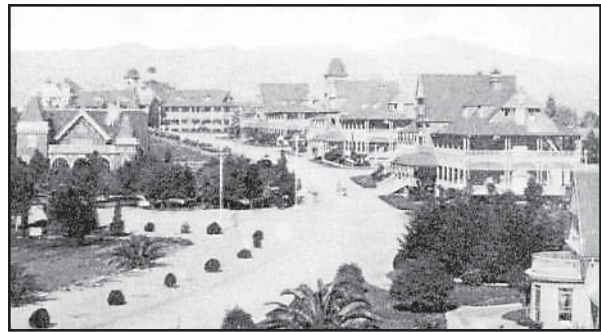
As you can see from Frank Bungartz's picture (see back cover, Image 2) the specimen is in beautiful condition. But it is not *Acarospora thelococcoides*. I mounted an apothecium. The specimen easily fit with the taxon *Acarospora obpallens* (Nylander in Hasse) Zahlbruckner which is distinguished by spores 4-5x1-1.5 μm , slender paraphyses (1-2 μm), varied ascus shapes, even-to-flared exciple, with rugose-to-smooth brown thallus and black lower cortex formed around the rhizal attachment (Knudsen, unpubl).

Did somebody put the wrong lichen in the packet? I doubt it. The problem is Hasse determined specimens of *Acarospora pleistospora* by the hymenial reaction of I+blue. *A. thelococcoides* can test either red or blue or both colors. *Acarospora obpallens* also has various I hymenial reactions including blue. Hasse shared this lack of understanding of I reactions with Nylander, who first introduced I as a hymenial reagent and died before he had a chance to learn his error (Orvo Vitikainen. 2001). Iodine tests are valuable with some genera, like *Peltula* and *Heppia*, but in some genera can be very unpredictable. They also can be unpredictable based on concentrations of I in solution (Bruce Ryan, pers.comm).

To see if Hasse had misunderstood Nylander, I examined the type specimen from Helsinki, Finland, where the Nylander herbarium with 50,000 plus specimens is preserved. There are two specimens of *Lecanora pleistospora* (Hb.Nylander #24866 and #24867) with neither designated as holotype. The first one is an excellent specimen of what we now call *A. thelococcoides*. It looked like it was collected yesterday by Wetmore. The other is a beautiful specimen of *A. obpallens* with typical 4x1 μm spores, black cortical bottom and slender paraphyses. As reported by Magnusson for *A. obpallens*, the specimen had C+red reaction of cortex on microscopic slide (Magnusson, 1929) but this spot test I have found to be as variable as IKI hymenial reactions.

I was thankful Zahlbruckner solved this problem long ago when he made *Acarospora pleistospora* and *Acarospora pleiospora* synonyms of *Acarospora thelococcoides* (Zahlbruckner, 1927).

But where did the name *Acarospora thelococcoides* come from?



"Near Soldier's Home:" type locality of many species discovered by Hasse (post card circa 1890s)

In 1886 Orcutt collected in San Diego County a specimen of terricolous lichens. From this single small collection Nylander first described *Lecanora thelococcoides* (Nyl., 1891). Magnusson examined and diagnosed this collection as containing both *A. thelococcoides* and *A. obpallens* (Magnusson 1929). William Weber on the packet confirms it is *A. thelococcoides*. James Lendemer (pers. comm.) has examined the type material of *A. thelococcoides* and confirms that the type (see Lendemer in rev. for lectotypification) is conspecific with recent collections I have made. The type is in poor condition (as are other *Acarospora* types) and consists of only a few fertile areoles. Because of the state of the type material we have chosen to also select an epitype to affix the application of the name. Epitypes are specimens collected by later authors when the type material is inadequate in order to aid later workers in understanding how the name should be applied.

In this case, Hasse and Nylander became confused by results of IKI reactions and Zahlbruckner corrected the problem. At present, lichenologists treat *A. thelococcoides* as one species and I agree with this interpretation.

What is really great is that everybody deposited their "types" in herbaria and I could re-visit the problem over a hundred years later and verify the results with the "types." The scientific value of types is also very evident in this next case.

Hasse published *Lecanora peltastictoides* in *The Bryologist*, Vol. 17, pg. 63 in 1914. The specimen I examined from the Farlow Herbarium at Harvard (FH) is considered the holotype. Hasse collected it in Palm Springs, Riverside County, California, 1901. As you

can see from Frank Bungartz's picture (see back cover, Image 3), the holotype is in excellent shape. It is not included in current Checklist of Lichens of North America (Esslinger and Egan, 1995.)

Magnusson examined it on December 24, 1926, and wrote the following annotation by hand which is included in the packet and is reproduced here exactly as he wrote it: "Hym. 85 μ white, uppermost 15-19 μ dirty brownish yellow, K+ pale, J+red. Par. In water less discrete, K+dirty 1.8-2 μ thicken uppermost 2-4 joints swollen 5-6X3-4 μ ; Sp. Eight, 11-13X6.5-7 μ Cortex 50-60 μ med (undecipherable) with particle, hyphae intricate, lumina 3-5 - 4-5 elongate or round Thal. All negative. Lecanora."

The apothecium I mounted did not stain to my satisfaction: it was possibly an *Aspicilia*-type but definitely not an *Acarospora*. It was not clear to me that it is the *Lecanora*-type. I saw fundamentally what Magnusson described in his annotation especially the eight spores per ascus and the large size of the spores. The jointed paraphyses were moniliform. I felt one mount was all I should do because my aim was to establish if it was a real species and then look for it in the field.

To my knowledge *Lecanora peltastictoides* has never been collected again.

I see no reason why it is currently not included in the checklist. I see good reason for it being excluded from *Lecanora* and transferred to *Aspicilia*. Members of CALS are actively looking for it around the San Jacinto Mountains and I believe we will find it again. New collections are definitely needed for new taxonomic work to determine its correct genus.

In this case the holotype verified its own taxon. And it will verify new collections when they are made.

Too often in the past in lichenology new species have been described or species have been put into synonymy without adequate analysis of the type specimens. But the preservation of types in herbaria is the solution to these problems as my investigations of *Acarospora thelococcoides* and *Lecanora peltastictoides* show.

ACKNOWLEDGEMENTS

Special thanks to Charis Bratt, Frank Bungartz, James Lendemer, Tom Nash, Bruce Ryan, Andy Sanders, Laurens B. Sparrius, Shirley Tucker, Orvo Vitikainen, and Darrell Wright. I appreciate the help of James Lendemer and Darrell Wright in editing the manuscript. Special thanks to the curators of the following herbaria: ASU, H, FH, MU, SBBG, US, and UCR.

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Abrothallus welwitschii in California on *Sticta limbata*

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A number of collections of lichenicolous fungus on *Sticta limbata* (Sm.) Ach. from coastal Central California have been identified as *Abrothallus welwitschii* Tulasne. These constitute first records for the state.

A. welwitschii is the name for an apotheciate/ pycnidiate fungus that lives in the thallus of *S. limbata* (also in *S. fuliginosa* (Hoffm.) Ach. in Europe). The apothecia are 0.3 - 0.7mm diameter, appearing through angular ruptures on the upper surface of this lichen. It is hemispheric, dark brown to black with, when young, an olive greenish pruina. There are no rims or exciples (arthonioid condition). Asci are large, thick walled, and bitunicate. The eight ascospores are 16.6-17.6 x 6.3-6.9 μ (M. Cole, personal communication), obovate, unequally bilocular, brown, and punctate. The perfect state usually accompanies the later stages of the pycnidial form.

The imperfect state is in the pycnidial form-genus *Vouauxiomyces*, characterized by large globose to flask-shaped conidiophores with distinctive black apertures. Conidia are 12-14x5-6 μ hyaline, essentially muffin shaped with a broadly truncate base, unilocular, and a hemispheric to a short cylindrical shape, one end rounded. The

broad base on the conidium seems to be a species character, other members of the form-genus having more narrowed bases.

Collections have been made on Sweeney Ridge and San Bruno Mt., in San Mateo Co., and on the CALS trip to the Pygmy Forest in Mendocino Co.

I wish to thank Bill Hill for pointing out the initial



Apothecia of *Abrothallus welwitschii* (the dark protrusions) on *Sticta limbata*. Author's photo.

collection (Sweeney Ridge), and Dr. Mariette Cole and Dr. Paul Diederich for independent identifications, and guidance in interpreting the structure; and to Dr S. Tucker for critical comments on the manuscript.

Questions and Answers

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1. QUESTION: WHAT IS THE MEANING OF THE WORD "EXSICCATI?"

Answer: In lichenology, the word *exsiccati* refers to duplicate dried lichen specimens sent out to appropriate institutions and to colleagues. It is the plural form of the Latin word *exsiccat*. The Latin verb *exsiccare* means to remove moisture or dry out, as does the English word *exsiccate*, which is a noun as well as a verb. A system was set up eons ago, when Latin was the language of science, to facilitate and organize the distribution of duplicates to other lichenologists around the world.

By the rules which were set up for these exchanges, when a lichenologist comes across an area where there is an abundance of a lichen with which he is thoroughly familiar, he can collect and prepare as many packets of this species as he feels is justified.

Then when he comes to another area where the same condition exists for another species he knows well, he can do the same thing. Eventually, he may have a large number of such packets. When he has packets for 25 different species, he can put them together into a *fascicle*, and mail it off to herbaria or private collections. Each fascicle is numbered, as are all the packets. Along with the collections goes a small pamphlet listing all the names in the fascicle and information regarding the location where each specimen was collected. If he wants he can send two fascicles, or 50 specimens. The number 25 is not a hard and fast rule, but it is customary to send that many at a time.

The recipients then have specimens for their reference collections which they know are correctly identified.

2. QUESTION: WHAT DETERMINES A SPECIES IN LICHENOLOGY?

Answer: This question was left unanswered in the last Bulletin in the discussion on classification. There is no brief and succinct answer. The definition we learned in grade school, that members of one species could breed with each other and not with members of another species, is not applicable to lichens. Many of them reproduce vegetatively, and many details about how the exchange of genetic material is carried out amongst the others are unclear. Thus the definition of a lichen species depends on similarities in morphology and anatomy, and in the past was subjective to some extent. With the advent of DNA studies and what they tell us of genetic makeup, along with modern microscopy and other new techniques this whole problem of species definitions will eventually be solved. In the meantime lichenologists still depend largely on chemistry and structural details, and with observations of the similarities between the members of one species and the dissimilarities between it and other species.

3. QUESTION: WHAT PERCENTAGE OF THE LICHEN THALLUS DOES THE PHOTOBIONT (ALGA OR CYANOBACTERIA) REPRESENT, ON THE BASIS OF VOLUME?

Answer: The photobiont represents 7% of the volume of the lichen according to one reference, (Ahmadjian 1993) and "no more than 20%, often much less" in another (Purvis 2000).

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CALS Educational Grants Program: \$500.00 Available for 2004

CALS Offers small academic grants to support research pertaining to the Lichens of California. No geographical constraints are placed on grantees or their associated institutions. The Educational Grants Committee administers the Educational Grants Program, with grants awarded to a person only once during the duration of a project.

Grant applicants should submit a proposal containing the following information:

1. Title of the project, applicant's name, address, phone number, e-mail address. Date submitted.
2. Estimated time frame for project.
3. Description of the project: outline the purposes, objectives, hypotheses where appropriate, and methods of data collection and analysis. Highlight aspects of the work that you believe are particularly important and creative. Discuss how the project will advance knowledge of California lichens.
4. Description of the final product: We ask you to submit an article to the CALS Bulletin, based on dissertation, thesis or other work.
5. Budget: summarize intended use of funds. If you received or expect to receive grants or other material support, show how these fit into the overall budget.

The following list gives examples of the kinds of things for which grant funds may be used if appropriate to the objectives of the project:

- Expendable supplies
- Transportation
- Equipment rental
- Laboratory services
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- Living expenses

CALS does not approve grants for outright purchase of high-end items such as cameras, computers, software, machinery, or for clothing.

6. Academic status: state whether you are a graduate student or an undergraduate student.

7. Academic support: one letter of support from a sponsor, such as an academic supervisor or major professor, should accompany your application. The letter can be enclosed with the application, or mailed separately to the CALS Grants Committee Chair.
8. Your signature, as the person performing the project and the one responsible for dispersing the funds.

The proposal should be brief and concise.

The Education Grants Committee brings its recommendations for funding to the CALS Board of Directors, and will notify applicants as soon as possible of approval or denial.

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Proposals are reviewed as received, by members of the committee using these criteria: Completeness, technical quality, consistency with CALS goals, intended use of funds, and likelihood of completion.

GRANT AMOUNTS

CALS grants are made in amounts of \$500.00 or less.

OBLIGATIONS OF RECIPIENTS

1. Acknowledge the California Lichen Society in any reports, publications, or other products resulting from the work supported by CALS.
2. Submit a short article to the CALS Bulletin.
3. Submit any relevant rare lichen data to the California Natural Diversity Data Base using NDDB's field survey forms.

HOW TO SUBMIT AN APPLICATION

Please email your grant application to:

Lori Hubbart, Chair of CALS Educational Grants Program: lorih@mcn.org

Or mail a hardcopy to:

Lori Hubbart
P.O. Box 985
Point Arena, CA 95468

News and Notes

USNEA WORKSHOP
SHINGLE MILL PRESERVE, SAN MATEO COUNTY
MAY 17, 2003

A group of nine CALS members gathered at the historic cabin in San Mateo County where CALS was founded in 1994. History was not the theme of this outing, however. The surroundings there in the Santa Cruz Mountains are heavily populated by lichens of the genus *Usnea*, a group not known for ease of determination, and we wanted to try our hand at identifying some of them.

But before we got involved in that a short walk was organized to stretch our legs and check on some other examples of the lichen flora in that area. We found *Peltigera polydactylon* growing beside the trail above Waterman Creek, and *Cladonias* in the mud bank nearby. In the mixed evergreen forest—Redwood, Doug Fir, Bay, Tanbark Oak, Madrone—we came across many old friends such as *Pseudocyphellaria anthraxis* and *P. anomala*, *Tuckermannopsis orbata*, *Evernia prunastri*, *Hypogymnia imshaugii*, *Pertusaria amara*, *Parmelia sulcata*, and lots of *Usnea*.

After eating our lunches at the historic cabin mentioned above, we cleared the table and the *Usnea* specimens were brought out for the workshop. The main thing we learned here was that *Usneas* really are very hard to key out.

Using several keys we became acquainted with many of the questions that arise in making these determinations, i.e. Were isidiomorphs concave, tuberculate or superficial? How do fibrils, isidia, verrucae and papillae differ? Were the medullary hyphae closely packed or loose? On the other hand, identifying the pinkish cord of *U. ceratina* (syn. *californica*) or the spiny apothecia of *U. arizonica* were easy.

Finally we managed to key one out to the *U. filipendula* group with the help of “Macrolichens of the Pacific Northwest” by Bruce McCune and

Linda Geiser.

Present were Sara Blauman, Cherie Bratt, Janet Doell, Richard Doell, Bill Hill, Karen Howard, Kuni, Boyd Poulsen, and Ron Robertson.

Reported by Janet Doell

CALS FIELD TRIP TO UC WHITE MOUNTAINS
RESEARCH STATION
JULY 11-13, 2003

The White Mountains are the highest ranges in the Great Basin between the Sierra Nevada in California and the Wasatch Range in Utah. They are situated along the California-Nevada Border about 225 miles east of the Pacific Coast. This area is the home of the famous Bristlecone Pine forests. Trees over 4,500 years old have been dated, giving rise to a chronology back to 6,700 B.C. Because the wood of the Bristlecone Pine is very dense and resinous, it is resistant to decay. Dead, fallen, or even upright individuals persist on the landscape for thousands of years.

The UC White Mountains Research Station of Crooked Creek is 10,000 feet above sea level. To get to the station, you must drive beyond Schulman Grove, over a long, gravel road. Large granite outcrops surround and guard the entrance to the Station. Yellow-bellied marmots can be seen sunning on the boulders.

Four buildings make up the station: one houses the kitchen, dining area and upstairs—a large living area with couches, piano, and library, which also serves as a classroom with tables and black boards. There are some adjacent rooms off the living area for researchers and guests. Another large building is dormitory-like with 5 or 6 rooms with 2 to 6 beds/bunk beds and communal bathrooms. The remaining buildings are called the Bristlecone cabins. They are smaller spaces where there was more

privacy, separate rooms with individual bathrooms and a small kitchen. The research station dates back to 1951, when there was only a Quonset hut called the 'Met Hut' because of the Meteorological studies housed there.

On Friday afternoon, July 11, CALS members began to arrive at the station. At 10,000' elevation, we knew we had some altitude adjustment to make. Swollen ankles and wrists, headaches from the edema of high altitude affected most of us. Many developed cracked lips and skin with the drying air and winds.

As we arrived, we walked up the trail by the granite slope for our first survey of the lichens growing at this high altitude.

After everyone arrived, we joined for dinner at 6:30. The station is well known for the excellent cuisine and we could attest to the truth of this claim. Mark Schrop, caretaker and also cook at the station had fixed delicious chicken with rice and baked fresh berry pies for dessert. After dinner, Mark explained the rules of the station and told us some of its history. Upstairs we had set up our microscopes and lap tops, books and identification gear, ready to look at our collections.

Saturday morning started with breakfast of fresh vegetables in eggs, turkey sausage and berry muffins.

Our plans were to go to Sage Hen flat, an area about a 25 minute walk from the station. Some made it to the site, but many got too interested in the lichens on the way to move on.

At noon we met back at the research station to eat our sack lunches of turkey, ham, and cheese sandwiches, cookies, fruit. We packed into our cars to drive to Patriarch Grove, at an elevation of 11,300 feet, the highest Bristlecone Grove in the Mountains. Near tree line, the grove is the home of the world's largest Bristlecone Pine, the Patriarch Tree. The drive was spectacular. The light areas of dolomite soils starkly contrast with the darker, shale formations covered with sagebrush scrub growth. The Bristlecone Pine grows only on the poorer dolomite soil. These Groves were discovered in 1953

so the forest district is celebrating a 50th anniversary this year.

We explored for lichens at the upper Bristlecone Pine Forest site, but found them very sparse on the dolomite, compared to the rich growth on the granite outcrops by Crooked Creek.

Some decided to continue driving up the road to the gate of the UC Barcroft Station. At an elevation of approximately 12,500ft, the treeless area was windblown. Tiny alpine plants barely grew above the surface of the soil. After collecting lichens on the rocks and soil, we drove the long way back to the station where we had chili and cornbread, salad and homemade banana crême pie with ice cream for dessert.

We retired upstairs to microscopes and laptops with photos for the evening.

Sunday morning after cleaning the station, and having breakfast of eggs, potatoes, and muffins, we started our way out of the White Mtns. We had sampled granite, dolomite and now were planning to look at the lichens on the shale and metamorphic rocks along White Mtn. Road. At the second stop, Andy, our resident archeologist found an atala spear head that was approximately 3000 years old.

The last stop was lunch stop and closing of the CALS White Mtn. field trip. All the cars but one were parked facing the Eastern Sierra when the tragedy of the weekend happened. CALS President, Bill Hill fishtailed on the road behind us and rolled down the hill probably 2 or 3 rolls. Miraculously, he was not hurt as his seat belt held him tightly while microscope boxes, cameras, books and laptop flew out of the car. The car landed right side up and Bill was able to open the door and get out, even though the car was totaled. Andy heard Bill call and Andy, Boyd, Ron and Tamara rushed back to retrieve all of Bill's belongings that were strewn down the hillside. Everyone headed off to the ranger station at Schulman Grove where Bill put all of his belongings in Sara Blauman's car and the 2 drove to Bishop. Bill's car was towed out of the mountains and Bill and Sara headed back to the Bay area.

Participating were: Don Brittingham, Bill Madsen,

Irene Winston, Sara Blauman, Kathy Faircloth, Tamara Sasake, Patty Patterson, Jerome Patterson, Boyd Poulsen, Bill Hill, Andy Pignoli, Judy and Ron Robertson, Shirley and Ken Tucker, Janet and Richard Doell.

Collectors:

ST = Shirley and Ken Tucker

SB = Sara Blauman

BP = Boyd Poulsen

PP = Patti Patterson

DB = Don Brittingham

JR = Judy and Ron Robertson

Acarospora smaragdula v. *lesdainii* H. Magn. ST
Acarospora strigata (Nyl.) Jatta ST
Acarospora thamnina (Tuck.) Herre ST, SB, JR
Aspicilia caesiocinerea (Nyl. ex Malbr.) Arnold ST, JR
Aspicilia contorta (Hoffm.) Kremp ST
Aspicilia sp. (stalked) ST
Buellia bolacina Tuck. ST
Buellia lepidastroidea Imsh. (Ryan keys) ST, JR
Buellia cf. *papillata* (Sommerf.) Tuck. ST
Caloplaca cf. *ammiospila* (Wahlenb.) H. Olivier ST
Caloplaca arenaria (Pers.) Müll.Arg. (C. *Lamprocheila* in some keys) ST, JR
Caloplaca cf. *castellana* (Räsänen) Poelt ST
Caloplaca trachyphylla (Tuck.) Zahlbr. ST, SB
Candelariella aurella (Hoffm.) Zahlbr. ST
Candelariella rosulans (Müll. Arg.) Zahlbr ST, SB
Candelariella terrigena Räsänen ST, SB, JR
Candelariella vitellina (Hoffm.) Müll ST, SB
Catapyrenium sp. ST
Catapyrenium squamellum (Nyl.) J.W. Thomson JR
Chaenothecopsis debilis (Turner & Borrer ex Sm.) Tibell (on wood) ST
Cladonia nashii Ahti ST
Collema tenax (Swartz) Ach. ST
Dermatocarpon miniatum (L.) W. Mann JR
Dimelaena oreina (Ach.) Norman SB, JR, PP
Diploschistes muscorum (Scop.) R. Sant. ST, JR
Lecanora cenisia Ach. ST, SB, JR
Lecanora garovaglii (Körber) Zahlbr. JR
Lecanora muralis (Schreber) Rabenh. ST, SB, JR, PP
Lecanora novomexicana H. Magn. SB
Lecanora polytropa (Hoffm.) Rabenh. ST, JR
Lecanora rupicola (L.) Zahlbr. JR
Lecanora cf. *sierrae* B.D. Ryan & T. Nash ST
Lecidea auriculata Th. Fr. ST, SB, JR
Lecidea atrobrunnea (Ramond ex Lam. & DC.)

Schaerer ST, JR, PP
Lecidea diducens Nyl. ST
Lecidea hassei Zahlbr. ST
Lecidea lapicida (Ach.) Ach. var. *lapicida* (Ryan keys) ST
Lecidea protabacina Nyl. ST
Lecidea tessellata Flörke ST, JR
Lepraria neglecta (Nyl.) Erichsen ST
Leprocaulon subalbicans (Lamb) Lamb & Ward (squamules only, on sod) ST
Letharia vulpina (L.) Hue DB
Lobothallia alphoplaca (Wahlenb.) Hafellner ST, SB, PP
Melanelia tominii (Oksner) Essl. SB
Peltigera collina (Ach.) Schrader BP
Peltigera ponojensis Gyelnik ST, JR
Physcia dubia (Hoffm.) Lettau ST, SB, JR
Physcia tribacia (Ach.) Nyl. ST
Physconia enteroxantha (Nyl.) Poelt. JR
Physconia isidiigera (Zahlbr.) Essl. JR, PP
Physconia isidiomuscigena Essl. ST
Physconia muscigena (Ach.) Poelt ST, JR
Placidium squamulosum (Ach.) Breuss ST
Pleopsidium chlorophanum (Wahlenb.) Zopf ST, SB, JR
Pleopsidium flavum (Bellardi) Körber SB
Polysporina simplex (Davies) Vezda ST
Pseudephebe minuscula (Nyl. ex Arnold) Brodo & D. Hawksw. JR, BP
Psora decipiens (Hedwig) Hoffm. SB, BP, JR
Psora globifera (Ach.) Massal. ST, BP
Psora pruinosa Timdal ST
Rhizocarpon riparium Räsänen ST
Rhizoplaca chrysoleuca (Sm.) Zopf. ST, SB, JR, PP
Rhizoplaca melanophthalma (DC.) Leuckert & Poelt ST, SB, PP
Sarcogyne privigna (Ach.) A. Massal. ST
Sarcogyne regularis Körber ST, DB
Sarcogyne similis H. Magn. ST
Sporostatia testudinea (Ach.) A. Massal. JR, BP
Staurothele drummondii (Tuck.) Tuck. ST, SB, JR
Umbilicaria krascheninnikovii (Savicz) Zahlbr. ST, SB, PP
Umbilicaria virginis Schaerer BP, JR
Verrucaria sp. ST
Vouauxiella lichenicola (Lindsay) Petrak & Sydow ST
Xanthoparmelia coloradoensis (Gyelnik) Hale SB
Xanthoparmelia mexicana (Gyelnik) Hale SB
Xanthoria candelaria (L.) Th. Fr. SB

Xanthoria elegans (Link) Th. Fr. ST, BP, SB, JR
Xanthoria soredata (Vainio) Poelt SB

Reported by Judy Robertson

CALS LICHEN WALK,
 SAN PEDRO VALLEY PARK,
 SATURDAY, SEPT. 6, 2003

San Pedro Valley Park is located in San Mateo county near the city of Pacifica. It is a 1,150 acre park with three fresh-water creeks: the south and middle forks of the San Pedro Creek, and Brooks Creek, which flow all year around. These creeks provide some of the few remaining spawning areas for migratory Steelhead in the county.

On Saturday, Sept. 6, Sara Blauman, Susanne Altermann, Stella Yang, Bill Hill, Loretta and John McClelland, Jim Mackey, Brad Hinckley, Carolyn Pankow and Catherine Antista met for this lichen walk with Judy Robertson as guide. The first 40 minutes we gathered at a round picnic table to look at an assemblage of lichen-covered twigs from the area, learning the difference between foliose, fruticose and crustose lichens; trying to discern yellow-green from greenish-yellow, grayish white from blue-gray; learning about the morphology and reproductive structures of the specimens and keying some of the most common lichens in the park using a simple key Judy had made.

After this introduction to lichens we started the actual walk in the park. We talked about lichen ecology and that we would be seeing lichens growing on trees, soil, rocks and artificial surfaces throughout the day.

The picnic area was filled with bay trees, willow and oaks. Interesting was a very old deciduous oak trunk covered with a variety of lichen crusts on the hardened smooth squares of bark contrasted with the deep grooves separating the squares, barren of lichens. The old trunk was covered with *Ochrolechia*, *Lecanora*, *Graphis*, *Pertusaria*, *Caloplaca* and *Buellia* species. We observed lichen succession from twig to trunk.

We started up the Hazelnut trail and some of the

participants were brave enough to taste the bitter *Pertusaria amara* (Ach.) Nyl. on the live oak trunks. A small nucleus of *Ramalina menziesii* Taylor covered the branches on the beginning of the trail and Jim Mackey, resident botanist, said this was the only concentration of *R. menziesii* in the park. The moist coastal fog encouraged the growth of *Dimerella lutea* (Dickson) Trevisan on the oak trunk beneath the *Ramalina* growth.

The Hazelnut trail moves out of the oaks and through some open chaparral where we started looking at lichen growth on soil. Four species of *Cladonia* including *Cladonia chlorophaea* (Flörke ex Summerf.) Sprengel and *C. squamosa* var. *squamosa* (Nyl. ex Leighton) Vainio with *Fuscopannaria praetermissa* (Nyl.) P.M. Jorg were growing on the soil banks. Lichens were not the only soil binders present as a species of liverwort was also quite prevalent along the trail.

At the highest point in the walk we stopped at a live oak next to the trail. Covered with many foliose and fruticose lichens, this was a great place for looking at lichen color contrasts and morphology differences and reinforcing what we had learned at the picnic table at the beginning of the day. Again, the coastal influence was evident with *Vermilicinia cephalota* (Tuck.) Spjut & Hale and *Heterodermia leucomelos* (L.) Poelt growing on the trunk and twigs. Many foliose and fruticose lichens including *Flavoparmelia caperata* (L.) Hale, *Parmotrema chinense* (Osbeck) Hale & Ahti, *Parmelia sulcata* Taylor, *Punctelia subrudecta* (Nyl.) Krog, *Xanthoria oregana* Gyelnik, *Nephroma helveticum* Ach., *Ramalina farinacea* (L.) Ach. and *R. pollinaria* (Westr.) Ach. were growing on the tree.

Judy challenged the participants to find a small hummingbird nest hidden in the crook of the branches, well camouflaged with lichens. It was found and photos taken. Sara Blauman, a birder, explained that the nest was probably never used as it did not appear expanded as a nest would after being filled with fledglings. The close proximity of the nest to the trail was the probable explanation.

As we came back to the starting point of the hike, we circled through the Park Nature Trail to a lawn area North of the Park Office. The smooth bark of

the alder trees was a great place to see where lichen crusts completely covered the trunks. We could hardly find a spot free of lichen growth. The smooth bark hosted *Lecanora pacifica* Tuck., *Tephromela atra* (Hudson) Hafellner, *Caloplaca* and *Buellia* species and the influence of the well-watered and fertilized lawn area probably contributed to the growth of *Xanthoria parietina* (L.) Th. Fr. on the lower part of the trunks.

The last stop was the cement in front of the Office. Earlier in the walk we found red, fuzzy trentepohlia growing on the wood bridge crossing San Pedro creek and here we would see an example of lichen on an artificial surface. The yellow-orange, sorediate *Caloplaca citrina* (Hoffm.) Th. Fr. was growing on the raised block of cement holding the flagpole.

Many stayed for lunch in the picnic area where we talked about lichens and lichen projects. Brad brought some slides of lichens and Bill and Judy helped identify them. Carolyn Pankow of San Pedro Valley Park had organized the walk and Judy presented her with a CD and photos of the lichens in the park. It was an enjoyable day for all.

Reported by Judy Robertson

FIELD TRIP TO CUYAMACA RANCHO STATE PARK,
SAN DIEGO COUNTY
OCTOBER 25, 2003

Dr. Tom Nash III from Arizona State University guided us through a variety of lichen species in the Cuyamaca Mountains of San Diego County. We made a loop hike beginning at Paso Picacho Campground through black oak and mixed coniferous forests. Dr. Nash had previously done some brief work in the Cuyamaca Mountains, using the area as a control for lichen-based air quality studies in southern California.

The goal of the trip was to explore the Cuyamaca area further, and for most of us to become more familiar with the southern California lichen species. Dr. Nash and Judy Robertson had permits for collections while most of the group were just along to learn and photograph. Ron Robertson also collected a variety of mosses on the trip.

We began at a series of rock outcrops and oaks near the campground. Species included *Dimelaena thysanota*, *Lecanora muralis*, *Lepraria* sp. *Diploschistes actinostomus*, *Lecidea atrobrunnea* group, and *Rhyzoplaca melanophthalma* (Ram.) Leuckert & Poelt. It was interesting to see a very outstanding chocolate brown *Aspicilia* that still has not been named. On bark we noted *Lecanora mellea*(?) and *Xanthoria polycarpa*.

Most of the hike was spent along Azalia Creek in what were dense forests of incense cedar and white fur. The area had been burned in a low intensity controlled burn about 15 years ago and it was nice to see a healthy variety of lichen species including large clumps of *Hypogymnia*. Bark also contained *Lecanora carpenia*, *Lecidea sensustricta*, *Pertusaria melanpunctia* and *Ochrolechia* sp. Somewhat prophetically the topic of discussion turned to fire ecology and we found outstanding colonies of *Hypocenomyce* sp. and *Trepeliopsis* sp. on old burned incense cedar stumps.

We had lunch along the trail and continued by a series of rock outcrops with *Dermatocarpon* sp. before reaching Azalia Springs. After a brief break there the now tired group high tailed it back to the starting point. Many of the group then adjourned for some socializing and dinner at Cuyamaca Lake.

As we were leaving for home Wayne Armstrong and Steve noted a fire around dusk and as we drove back we noted two fire trucks coming from the Mount Laguna area toward the beginnings of what would become the Cedar Fire. Little did any of the group know that this hike was our last opportunity to see the area as dense coniferous forest for quite some time. By Monday night I watched from Mount Laguna as the Cedar fire burned through the 500 year old sugar pines near the top of Cuyamaca and Middle Peak and on Tuesday afternoon, the fire picked up eastward speed and roared through the area where we had just hiked three days before as a crown fire. Most of the trees in the area were lost along with many of the nearby homes. Fire crews saved the restaurant where we had dinner, but most of the homes in the area were not so lucky.

The trip and the fire highlight the transitory and ever changing nature of our environment. It also points out how valuable collections are. The collections made on this trip will be important guides by which to measure the future recovery of biological diversity in the area. Wayne Armstrong of Palomar Community College took some great photographs on the trip that are already up on his excellent website at <<http://waynesword.palomar.edu/pljan98e.htm>>.

Thanks again to our leader and all those who participated. The group included Dr. Tom Nash, student, volunteer, Judy Robertson, Ron Robertson, Andrew Pignuolo, Mary Ann Hawk, Wayne Armstrong, Wayne's friend Steve, Sara Blauman, Lawrence Glacy, Kerry Knudsen, and Katz Hasebe.

Reported by Andrew Pignuolo

AN INTRODUCTION TO CRUSTOSE LICHENS
DARWIN HALL, RM 207, SSU, COTATI, CA.
NOVEMBER 15, 2003

Judy's husband Ron Robertson had made a "teaching set" of crustose lichen specimens to use for this

workshop. Each participant had the same 15 specimens to examine.

We used the excellent descriptions of crustose lichen thalli in the *Lichen Flora of the Greater Sonoran Desert* to compare and contrast the specimens. We examined different apothecial morphologies, then used the compound microscopes to look at our apothecial sections. Most types of spores were represented in the teaching set. We filled out worksheets for each specimen and then, the last activity in the afternoon, used all of the data to identify the specimens. This was an intense day, with a lot fitted into 6 hours but we ended with a pretty good feel for crusts.

Thank you to Dr. Chris Kjeldsen for making arrangements for the classroom in Darwin Hall where we could use the dissecting and new compound scopes.

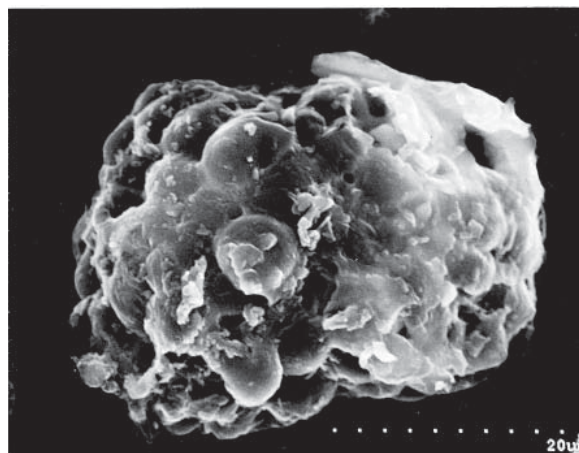
Participating were Sara Blauman, Katz Hasebe, John and Loretta McClellan, Don Brittingham, Tamara Sasake, Bill Hill, and Judy Robertson

Reported by Judy Robertson

From our editor, Charis Bratt: "This is an SEM photo of the spore of *Texosporium sancti-jacobi* – the 'Woven spore lichen.' A misnomer in my opinion, but the picture may be of interest."

Photo credit Dr. Sherwin Carlquist.

See also article and illustrations of *T. sancti-jacobi* in CALS Bulletin 9(2), Summer 2002



20μ

Upcoming Events

HOWARTH PARK, SONOMA CO.
SATURDAY, JANUARY 10, 2004, 10 AM

Nestled in the midst of the City of Santa Rosa is Howarth Park, 150 acres of oak woodland with a small lake, many walking paths and trailside benches. With mild climate and coastal fog, Sonoma County is rich in lichen flora. Saturday, January 10, Judy Robertson will be leading a lichen walk for the local CNPS chapter. CALS members are welcome to join. We will look for the common lichens in the Park, do some field identification, and talk about lichen ecology. We will start at 10 and end about 2. Bring a lunch.

From Hwy 101 turn East on Hwy 12, continue East to Summerfield Road and turn left (North). The Howarth Park entrance will be on the right before you get to Montgomery Drive. Turn right into the Park road and continue up the road to the larger parking lot by Lake Ralphine. Meet at the Nature trailhead (by the maintenance shed).

MCCLELLAN RANCH PARK, SANTA CLARA CO.
SATURDAY, JANUARY 17, 2003, 10 AM

This is the CALS field trip originally planned for October 25, 2003 but cancelled due to the conflict with the field trip to Cuyamaca State Park led by Dr. Tom Nash. We have rescheduled it on this January date.

Following are the directions, but please refer to the CALS Summer 2003 bulletin for more information about the park. Directions: McClellan Ranch Park is located in the city of Cupertino (Santa Clara County). Take Highway 85 to the Stevens Creek Boulevard exit in Cupertino. Go west on Stevens Creek for about a mile until it intersects with Stevens Canyon Road. Make a left turn onto Stevens Canyon Road, then proceed for about a third of a mile (heading south), until you see McClellan Road on your left. You may have to drive slowly to find the street sign. Make a left turn onto McClellan, then proceed about one quarter of a mile, until you

will see a golf course on your right. At this point slow down; the park will be on your immediate left. There is currently no admission fee.

For more information about McClellan Ranch Park, please call Cupertino Parks and Recreation at (408) 777-3120, or visit <www.cupertino.org/update/rec/facility.htm>. We will meet in the parking lot at 10 am. Bring a lunch.

ROCK CITY AREA FIELD TRIP,
MT. DIABLO, CONTRA COSTA CO.
10AM, SATURDAY, JANUARY 31, 2004
FOLLOWED BY, AT 5PM,
CALS POTLUCK/BIRTHDAY CELEBRATION/
GENERAL MEETING
BRICKYARD LANDING CLUBHOUSE
POINT RICHMOND

This promises to be a great day, full of CALS activities. We will start at the Rock Creek Area of Mt. Diablo at 10 am. Doris Baltzo, a long-time CALS member, will lead us on a lichen foray to this area, familiar to her as her Masters Thesis was *The Lichens of Mount Diablo State Park*. We will meet at the Rock City Area of Mt. Diablo. Coming from the North or South on Hwy 680, watch for the Mt Diablo signs, and turn east on Diablo Road (So. of Alamo). Drive east to the South Gate. Rock City will be the first picnic area after the gate. This will be our starting point. We may reach the summit, which has a fire trail around it with many rock lichens. Bring a lunch.

At approximately 4 pm, we will drive to the Brickyard Landing Clubhouse in Pt. Richmond, where we will hold our annual CALS Potluck, Birthday Celebration and General Meeting. If you need directions to the clubhouse, contact Janet or Richard at <rdoell@sbcglobal.net> or (510) 236-0489

After the meeting, Richard and Janet Doell will show slides taken in connection with the preparation of their new mini guide to Southern California Lichens, which is approaching completion, and talk about some of their experiences along the way.

CALS will furnish the cake, plates, utensils and drinks for the Pot luck. Please bring your favorite dish to share.

Contact Judy Robertson at <jksrr@aol.com> or 707-584-8099 if you plan to attend the field trip and/or dinner.

BEGINNING LICHEN WORKSHOP
UC DAVIS
10AM TO 4PM, SATURDAY, FEBRUARY 28, 2004

This beginning lichen workshop is primarily for the Davis Botanical Garden community, however, if there is available space, CALS members can attend. Please contact Judy Robertson if you are interested.

POINT REYES NATIONAL SEASHORE
FIELD TRIP TO THE LIGHTHOUSE AND PIERCE
RANCH
SATURDAY, MARCH 20, 2003

A lichen walk at Pt. Reyes National Seashore. We will meet in the morning at the parking lot for the Lighthouse at 10 AM and look at lichens in that area. Then we will proceed to the Pierce Ranch where there is a remarkable collection of lichens on the old wooden fences there. Bring a lunch, a hand lens, and warm clothes. There will be no collecting. To sign up please contact Janet Doell at 512-236-0489 or e-mail her at <rdoell@sbcglobal.net>.

NORTHWEST LICHENOLOGIST MEETING
ELLENSBURG, WASHINGTON
MARCH 25-27, 2004

The NW Lichenologist meeting will be in Ellensburg, WA, March 25-27, 2004. There will be a field trip on Saturday the 27th. Jeanne Ponzetti and Roger Rosentreter are in charge of the program, workshop and field trip. The "theme" is still not formalized at this point, but considering Jeanne's and Roger's expertise in soil crusts, that will probably be the focus of the workshop and field trip.

For more details as the date gets closer, go to the NW

Lichenologist Website at <scarab.cordley.orst.edu/guild/>.

NORTHERN CALIFORNIA LICHEN TOUR
SHERWOOD ROAD, WEST OF WILLITS AND
BROOKTRAILS
10AM, SATURDAY, APRIL 17, 2004

The area is a wonderland of lush, lichen growth of all kinds. The terrain is a transition zone between the redwood and Douglas fir forest. There are large open areas of meadows and wet zones with huge rock monoliths and out-crops providing a rich environment for many species of lichens. CALS members Don Brittingham and the late Jerry Cook explored this area for lichens. Don will guide us to the best lichen spots. Meet at the Skunk Train Railroad Depot parking lot for carpooling to the various sites 15-20 miles away.

IN SEARCH OF *Verrucaria tavaresiae*
LICHEN WALK, BEAR VALLEY TRAIL TO ARCH ROCK
POINT REYES NATIONAL SEASHORE, MARIN CO.
10AM, SUNDAY, MAY 1, 2004

Dr. Dick Moe is an expert on the marine lichen *Verrucaria tavaresiae* Moe. He will lead us to the site at Arch Rock in Marin County where we will be able to see this lichen that he described in the CALS Summer 1997 Bulletin (Vol. 4, No. 1). Dick claims that once you develop the right search image, this lichen will be a lot easier to spot elsewhere. We will start at the Bear Valley Trail Parking lot. From the parking lot to Arch Rock is approximately 4 miles, so be prepared for a day of walking. We will explore for lichens along the way. Bring a lunch and water.

ONGOING LICHEN IDENTIFICATION WORKSHOPS

Darwin Hall, Room 207, Sonoma State University. The 2nd and 4th Thursday of every month, 5 pm to 8:30 pm. Join us every 2nd and 4th Thursday of each month for these Lichen ID sessions at SSU. We bring our own specimens and use the classroom dissecting and compound scopes and a variety of keys to identify them. For more information contact Judy Robertson at <jksrr@aol.com>.

Announcements

A SINCERE THANKS

The California Lichen Society would like to thank our benefactors, donors and sponsors for the second half of 2003. Their support is greatly appreciated and helps in our mission to increase the knowledge and appreciation of lichens in California.

Benefactors:

Irene Brown

Donors:

David Magney
Patti Patterson
John Pinelli

Sponsors:

E. Patrick Creehan, M.D.
Lawrence Janeway
Kerry Knudsen
Donna Maytham
Elizabeth Rush
James Shevock

ELECTION TIME!

CALS officers serve a two year term beginning in January. January 2004 will be the beginning of the 6th term of officers. We are pleased to announce the proposed slate below. You will find a flyer in this bulletin for you to cast your vote. Please return the ballot with your membership dues. A no vote cast will be considered an affirmative vote for the following slate:

President Bill Hill
Vice President Boyd Poulsen
Secretary Sara Blauman
Treasurer Kathy Faircloth

(Members at Large are the CALS Bulletin Editors)

GIFT OF SPECIMENS

The California Lichen Society has received from the Herbarium of Nonvascular Cryptogams, Monte L. Bean Life Science Museum, Brigham Young University, Larry St. Clair Curator, Fascicle No. 3 of "Anderson and Shushan: Lichens of North America," Nos. 51-75, except 60, 74, 75

51. *Cyphelium notarishii* (Tul.) Blomb. & Forss.
52. *Dermatocarpon miniatum* (L.) W. Mann
53. *Dimelaena oriena* (Ach.) Norman
54. *Diploschistes muscorum* (Scop.) R. Sant.
55. *Evernia divaricata* (L.) Ach.
56. *Hypogymnia heterophylla* L. Pike
57. *Icmadophila ericetorum* (L.) Zahlbr.
58. *Imshaugia placorodia* (Ach.) S.F. Meyer
59. *Lecanora novomexicana* H. Magn.
60. *Lecanora varia* (Hoffm.) Ach.
61. *Lobaria hallii* (Tuck.) Zahlbr.
62. *Ochrolechia upsaliensis* (L.) A. Massal.
63. *Parmelia sulcata* Taylor
64. *Parmeliopsis ambigua* (Wulfen) Nyl.
65. *Peltigera collina* (Ach.) Schrader
66. *Peltigera venosa* (L.) Hoffm.
67. *Physconia muscigena* (Ach.) Poelt
68. *Pseudevernia intense* (Nyl.) Hale & Culb.
69. *Psora nipponica* (Zahlbr.) Gotth. Schneider
70. *Rhizoplaca chrysoleuca* (Sm.) Zopf
71. *Solorina crocea* (L.) Ach.
72. *Solorina octospora* (Arnold) Arnold
73. *Sporastatia testudinea* (Ach.) A. Massal.
74. *Tephromela armeniaca* (DC.) Hertel & Rambold
75. *Unbilicaria deusta* (L.) Baumg.

Thank you Dr. St. Clair. These specimens are now in the CALS Herbarium Library. If you wish to borrow any of them, please contact Judy Robertson at <jksrr@aol.com>. Postage is the responsibility of the borrower.

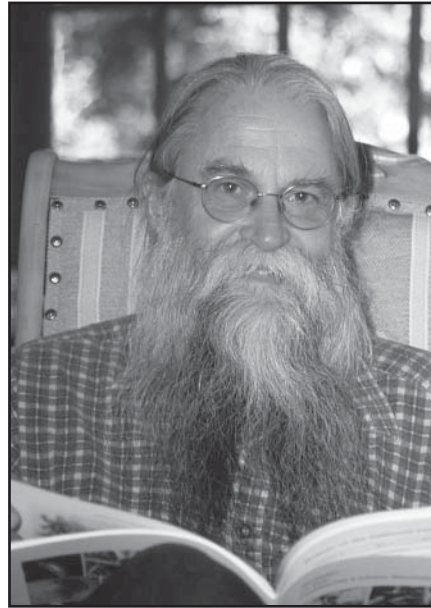
See also specimen lists in CALS Bull. V10(1).

(Announcements continued on p. 52)

President's Message

Lichenology, "Us Amateurs," and How We Do It

There are so precious few "Professional Lichenologists," who have managed to make studying lichens an income producing occupation, that I sometimes wonder if we should form a "committee for the preservation of endangered lichenologists." Lichenology is NOT a lucrative business, so it must be an occupation of love and concern for the subject. To me "professionals"—those with formal training in lichenology—would include students whose total life focus is researching lichens under the guidance of their professors. The rest of us are "amateurs" who obviously must be doing it out of love, with no visible economic support from the activity. What we know about lichens, we manage to scrape together and badger from the experts as best we can, and by helping each other. That is much like how our California Lichen Society was started. CALS is not a university department with tenured professors and academic endowments - although we do have professors, professionals, and students whose efforts are blessed—and somewhat remunerated—by their position. We are mostly a bunch of amateurs seized by the wonders of lichens, and studying them on our own. So how do we do it?



It is wonderful to meet new members on fieldtrips who are 'bitten' by the wonders of lichens and forge ahead learning so fast, buying all the books, and attending just about every workshop and gathering we have on lichens. Boyd Poulsen travels four hours just to attend our Thursday night workshops. Surprisingly quickly many become quite competent with little or no apparent formal training. There are those, such as Doris Baltzo, with a former education in lichenology, who still volunteer regularly at the herbarium. Their ranks are joined with new members, such as Kerry Knudsen, who is now spending time at the UC Riverside herbarium.

One help is to maintain some kind of focus to keep from being overwhelmed while we bootstrap ourselves into "lichenologists." Back when we first started CALS, Darrell Wright said, "Pick a genus and get to know it". A corollary might be "pick a rock or tree and get to know the lichens on it".

It is also interesting to find so many 'dynamic duos'—couples such as Judy and Ron Robertson, Janet and Richard Doell, and even 'professionals' like Tom Nash and Corina Griess, Roger Rosentreter and Ann DeBolt—who support each other's work around lichens.

In the end there is a symbiosis between the professionals and amateurs. The amateurs get an education with help from the professionals, and further the social climate and public interest in lichens, which helps professionals secure their position.

We at CALS keep the organization going without burning ourselves out, by rotating the functions of our governing Board with an election of officers every two years. The coming year will have some of those changes. For the next term we are considering: Kathy Faircloth to replace Stephen Buckhout for treasurer, Sara Blauman to take over Judy Robertson's main role as secretary, and Tom Carlberg to take on the duties of editor from Cherie Bratt. I am willing to continue as president, as is Boyd Poulsen as vice president. We thank you all who are stepping down: Stephen for your adept handling of our finances and level headed advice on the Board, Judy for your many tasks at keeping the organization going (although she still wants to keep organizing our fieldtrips), and Cherie for your hard work at keeping our CALS Bulletin a work of Professional Stature. And we certainly need the wisdom of our—shall we say “CALS elders”—so don't go too far away!

Lets keep at it—as we delve more into this interesting niche of life on our planet.

Bill Hill

Announcements Continued from p. 50)

DONATION OF LICHEN LITERATURE

Stephen Sharnoff has generously donated 3 large boxes of lichen literature to the CALS Library. These are articles from various journals and data on a gamut of lichen subjects. Presently they are alphabetized in hanging folder files. If you are interested in putting these into a database so CALS members can check them out for loan, please contact Judy Robertson at 707-584-8099 or <jksrr@aol.com>.

ITEMS FOR SALE

CALS has the following items for sale. Checks should be made out to The California Lichen Society.

1. A CALS mini guide to some common California Lichens, text by Janet Doell, photography by Richard Doell. A pocket sized book illustrating 41 lichen species, with an introduction and descriptive notes for each photo. Designed as an introduction to California lichens for anyone interested in the natural world who would like to learn something about lichens. Price \$10.00 (tax included), \$12.00 if mailed. To order contact Janet Doell at 510 236-0489, or e-mail her at rdoell@sbcglobal.net.

2. CALS lichen poster. This colorful 30" x 20" poster

features 21 lichens. Photography by Richard Doell. You can see a picture of the poster at the CALS Web site: <http://ucjeps.herb.berkeley.edu/rlmoe/cals.html>. To order contact Janet Doell as outlined above.

3. Hand Lens. \$5.00 (tax included), \$7.00 if mailed. These are Waltex 4 x 6 x 10 magnifiers (2 fold out lenses in a single holder; they are superimposed for the highest magnification). To order contact Judy Robertson at 707 584-8099 or e-mail her at jksrr@aol.com.

4. 2004 *Lichens of the Sonoran Desert Region* Calendar, 16 pages spiral bound 8 1/2 inches wide by 11 inches high, produced by CALS member Frank Bungartz of Arizona State University. \$15 (tax included), plus postage if mailed: \$2.21 domestic within USA, \$3.10 to Canada, \$8 air delivery foreign (outside of USA or Canada), or \$4 foreign economy rate (3 to 8 weeks delivery). To order contact Bill Hill at aropoika@earthlink.net and send payment AND your mailing address to: Calendar, POBox 472, Fairfax CA 94930. This year's calendar includes informative notes for lichens depicted. You can preview it at <<http://ces.asu/ASULichens/profiles/calendar.html>>.

For lichen identification supplies, including chemical kits, please contact Charis Bratt at 805 682-4726, ext. 152, or e-mail her at cbratt@sbbg.org.

The Bulletin of the California Lichen Society

Vol. 10, No. 2

Winter 2003

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Back Cover:

Image 1. Type of *Acarospora reagens* Zahlbr. Collected on sandy soil near Palm Springs at eastern base of San Jacinto Mountains by Hasse. Squamule size 1-1.5mm.

Image 2. *Lecanora pleistospora* Nyl. "Hab. Earth foothills of Santa Monica Mountains Cal/orig. locality near Soldier's Home"—Hasse on label (Isotype. Squamule size 1mm.

Image 3. *Lecanora peltastictoides* Hasse Type collected by Hasse. "Palm Springs, Riverside County, California, 1901."

Image 4. *Acarospora thelococcoides* (Nyl.) Zahlbr. Collected by Clifford Wetmore in Riverside County, California, 1966. Squamule size 1mm.

Image 5. *Lecanora steonospora* Stiz. (isotype) "An *Acarospora*"—Bruce Ryan at dinner in Tempe, Arizona, 2003. Collected in San Gabriel Mountains above 1700 meters by Hasse. Squamule size 1mm

All Photographs by Frank Bungartz, ASU Lichen Herbarium, Tempe, Arizona.
(See article by Knudsen on page 36.).



Illustrations for article by
Knudsen page 36

Legend on overleaf

