

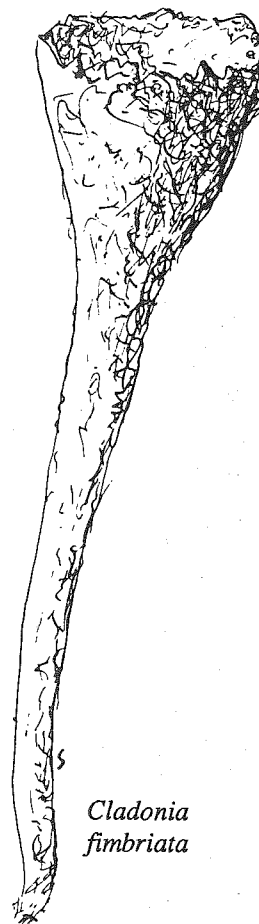
BOSTON LICHENS PAST, PRESENT AND FUTURE

Boston lichenologists, whose records and collections of lichen species in the metropolitan area can be found in the Farlow Reference Library and the Farlow Herbarium, probably had little notion of the comparative uses to which their efforts eventually would be put. Ten years ago Dr. Martha Sherwood and I decided to document the changes which have occurred in the Boston area lichen flora since the earlier records were made. We compared the published records and collections of lichen flora in the Boston area made prior to 1915 with our floristic study done during 1978 and 1979.

Since the middle of the nineteenth century, European lichenologists have been noting the detrimental effects of urbanization and industrialization on lichens by asking essentially the same question we did: "How do the past and present floras compare?" Our question was simple, our labor long, and our results sad but in keeping with other studies done in urban areas.

To construct a retrospective flora for the area we turned to the historical

literature. Edward Tuckerman, pioneer American lichenologist, began his studies in Cambridge, and between 1839 and 1845 he enumerated some New England "Lichenes" in four publications. Clara E. Cummings wrote a short checklist of the lichens in the *Flora of the Blue Hills, Middlesex Fells, Stony Brook and Beaver Brook Reservation* in 1896. The work of Lorin L. Dame and Frank S. Collins for the Middlesex Institute in 1888 and an unpublished manuscript of Lincoln Ware Riddle, "Lichens of Middlesex County," dating back to around 1915, were also checked for local lichen records. The problems we encountered constructing the historical flora with respect to species frequency and nomenclature are well summarized in the introduction to the lichen checklist in Dame and Collins' *Flora of Middlesex County*.



*Cladonia
fimbriata*

This list is undoubtedly far from being a complete catalogue of the lichens of Middlesex County; and the number of species would probably be double if the same study could be given to this order as to the flowering plants or ferns. As it stands, it is a list of species known to occur here; but the absence of any species from this list does not at all imply that it does not grow in the county, or even that it is very rare. In arrangement, nomenclature, etc., Tuckerman's later works have been followed, which gave a somewhat different system in the use of names of authorities for genera, species, etc., from that employed in other orders. Unless otherwise stated, species from Cambridge, Watertown, Newton, Medford, Arlington, and Lexington are on the authority of Prof. Tuckerman; from Waltham, Mrs. S. E. French; from Chelmsford, Rev. J. L. Russell; and species from Natick and Sherborn were collected by Clara E. Cummings, to whom the writers are much indebted for a revision of the entire list of lichens, as well as for additional species and localities.

With the historical flora we constructed from the literature in hand, we conducted a herbarium search to verify the records. Using both the accepted lichen names and the names used by the former authors, we systematically searched the herbaria of Tuckerman, Riddle, and Charles J. Sprague and the general lichen herbarium at the Farlow. The small herbarium of the New England Botanical Club was also examined. Reading the labels on nineteenth-century herbarium packets is a challenge comparable only to identifying depauperate urban *Cladonia* species.

Based on the locations cited in the historical records we decided to limit our current floristic study to locations within route 128. Between July 1978 and August 1979, we visited 94 sites. The sites were selected either because they were mentioned in the literature or because they had substrates known to be "favored" by lichens. The large reservations to the north of the city, Middlesex Fells and Lynn Woods, and the Blue Hills Reservation to the south of the city were included, as were 31 city parks, 18 cemeteries, 11 vacant lots, 9 coastal areas (including the Boston Harbor islands), 11 residential streets and yards, and one bog (The Great Cedar Swamp in the Blue Hills Reservation).

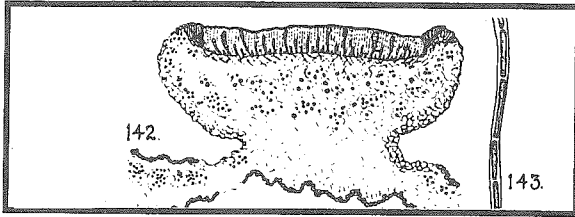
At each site a spectrum of likely substrates was examined. Readily identified species were recorded and questionable species were

collected. Determinations were made using Mason E. Hale's *How to Know the Lichens* and Irwin M. Brodo's "The Lichens of Long Island." Chemical analyses were limited to spot tests.

Our results confirmed that the Boston metropolitan area has become a less favorable locality for lichens than it has been in the past. The historical flora was found to consist of 225 species. About two-thirds, or 147 species, of the historical flora has vanished. The historical flora had 81 genera. In 1979 there were 41 left and 15 of these were rare, being found only once or twice in our survey area. The rare remaining genera are *Candelaria*, *Cetraria*, *Dermatocarpon*, *Graphis*, *Peltigera*, *Pertusaria*, *Phaeographis*, *Pycnothelia*, *Ramalina*, *Rhizocarpon*, *Stereocaulon*, *Trypethelium*, *Umbilicaria*, *Usnea* and *Verrucaria*.

Among the 40 genera now missing from our Boston flora are graceful fruticose genera (*Ephebe*, *Evernia*), many large terricolous and corticolous foliose and fruticose genera (*Anaptychia*, *Lobaria*, *Nephroma*, *Sticta*), genera with symbiotic cyanobacteria (*Collema*, *Leptogium*) and several epiphytic crustose genera (*Arthonia*, *Conotrema*, *Xylographa*).

The current flora has been reduced to 123 species, 35 percent of the historical count.



Sixty-three percent of the current flora is composed of species found in the historical records; 37 percent, or 45 species, are new records for the area. The 48 genera represented in the current flora include the rare ones mentioned above. The 7 genera new to the flora are all crustose lichens, ones possibly easily overlooked by earlier lichenologists, but lichens for which the remaining rock outcrops in the area and the brick-and-mortar structures of the city are suitable substrates.

The taxa that are still surviving in the Boston urban area are doing so in the least-disturbed areas, such as the road cuts, large reservations, established residential areas and cemeteries. Here, the foliose lichens, *Xanthoparmelia*, *Parmelia*, *Physcia*, and *Hypogymnia*, are found in varied states of health and abundance. *Cladonia* is ubiquitous. At its best, we found it in typical sizeable mats; at its worst, it consisted of unidentifiable squamules at the base of tree trunks. A little over half of the current flora is composed of crustose lichen genera found on surfaces subjected to little wear or substrate buffering, such as rock outcrops, walls, bark and tombstones. *Lecanora dispersa* (Pers.) Sommerf., a crustose mortar lichen, was found in 57 sites, a testament to both its ability to colonize urban areas and to the amount of mortar in Boston.

Where data permitted, we attempted to compare distribution patterns for species found both in the current and historical floras. Pollution-sensitive species are now found less frequently the closer one gets to

the heart of the city. The changes in the frequencies of fruticose, foliose, crustose and leprose-crustose species parallel the findings of Brodo (1968) for New York City and Laundon (1967) for London. By dividing our research area into concentric four-mile-wide zones around the center of the city and taking into consideration the areas of these zones, we were able to document this decrease in species richness. Within a four-mile-wide radius of the city center, 23 species were found. In the four-mile-wide concentric ring located between 4 and 8 miles, 58 species were found. Finally, in the ring lying immediately outside of this, we found 85 species.

Monitoring of pollutants suspected of damaging lichens did not exist when the historical collections were made. At the time of our study, the Massachusetts Department of Environmental Quality Engineering reported sulfur dioxide (the principal pollutant suspected of damaging lichens) levels were high enough to support our findings. David Hawksworth and Paulette M. McManus (1989) have reported that under conditions of ameliorating sulfur dioxide levels, lichen recolonization is occurring in London. It can only be hoped that future floristic work in the Boston area will show a similar trend.

Elizabeth J. Kneiper

REFERENCES

- Brodo, I.M. 1968. The Lichens of Long Island, New York: a vegetative and floristic analysis. *Bull. N. Y. State Mus.* 410: I-X, 1-330.
- Hawksworth, D.L., & P. M. McManus. 1989. Lichen recolonization in London under conditions of rapidly falling sulfur dioxide levels, and the concept of zone skipping. *Bot. J. Linn. Soc.* 100:99-109.
- Laundon, J.R. 1967. A study of the lichen flora of London. *Lichenologist* 3:277-327.

NEWS

C. G. LLOYD REPRESENTS FARLOW PORTRAIT COLLECTION IN HARVARD EXHIBIT

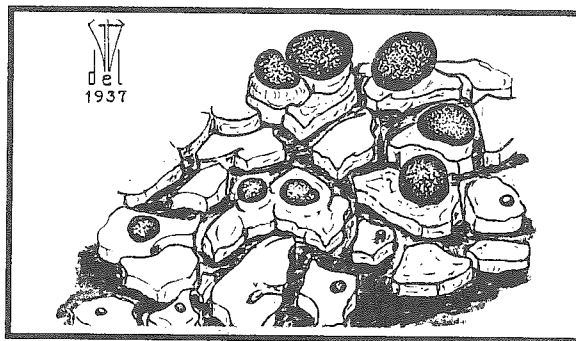
The photograph shows C. G. Lloyd in repose with cigar in hand and field dress including puteses, and with a Samoan woman at each side. The caption reads "Monsieur C. G. Lloyd and Two of His Samoan Friends send you Christmas Greetings from the South Pacific." This photo, eccentric mycologist C. G. Lloyd's 1904 Christmas card to colleague Roland Thaxter, was selected from among the "hundreds of thousands of photographs" at Harvard for inclusion in an upcoming exhibit and published catalog commemorating the 150th anniversary of photography -- "The Invention of Photography and its impact on Learning: Photographs from Harvard University." The exhibit opens November 2nd with displays at the Carpenter Center, Widner Library and numerous satellite exhibits throughout the University.

FURTHER READINGS FROM THE WORKS OF KEITH CLAY

The Special Guest of the 1989 FOF Annual Meeting (November 4th) is Keith Clay of Indiana University, Bloomington. Professor Clay's interests in fungal ecology have recently lead him into the realm of the endophytes, fungi that live their entire lives within a plant. Toxins produced by the fungi make endophytes likely candidates for the biological control of crop pests, which could reduce or eliminate the need for pesticides.

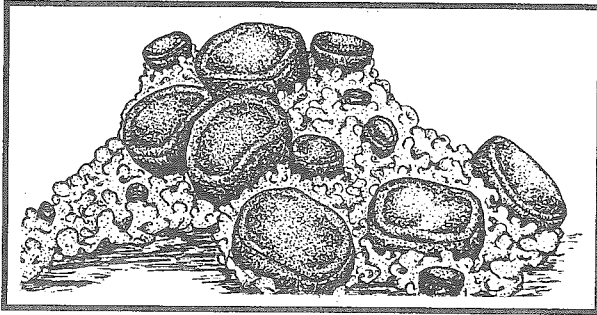
FOF members wishing to read more about Prof. Clay's work might consult his article

in the September 1989 issue of *Natural History* "Trespassers will be poisoned" or for a more detailed account see: "Clavicipitaceous endophytes of grasses: their potential as biocontrol agents" in *Mycological Research* 92(1): 1-12, 1989. (You don't recognize that title? That's the new name for the *Transactions of the British Mycological Society*).



DANISH "DISCO" AUTHORITY IS THE FARLOW'S 1989 GENEVA SAYRE VISITING SCHOLAR

Henry Dissing of the Inst. Sporeplanter, Copenhagen, Denmark visited the Farlow during September. Dr. Dissing is a noted authority on the "operculate discomycetes", the fungal group that includes *Peziza*, *Helvella* and those taste treats, the morels and truffles. Along with working in the herbarium and "talking shop" with the Farlow staff, Dr. Dissing was eager to get out and see the Northeastern mycota firsthand. An excursion to Mt. Monadnock resulted in valuable new material of *Medeolaria farlowi* first described in 1922 by Farlow mycologist, Roland Thaxter. *Medeolaria* is a real odd-ball among the fungi and typifies the monotypic order Medeolariales and family Medeolariaceae. Dr. Dissing's visit was made possible by the Friends of the Farlow, Geneva Sayre Fund.



FARLOW VISITORS

SINCE APRIL, 1989

M. Asód (Cambridge, MA), D. Barry (Durham, NH), F. Bowers (Stevens Point, WI), M. Bumgarner (Cambridge, MA), J. Cage (New York), D. Cheney (Boston, MA), H. Chun (Brighton, MA), M. Corlett (Ottawa), J. Cox (Cambridge, MA), M. Delaney (Belmont, MA), K. Dickey (Berkeley, CA), H. Dissing (Copenhagen), P. Else (Sitka, AK), R.O. & U.K. Fitten (Cambridge, MA), J. & G. Garges (Riverside, CA), G.R. Ghosh (Uttar Pradesh, India), Y. Hadar (Lexington, MA), S. Huhndorf (Urbana, IL), N. LeClair (Cambridge, MA), J.N. Leonard (Hingham, MA), P. May (Belmont, MA), D.W. Minter (Surrey, England), R.A. Moustafa (Petersham, MA), J.B. Raintree (Nairobi, Kenya), R.S. Peterson (Santa Fe, NM), M. Rajchenberg (Buenos Aires), J. Seger (Salt Lake City, UT), R.S. Sennett (Belmont, MA), P. Skerker (Lexington, MA), A. Takhtajan (Leningrad), P. Wendler (Lexington, MA),

FARLOW STAFF

Dr. Sharon Gowan will be spending one year at the Farlow Library and Herbarium as a lecturer in the Department of Organismic and Evolutionary Biology and as a post-doctoral fellow in the Harvard University Herbaria. Dr. Gowan received her Ph. D. from Duke University working with William and Chicita Culberson. Her thesis was on a group of crustose lichens, the genus *Porpidia*.

At Harvard she will be teaching a course with D.H. Pfister entitled "Non-vascular Autotrophs and Fungi" and will be continuing her work on the biology of lichens.

Joining the staff early in 1990 will be Dr. Benito Tan. Dr. Tan, a native of the Phillipines, will be employed under the Edwin Bartram Fund for Bryology as a research assistant.

FOF NEWS

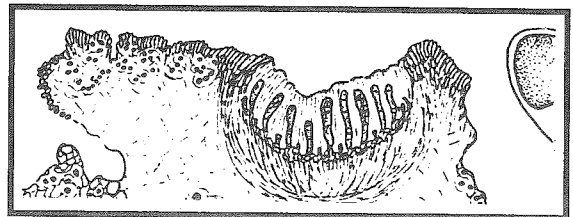
The Spring 1989 FOF Book Sale offered for sale 209 books and enticed 53 members to participate. Eighty-five percent (178 books) were sold resulting in \$1380.95 added to the FOF treasury.

Sabine Huhndorf of the Illinois Natural History Survey visited the Farlow this June supported by a FOF Graduate Fellowship. During her three-week stay she pursued her dissertation research on the taxonomy of *Leptosphaeria* occurring on Rosaceae.

We are pleased to welcome as new FOF members Michael Corlett (Ottawa, Canada), Kathleen J. McCarthy (Jersey City, NJ), and Philip Wendler (Lexington, MA).

We regretfully note the death this past March of L. Clarke Johnson of Kingsport, Tennessee, a charter member of FOF and an avid participant in all its book sales.

Some FOF coffee mugs remain. Should you wish to purchase any as Christmas gifts, don't wait!



FOF TREASURY

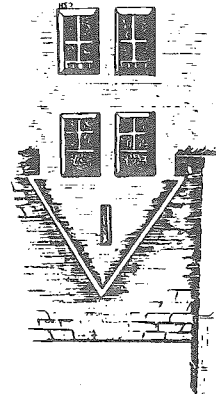
6/30/88 Balance	\$ 13 451.15
Income	\$ 4 565.68
Expenditures	\$ 3 813.71
5/21/89 Balance	\$ 14 203.12

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OF CRYPTOGAMIC

FARLOW REFERENCE LIBRARY

FOF ANNUAL MEETING

The 1989 annual meeting of the *Friends of the Farlow* will be held on **Saturday, November 4th** at the Farlow. A brief business meeting will convene at 3:30 pm and will be followed at 4:00 pm by a guest lecture. Dr. Keith Clay of Indiana University will address the "Fungal Endophytes of Grasses." A reception for Friends and their guests will follow in the Farlow Library. Parking will be permitted in the lot behind (to the north) of the Farlow (enter the lot from Oxford Street directly opposite Everett Street).

Friends of the Farlow is an international group of amateur and professional botanists concerned with supporting the programs and resources of the Farlow Reference Library and Herbarium of Cryptogamic Botany of Harvard University. Membership categories are: Associate member, \$5-15; Full member, \$25; Sponsor, \$50-1000; Benefactor, over \$1000. Membership year runs from July 1st to June 30th. (To join, please make check payable to *Friends of the Farlow* and send to address below.) Members receive discounts on Farlow publications, receive the newsletter, and participate in the annual book sale, annual meeting and other events. This newsletter is published twice a year, and members are encouraged to submit short notes, commentaries or news about the Farlow or the *Friends* for inclusion in it. For more information contact the editor at the Farlow Reference Library, 20 Divinity Avenue, Cambridge MA 02138 (tel. 617-495-2369).
