

AN ANNOTATED LIST OF
FOLIOSE AND FRUTICOSE LICHENS IN LAND BETWEEN THE LAKES¹

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ABSTRACT

A survey was made of the foliose and fruticose lichens of Land Between the Lakes in Kentucky and Tennessee. Intensive study and representative collections were made in approximately 100 widely scattered sites. Twenty genera and 82 species were found. *Parmelia rudecta* and *P. livida* were the most abundant species while *Cladonia verticillata* was the most rare.

The purpose of this study was to survey foliose and fruticose lichens of Land Between the Lakes in Kentucky and Tennessee. Species were determined, and the abundance and distribution of each taxon was noted. This study began on June 5, 1965 and ended July 1, 1968.

Land Between the Lakes is a 170,000 acre wooded peninsula which The Tennessee Valley Authority is developing as an outdoor recreation and conservation education area. This narrow strip of land 6 to 8 miles wide and approximately 40 miles long, is between Kentucky Lake and Lake Barkley. It includes parts of Stewart County in Tennessee and Trigg and Lyon Counties in Kentucky.

Approximately 100 sites, representative of the area and widely scattered over the territory, were studied intensively. Every passable road was cruised by car, and study stations were selected. Areas inhabited by humans were avoided, but this caused little inconvenience since many houses were abandoned or were being demolished. From the selected areas forays were made on foot along trails, abandoned roads and through the woods. Some areas were reached by boat.

Once a site was selected, careful examination was made of the exposed soil, shrubs, standing and fallen trees and fallen branches. Decaying logs and stumps were observed, especially for *Cladonia* species. A 4X binocular loupe optical visor, with 4 inch focal length, was very helpful for rapidly scanning trunks of trees and selecting specimens.

More than 1200 collections were made and brought to the laboratory for final identification and elimination of duplicates from each study area. No attempt was made to collect each species at every station. Such practice would have led to bulk in the herbarium and useless attrition of the lichens. Specimens were packed in 3¾ in. X 5¾ in. packets and stored in wooden trays with lids. The collections are housed in the Austin Peay State University Herbarium.

Many excellent study sites were found. Dry, thinly-forested knolls where two or more of the following species dominated; mountain chestnut oak (*Quercus*

montana), blackjack oak (*Quercus marilandica*), scarlet oak (*Quercus coccinea*), post oak (*Quercus stellata*), and pignut hickory (*Carya glabra*); were found to be excellent sites for both corticolous and soil lichens. Sufficient but not excessive light, a suitable substratum and frequency and amount of rainfall appeared to be more important than soil moisture in the establishment and growth of lichens. Isolated old trees were usually found in and around churchyards and cemeteries. These were exposed to suitable light and were among the best collecting sites. Old gravestones often yielded interesting plants. Deep woods with a heavy canopy were seldom productive. The sparsity of large rocks and boulders limited the number of the primarily saxicolous species.

The best section for study was the group of rocky knolls near Ginger Creek. The soil was dry with southern exposure, and mountain chestnut oak dominated the open forest. Tree trunks were covered with more plants and a greater number of species than at any other station. Close by, the region just west of Barrow Cemetery was also productive.

The most abundant and widespread species were *Parmelia rudecta* and *P. livida*. Wherever lichens were found these were sure to be present. Other abundant species were *Cladonia subtenuis*, *Heterodermia obscurata*, *Physcia stellaris*, and *Physcia tribacoides*.

A few species were considered to be rare because only one or few populations were found or because there was sparse growth wherever encountered. Some of these were: *Candelaria fibrosa*, *Cladonia caroliniana*, *Cladonia verticillata*, *Pannaria lurida*, *Parmelia borreri*, and *Pseudocyphellaria aurata*.

In the annotation of species to follow, observable differences between similar species are mentioned which should prove helpful even to the advanced student. The keys published by Hale (1961) were followed in identification. Taxonomic changes were made to coincide with the nomenclature given by Hale and Culberson (1966), Culberson (1966) and others. I am indebted to Dr. Mason E. Hale, Jr. for help in identifying some of the *Cladonia* species.

The following terms are used to indicate the distribution and numbers of plants of the various species as indicated by this study:

Abundant: Growing plentifully in all regions.

Common: Found in most regions but less than abundant.

Widespread: Occurring in several areas but not commonly.

Scarce: Observed occasionally but not likely to be found in any given area.

Rare: Found so seldom as to be remarkable.

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Terms used to indicate the width of lobes when measured near the end:

Lobes wide: 8.0 mm and wider

Lobes medium: 5.0 - 8.0 mm

Lobes narrow: 5.0 mm and less

Quadrant numbers used to indicate collecting sites are those designated on the map of Land Between the Lakes, Tennessee Valley Authority, Division of Water Control Planning September, 1964, 71-MS-453E503 R1, available at LBL Headquarters, Golden Pond, Kentucky. Herbarium specimens are designated by numbers following collection data.

ANNOTATED LIST OF FOLIOSE AND FRUTICOSE LICHENS
FOUND IN LAND BETWEEN THE LAKES

Anaptychia palmatula (Michx.) Vain. A widespread, brownish-green lichen usually found growing loosely attached to trees near their base. It is densely covered with squamules which are somewhat rounded above and much branched. The lobes are 1.0 - 2.0 mm wide. Small apothecia, which may have squamules, are almost invariably present. Rhizines near the ends of lobes are white to brownish-discolored. A species with which this one may be confused is *Physcia lacinulata*. The latter differs in that it has no apothecia, the rhizines are black with white tips, and the squamules are short and notched.

TRIGG: white oak, 8H3, 1351; pignut hickory, 1 mile north of 6K3, east shore of Kentucky Lake, 1270.

STEWART: pignut hickory, 200 yards west of 6L2, 1324; mockernut hickory, one-fourth mile south of 7L4, 1457; white oak, one-half mile east of 9P3, near Hopewell Church, 1250; base of white oak, one-half mile west of 9P3, 1450.

Anzia colpodes (Ach.) Stizenb. Although found at several collecting sites, this species was scarce. Close examination of the plants with a hand lens is quite rewarding. Because of the characteristic type of branching at the ends of lobes and the thick cushion of black hyphae on the underside, which shows at the margins, one is reminded of a puppy's foot. The lobes are narrow and apothecia are usually present. The bluish green upper surface shows many immersed black pycnidia.

LYON: hickory, one-fourth mile southwest of 5D2, 1087.

TRIGG: northern red oak, 300 yards northwest of 6J2, Lookout Tower, 1211.

STEWART: scarlet oak, 8P4, Blue Spring Road, 1453; bitternut hickory, 9P2, 1476.

Baeomyces roseus Pers. The only species of this genus which grows here was found at only one location. It was growing on a flat area which had been denuded by grading a road. The ashy plant grows crustose over the soil with short upright podetia topped with whitish or slightly pink apothecia. Apparently these were young plants since the podetia were very short.

TRIGG: soil, 1 mile west of 6J4, 1186.

Candelaria concolor (Dicks.) B. Stein. This is the most widespread of the very small lemon-yellow or gold lichens within the area. The lobes are very narrow (0.3 mm) with lemon-yellow and green soredia mostly at the tips of the main lobes and their short, side branches.

The upper cortex is lemon-yellow near the tips of lobes and greenish-yellow farther back. Only a few apothecia were found. This species might be confused with *C. fibrosa* and *Xanthoria candelaria*. For a discussion of differences among them see notes on the latter.

LYON: black locust, one-fourth mile southeast of 5D4, 1130; hackberry, one-fourth mile southwest of 6D2 on Green Branch, 1381; black walnut, 200 yards west of Museum, 7E4, 1460.

TRIGG: black locust, one-fourth mile east of 6G2, Jenny Ridge Road, 1198; slippery elm, 8H3, 1362.

STEWART: red cedar, one-half mile west of 8K1, Fox Ridge, 1365; red cedar, 7L2, Hendon Cemetery, 1296; red cedar, one-half mile west of 9P1, Blue Spring Road, 1220; sugar maple, one-half mile southeast of 9P3, 1465; post oak, 7R1, 1449; 200 yards south of 7P2, pignut hickory, 1505.

Candelaria fibrosa (Fr.) Mull. Arg. This scarce species in LBL was collected at only three stations; however, there were many plants at the Fort Henry site. This lichen is lemon-yellow and looks very much like *C. concolor* but has abundant apothecia and no soredia while the latter has abundant soredia and usually no apothecia.

LYON: sugar maple, near 3D2 at Lee Cemetery, 1117. TRIGG: black walnut, 200 yards west of Museum near 7E4, 1458.

STEWART: willow oak, Fort Henry, 7P4, 1483.

Cetraria juniperina (L.) Ach. Examination of recently cut trees indicated that this lichen grew abundantly on the upper branches, particularly on oaks. It was also widespread on living and dead tree trunks and twigs. The thallus is very convoluted and grows so loosely attached to the substratum that it appears umbilicate. The upper surface is dark gray-green, ridged and wrinkled, and there are many large apothecia, usually near the ends of lobes. There are numerous black pycnidia along the margins of lobes and on both the upper and lower surface. The lower surface is pale yellow and the medulla lemon-yellow.

LYON: honey locust, one-fourth mile southwest of 6D2 on Green Branch, 1388.

TRIGG: southern red oak, one-fourth mile west of 7E4, northside of Hematite Lake, 1008; dead bark, 200 yards west of 5G1, 1048; blackjack oak, 1 mile west of 6J4, 1172; mountain chestnut oak, 300 yards west of 6J1, 1400.

STEWART: dead twig, one-half mile west of 8K1, Fox Ridge, 1368; upper branch of black oak, two-thirds mile west of 8M3, Tharpe Road, 1255.

Cladonia apodocarpa Robb. Apothecia are usually absent on this species, and if present they are on very short podetia. The squamules of this scarce species, which are large for this genus, are bluish-green above and pure white below. The white, lower surface shows conspicuously when the lobes turn upward after drying. LYON: soil, 200 yards west of 5E1, 1497; soil, north bank of Duncan Creek near 4E2, 1419.

Cladonia bacillaris (Ach.) Nyl. This common fruticose lichen usually grows on old or decaying wood and sometimes on soil. The red-tipped, unbranched podetia are very small averaging about .5 mm in diameter and

up to 1 cm tall, and have the top half or more densely covered with powdery soredia. Squamules from which the podetia grow are very small and intricately branched.

LYON: old wood, one-fourth mile southwest of 5D2, 1416.

TRIGG: soil, one-fourth mile west of 7E4, roadside, 1410; rotting wood, two hundred yards north of 7H4, Gordon Hill Spring, 1427; rotting wood, three hundred yards southwest of 7K3, Jones Creek, 1437; rotting wood, 1 mile north of 6K3, east shore of Kentucky Lake, 1443.

STEWART: rotting wood, one-half mile west of 8L3, Ginger Creek Road, 1445; rotting wood, three hundred yards west of 6L2, east shore of Kentucky Lake, 1501; rotting wood, one-half mile west of 9P1, Blue Spring Road, 1439.

Cladonia caespiticia (Pers.) Flörke. The squamules of this species are very small, usually less than .5 mm wide and finely dissected. The tan apothecia, .5 - 1.0 mm wide, are on podetia so short that they look sessile. The few plants collected during this study all had apothecia. The species may be more plentiful than indicated by the number of collections since *Cladonias* without apothecia were largely avoided. Such plants are usually impossible to identify with certainty.

LYON: soil, one-fourth mile west of 7E4, northside of Hematite Lake, 1411.

TRIGG: soil, one-half mile northeast of 7F1, Jake Creek, 1502.

Cladonia capitata (Michx.) Spreng. A common yellow-green fruticose lichen which grows attached to the substrate and resembles *C. cristatella* but has tan rather than red apothecia atop the podetia (upright branches). Podetia, which are up to 2.5 cm tall, may have many squamules or may be almost free of them. There are no soredia. It grows on soil, old wood or rocks, sometimes covering an area as large as the hand, usually along road banks or near the border of old fields in full sunlight to deep shade.

LYON: soil, one-half mile northeast of 5D3, 1492; bank of road, 200 yards north of 4E1, Higgins Road, 1478.

TRIGG: Soil, 200 yards south of 7E1, 1013; soil, one-fourth mile southwest of 6J4, 1188; soil, 300 yards northwest of 6J2, Lookout Tower, 1207; soil, one-fourth mile west of 6J2, 1486; soil, 200 yards south of 6J1, Hwy. 49, 1414; soil, 300 yards southwest of 7K3, Jones Creek, 1435.

STEWART: soil, one-third mile northwest of 8M4, 1446; soil, 8P4, Blue Spring Road, 1233; soil, 200 yards southwest of 8J6, 1426.

Cladonia caroliniana (Schwein.) Tuck. This species was found at only one collecting site but was growing abundantly there; therefore, it will likely be found in other areas. The podetia are relatively thick (up to 3.0 mm in diameter), shiny and branched frequently but not intricately. It was growing on soil and leaves, unattached to the substratum, in masses covering several square feet. It did not have as strong a tendency to form large thick clumps as *C. rangiferina*. The yellowish-green color of *C. caroliniana* also helps distinguish the two.

TRIGG: soil, 1 mile west of 6J4, 1206.

Cladonia chlorophaea (Flörke) Spreng. This fascinating lichen usually grew on soil and was common within the area. The relatively stout podetia flare into goblet-shaped cups at the top. The podetia are covered with soredia both inside and outside the cup and frequently there are squamules on the podetia near the base. The presence of soredia and the more shallow cups separate this species from the non-sorediate, deep-cupped *C. pyxidata*.

LYON: soil 100 yards south of 4C1, Brandon Chapel Road, 1404.

TRIGG: soil, one-fourth mile west of 7E4, northside of Hematite Lake, 1409; soil, one-fourth mile east of 7K2, Laura Furnace Creek, 1147; soil, 300 yards east of 6K2, Blockhouse Creek Bay, 1283; moss, 300 yards southwest of 7K3, Jones Creek, 1436.

STEWART: soil, one-third mile northwest of 8M4, 1315; rotting wood, 9P2, Highway 49, 1441; soil, 8P4, Blue Springs Road, 1234.

Cladonia coniocraea (Flörke) Spreng. This species grows on soil or decayed wood, frequently intermingled with moss. It is slender, unbranched, tapering and rather horn-shaped to 2.0 cm high. The podetia frequently have a few squamules near the base and the surface of the upper half to two-thirds is densely powdery sorediate. It was widespread within the area quite often growing in deep shade.

TRIGG: rotting wood, three hundred yards northwest of 6J2, Lookout Tower, 1430; old bark, two-thirds mile northwest of 6J2, Redd Hollow, 1408; soil, 300 yards southwest of 7K3, Jones Creek, 1179.

STEWART: rotting wood, one-half mile west of 8L3, Ginger Creek Road, 1444; soil, 200 yards northeast of 7M2, 1335; moss, one-third mile northwest of 8M4, 1500.

Cladonia cristatella Tuck. If a person knows only one lichen it is probably this one for it is showy and fascinating. Like many *Cladonia* it varies considerably in size, branching and squamulation. The brilliant, red apothecia atop the podetia (upright branches) are the most outstanding of diagnostic features. The podetia may be up to 3.0 cm high, branched or unbranched and comparatively smooth or very squamulate. Podetia are yellow-green, have a shiny surface and are without soredia. It grows mostly on soil but frequently is found on decaying wood, particularly on old stumps and even on the roofs of buildings. It was quite common, especially along roadsides and in old fields and near their borders.

LYON: soil, one-half mile northeast of 5D3, 1491; old wood, one-fourth mile southeast of 5D4, 1131; decaying wood, one-fourth mile southwest of 5D2, 1068.

TRIGG: soil, one-fourth mile west of 7E4, northside of Hematite Lake, 1018.

STEWART: old wood, 100 yards southeast of 8L1, 1320; old log, one-half mile west of 9P1, Blue Spring Road, 1232.

Cladonia floerkeana (Fr.) Somm. This species was collected at only one location where it was growing abundantly on the decaying, wooden shingle roof of an old toolshed in full sunlight. The podetia are usually

branched near the top and are tipped with bright red apothecia. The soredia on the podetia separate this species from the more common, red-tipped *C. cristatella* which resembles it but lacks soredia.

TRIGG: shingle roof, 8H3, 1503.

Cladonia macilenta Hoffm. This is an ash-white, sorediate, unbranched, fruticose lichen which closely resembles *C. bacillaris* and is separated from it definitively by chemical test. The podetia are red tipped.

STEWART: rotting wood, 9P2, Highway 49, 1442.

Cladonia pyxidata (L.) Hoffm. This species is found growing on soil in dry, often sunny, habitats. It was scarce in the area. The short, stout podetia form wide, deep, goblet-shaped cups at the terminus. These cups do not proliferate from margins or center. There are no soredia on the podetia or cups although coarse, granular areoles are usually present. This lack of soredia helps separate this species from the more common *C. chlorophaea* which is sorediate.

LYON: soil, one-half mile northwest of 5D3, road bank of State Highway 58, 1506.

Cladonia rangiferina Wigg. This species grows in large clumps in sunny areas, unattached, on dry soil or old leaves, particularly along roadsides. The plant is made up entirely of intricately branched, hollow podetia, usually without apothecia. The color varies from light to medium gray. Morphologically it is difficult to distinguish from *C. subtenuis* which is more common. See description of the latter.

LYON: soil, 200 yards west of 5E1, 1499; soil, one-half mile northeast of 5D3, 1490; soil, 75 yards west of 5D3, 1495; soil, trail, three-fourths mile north of 5E1, 1133.

Cladonia squamosa (Scop.) Hoffm. As the name suggests, the podetia are densely covered with fine squamules. The podetia grow upright, are much branched, range up to 5 cm high and may have numerous small, tan apothecia terminally or laterally. It grows on soil, frequently among mosses. There are no soredia.

TRIGG: moss, 1 mile west of 6J4, 1428; rotting wood, 300 yards northwest of 6J2, Lookout Tower, 1429; soil, two-thirds mile northwest of 6J2, Redd Hollow, 1407; rotting wood, 300 yards southwest of 7K3, Jones Creek, 1431.

STEWART: moss, one-third mile northwest of 8M4, 1447.

Cladonia subtenuis (Abb.) Evans. This is a common, fruticose species being conspicuous along roadsides in many areas. The podetia are intricately branched and form large clumps on dry soil usually in sunny exposures. When dry, the plant is extremely brittle and if trampled fragments extensively. This may account for the fact that populations usually extend over several square meters. The color ranges from yellowish-green to ash-gray. The ash-gray form is morphologically identical to *C. rangiferina* and the two are separated only by a chemical test. The two species sometimes grow in mixed populations. Routine collecting indicated that the former was by far the more common.

LYON: soil, one-half mile northeast of 5D3, 1489; soil, 200 yards west of 5D2, 1484.

TRIGG: soil, one and one-fourth miles west of 5F4,

Sugar Bay Road, 1488; soil, one-fourth mile west of 6J2, 1496.

Cladonia strepsilis (Ach.) Vain. This species is common on bare soil, particularly along road banks. Podetia, which are 3 mm to 6 mm high, are squamulose, much divided and irregularly branched and end in dark brown usually less than 1 mm wide. The species was widespread within the area.

TRIGG: soil, 200 yards south of 6J1, Highway 49, 1413.

Cladonia verticillata (Hoffm.) Schaer. This is one of the rarest and most interesting lichens found in LBL. The species grows in southern Canada and extends down the high elevations of the Appalachians and was not expected here. The grayish-green plants form cups at the top of the podetia. From the center of these cups other podetia grow and form cups until the process has been repeated several times and the plant may have reached 5.0 cm in height.

TRIGG: soil, one-fourth mile east of 7K2, Laura Furnace Creek, 1143.

Coccocarpia cronia (Tuck.) Vain. This is one of the rare species of the area. The narrow lobed slate-blue thallus is heavily isidiate. A heavy growth of blue-gray tomentum on the bottom of lobes up to the tips helps distinguish this plant from another slate-blue, isidiate species, *Leptogium cyanescens*, which has naked lobes on the underside near the tips. In other regions the plants frequently grow on rocks but were found only on bark in this area.

LYON: hickory, one-fourth mile southwest of 5D2, 1074.

TRIGG: white oak, 300 yards northwest of 6J2, Lookout Tower, 1209; black oak, one-fourth mile east of 7K2, Laura Furnace Creek, 1137.

Collema conglomeratum Hoffm. A widespread dark brown to black species which usually grows among mosses on tree trunks. The thallus is gelatinous when wet. Numerous small, black apothecia, up to .7 mm in diameter, are crowded on the upper surface.

TRIGG: moss, two hundred yards south of 7E1, 1412.

Dermatocarpon miniatum (L.) Mann. Except when wet, this roundish, leather-like plant looks more dead than alive. Growing attached to limestone by a single umbilicus, it may exhibit some irregular lobing which appears to be caused by cracks in the thallus. The upper surface is brownish gray and has numerous dark brown to black dots (immersed perithecia) while the lower surface is brown to black. It was scarce within the area, presumably because of paucity of suitable substratum. STEWART: limestone bluff on bank of road, 200 yards northwest of 9M2, 1321; limestone bluff, at spring in Model on Highway 49, 8L3, 1477.

Dermatocarpon tuckermanii (Rav.) Zahlbr. This brown, squamulose lichen was widespread within the area but not common. It grows on the bark of trees, most often on white oaks, usually near the base but may be found up to five feet high. The adnate growth with the characteristic brown color and the black dots (immersed perithecia) on the surface make this an easy species to identify.

LYON: post oak, one-fourth mile southeast of 5D4, 1132.

TRIGG: black gum, 300 yards southwest of 7K3, Jones Creek, 1181; post oak, one-half mile east of 6G2, Jenny Ridge Road, 1197; white oak, one-half mile west of 7E4, northside of Hematite Lake, 1002; white oak, one-fourth mile south of 7F4, Crooked Creek, 1371; white oak, one-fourth mile north of 6K3, east shore of Kentucky Lake, 1287; pignut hickory, one mile northwest of 5F5, south shore of Sugar Bay, 1291.

STEWART: white oak, one-half mile west of 9P3, 1451; white oak, 8L4, Highway 49, 1397; white oak, 200 yards northeast of 7M2, 1331.

Heterodermia domingensis (Ach.) Trev. This species is scarce within the area. The mineral-gray plant has lobes about 1.0 mm wide with soredia mostly along the margins of lobes. A light tan to dirty-white lower cortex is present and smoke-colored rhizines 1.0 mm long protrude from the lower side near the tips of lobes. The smoke-colored rhizines along with marginal soredia help distinguish this species from *H. tremulans*.

TRIGG: black oak, one-fourth mile west of 7E4, northside of Hematite Lake, 1016; black oak, 200 yards north of 7E4, Gordon Hill Spring, 1396; pignut hickory, 1 mile north of 6K3, east shore of Kentucky Lake, 1279.

Heterodermia hypoleuca (Ach.) Trev. When this rare lichen is found it should present little difficulty in identification. Lobes of this light-gray plant are 1.0 - 2.0 mm wide and without soredia or isidia. Frequently there are lobules on the older part of the plant but there are no squamules. Large apothecia for such a small plant, up to 3.0 mm wide, are almost invariably present. Rims of the larger ones have a tendency to fold inwardly in a longitudinal fashion forming a narrow slit-like opening to the upper surface of the apothecium. The underside is chalk-white and without a cortex. Rhizines are long and black and have so many short, perpendicular side branches that they become quite fuzzy.

TRIGG: black oak, 200 yards west of 5G1, 1051; mountain chestnut oak, 300 yards west of 6J1, 1399.

Heterodermia obscurata (Nyl.) Trev. This species is common to abundant. One of the most obvious distinguishing characteristics of this mineral-gray species is the lack of a lower cortex and the yellow, felty underside. The lobes are approximately 1.0 mm wide and have both marginal and terminal soredia. Black rhizines with white tips protrude from the underside near the margins and tips. In other regions the lower side sometimes appears purple-black, a condition not found in this investigation. No apothecia were observed.

LYON: white oak, Paradise Church, two-thirds mile northeast of 4D2, 1122.

TRIGG: black oak, one-fourth mile west of 7E4, northside of Hematite Lake, 1006; blackjack oak, 200 yards southwest of 6G2, trail, 1035; black gum, one-fourth mile southwest of 6J4, 1193; blackgum, one-fourth mile west of 6J2, 1448; scarlet oak, 200 yards south of 6J1, Highway 49, 1026; white oak, one-fourth mile north of 6K3, east shore of Kentucky Lake, 1262; black oak,

one-fourth mile east of 7K2, Laura Furnace Creek, 1135.

STEWART: white oak, 200 yards northeast of 7M2, 1332; winged elm, one-fourth mile west of 8P6, Boyd Cemetery, 1246.

Heterodermia tremulans (Mull. Arg.) W. Culb. This mineral-gray lichen was one of the most abundant within the area. Soredia are abundant mostly on the lower sides of the tips of lobes and marginal branches in turned-up, crescent-shaped soredia. White rhizines, 1.0 mm long, are common on the underside near the tips of lobes and these protrude forward from under the plant. A lower cortex is present and is light tan to whitish. Lobes are 1.0 - 2.0 mm wide.

LYON: scaleybark hickory, Bethlehem Church, one-half mile south of 5C1, 1127; post oak, Paradise Church, two-thirds mile northeast of 4D2, 1120; hickory, 200 yards west of 5D2, 1485; one-fourth mile southwest of 5D2, 1073; pignut hickory, one-half mile southwest of 4E2, north shore Duncan Creek Bay, 1278.

TRIGG: white oak, one-fourth mile west of 7E4, northside of Hematite Lake, 1022; hickory, one-fourth mile west of 5F4, 1044; white oak, 200 yards west of 5G1, 1055; post oak, one-half mile east of 6G2, Jenny Ridge Road, 1199; sweetgum, 200 yards south of 7H4, Gordon Hill Spring, 1155; white oak, 8H3, 1354; white oak, one-fourth mile north of 6K3, east shore of Kentucky Lake, 1261; pignut hickory, 300 yards southwest of 7K3, Jones Creek, 1183; black oak, one-fourth mile east of 7K2, Laura Furnace Creek, 1136.

STEWART: oak log, one-half mile west of 8L3, Ginger Creek Road, 1304; white oak, 200 yards northeast of 7M2, 1333; beech, one-fourth mile east of 9P3, Hopewell Church, 1227.

Leptogium chloromelum (Sw. ex Ach.) Nyl. The two collections made were growing on bark near the base of the tree. Lobes are extremely warty, wrinkled and puckered; finely dissected at the ends and mostly pointed vertically. This brownish-gray lichen probably was more common within the area than the two collections indicated.

LYON: mountain chestnut oak, along trail, three-fourths of a mile north of 5E1, 1424.

TRIGG: white oak, Higgins Cemetery, 5G3, 1418.

Leptogium cyanescens (Pers.) Korb. A common, slate-blue lichen growing on bark, usually near the base of the tree. The paper-thin thallus is densely isidiate and has a slightly shiny surface. Lobes are 3.0 - 5.0 mm wide and are naked underneath near the ends. This species resembles *Coccocarpia cronia* which is also slate-blue and isidiate. For a discussion of the differences see the notes for the latter species.

LYON: northern red oak, north bank of Moss Creek Dock near 3D3, 1105.

TRIGG: white oak, one-fourth mile west of 7E4, northside of Hematite Lake, 1020.

STEWART: white oak, one-half mile west of 8L3, Ginger Creek Road, 1302; pignut hickory, one-fourth mile east of 9P3, Hopewell Church, 1230.

Leptogium lichenoides (L.) Zahlbr. This is a rare and unexpected find for the area because it is primarily a northern and mountainous species. With casual ex-

amination this lichen might be dismissed as a patch of brown mold. Critical examination reveals that it is composed largely of many, finely dissected, branched lobes which stand erect, tangled and crowded.

TRIGG: black oak, one-fourth mile west of 7E4, north side of Hematite Lake, 1019; small rock, one mile northwest of 5F5, south shore of Sugar Bay, 1292.

STEWART: soil, 200 yards northwest of 9M2, 1322. *Leptogium saturninum* (Dicks.) Nyl. This is a wide-spread, dark brown lichen which grew on the bark of many hardwoods, usually near the base. Lobes are slightly shiny, medium in width, and have numerous, short isidia. The underside has a thick, light colored, short tomentum.

TRIGG: persimmon, one-fourth mile east of 6H1, Long Creek Road, 1170; blackgum, 300 yards southwest of 7K3, Jones Creek, 1182.

Pannaria lurida (Mont.) Nyl. This was found at only one study site where there were several plants growing on approximately 15 trees, mostly post oaks, within a 75-yard radius. It is a handsome lichen with a dull, light-brownish color on the older part and a dove-gray, slightly frosted surface near the ends of lobes. Numerous small, but showy, brick-red apothecia, with whitish, frosted rims, present a pleasing contrast with the surface of the thallus. Apothecia turn black with age. The 2.0-3.0 mm wide lobes are broad for this genus. Dense tomentum, which is light-colored near the tips of lobes but dark-gray farther back, covers the underside of the plants.

STEWART: post oak, one third mile northwest of 8M4, 1318.

Parmelia aurulenta Tuck. This is a common lichen found on the bark of many hardwoods and on rocks. This large, mineral-gray plant has medium-width lobes with soredia in pustule-like eruptions on the surface and usually has a rather scraggly growth. The medulla is a very light yellow.

LYON: white oak, one-fourth mile southwest of 5D2, 1076; red elm, north bank of Duncan Creek near 4P2, 1095.

TRIGG: black oak, one-fourth mile west of 7E4, north side of Hematite Lake, 1017; winged elm, 8H3, 1360; black gum, one-fourth mile southwest of 6J4, 1190; winged elm, 200 yards southwest of 8J6, 1149; southern red oak, 200 yards south of 6J1, Highway 49, 1028; post oak, one-fourth mile east of 7K2, Laura Furnace Creek, 1139.

STEWART: pine, Cedar Bluff near 6L3, 1464; white oak log, one-half mile west of 8L3, Ginger Creek Road, 1306; beech, one-fourth mile east of 9P3, Hopewell Church, 1126.

Parmelia bolliana Mull. Arg. This grows on the bark of various hardwoods. Its distribution may be more widespread than collections here indicate because, in the field, it closely resembles *P. rudecta*. It is a large, broad-lobed, mineral-gray plant with white pores on the upper surface. The margins of lobes are without cilia, and it often has abundant squamules on the upper surface. *P. rudecta*, which also has white pores, has isidia on the upper surface rather than squamules.

LYON: sugar maple, Lee Cemetery, 3D2, 1112; hickory,

one-fourth mile southwest of 5D2, 1071; northern red oak, north bank of Duncan Creek near 4P2, 1089. TRIGG: black oak, one-half mile northwest of 6G2, 1070.

Parmelia borrieri (Sm.) Turn. The single find of this species indicated that it is rare within the area, but it is easily overlooked since it resembles the very abundant foliose species *P. rudecta*. They are both mineral- to dark-gray and have white pores in the upper surface, but this lichen has soredia in the pores on the older parts while *P. rudecta* has the older part covered with isidia.

TRIGG: pignut hickory, one-fourth mile south of 7F4, Crooked Creek, 1372.

Parmelia caperata (L.) Ach. Because of its yellow-green color and large size, this was one of the showiest foliose lichens and one of the most common lichens in LBL. It was found on rocks and on the bark of many trees. Plants sometimes exceed 15 cm in diameter. Widths of lobes may vary from medium to large. Coarse soredia grow in pustule-like eruptions on the upper surface of the older part of the ciliate lobes, exposing the white, felty medulla (under lens).

LYON: bitternut hickory, north bank of Moss Creek Dock near 3D3, 1102.

TRIGG: black oak, one-fourth mile west of 7E4, north side of Hematite Lake, 1003; white oak, 200 yards west of 5G1, 1053; post oak, one-half mile east of 6G2, Jenny Ridge Road, 1194; blackjack oak, 200 yards southwest of 6G2, trail, 1033; rock, one-half mile northwest of 6G2, 1455.

STEWART: small rock, 300 yards west of 6L2, east shore of Kentucky Lake, 1328; red cedar, one-half mile west of 9P1, Blue Spring Road, 1221.

Parmelia caroliniana Nyl. Since it was found only once this species was apparently rare within the area. The upper surface of this mineral-gray plant is reticulately cracked showing the white medulla. It has an abundance of isidia. Lobes are of medium width and grow rather closely to the substrate.

STEWART: pine, Cedar Bluff, near 6L3, 1463.

Parmelia cetrata Ach. This plant was rare in LBL; only four plants were found. The most outstanding characteristic of this large, mineral-gray lichen is the reticulately cracked surface which can be observed with a hand lens. It might be confused with *P. reticulata*, which also has a reticulately cracked surface, excepting that the latter has soredia while *P. cetrata* has none. The margins of lobes are ciliate.

LYON: sugar maple, Lee Cemetery, 3D2, 1423.

TRIGG: black oak, one-fourth mile west of 7E4, north side of Hematite Lake, 1007; mountain chestnut oak, one-half mile northwest of 6G2, 1057; scarlet oak, 200 yards south of 6J1, Highway 49, 1027.

Parmelia crozalsiana B. de Lesd. ex Harm. This was a widespread species found in all counties. The most prominent characteristic is the very ridged and wrinkled surface, even up to the ends of the lobes. Faint yellowish to white soredia occur in round, surface eruptions although the medulla is white, thick and firm. The lobes are of medium width without cilia along the

margins. This is first report of the species for Tennessee.

LYON: sugar maple, Lee Cemetery, 3D2, 1421; black locust, two-thirds mile west of 4D4, east shore of Kentucky Lake, 1295; black locust, one-fourth mile southwest of 5D2, 1062; northern red oak, north bank of Duncan Creek near 4P2, 1090.

TRIGG: black gum and mountain chestnut oak, one-fourth mile southwest of 6J4, 1189; winged elm, 200 yards southwest of 8J6, 1157.

STEWART: pignut hickory, 9P2, Highway 49, 1257. *Parmelia cryptochlorophaea* Hale. Although collections of this South Coast species were made in each of the three counties, it was nevertheless scarce. It is mineral-gray; the lobes are usually narrow and soredia are born in tall capitate heads along the margins. All plants were growing on bark.

LYON: bitternut hickory, Lee Cemetery, 3D2, 1114; sweetgum, north bank of Duncan Creek near 4P2, 1093.

TRIGG: sugar maple, 8H3, 1356; mountain chestnut oak, 300 yards west of 6J1, 1403.

STEWART: sourwood, 200 yards northwest of 7M2, 1334; sassafras, one-half mile west of 8L3, Ginger Creek Road, 1300.

Parmelia cumberlandia (Gyeln.) Hale. This species was found in only a few areas but was growing abundantly in each of these. It grew closely adherent to rocks of any size. Plants were orbicular and ranged up to 15 cm in diameter. The lobes are narrow to 4 mm wide, and occasionally secondary growth of narrow lobes (.5-1 mm) overgrow the primary thallus at the center of the plant. The plant is yellow-green above, tan below. There are no isidia or soredia. Abundant apothecia are sometimes crowded on the older part of the plant.

LYON: rock, 200 yards east of 4D4, 1420. STEWART: rock, Rushing Creek Campgrounds, 6K1, 1481; rock, one-half mile northwest of 7M3, 1480.

Parmelia dilatata Vain. This was one of the rare species of the area represented by only three collections. It becomes large, has a light gray upper surface and white soredia which are marginal and submarginal. The margins of the lobes are ciliate. The large size, gray color, presence of soredia and lack of cilia distinguish it from other lichens of the area.

TRIGG: sweetgum, one-half mile northwest of 7J1, Wienger Hollow, 1154; serviceberry, 300 yards southwest of 7K3, Jones Creek, 1184.

STEWART: oak log, one-half mile west of 8L3, Ginger Creek Road, 1303.

Parmelia dissecta Nyl. This species, which grows abundantly on the Cumberland Plateau, was represented by a single collection in LBL. It is easily distinguished from other small, narrowly lobed, light-gray Parmelias growing within the area. Lobe surfaces are heavily covered with isidia to within a few millimeters of the end. The exposed surface is smooth and shiny. Lobes are intricately branched.

STEWART: mountain chestnut oak, one-half mile northwest of 7M3, 1345.

Parmelia galbina Ach. Field determination of this widespread plant is somewhat difficult because the

medulla must be carefully examined with a lens in good light to discover the faint yellow color which is usually most noticeable under the apothecia. Otherwise it may be mistaken for *P. livida*. (The observable differences between the two are isidia in the annotation of the latter.) Soredia and isidia are lacking. The plant is mineral-gray; the lobes are narrow and adnate; apothecia are usually present.

LYON: red maple, 4E1, near Smith Bay Dock, 1085; hackberry, one-fourth mile southwest of 6D2, on Green Branch, 1386; fallen oak limb, one-fourth mile west of 7E4, 1462.

TRIGG: sugar maple, one-half mile northwest of 8J2, Berkley Spring, 1392; black oak, one-fourth mile west of 7E4, north side of Hematite Lake, 1011; sweetgum, 200 yards south of 7H4, Gordon Hill Spring, 1156; scarlet oak, 200 yards south of 7H4, Gordon Hill Spring, 1165.

STEWART: winged elm, one-fourth mile west of 8P6, Boyd Cemetery, 1245; tulip poplar, one-half mile southeast of 9P3, 1466.

Parmelia hypotropia Nyl. Identification of this abundant, large-lobed lichen is easy because of a distinctive combination of characteristics. The lobes turn upward, displaying the white rim on the underside near the margins. Soredia and black cilia are located along the margins of lobes while the upper surface of lobes is mineral-gray with fine white spots. It was abundant on the bark of many trees and sometimes on old wood.

LYON: scalybark hickory, Bethlehem Church south of 5C1, 1126; winged elm, 200 yards east of 4D4, 1098; red maple, 4E1, near Smith Bay Dock, 1087; hackberry, one-fourth mile southwest of 6D2 on Green Branch, 1383; honey locust, one-fourth mile southwest of 8J6, 1152; sugar maple, one-half mile northwest of 8J2, Berkley Spring, 1390.

STEWART: red cedar, one-half mile west of 9P1, Blue Spring Road, 1214; dead twig, 300 yards west of 6L2, east shore of Kentucky Lake, 1329.

Parmelia livida Tayl. Mountain chestnut oak apparently was one of the best substrates for this abundant species although it grew on the bark of a great variety of hardwoods. The plants have narrow, usually tightly adherent lobes without soredia or isidia. Plants 3 cm in diameter and larger usually have an abundance of apothecia. This species is easily confused with *P. galbina*. The lobes of *P. livida* are usually wider (3 to 4 mm), light mineral-gray, and have a white medulla; while the lobes of *P. galbina* are narrower (2 to 3 mm) darker mineral-gray and have a faint yellow medulla, particularly under the apothecia.

LYON: honey locust, one-fourth mile southwest of 6D2, on Green Branch, 1385; honey locust one-fourth mile southwest of 5D2, 1063; winged elm, 200 yards east of 4D4, 1100; red maple, 4E1, near Smith Bay Dock, 1086.

TRIGG: hickory, one-fourth mile west of 5F4, 1045; mountain chestnut oak, one-half mile northwest of 6G2, 1060; mountain chestnut oak, one-half mile north of 7G5, 1202; red maple, one-half mile northwest of 7J1, Wienger Hollow, 1160; winter huckleberry, 300 yards east of 6K2, Blockhouse Creek Bay, 1284.

STEWART: sassafras, one-half mile west of 8L3, Ginger Creek Road, 1301; mountain chestnut oak, one-third mile northwest of 8M4, 1313; pignut hickory, 8P4, Blue Spring Road, 1239.

Parmelia margaritata Hue. This wide-lobed, sorediate species resembles *P. reticulata* but does not have reticulate cracks in the surface. It was common, growing on the bark of many kinds of trees.

LYON: winged elm, one-fourth mile southwest of 6D2 on Green Branch, 1389; sugar maple, Lee Cemetery, on Green Branch, 1389; sugar maple, Lee Cemetery, 3D2, 1111.

TRIGG: white oak, 8H3, 1357; pignut hickory, 1 mile north of 6K3, east shore of Kentucky Lake, 1281.

STEWART: pignut hickory, 300 yards west of 6L2, east shore of Kentucky Lake, 1323; winged elm, one-fourth mile west of 8P6, Boyd Cemetery, 1244; fallen tree, one-half mile west of 9P1, Blue Spring Road, 1223.

Parmelia mellissii Dodge. This is one of the large, broad-lobed parmelioids which was scarce within the area. The upper surface is gray to whitish-gray and is isidiate. Numerous, short cilia occur on the margins of lobes. It is a corticolous species.

LYON: sugar maple, Lee Cemetery, 3D2, 1116.

TRIGG: white oak, 8H3, 1355; hickory, 200 yards southwest of 8J6, 1151.

STEWART: southern red oak, 7L2, Hendon Cemetery, 1298; southern red oak, one-fourth mile west of 8P6, Boyd Cemetery, 1243; sugar maple, 7R1, 1452.

Parmelia michauxiana Zahlbr. Identification of this common, mineral-gray lichen is not difficult if apothecia are present. The apothecia are usually tall, appearing almost stalked, and are not perforated. Lobes are broad, frequently with small-branch lobes; ciliate on margins; and lack soredia or isidia. The lower side of lobes is naked and has a broad, tan rim around the margin. It usually grew on bark but was also saxicolous.

LYON: bitternut hickory, north bank of Moss Creek Dock near 3D3, 1108; sugar maple, Lee Cemetery, 3D2, 1115; northern red oak, one-fourth mile southeast of 5D4, 1129; hickory, 4E1, near Smith Bay Dock, 1082.

TRIGG: persimmon, 200 yards west of 5G1, 1052; scarlet oak, 200 yards south of 7H4, Gordon Hill Spring, 1164; white oak, 8H3, 1359; mountain chestnut oak, 300 yards northwest of 6J2, Lookout Tower, 1210; mountain chestnut oak, one mile north of 6K3, east shore of Kentucky Lake, 1269.

STEWART: mountain chestnut oak, one-third mile northwest of 8M4, 1316; rock, one-half mile northwest of 7M3, 1342; old oak log, one-half mile west of 8L3, Ginger Creek Road, 1307.

Parmelia obsessa Ach. Because this plant is so small, it is easily overlooked; therefore, it may have been more prevalent within the area than the single collection indicated. Plants are very small. Lobes are approximately 0.5 mm wide and isidiate. The medulla is pale yellow-orange. It produces a golden fluorescence under ultraviolet light at 3600 Å.

TRIGG: scarlet oak, 200 yards south of 7H4, Gordon Hill Spring, 1166.

Parmelia perforata (Jacq.) Ach. An examination of the apothecia of this plant, which are almost invariably present, reveals a perforated center; the reason for

the name. This species has very broad lobes with cilia and usually with upturned margins revealing a white rim on the underside. It is mineral-gray and has no soredia or isidia. It was a common species growing on the bark of many kinds of trees.

LYON: old bark, 200 yards west of 5C1, 1498; honey locust, one-fourth mile southwest of 6D2 on Green Branch, 1384; hickory, 4E1, near Smith Bay Dock, 1080; red elm, north bank of Duncan Creek near 4E2, 1094.

TRIGG: red maple, one-half mile northwest of 7J1, Wienger Hollow, 1162; mountain chestnut oak, one mile west of 6J4, 1177.

STEWART: southern red oak, one-fourth mile west of 8P6, Boyd Cemetery, 1242.

Parmelia rampoddensis Nyl. A large, handsome, but rare, lichen of the area; all three collections came from Stewart County. Lobes are broad (up to 20 mm), light gray above, and black underneath except for a broad, naked, tan rim at the ends. The soredia are on the margins of the lobes in long, narrow soredia. Claw-shaped cilia occur sparsely along the margins. This is the first report of the species for Tennessee.

STEWART: mountain chestnut oak, 100 yards south of 8L1, 1319; mountain chestnut oak, one-half mile northwest of 7M3, 1337; mountain chestnut oak, two-thirds mile west of 8M3, Tharpe Road, 1256.

Parmelia reticulata Tayl. Critical examination of the surface of the lobes with a lens reveals the reason for the species name. The plant is large at maturity. Lobes are medium to broad with cilia and soredia along the margins. The upper surface has fine, reticulate cracks extending near the ends of the lobes. This mineral-gray lichen grew abundantly throughout the area on the bark of many kinds of trees and was one of the most common foliose species on rocks. It might be confused with *P. cetrata*, which also has a reticulately-cracked upper surface, but the latter has no soredia.

LYON: bitternut hickory, north bank of Moss Creek Dock near 3D3, 1101; sugar maple, Lee Cemetery, 3D2, 1422; hickory, 4E1, near Smith Bay Dock, 1083; sweetgum, north bank of Duncan Creek near 4P2, 1091; pignut hickory, one-half mile southwest of 4E2, north shore of Duncan Creek Bay, 1286; mountain chestnut oak, one-half mile north of 7G5, 1203 mountain chestnut oak, one-half mile northwest of 6G2, 1032.

TRIGG: blackjack oak, 200 yards west of 5G1, 1040; black oak, near 6H4, 1468; white oak, 8H3, 1352; mountain chestnut oak, 1 mile west of 6J4, 1176; small rock, 100 yards west of 6J2, Lookout Tower, 1185; small rock, one-fourth mile north of 6K3, east shore of Kentucky Lake, 1272.

STEWART: old grave stone, 7L2, Hendon Cemetery, 1297; mountain chestnut oak, one-half mile northwest of 7M3, 1340; small rock, one-third mile northwest of 8M4, Tharpe Road, 1254; pignut hickory, 8P4, Blue Spring Road, 1237.

Parmelia rudecta Ach. This was the most widespread and abundant foliose lichen in the region. Wherever the lichens were found, it was likely to be present on the bark of most hardwoods and rocks. It grows to be a

large plant with medium-width lobes (5 to 8 mm) which have no cilia along the margins. The upper surface has white pores on the younger portion and an abundance of isidia on the older part. The lower surface is naked and tan near the margins of the lobes. The species might be confused with *P. bolliana* which has squamules on the upper surface but does not have isidia.

LYON: honey locust, one-fourth mile southwest of 6D2 on Green Branch, 1387; hickory, one-fourth mile southwest of 5D2, 1072; red elm, north bank of Duncan Creek near 4P2, 1096.

TRIGG: black oak, one-fourth mile west of 7E4, north side of Hematite Lake, 1009; white oak, 200 yards west of 5G1, 1054; post oak, one-half mile east of 6G2, Jenny Ridge Road, 1195; blackjack oak, 200 yards southwest of 6G2, trail, 1036; red maple one-half mile northwest of 7J1, Wienger Hollow, 1159; cork elm, 8H3, 1348; winged elm, 200 yards southwest of 8J6, 1148; scarlet oak, 200 yards south of 6J1, Highway 49, 1025; scarlet oak, one-half mile west of 8K1, Fox Ridge, 1367.

STEWART: red cedar, one-half mile west of 9P1, Blue Spring Road, 1215.

Parmelia saxatilis (L.) Ach. The three collections of this plant, in each of the three counties, represent an extension of the range of this northern, or high-altitude species. The narrow, angular lobes have a dense cover of black rhizines on the underside to the margins. The upper cortex is mineral-gray with isidia on the older portions and is reticulately rigid with white lines toward the tips.

LYON: pignut hickory, Lee Cemetery, 3D2, 1113.

TRIGG: mountain chestnut oak, one mile north of 6K3, east shore of Kentucky Lake, 1274.

STEWART: mountain chestnut oak, one-third mile northwest of 8M4, 1314.

Parmelia subcrinita Nyl. This is another of the large, gray parmelioids with wide lobes (up to 20 mm) within the area. The upper surface of the thallus is a dull, mineral-gray with isidia. The lower cortex is black with a narrow, tan, outer band. The cilia on the margins of lobes help distinguish this species from the non-ciliated *P. tinctorum* which it resembles. The two can be separated readily by chemical tests. Three of the five collections were made from mountain chestnut oak.

TRIGG: mountain chestnut oak, one mile west of 6J4, 1178; mountain chestnut oak, 300 yards west of 6J1, 1402.

STEWART: southern red oak, one-half mile west of 8K1, Fox Ridge, 1366; small rock, 300 yards west of 6L2, east shore of Kentucky Lake, 1325; mountain chestnut oak, one-half mile northwest of 7M3, 1338.

Parmelia subsidiosa (Mull. Arg.) Dodge. This was another of the parmelioids found in LBL which is mineral-gray and has the upper cortex reticulately cracked. This one has isidia and is ciliate along the margins. It was widespread, growing on the bark of many kinds of trees. The species with which it is most likely to be confused, *P. caroliniana*, is reticulately cracked but lacks cilia.

LYON: pignut hickory, one-fourth mile south of 7F4,

Crooked Creek, 1373; blackjack oak, 200 yards west of 5G1, 1041; mountain chestnut oak, one-half mile northwest of 6G2, 1058; blackjack oak, 200 yards southwest of 6G2, 1034.

TRIGG: sugar maple, one-half mile northwest of 8J2, Berkley Spring, 1391.

STEWART: pignut hickory, 9P2, Highway 49, 1258; pignut hickory, one-half mile west of 8L3, Ginger Creek Road, 1299.

Parmelia subtinctoria Zahlbr. This species was common, growing on the bark of many kinds of trees and on small rocks. The underside is usually uniformly brown while the upper surface is greenish-gray with many fine white dots on the younger portion (under lens) but no pores. There are isidia on the older part, and numerous, short cilia along the margins of lobes.

LYON: bitternut hickory, north bank of Moss Creek Dock near 3D3, 1104; black oak, Lee Cemetery, 3D2, 1110; hickory, one-fourth mile southwest of 5D2, 1069; hickory, 4E1, near Smith Bay Dock, 1081; northern red oak, north bank of Duncan Creek near 4P2, 1088; northern red oak, one-half mile southwest of 4E2, north shore of Duncan Creek Bay, 1290.

TRIGG: black oak, one-fourth mile west of 7E4, north side of Hematite Lake, 1004; sweet gum, one-fourth mile west of 5F4, 1042; small rock, one-fourth mile west of 5F4, 1046; rock, one-fourth mile south of 7F4, Crooked Creek, 1370; white oak, 8H3, 1353; mountain chestnut oak, one mile north of 6K3, east shore of Kentucky Lake, 1273; dead hickory, 8K4, 1364.

STEWART: pignut hickory, 300 yards west of 6L2, east shore of Kentucky Lake, 1327; pignut hickory, 8P4, Blue Spring Road, 1238; pignut hickory, one-half mile west of 9P1, Blue Spring Road, 1212.

Parmelia texana Tuck. Only two small plants of this southern species were found on the trunk of honey locust. Soredia are in capitate soredia on the surface of the lobes which are of medium width. The color is medium gray.

LYON: honey locust, one-fourth mile southwest of 5D2, 1064.

Parmelia tinctorum Nyl. Both in size and appearance this was the most majestic foliose lichen found in LBL. The lobes are wide (up to 20 mm) with a clean, smooth upper cortex particularly near the ends with broad, naked, tan faced on the underside. The margins are without cilia. It is mineral-gray and isidiate. It was widespread within the area but apparently was near the northern limit of the range which is primarily the Gulf States.

LYON: sweet gum, north bank of Duncan Creek near 4E2, 1092.

TRIGG: northern red oak, one-fourth mile south of 7F4, Crooked Creek, 1369. southern red oak, one-half mile east of 6G2, Jenny Ridge Road, 1200; mountain chestnut oak, two-thirds mile northwest of 6J2, Redd Hollow, 1471.

STEWART: mountain chestnut oak, 300 yards west of 6J1, 1398; mountain chestnut oak, one-half mile northwest of 7M3, 1339; mountain chestnut oak, one-third mile northwest of 8M4, 1308.

Peltigera canina (L.) Willd. This is one of the common

lichens occurring in the area. It always grew on soil or moss. It is easily identified because of its habitat, large size (lobes up to 25 mm wide) and other distinct characteristics. The upper surface is dull, light gray to brown, and pruinose or tomentose (under lens) particularly near the ends of the lobes. There are no isidia but squamules (scale-like outgrowths) sometimes occur on the older margins or where the surface has been cracked. Vein-like ridges occur on the light tan to cream-colored lower surface. The large, brown apothecia are fingernail shaped and flat on the ends of narrow lobes.

LYON: soil, Brandon Chapel Road, 100 yards south of 4C1, 1125; soil, north bank of Moss Creek Dock near 3D3, 1103.

TRIGG: soil, 7F1, 1375; soil, one-fourth mile east of 6H1, Long Creek Road, 1169; soil, 300 yards northwest of 6J2, Lookout Tower, 1208.

STEWART: soil, 300 yards west of 6L2, east shore of Kentucky Lake, 1330; soil, one-fourth mile east of 9P3, Hopewell Church, 1249.

Peltigera polydactyla (Neck.) Hoffm. This species was rare in LBL; only one collection having been made. The description given for *P. canina* is applicable to this plant with the following exception: *P. polydactyla* has a shiny upper surface and there is no pruina or tomentum on the lobes. One other plant was found which is probably this species but positive identification could not be made because there were no apothecia. Its collection is listed below.

TRIGG: soil, two-thirds mile northwest of 6J2, Redd Hollow, 1469.

STEWART: soil on rock, one-fourth mile south of 8L2 on Highway 49, 1475 (*P. polydactyla* or *P. horizontalis*).

Physcia ciliata (Hoffm.) Du Rietz. Although collected only one time, this species is probably widespread. It resembles *P. stellaris* but is darker gray and has numerous cilia, particularly on the outer margins of apothecia.

STEWART: slippery elm, 100 yards south of 8L3, 1507. *Physcia grisea* (Lam.) Zahlbr. The ashy-white look of this species is due to the heavy pruina covering the entire cortex. It also looks dirty because of a mixture of brownish and greenish soredia. Soredia are abundant along the margins which turn upward at the top edge of the soredia. This was a common lichen on the bark of many trees.

LYON: white oak, Paradise Church, two-thirds mile northeast of 4D2, 1124; black oak, Lee Cemetery, 3D2, 1109, red elm, north bank of Duncan Creek near 4P2, 1097.

TRIGG: post oak, one-fourth mile west of 7E4, north side of Hematite Lake, 1014; pignut hickory, 1 mile northwest of 5F5, south shore of Sugar Bay, 1293; slippery elm, 8H3, 1347; white oak, 200 yards south of 6J1, Highway 49, 1037; pignut hickory, 1 mile north of 6K3, east shore of Kentucky Lake, 1277.

STEWART: red cedar, one-half mile west of 9P1, Blue Spring Road, 1222.

Physcia laciniata Mull. Arg. Dense squamules which occur within 3 to 5 mm of the ends of lobes and the

dull, brownish-green color help distinguish this species. The squamules are so dense and small that the plant frequently looks powdery. Ends of the lobes are slightly pruinose. Rhizines near the tips of lobes are black with white tips. Apothecia were not found. It is common in LBL on many kinds of trees usually near strates. This species may be confused with *Anaptychia subpalmatula*. For separation of the two see notes for the latter.

LYON: hickory, one-fourth mile southwest of 5D2, 1456; black oak, one-fourth mile southwest of 5D2, 1066; white oak, one-half mile southwest of 4E2, north shore of Duncan Creek Bay, 1288.

TRIGG: post oak, one-half mile east of 6G2, Jenny Ridge Road, 1196; white oak, 200 yards south of 6J1, Highway 49, 1039; pignut hickory, 1 mile north of 6K3, east shore of Kentucky Lake, 1280.

STEWART: mountain chestnut oak, one-half mile northwest of 7M3, 1343; black gum, one-fourth mile east of 9P3, Hopewell Church, 1229.

Physcia millegrana Degel. This common, tiny, greenish-gray lichen is easily overlooked, appearing to the unaided eye as a course powder on the bark of trees. Examination of the plant with a lens reveals the appropriateness of the name for soredia are so numerous that it appears to have thousands of granules. Lobes are 0.5 mm or less wide. Apothecia, which are occasionally present, have a dark brown surface covered with a whitish, powder-like bloom. It sometimes covers large areas of bark on trees.

LYON: hackberry, one-fourth mile southwest of 6D2, on Green Branch, 1379; black locust, one-fourth mile southwest of 5D2, 1061.

TRIGG: pignut hickory, one-fourth mile southwest of 6J4, 1187; hickory, 200 yards southwest of 8J6, 1150.

STEWART: winged elm, one-fourth mile west of 8P6, Boyd Cemetery, 1248.

Physcia orbicularis (Neck.) Poetsch. This is one of the three physcias occurring within the area which is dull brownish-green. This species has soredia which are capitate on the surface mostly in the erupted ends of the short secondary lobes. Except for the white medulla it looks like *P. orbicularis* f. *rubropulchra* which has a bright orange-red medulla. Rhizines are black with white tips. It usually grows mixed with moss on the bark of trees and on roots. It was scarce within the area.

TRIGG: rock, near 7K2, 1473.

STEWART: buckeye, 200 yards southwest of 9P1, 1461.

Physcia orbicularis f. *rubropulchra* Degel. This is another of three physcias occurring within the area which is dull brownish-green. For differentiation of the three see the notes on *P. orbicularis*. The bright orange-red medulla of f. *rubropulchra* distinguishes it from all other lichens within the area. It has soredia in eruptions on the upper surface but mostly in the erupted ends of side branches. The rhizines are black with white tips. It was common on the bark of many kinds of trees and on rocks.

LYON: scalybark hickory, Bethlehem Church south of 5C1, 1128.

TRIGG: hackberry, one-fourth mile west of 5F4, 1043; northern red oak, one-fourth mile north of 6K3, east shore of Kentucky Lake, 1459.

STEWART: red cedar, one-half mile west of 9P1, Blue Spring Road, 1213.

Physcia stellaris (L.) Nyl. To find large numbers of this abundant species one only needed to examine the upper branches of recently cut trees, particularly the smooth branches of oaks. However, it was found plentifully on the trunks of many kinds of trees where plants were not so orbicular and were presumed to be older. The plants are usually less than 3 cm in diameter. Numerous apothecia, 1 mm or less in diameter, are almost invariably present. These have dark brown surfaces showing through a whitish, powder-like bloom. The upper surface is ashy-gray and covered with fine dots (under lens). This species should be examined with a lens for greatest appreciation of its beauty.

LYON: hackberry, one-fourth mile southwest of 6D2, on Green Branch, 1380; white oak, one-fourth mile southwest of 5D2, 1065; black locust two-thirds mile west of 4D4, east shore of Kentucky Lake, 1294.

TRIGG: upper branches of black oak, one-fourth mile west of 7E4, north side of Hematite Lake, 1010; white oak, 200 yards west of 5G1, 1065.

STEWART: oak, one-half mile northwest of 7M3, 1341; winged elm, one-fourth mile west of 8P6, Boyd Cemetery, 1247.

Physcia subtilis Degel. This species was collected at only one site, but it was growing abundantly there on small rocks. The lobes are so finely dissected and narrow (0.3 mm) that the plants are easily overlooked or dismissed as crustose. Plants are tightly appressed. Abundant, granular soredia are located on the margins and surfaces of lobes.

STEWART: small rocks, 300 yards west of 6L2, east shore of Kentucky Lake, 1336.

Physcia tribacoides Nyl. This species grew abundantly on the bark of hardwoods and conifers. The entire plant is usually 3 cm or less in diameter but one plant was found which was 7 cm in diameter. The upper surface is ashy white with a very little pruina near the tips of lobes. The plant is slightly tan below. Soredia occur in abundant capitate soredia, which may be 1 mm in diameter, on the upper surface. The soredia erupt and spread so that the apex is frequently wider than the base.

LYON: white oak, Paradise Church, two-thirds mile northeast of 4D2, 1123; white oak, one-fourth mile southwest of 5D2, 1075; white oak, one-half mile southwest of 4E2, north shore of Duncan Creek Bay, 1285.

TRIGG: white oak, one-fourth mile west of 7E4, north side of Hematite Lake, 1021; post oak, one-fourth mile west of 7E4, north side of Hematite Lake, 1015; white oak, 5G3, Higgins Cemetery, 1047; black gum, one-fourth mile southwest of 6J4, 1191; southern red oak, 200 yards south of 6J1, Highway 49, 1038; hickory, one-fourth mile east of 7K2, Laura Furnace Creek, 1142; white oak, one-fourth mile north of 6K3, east shore of Kentucky Lake, 1266.

STEWART: pignut hickory, one-third mile northwest of 8M4, 1311; red cedar, one-half mile west of 9P1, Blue

Spring Road, 1218; sugar maple, one-half mile southeast of 9P3, 1467.

Pseudocyphellaria aurata (Ach.) Vain. This lichen was found growing only in a west-facing slope on the east shore of Kentucky Lake near Blockhouse Creek Bay. Approximately 50 plants were observed on the bark of several kinds of trees scattered on about an acre of land. The plant, though ragged at times, is impressive because of the bright, gold-colored soredia along the margins and the gold medulla which shows at the margins of lobes and where cracks appear in the surface. The lobes are broad and dull, dark greenish-gray on the upper surface, becoming rose-colored after long storage. The lower surface is felt-like and exhibits many rather large, flat, yellow pores.

TRIGG: pignut hickory, 1 mile north of 6K3, east shore of Kentucky Lake, 1282.

Pyxine caesiopruinosa (Nyl.) Imsh. This is a common lichen within the area easily overlooked because of its small size. It is flat and tightly appressed to bark. The light mineral-gray thallus has abundant soredia occurring along the margins of lobes and on the upper surface. Heavy frosting of the upper surface of lobes extends from near the tips back as far as 5 mm but usually stops short of the margins and tips. This frosting stands up as though it were plastered on after growth had been completed. Lobes are 0.5 to 1.0 mm wide. The medulla is light yellow. The plant fluoresces bright gold under ultra-violet light of 3660 Å wave length. This species might be confused with *P. sorediata*. However in *P. sorediata* the lobes are broader (1.0 to 2.0 mm) and are powdery pruinose near ends; the medulla is bright golden yellow; and the plant is not fluorescent.

LYON: post oak, Paradise Church, two-thirds mile northeast of 4D2, 1119; hackberry, one-fourth mile southwest of 6D2, on Green Branch, 1377; black oak, one-half mile southwest of 4E2, north shore of Duncan Creek Bay, 1289.

TRIGG: post oak, one-fourth mile west of 7E4, north side of Hematite Lake, 1012; white oak, 8H3, 1350; black oak, 1 mile north of 6K3, east shore of Kentucky Lake, 1276; hickory, one-fourth mile east of 7K2, Laura Furnace Creek, 1141.

STEWART: pignut hickory, 8P4, Blue Spring Road, 1241.

Pyxine sorediata (Ach.) Mont. This is a common species in the area growing on the bark of many kinds of trees. The mineral-gray thallus seldom becomes 6.0 cm in diameter. Abundant soredia are mostly marginal but also occur on the surface of lobes. Light, powdery pruinose occurs on the upper surface near the ends of lobes. A golden-yellow medulla, exposed easily by scratching the brittle surface with the fingernail, helps distinguish it from *P. caesiopruinosa* which it resembles. See notes on the latter for other taxonomic differences.

LYON: white oak, Paradise Church, two-thirds mile northeast of 4D2, 1121; pignut hickory, one-fourth mile southwest of 5D2, 1067.

TRIGG: black oak, one-fourth mile west of 7E4, north side of Hematite Lake, 1005; white oak, 8H3, 1358; northern red oak, one-fourth mile north of 6K3, east

shore of Kentucky Lake, 1260; post oak, one-fourth mile east of 7K2, Laura Furnace Creek, 1138.

STEWART: oak log, one-half mile west of 8L3, Ginger Creek Road, 1305; mountain chestnut oak, one-half mile northwest of 7M3, 1344; beech, one-fourth mile east of 9P3, Hopewell Church, 1225.

Ramalina fastigiata (Pers.) Ach. Not only was this fruticose species scarce within the area but those plants collected were usually scrawny. The pale, yellowish-green thallus is tufted, flat and hard with numerous ridges paralleling the margins. Often there are white pores along the surface. Apothecia are on the upper surface mostly near the margins of lobes.

LYON: bitternut hickory, north bank of Moss Creek Dock near 3D3, 1106.

TRIGG: red maple, one-half mile northwest of 7J1, Wienger Hollow 1161; dead branch, one-half mile northwest of 8J2, Berkley Spring, 1394.

STEWART: pignut hickory, 300 yards west of 6L2, east shore of Kentucky Lake, 1326; pignut hickory, 8P4, Blue Spring Road, 1240.

Usnea mutabilis Stirt. This is a scarce species within the area. The cortex is yellowish-green; the medulla is red. The plant is firmly anchored at the base and tufted. Many small isidia are interspersed with the soredia, or alone, over the surface. Radiating side fibrils are numerous but there are no apothecia. Examination with a lens is necessary to separate this isidiate-sorediate species from the non-isidiate-sorediate *U. strigosa* whenever the latter is without apothecia.

LYON: bitternut hickory, north bank of Moss Creek Dock near 3D3, 1107.

TRIGG: mountain chestnut oak, 1 mile west of 6J4, 1173; old branch, one-half mile northwest of 8J2, Berkley Spring, 1395; mountain chestnut oak, 1 mile north of 6K3, east shore of Kentucky Lake, 1268.

Usnea rubicunda Stirt. This lichen is rare in this area. It is found growing on the bark of trees with the base firmly anchored and is tufted. Numerous small isidia occur on the thallus, generally intermingling the soredia. The cortex is mostly red, becoming dark red near the base, while the medulla is white. Numerous, small isidia appear over the surface intermingled with the soredia. The red cortex separates this species from *U. mutabilis* and *U. strigosa* both of which have a yellowish-green cortex.

TRIGG: mountain chestnut oak, 1 mile west of 6J4, 1175; mountain chestnut oak, 1 mile north of 6K3, east shore of Kentucky Lake, 1275.

Usnea strigosa (Ach.) A. Eat. This is one of the widespread and more spectacular lichens of the area. The yellow-green thallus is tufted and firmly attached at the base. The main branches are numerous and are usually tipped with relatively flat apothecia which have many marginal proliferations. No soredia or isidia are present but multitudinous side fibrils radiate almost perpendicularly from the branches, and these may vary from mere bumps to structures several millimeters in length. These characteristics help distinguish it from other species of *Usnea* in the area. In addition, the medulla is usually red or coral.

LYON: honey locust, one-fourth mile southwest of 6D2, on Green Branch, 1382.

TRIGG: pignut hickory, one-fourth mile south of 7F4, Crooked Creek, 1374; mountain chestnut oak, 1 mile west of 6J4, 1174; dead branch, one-half mile northwest of 8J2, Berkley Spring, 1393.

STEWART: scarlet oak, 8P4, Blue Spring Road, 1236. *Xanthoria candelaria* (L.) Th. Fr. The scarcity of this species within the area was surprising since it grows abundantly in Montgomery County, Tennessee approximately 50 miles up the Cumberland River to the east. This is one of three very small yellow or gold lichens occurring in LBL. The lobes are narrow (up to 0.5 mm), gold near the end and greenish-gold farther back. Gold and green soredia occur along the margins of lobes but are most abundant on the lower side of the tips which have a tendency to turn upward. With the unaided eye the plant gives the appearance of scattered, golden, coarse nap on the bark of trees. This species may be confused with *Candelaria concolor* which also has soredia but is lemon-yellow near the ends of lobes and yellow-green farther back. The other yellow species, *C. fibrosa*, is similar to *C. concolor* but it has abundant apothecia and no soredia.

LYON: cork elm, 4E1, near Smith Bay Dock, 1084; black walnut, 7E4, 200 yards west of the Museum, 1459.

STEWART: willow oak, Fort Henry, 7P4, 1482.

AN ALPHABETICAL CHECKLIST OF FOLIOSE AND FRUTICOSE LICHENS FOUND IN LAND BETWEEN THE LAKES

Anaptychia palmatula (Michx.) Vain.
Anzia colpodes (Ach.) Stizenb.
Baeomyces roseus Pers.
Candelaria concolor (Dicks.) B. Stein
Candelaria fibrosa (Fr.) Müll. Arg.
Cetraria juniperina (L.) Ach.
Cladonia apodocarpa Robb.
Cladonia bacillaris (Ach.) Nyl.
Cladonia caespiticia (Pers.) Flörke
Cladonia capitata (Michx.) Spreng.
Cladonia caroliniana (Schwein.) Tuck.
Cladonia chlorophaea (Flörke) Spreng.
Cladonia coniocraea (Flörke) Spreng.
Cladonia cristatella Tuck.
Cladonia floerkeana (Fr.) Somm.
Cladonia macilenta Hoffm.
Cladonia pyxidata (L.) Hoffm.
Cladonia rangiferina Wigg.
Cladonia squamosa (Scop.) Hoffm.
Cladonia subtenuis (Abb.) Evans
Cladonia strepsilis (Ach.) Vain.
Cladonia verticillata (Hoffm.) Schaer.
Coccocarpia cronia (Tuck.) Vain.
Collema conglomeratum Hoffm.
Dermatocarpon minutum (L.) Mann
Dermatocarpon tuckermanii (Rav.) Zahlbr.
Heterodermia domingensis (Ach.) Trev.
Heterodermia hypoleuca (Ach.) Trev.
Heterodermia obscurata (Nyl.) Trev.
Heterodermia tremulans (Müll. Arg.) W. Culb.
Leptogium choromelum (Sw. ex Ach.) Nyl.
Leptogium cyanescens (Pers.) Korb.
Leptogium lichenoides (L.) Zahlbr.
Leptogium saturninum (Dicks.) Nyl.
Pannaria lurida (Mont.) Nyl.
Parmelia aurulenta Tuck.

Parmelia bolliana Müll. Arg.
Parmelia borreri (Sm.) Turn.
Parmelia caperata (L.) Ach.
Parmelia caroliniana Nyl.
Parmelia cetrata Ach.
Parmelia crozalsiana B. de Lesd. ex Harm.
Parmelia cryptochlorophaea Hale
Parmelia cumberlandia (Gyeln.) Hale
Parmelia dilatata Vain.
Parmelia dissecta Nyl.
Parmelia galbina Ach.
Parmelia hypotropa Nyl.
Parmelia livida Tayl.
Parmelia margaritata Hue
Parmelia mellissii Dodge
Parmelia michauxiana Zahlbr.
Parmelia obsessa Ach.
Parmelia perforata (Jacq.) Ach.
Parmelia rampoddensis Nyl.
Parmelia reticulata Tayl.
Parmelia rudefecta Ach.
Parmelia saxatilis (L.) Ach.
Parmelia subcristata Nyl.
Parmelia subsidiosa (Müll. Arg.) Dodge
Parmelia subtinctoria Zahlbr.
Parmelia texana Tuck.
Parmelia tinctorum Nyl.
Peltigera canina (L.) Willd.
Peltigera polydactyla (Neck.) Hoffm.
Physcia ciliata (Hoffm.) Du Rietz

Physcia grisea (Lam.) Zahlbr.
Physcia lacinulata Müll. Arg.
Physcia millegrana Degel.
Physcia orbicularis (Neck.) Poetsch
Physcia orbicularis f. rubropulchra Degel.
Physcia stellaris (L.) Nyl.
Physcia subtilis Degel.
Physcia tribacoides Nyl.
Pseudocyphellaria aurata (Ach.) Vain.
Pyxine caesiopruinosa (Nyl.) Imsh.
Pyxine sorediata (Ach.) Mont.
Ramalina fastigiata (Pers.) Ach.
Usnea mutabilis Stirt.
Usnea rubicunda Stirt.
Usnea strigosa (Ach.) A. Eat.
Xanthoria candelaria (L.) Th. Fr.

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