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LICHENS. For those whose interest extends to the lichens which grow on the trunks and branches of trees, this issue of the Bulletin has been prepared. There are probably about fifty different kinds of lichens to be found growing on Massachusetts trees. Consequently the notes here presented make no pretense to completeness, but it is believed that they cover the commoner species.

Lichens were long thought to be "individuals" in the plant kingdom after the manner of mosses, fungi, and the higher plants. But with the development of the microscope and the resulting investigation of minute structures they have proven to be dual beings consisting of algae and fungi growing together in a curious interrelationship apparently for mutual benefit. The present tendency is to maintain them as a separate group.

Most lichens are so constructed that they are largely independent of the soil as a source of water and nutrient salts. They absorb moisture, whether it be in the form of rain, mist, or water vapor, with extraordinary ease and rapidity from the air or from the surface upon which they live, so that from a tinder-dry quiescent state in which they barely exist they may become turgid and active almost instantly under the influence of a light rain. Along with water they absorb large quantities of carbon dioxide from the air, and both are utilized by the green or blue-green algal constituents in the manufacture of the starchy materials upon which the whole plant lives. So far as is known reproduction is nearly always vegetative, by spores or by the breaking off of portions of the lichen plant or thallus to form new colonies.

Unless they lie flat on rocks or soil, lichens are held closely to their substrata by minute threads or rhizoids which penetrate small inter-

stices of bark or wood. Some species are so thin and permeate the bark so completely as almost to appear part of it. It would seem then – and such proves to be the case – that large foliose species should be expected upon trees with deeply fissured bark to which their comparatively large rhizoids can cling, while crustose forms which actually penetrate the outer surfaces of the cork might be found most commonly on smooth-barked trees. Another factor beside the necessity for a holdfast must be considered, however. Trees whose bark is much broken by cracks and crevices hold much more water on their surfaces than smooth-barked ones, and so offer a distinct attraction for plants which are forced to utilize atmospheric moisture. Due in part to long periods of inactivity in dry weather, and in part, probably, to inherent qualities of the plants themselves, lichen growth is extremely slow. Some of the common foliose species will add a quarter of an inch to their diameter in one year, while others have been observed over periods covering fully twenty-five years without showing perceptible increase in size. In many trees the bark changes from a smooth to fissured condition with age so that there is a progression of lichen species whose requirements differ. The fact that most of the lichens are usually found on the lower ten to twenty feet of a tree is probably due not only to more suitable atmospheric conditions near the ground but also to the presence higher up of the younger, less fissured bark which offers less purchase for holdfasts and less surface moisture.

Whatever the lichens may take from the bark itself is not known to do any damage to the trees, although it should be noted that they are most abundant on trees which are not in a healthy condition.

That lichens are sensitive to minute differences in the content of the atmosphere is shown by the common observation that they are almost entirely absent from the neighborhood of large cities. This seems to be due in part to the presence of coal smoke with its accompanying gases which have been found harmful even in small quantities.

Certain lichens have been “known” from time immemorial to have medicinal properties. A few such as the Iceland Moss, *Cetraria islandica*, are still in use. Some species contain purple, yellow, and green pigments which are easily extracted to make good dyestuffs. Lichens attain their greatest importance to man, however, in the treeless arctic and subarctic parts of the globe where fruiticose or “bunch” lichens, known as “reindeer mosses”, cover large areas to make natural forage for vast herds of reindeer and caribou.

HUGH M. RAUP

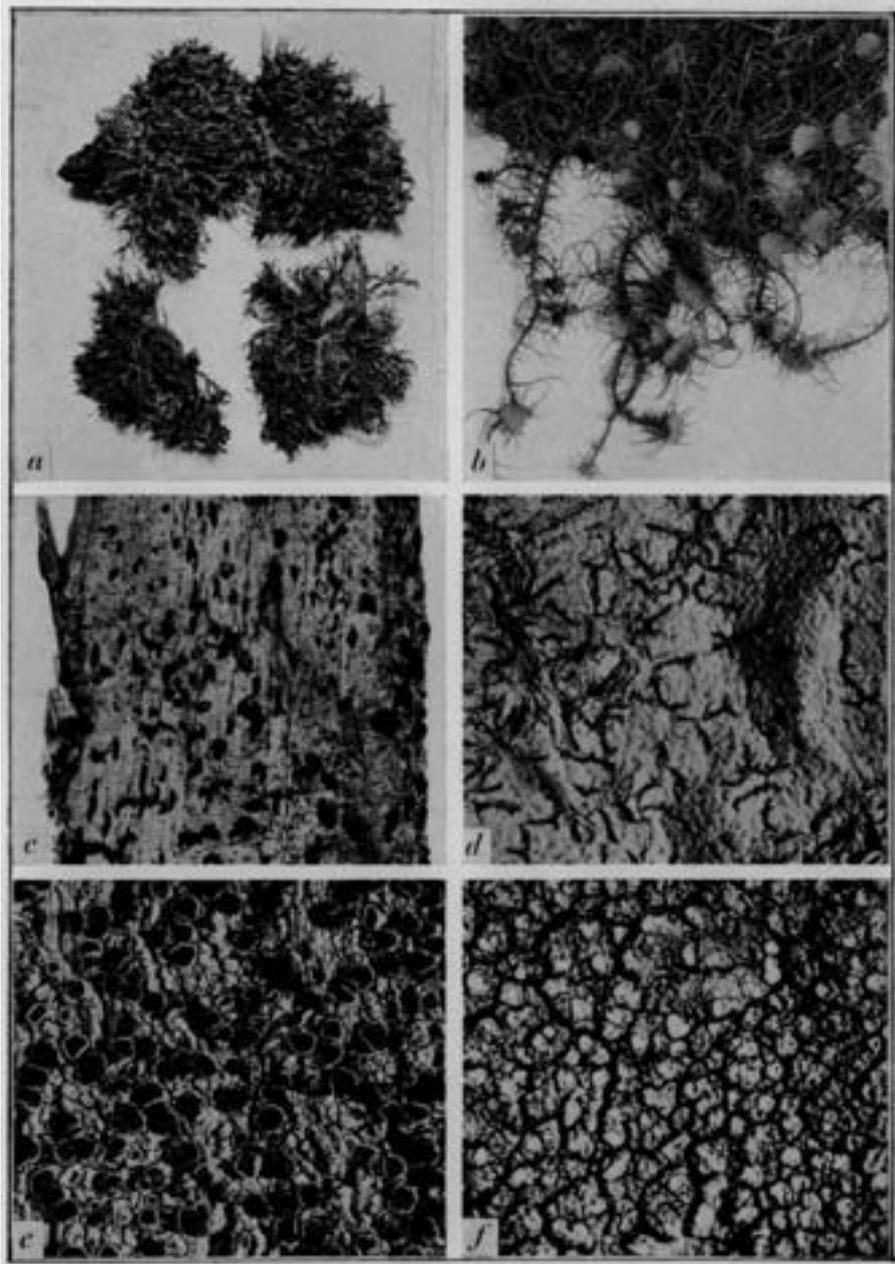


PLATE I

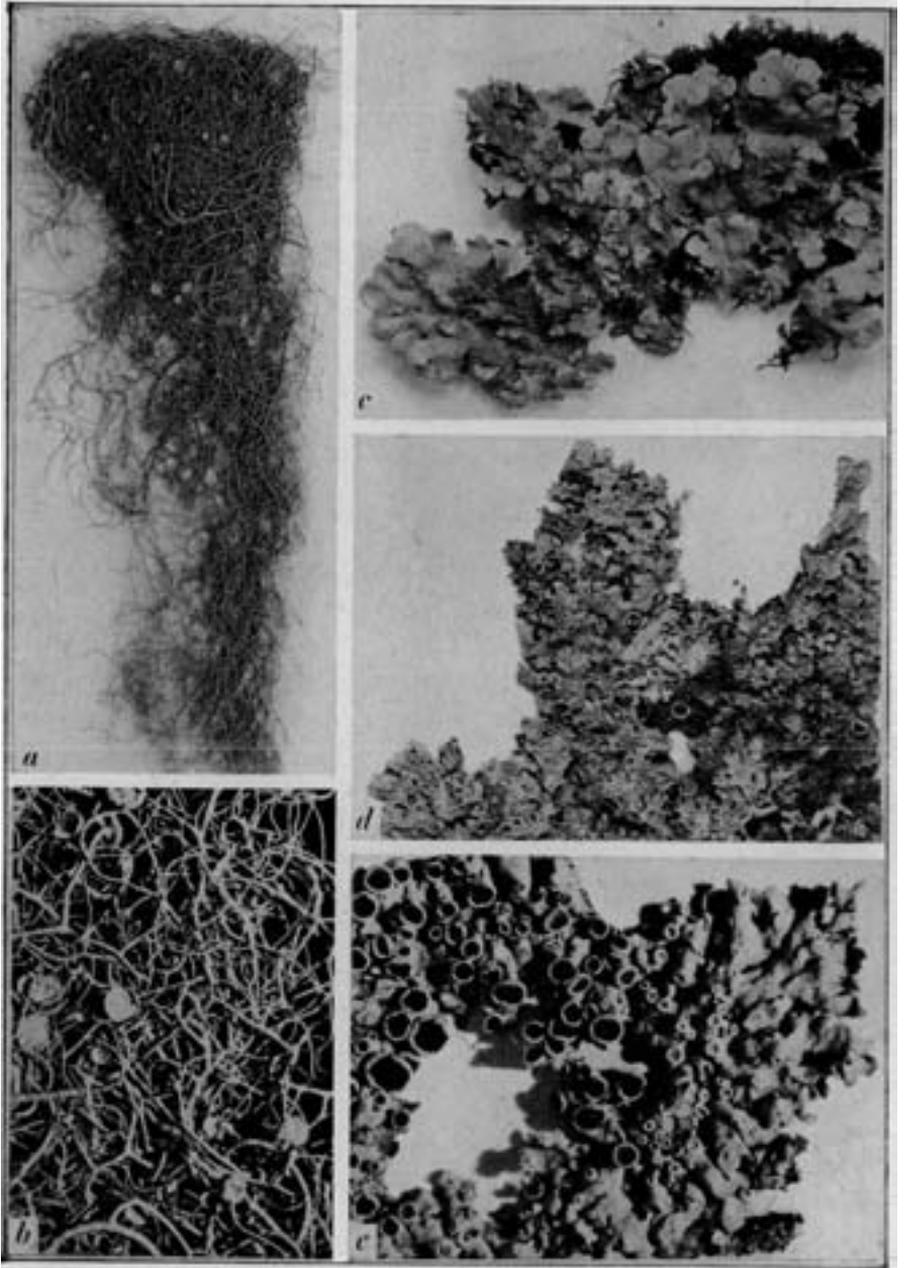


PLATE II

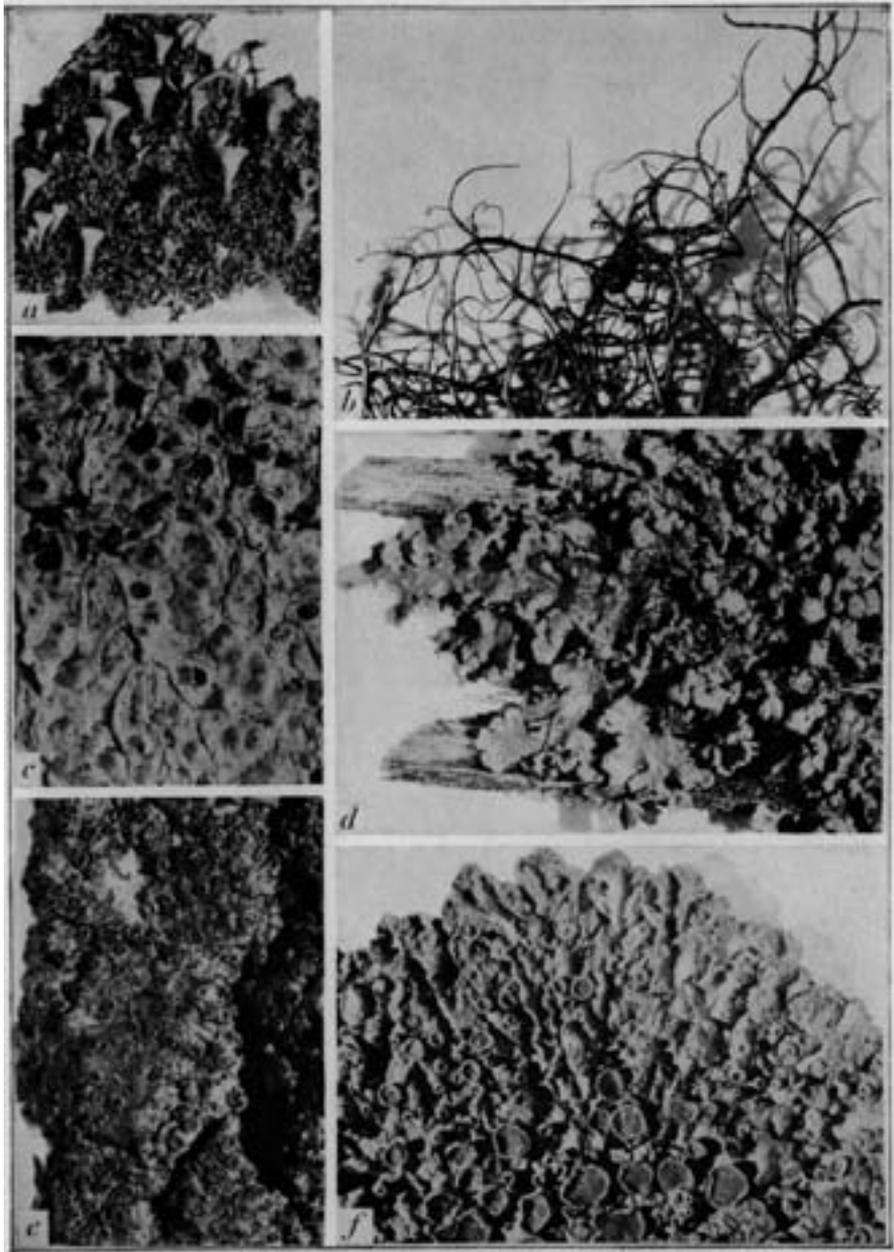


PLATE III

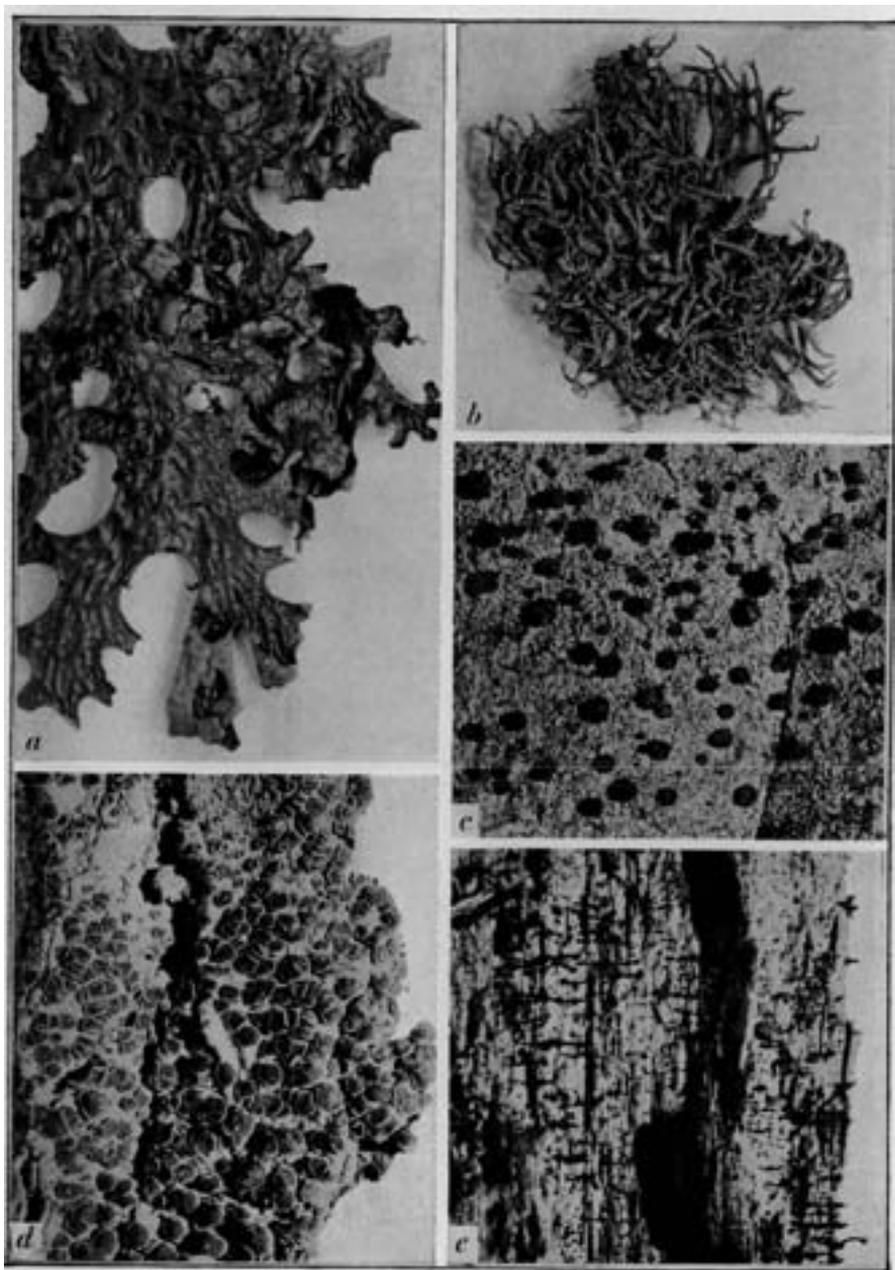


PLATE IV

EXPLANATION OF THE PLATES

PLATE I.

- a.* RAMALINA CALICARIS (*L.*) *Rohl.* Nat. size. Usually on rough bark. Color gray or pale green.
- b.* USNEA DASYPOGA *Rohl.* Nat. size. Usually found on old rough-barked trees. Color gray to pale green.
- c.* OPEGRAPHA VARIA *Pers.* x4. Forms a thin whitish crust on smooth bark. Fructifications black.
- d.* GRAPHIS SCRIPTA (*L.*) *Ach.* x3. Thallus a thin white or grayish crust on smooth bark. Fructifications black.
- e.* LECANORA SUBFUSCA (*L.*) *Ach.* x4. Thallus a rather thick, fissured crust on rough or smooth bark, gray or pale green. Fructifications brown or black, with margins colored like the thallus.
- f.* PERTUSARIA VELATA (*Turn.*) *Nyl.* x4. Thallus thin, or in age thick and fissured, whitish or pale green. The fructifications are in the shallow, lighter-colored, and often powdery depressions.

PLATE II.

- a.* USNEA TRICHODEA *Ach.* Nat. size. Forms pale green festoons on branches, usually on old trees. The small disks are the spore-bearing organs.
- b.* The same. x4.
- c.* PARMELIA CAPERATA (*L.*) *Ach.* Nat. size. Very common on rough-barked trees. Upper surface straw-colored, usually paler toward the margin; lower surface black, with black rhizoids. Fructifications (not appearing on this specimen) reddish-brown disks with pale rims, much like those of the following.
- d.* PARMELIA SAXATILIS (*L.*) *Ach.* Nat. size. Usually on rough bark. Upper surface gray or pale green; lower surface and rhizoids black. Fructifications reddish-brown with pale rims.
- e.* PHYSCIA STELIARIS (*L.*) *Nyl.* x3. Usually on rough bark. Gray to pale green, with white under surface and rhizoids. Fructifications with dark brown or black disks.

PLATE III.

- a.* CLADONIA PYXIDATA (L.) Hoffm. Nat. size. Common on the mossy bases of tree trunks. Thallus of many small lobes which are pale green or darker above and white beneath; the cups are usually pale green, sometimes with small dark brown spore-bearing organs on their rims.
- b.* ALECTORIA CHALYBEIFORMIS (L.) Rohl. x3. Branches usually stiff, dark brown, and rather shiny. The small white bodies on them are vegetative reproductive organs, or *soredia*.
- c.* PYRENULA NITIDA (Weig.) Ach. x4. The thallus, usually on smooth bark, is a gray to pale green crust. Fructifications black.
- d.* CETRARIA PINASTRI (Scop.) Rohl. x3. Usually on rough bark. Thallus lobes green or straw-colored above, with the yellow under surface often rolled up at the edge, so that the lobes appear to have yellow borders.
- e.* RHINODINA SOPHODES (Ach.) Mass. x4. On smooth or rough bark. Thallus a thin, gray to brown, granular crust. Fructifications dark brown or black, with margins colored like the thallus.
- f.* XANTHORIA PARIETINA (L.) Beltram. x3. The whole plant orange-colored.

PLATE IV.

- a.* LOBARIA PULMONARIA (L.) Hoffm. Nat. size. Usually on damp bark in rich woods. Grayish or yellowish green, with reddish-brown fructifications.
- b.* EVERNIA PRUNASTRI (L.) Ach. Nat. size. Pale gray-green or straw-colored, usually on rough bark. Rarely found with fruit.
- c.* BUELLIA DISCIFORMIS Mudd. x4. Thallus a gray or gray-green crust on smooth bark. Fructifications black.
- d.* CALOPLACA AURANTIACA Th. Fr. x3. Thallus a yellowish to gray or whitish crust on rough or smooth bark. Fructifications orange to saffron, with paler rims.
- e.* CALICIUM LENTICULARE Fr. x4. Thallus a thin white or gray crust, often not evident. The black or dark brown spore-bearing organs are on the slender black stipes. Usually on dead wood.