STUDIES ON THE RATES OF GROWTH OF CRUSTOSE AND FOLIOSE FORMS OF LICHEN THALLI

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INTRODUCTION

These investigations were begun at the University of Michigan Biological Station in the summer session 1950, beginning June 26 at the suggestion of Mrs. Volney H. Jones and under the direction of Dr. Frederick K. Sparrow.

It is the author's wish to continue these studies over a period of 4-5 years until a somewhat definite idea can be obtained regarding the rates of growth of these lichen thalli.

DESCRIPTION OF PROBLEM

In a few cases, the specimen stations have been located in such a way that they might contain the same genus of lichen at two or three stations. This was done primarily with the genus Lecanora because it offers many advantages to the beginner in measuring the growth of the thallus and in its abundance in the area. By taking more than one specimen of the same kind, more conclusive information can be obtained regarding that fomm than if only one specimen was used. Where possible, this has been the case, in selecting each station. At each station, stakes numbered with the proper station number have been placed in the ground at the base of the tree or if the specimen is on the ground, the stake has been placed close to it. On all of the trees at which each station is located, metal signs marked "Reserved for Observation" have been placed close to the actual specimen, but still leaving space for the enlargement of the thallus.

Most of the specimens were located on trees because this offers the best way of re-locating the stations and more security

from passerbys who might step on the specimens and render them worthless for the observations. Measurements of the widths of the thalli are inconsistent in the method of expressing them because certain of these lichen thalli grow at a more noticeable rate than do others and therefore can be measured to the nearest millimeter whereas in the supposedly slower growing forms, measurements have been taken to the nearest 32th of an inch and still obtain accurrate data of the increase in size. All microscope measurements have been taken on soaked specimens.

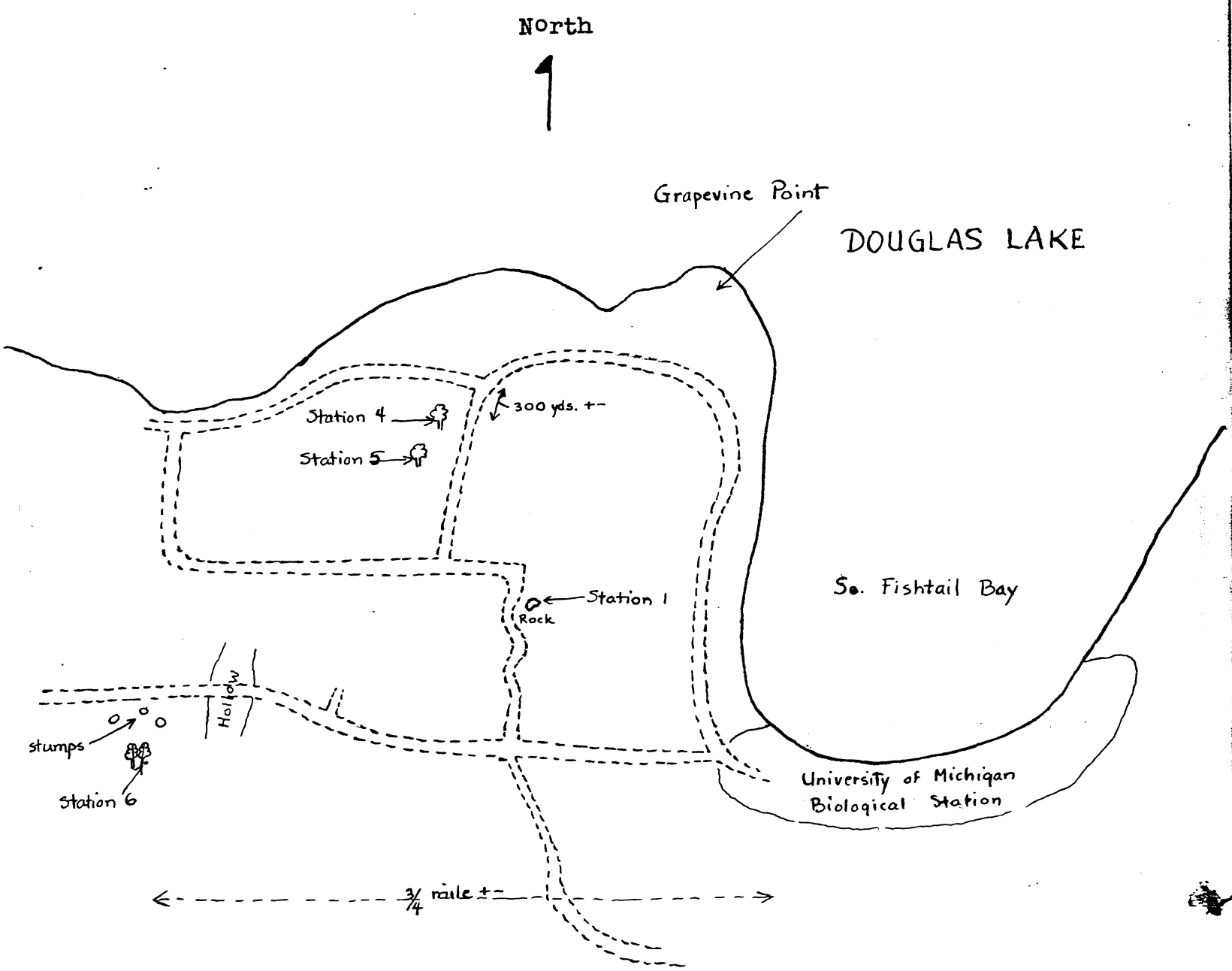
For the most part, the specimens were chosen to provide as many different ages and types as could be found in the time alloted. Some were chosen with fruits and others without in hopes of seeing how long before, and when, the fruits are produced.

In as far as it was possible, attempts have been made to obtain a duplicate specimen of exactly the same species as those under observation and in such cases as these duplicates were found, they have been marked with the proper station number and have been placed in the lichen herbarium of the University of Michigan Biological Station, and are in a separate folder marked "Duplicates of Specimens Under Observation".

On the following pages are maps showing the general location of each station, and the actual field and microscope measurements with general descriptions of each thallus.

DIAGRAMMATIC SKETCH OF GRAPEVINE POINT SHOWING APPROXIMATE LOCATION OF LICHEN STATIONS

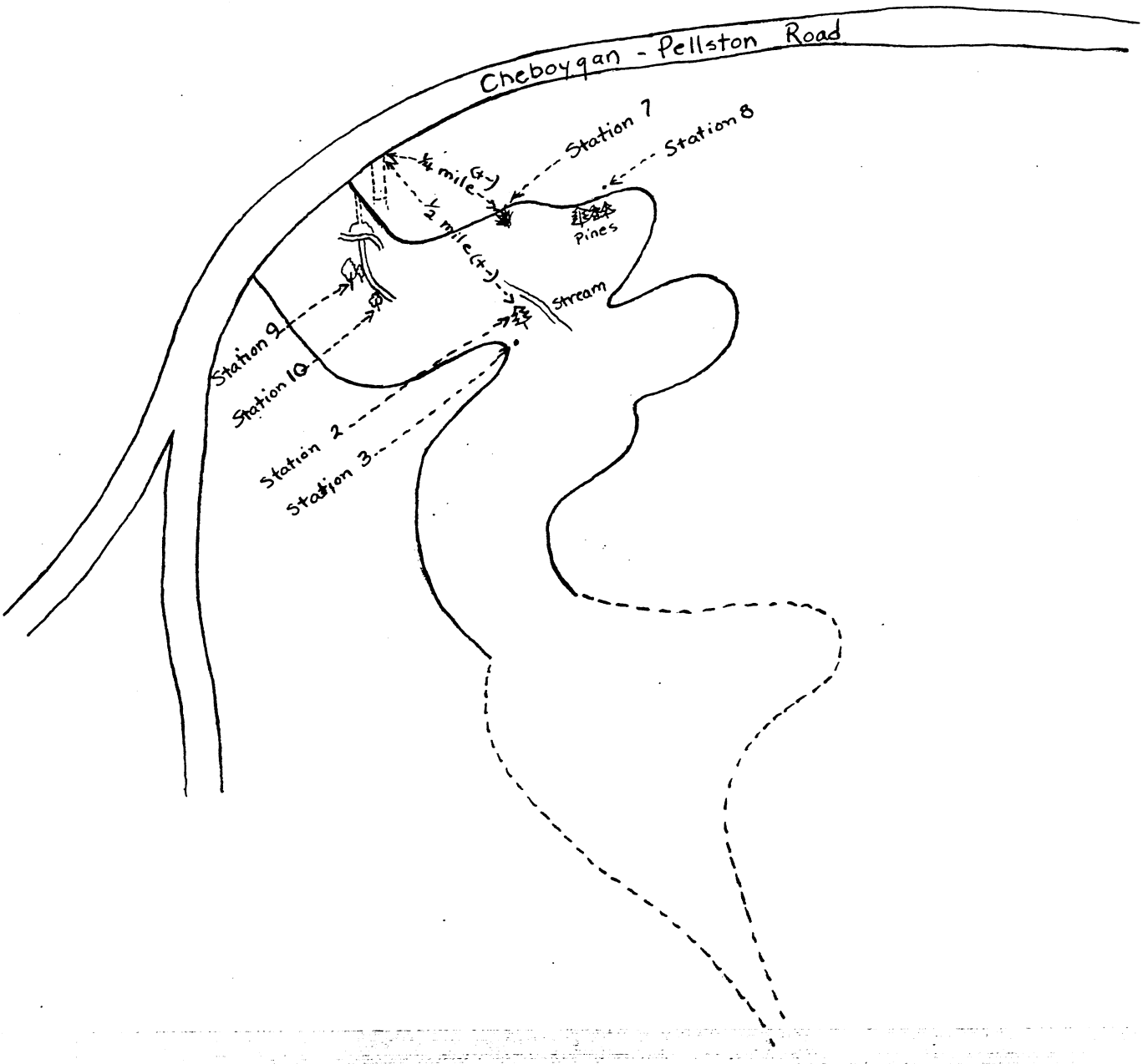
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DIAGRAMMATIC SKETCH OF THE GORGE SHOWING APPROXIMATE LOCATION OF LICHEN STATIONS

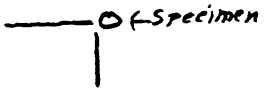
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North



Station No. 1 --- Grapevine Point

Location: This specimen is located on a granite rock at the east side of the fire road running south as it continues around Grapevine Point. At the north end of the Point, the road curves south for a considerable distance then bends east then again south and the rock is located about 100 feet (+-) from this bend. Rock scored with a hammer so marks would point toward specimen as:



Stake marked with pin no.1 at base of rock. Specimen 8'' (inches) from base of rock. Thallus measurements taken August 3, 1950.

Specimen: Lecanora cinerea (L.) Rohling

Size of Thallus:

Vertical -- 3.3 cm.

Horizontal -- 3.1 cm.

Thickness -- approx. .5mm

Number of Fruits approximately 248.

Size of Fruits: .1 to .8mm

Size of Spores: 13-15μ 10-12μ .

Condition of Thallus:

Good, healthy. Fruits appear numerous but thicker in abundance along margins of thallus. Sparse in center of thallus. Thallus gray to dark, fruits black.

Station No. 2 --- The Gorge

Location: Specimen on Pinus strobus in main ravine of Gorge about ½ mile (+-) south of the Cheboygan-Pellston road. Tree located near stream along which are many dead trees still standing. Specimen 5ft. 7in. up from base of tree with "Reserved" sign 3 inches below base of thallus. Stake numbered 2 at base of tree. There are two of the same species of lichens on this tree. The first measurements are those of the specimen on the right when facing the tree and the second are those of the specimen on the lower left. Thallus measurements taken July 19, 1950.

1st Specimen: Parmelia caperata (L.) Ach.

Size of Thallus:

Vertical -- 5 3/4 inches.

Horizontal -- 6 inches.

Thickness -- 96μ to 119μ.

Fruits: None.

Condition of Thallus:

Healthy, robust growth. No indication of ageing in center or elsewhere on thallus. Thallus lobing and folding up on edges. Lobes average 7/16 inches wide. Thallus straw colored, black below with brown margins; no rhizoids along margins. Thallus closely attached to tree.

2nd Specimen: Parmelia caperata (L.) Ach.

Size of Thallus:

Vertical -- 5 3/4 inches.

Horizontal -- 6 inches.

(Station No. 2 con't.)

Fruits: None.

Condition of Thallus:

Healthy, much the same as previous specimen. No fruits. Thallus with 1 sq. cm. torn off. Closely attached to tree; margins of thallus turning up somewhat.

Station No. 3 -- The Gorge

Location: Specimen at base of rotting stump; growing over moss on side of hill to west side of main ravine in Gorge. Situated about 100-150 feet south-west of Station No. 2. About ½ mile (+-) south of Cheboygan-Pellston road. Stake numbered 3 in ground at base of specimen. Thallus measurements taken August 12, 1950.

Specimen: Peltigera canina (L.) Willd.

Size of Thallus (widest widths):

Vertical -- 9 inches.

Horizontal -- 9 3/8 inches.

Thickness -- 460μ - 480μ .

Number of Fruits approximately 203.

Size of Fruits: 4-5 to 4-6mm.

Size of Spores: 30-49μ 3-5μ. 3-5 septate, slightly curved.

Condition of Thallus:

Apothecia numerous, reddish-brown folded back. Fruits not as abundant in center of thallus. Portion of center of thallus showing moss through on ground beneath. Thallus green and wet when first observed; gray and dry at observation two weeks later. Thallus generally healthy.

Station No. 4 -- Grapevine Point

Location: Specimen on Fagus grandifolia, 11 steps to the west side of the fire-road running south through center of Grapevine Point. Road leads on south from fork that branches off to west of it on north-west side of the Point. (See Map). Tree located 300 yards (+-) south of this fork. "Reserved" sign 3 inches below base of specimen. Stake numbered 4 at base of tree. Thallus measurements taken August 3, 1950.

Specimen: Lecanora subfusca (L.) Ach.

Size of Thallus:

Vertical (center) -- 2 cm.

Vertical (right side) -- $2\frac{1}{2}$ cm.

Vertical (left side) -- $1\frac{1}{2}$ cm.

Horizontal -- $5\frac{1}{2}$ cm.

Thickness -- 432μ - 500μ.

Number of Fruits approx. 415.

Size of Fruits -- .7mm.

Size of Spores: Immature ???. 5-7μ 9-11μ. More or less spherical

Condition of Thallus:

Good, no dead spaces on thallus. Largest at right end with thallus tapering slightly at left side. Fruits appearing numerous to eye. Thallus ashy gray.

Station No. 5 -- Grapevine Point

Location: Specimen on large Fagus grandifolia about 300 feet south of Station No. 4 and 17 steps west from the same fire-road as runs past Station No. 4. (See Map.) "Reserved" sign 3 inches below spedimen on tree. Stake numbered 5 at base of tree. Thallus measurements taken August 3, 1950.

Specimen: Lecanora pallida (Schreb.) Rabh.

Size of Thallus:

Vertical -- 2.3 cm.

Horizontal -- 2.7 cm.

Thickness -- (Not taken in 1950)

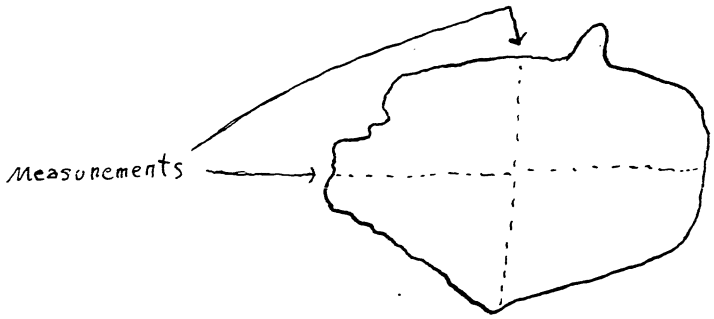
Number of Fruits approximately 60 large enough to see. Many tiny ones.

Size of Fruits -- .2 - 1mm.

Spores: No mature spores observed.

Condition of Thallus:

Healthy. No splotches or dead areas anywhere on thallus. Thallus whitish-gray. General shape of thallus is seen in the following diagram:



Station No. 6 -- Grapevine Point

Location: Specimen on Quercus borealis, 19 steps from edge of fire-road 3/4 of a mile (+-) west of the Biological Station. Fire-road runs in more or less straight line west of UBS. Station No. 6 located across big hollow and near 3 large burned stumps on south side of road. Two oak trees together. "Reserved" sign 2 inches below specimen. Stake No. 6 at base of left tree of the two. (East) There are two specimens here. The first one is 2 inches above the sign while the second one is 19 inches higher up directly above first specimen. Thallus measurements taken on August 7, 1950.

1st. Specimen: Parmelia olivacea (L.) Ach.

Size of Thallus:

Vertical -- 1½ inches.

Horizontal -- 1 3/4 inches (widest part).

Thickness approx. 115μ - 345μ.

Fruits: None.

Condition of Thallus:

Healthy all over; lobes much dichotomously branched averaging 1/16 to 1/8 inches wide. Thallus closely adnate to bark of tree. Thallus brown, almost circular, no fruits.

2nd Specimen: Parmelia olivacea (L.) Ach.

Size of Thallus:

Vertical (widest part) -- 2 inches.

Horizontal (widest part) -- 2 1/16 inches.

Thickness approx. 115μ - 345μ.

Fruits: None.

(Station No. 6 con't.)

Condition of Thallus:

Healthy all over. Shape almost circular, brown. Two cracks in bark of tree just right of center of thallus, separating thallus slightly. Closely adnate to bark of tree.

Station No. 7 -- The Gorge

Location: Specimen on Fagus grandifolia located on north rim of the Gorge about ¼ (1/4) mile (+-) from the entrance to the Gorge at the south side of the Cheboygan-Pellston road. The tree on which the specimen is located stands 15 feet down over the rim of the Gorge. "Reserved" sign 3 inches below base of specimen. Stake numbered 7 at base of tree. Thallus measurements taken August 12, 1950.

Specimen: Lecanora subfusca (L.) Ach.

Size of Thallus:

Vertical (widest part) -- 22/32 inches (left side)

Vertical (widest part) -- 18/32 inches (center)

Vertical (widest part) -- 22/32 inches (right side)

Horizontal (widest part) -- 3½ inches.

Thickness approx. 200μ - 384μ.

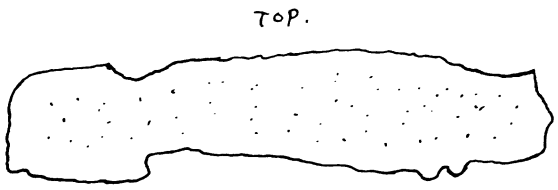
Number of Fruits approx. 450.

Size of Fruits: .1 - .7 mm.

Spores -- Too immature to measure.

Condition of Thallus:

Apparently healthy. Grayish to whitish, especially along outer edges whitish. Disk of apothecia reddish-brown. General shape of thallus is as follows:



Station No. 8 -- The Gorge

Location: Specimen on burned over pine branch on north rim of the Gorge about ½ mile (+-) south and east of entrance to Gorge on south side of Cheboygan-Pellston road. Branch beside burned stump still standing 25 feet back north-east from rim of Gorge, near first pine grove that is on north rim of Gorge. Stump posted with "Reserved" sign and branch sticking up in front of stump. Thallus surrounded by same species of lichen to the top and below the actual specimen. Experiemental specimen is in between these. Stake numbered 8 at base of stump. Thallus measurements taken on August 12, 1950.

Specimen: Parmelia physodes (L.) Ach.

Size of Thallus:

Vertical -- 2 12/32 inches.

Horizontal -- 2 inches.

Thickness approx. 384μ-- 500μ .

Fruits: None.

Condition of Thallus:

Healthy, robust all over except small nick in thallus near center. Thallus growth form almost a perfect circular rosette, grayish, much lobed, lobes broad to narrowed somewhat. Branches also in center of thallus.

Station No. 9 -- The Gorge

Location: Specimen on one of three *Acer rubrum* trees growing 75 feet (+-) south and 40 degrees East of fireplace spot at base of entrance path to the Gorge. Trees located 5 feet west of path that runs across stream and on past these trees in a southerly direction. Specimen 3 inches above "Reserved" sign on the tree containing the specimen. Stake numbered 9 at base of tree. Thallus measurements taken August 12, 1950.

Specimen: *Parmelia saxatilis* (L.) Ach.

Size of Thallus:

Vertical -- $2\frac{1}{2}$ inches.

Horizontal -- $2\frac{1}{4}$ inches.

Thickness -- 126μ- 146μ .

Fruits: None.

Condition of Thallus:

Robust. Thallus gray, much branched. Branching dichotomously. Sorediate in center. One lobe loose from tree but still intact to specimen in center of thallus. Tips of other lobes loosely adnate to the tree. No fruits.

Station No. 10 -- The Gorge

Location: Specimen is located on Quercus borealis, approximately 5 feet southeast of Station No. 9 and about 75 feet south and 40 degrees East of fireplace spot at base of path entrance to the Gorge. Path crossing stream goes right by this tree on the east side. "Reserved" sign 3 inches below the specimen. Thallus measurements taken August 12, 1950.

Specimen: Sterile, as yet undetermined.

Size of Thallus:

Vertical (widest part) -- 1 18/32 inches.

Horizontal (widest part) -- 3 20/32 inches.

Thickness approx. 600 μ - 750 μ.

Fruits: None.

Condition of Thallus:

Robust. Whitish to pale gray and soredia white. Approximately 306 soredial patches (??) on thallus. Parmelia saxatilis surrounding it in places and growing over it at top but not harming the specimen. At right of center and at the center are faint cracks in the tree bark that separate the thallus 3/32 inches in the separation on the right, while the center crack is only faintly visible. Lower left of thallus has 3/32 inch spot where portion of specimen was removed to take thallus measurements. General shape of thallus appears below.

