Six Weeks of Microscopic Botany

in the

Agricultural College, Michigan.

Fall Term 1886.

by.

Thomas Dearden.

Fig. 1. Plate 1. Cells in cross section of white ash. Cells 3 to 6 sided, irregular in shape and size. All walls of various thicknesses. The large cells were at the beginning of a year's growth

Fig 2. Plate 1. Ducts in cross section of white ash. These are of various sizes, generally circular. The cell walls were cut up into little chunks by a series of canals. Sometimes two cells were joind together. The ducts are found in the first part of the years growth.

Fig 3 Plate 1. Medullary Rays in cross section of whitash. The cells were arranged end to end generally along the medullary ray though some cells were placed side by side. The cell walls were crossed by small canals. There were also small holes in the bottom of the cells. The walls are sometimes scolloped.

Fig 4. Plate 1. A macerated specimen of whitash. The cells were shaped somewhat like a parallelogram the ends being somewhat rounded. The cells were 4 to 6 times as long as wide. These cells also had the canals through the walls.

Fig 5. Plate 1. Cell membrane from the bottom of a cell. This was very thin and transparent and was full of small elliptical holes arranged in lines.

Fig 3. Plate 1 also has two cells of the woody fibre. They are long and pointed, something like a coarse hair

Injuries to which trees are liable.

Trees are damaged in many different ways. Some animals such as; squirrels, rabbits, beaver, bears, muskrats, mice, horses, sheep, goats, cattle, moose, deer, caribou & pigs are the cause of a great many damages to trees. These different animals gnerally tear and destroy the bark, thus leaving an unprotected surface to the weather. New bark gradually grows over this surface but there is always a defect there. Mankind damages trees in a variety of ways such as, driving over roots, making a clearing in the forest which exposes othes trees which are not used to exposure, driving nails into them and also putting wires around them. Mankind also damages timber by careless felling and by not sawing and sticking up properly. In sticking up soft timber the strips which are used to keep the boards apart are pressed into the lower boards thus causing damage to the lumber. Birds; such as, woodpeckers,

ptarmigan, partridge and grouse injure trees in several ways also insects, such as; beetles, ants, larvae, borers, caterpillars and mollucks or shell fish. These latter damage timber along the waters edge by boring into it until it is fairly honeycombed. Then again the roots of the black walnut frequently kill the surrounding trees. Trees are also damaged by poor soil, by being smothered by other trees and by trees rubbing against each other. Sometimes trees are unfit for some purposes by having short trunks, being twisted or curled and having whirls of branches. Some trees are very easily split down the crotches, such as: the American Elm and the Catalpa. An Oak tree has a very strong crotch. Trees are injured by ice and snow which collects on the limbs and breaks them by its weight. Then in spring floods & freshets the trees on the banks of a river or stream are injured by the floating ice. A hard freezing injures trees.

Men sometimes blaze trees which injures the timber. Fire also damages and destroys timber for many purposes. The ends of logs are frequently checked by exposure to the sun in mill yards. The Oak, Beech and Hard Pine are very easily checked. Maple should be kept under cover in a dry place otherwise it will rot quickly. Lightning, fungus, grafts, trees growing hollow are also injurious to trees for timber purposes.

Injuries to which
Trees are liable.

Thomas Dearden

Nov. 3rd. 1886.

FIG. 1.

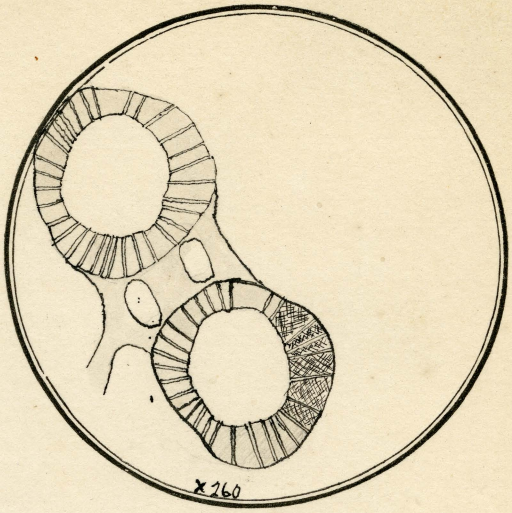

FIG. 2.

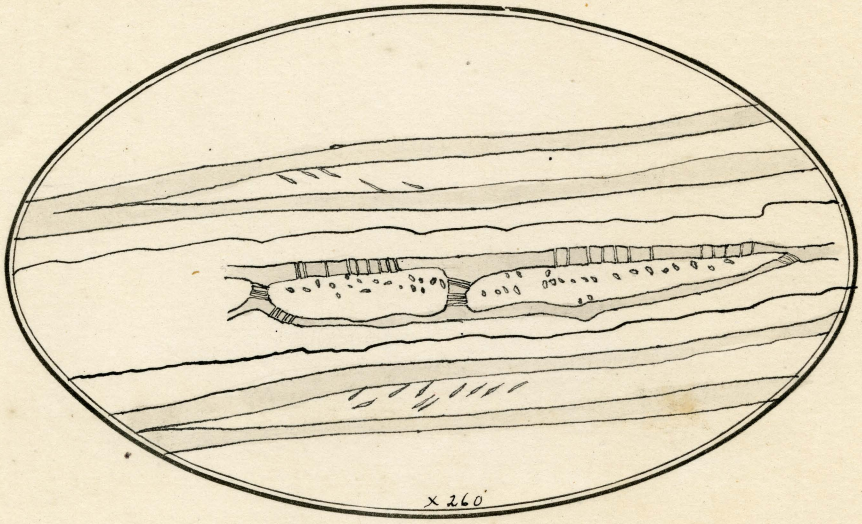

FIG. 3.

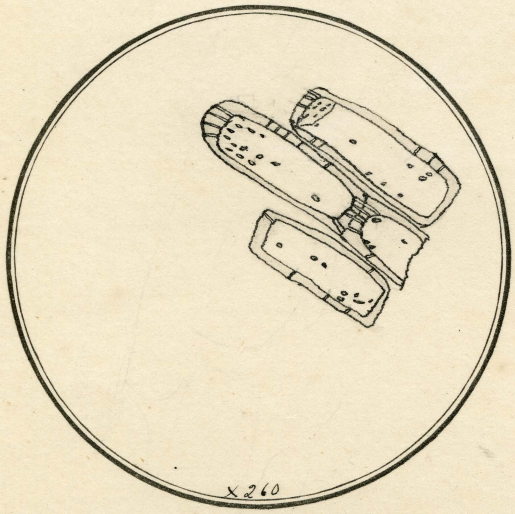

FIG. 4.

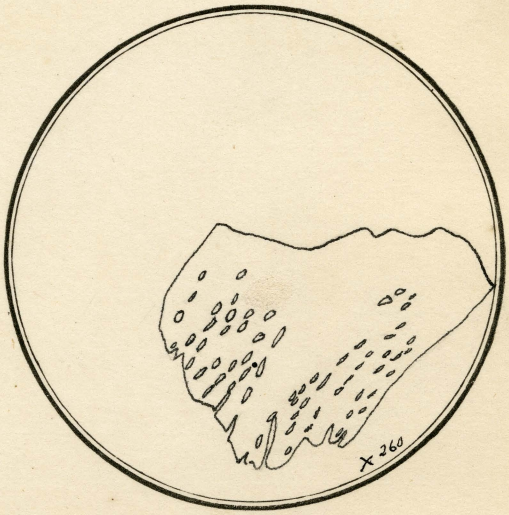

FIG. 5.

PLATE I.

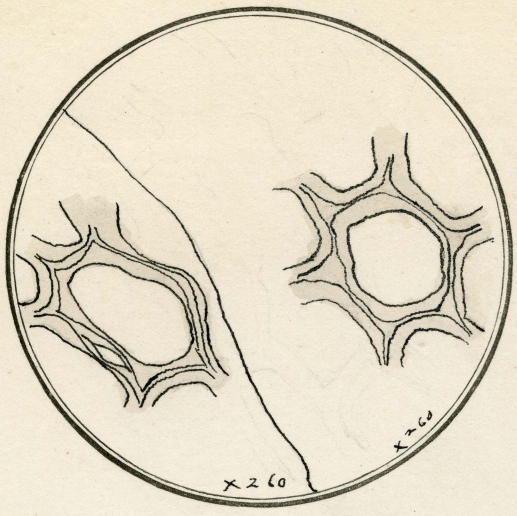

FIG. 1.

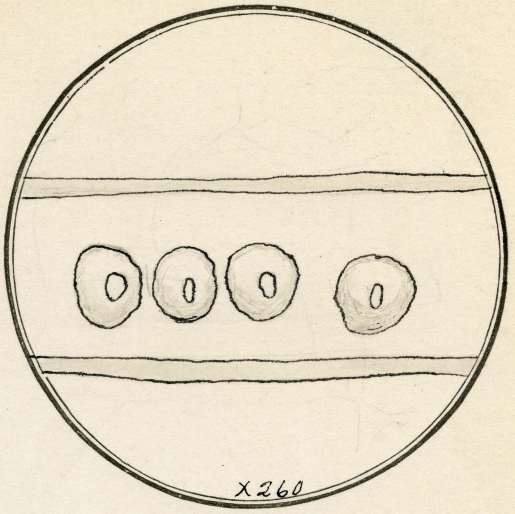

FIG. 2.

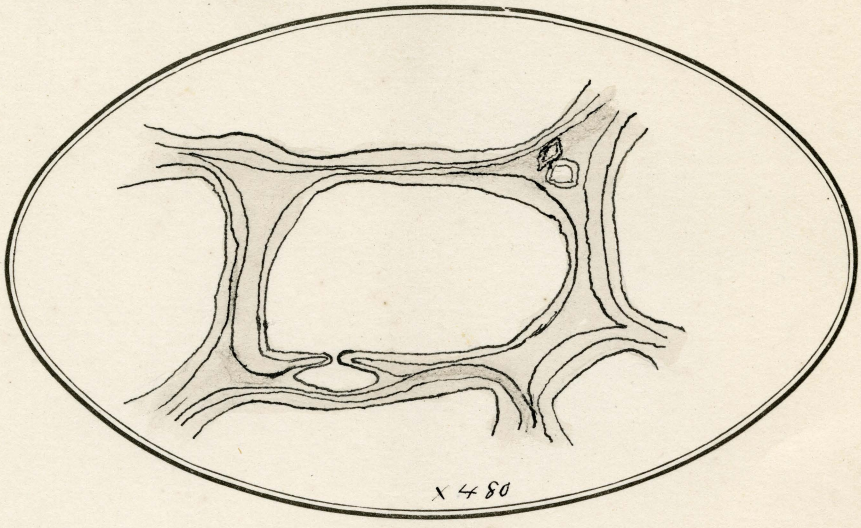

FIG. 3.

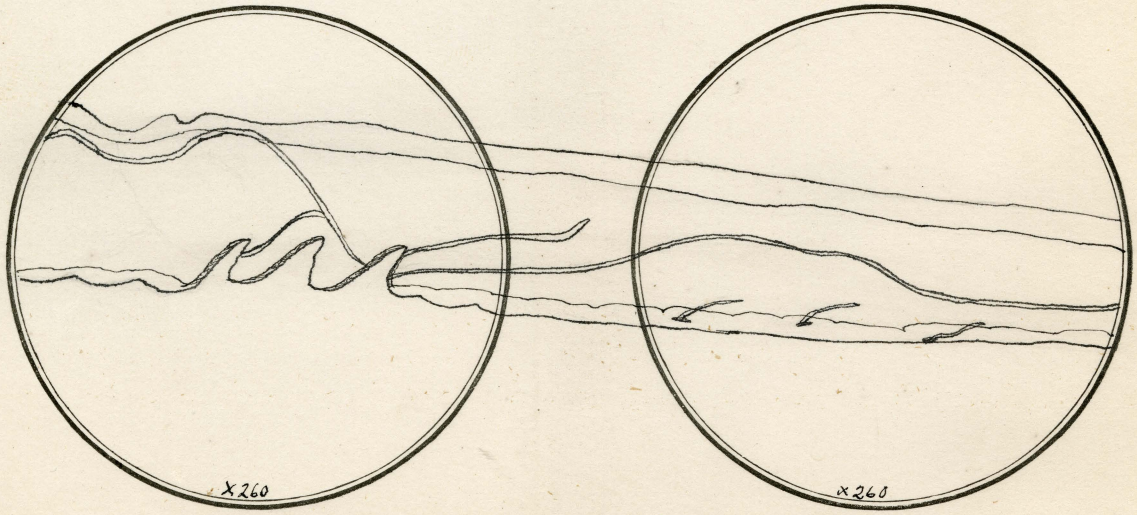

FIG. 4.

FIG. 5.

PLATE 2

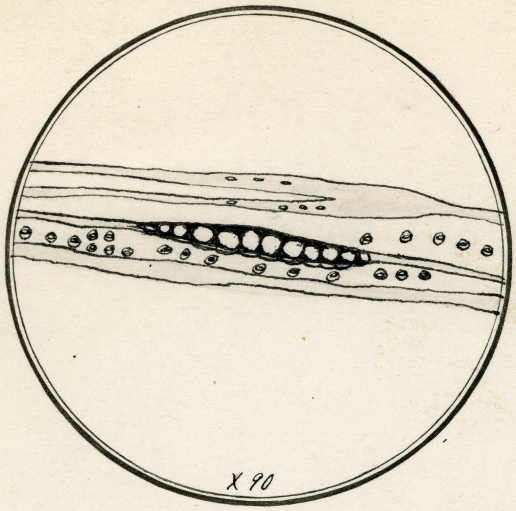

FIG. 1.

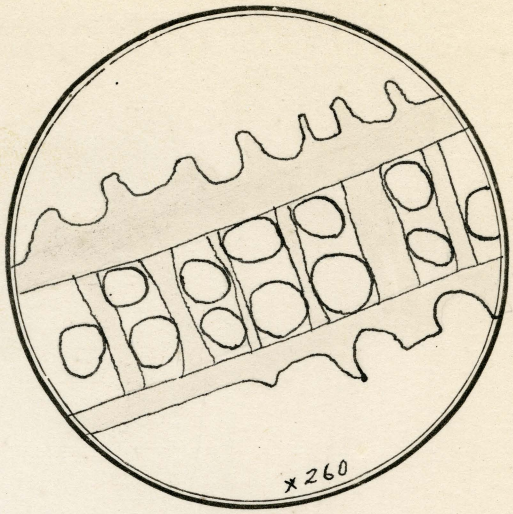

FIG. 2.

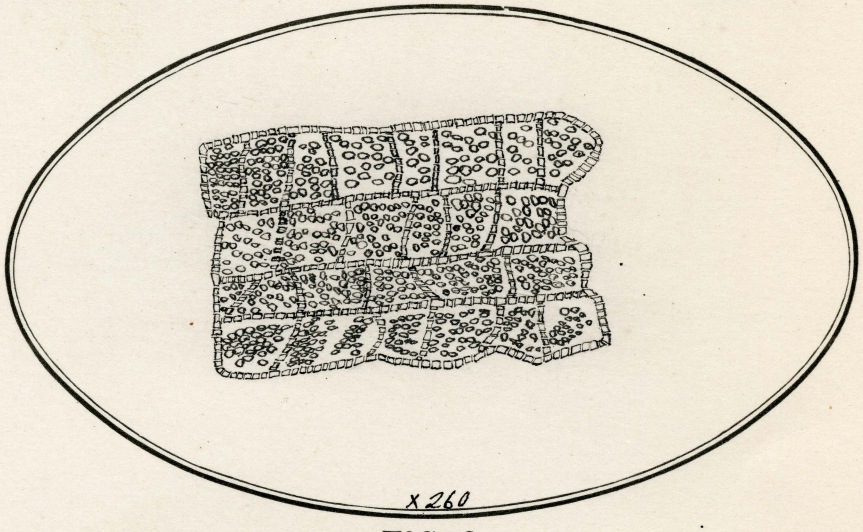

FIG. 3.

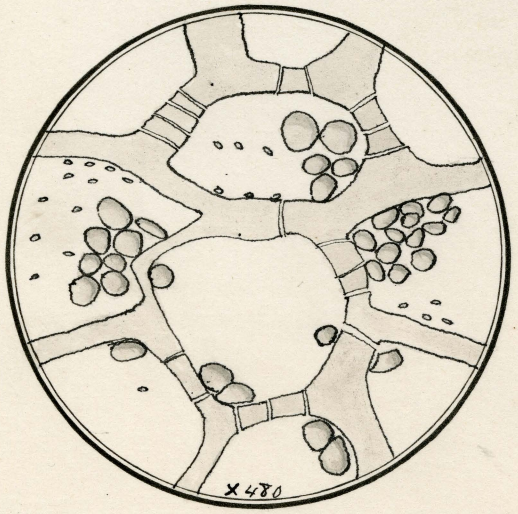

FIG. 4.

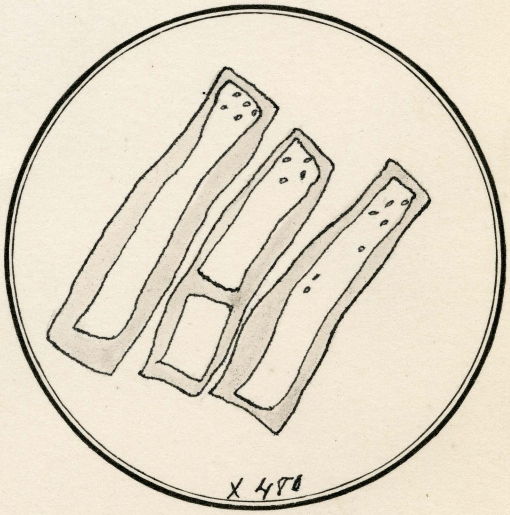

FIG. 5.

PLATE 3

The cells ~~walls~~ were enlarged in the middle and the sides of the cells had a series of elliptical holes which were placed in one direction and when you focused the microscope down another series of small holes was seen slanting in the other direction

Figs 1 and 3 of Plate 2 - are cells and bordered pits of white pine a cross section. The bordered pits are spaces formed in the cell walls. They are shaped like two soup plates with their rims placed together. These pits have holes through them opposite to each other. If the specimen was cut about in the middle it would show the points as it were of the pits, thus ~~<~~

Fig 2. Plate 2. shows a radial section of the bordered pits The pits are most numerous at the end of a years growth.

Figs 4 and 5. Plate 2. Macerated specimen showing fungi. These fungi work their way through the wood and destroy it.

Fig 1. Plate 3. Tangential section of white pine showing the end of a medullary ray also section of bordered pits.

Fig 2. Plate 3. Radial section of white pine showing the holes through the Medullary rays and Tracheides. These holes coincide with on another and allow the protoplasm to pass from one cell to the other.

Fig 3 Plate 3. Radial section of white oak showing cells of one medullary ray filled with starch.

Fig 4. Plate 3 Cross section of white oak showing cells of pits filled with granules of starch. The bottoms of these cells have little holes in them. There were little canals in the cell walls which divided them into little pieces as it were.

Fig. 5. Plate 3 Macerated specimen of white Oak. showing cells of medullary rays. These cells had small holes through the bottom but the specimen was not thin enough for me to see any canals through the cell walls.