

The Microscopy of Flax Fiber

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In examining a flax fiber under a microscope with polarized light, many cross lines are more or less visible. These show that the fiber is not uniform. The upper layer of the fiber wall, as well as the striations appear as cross lines and are of a light gray or yellowish color, while the inner layer is a bright lavender or green color.

If the fiber is examined right after retting, i.e., before it has been processed in any way, displacements rarely are observed. After chemical or mechanical treatment, or both, the number of striations more or less vis-

cylindrical sections. The distances thus created are the displacements mentioned above. These small sections remain en-

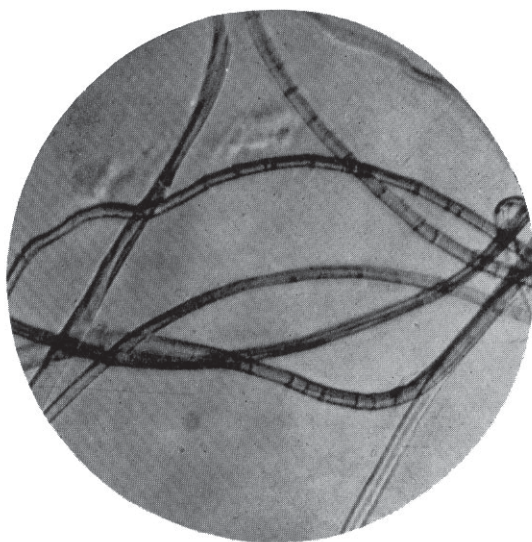


Fig. 1

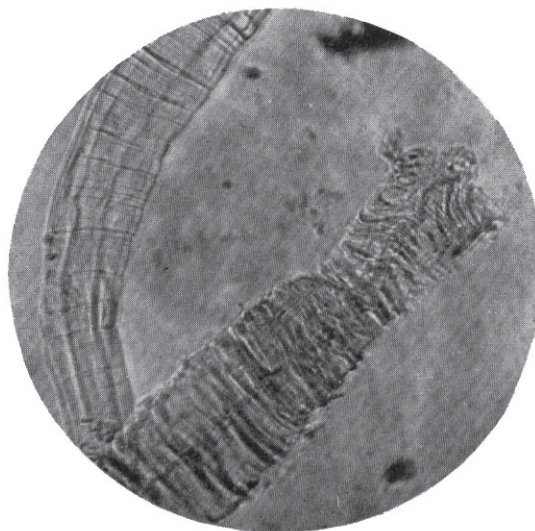


Fig. 2

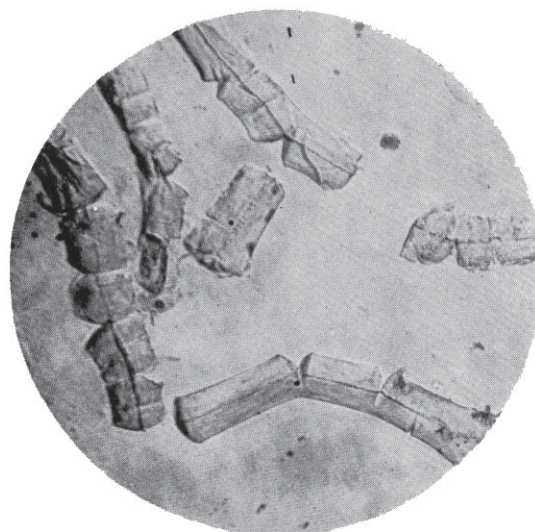


Fig. 3

ible, steadily rises with the number of processes gone through. For instance, in looking at a fiber under the microscope, which is taken from a fabric, it can be seen that it is divided almost entirely into striations.

In a fiber, which has not been processed in any way, except treated with hydrochloric acid (23° Bé) or lye (40° Bé) under polarized light, one can see easily the formation of the so-called displacements. Because of the irregular swelling of the fiber walls, the upper layer begins to separate itself to a degree, while the entire length of the inner layer is divided into a number of

closed in the common "skin," i.e., in the upper layer of the fiber. In other cases, the separating extends to the upper layer of the fiber, and finally the whole fiber is divided

into small single sections. In conformity with Prof. I. W. Nowapokrowski's nomenclature, these sections are termed "parcels." Parcels, on the average, are 16½ to 33 mm long and are equal in width to the cross section of the fiber. Elementary flax fiber is merely a single plant cell, which consists throughout its whole length of a great number of these parcels connected with each other. The method, or means, by which these parcels adhere to each other cannot be observed by either ordinary or polarized light.

Under the influence of mechanical or

optical, caused by looking at the fiber from above. The knotty swellings often observed are formed by the pressure of the swelling parcels upon the upper layer at these places.

From the above, the formation of the displacements may be explained, which displacements always appear as a result of practically any treatment given the fiber, as soon as the connections between the parcels are weakened. By this means, the best methods of processing can be determined and checked. Every process, or treatment, given flax must be done with a view to sav-

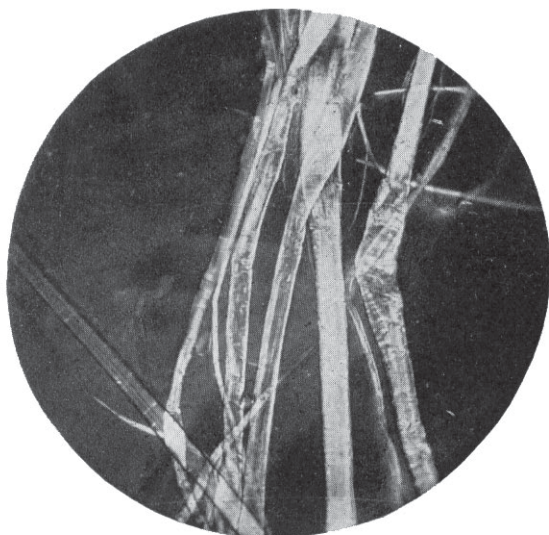


Fig. 4

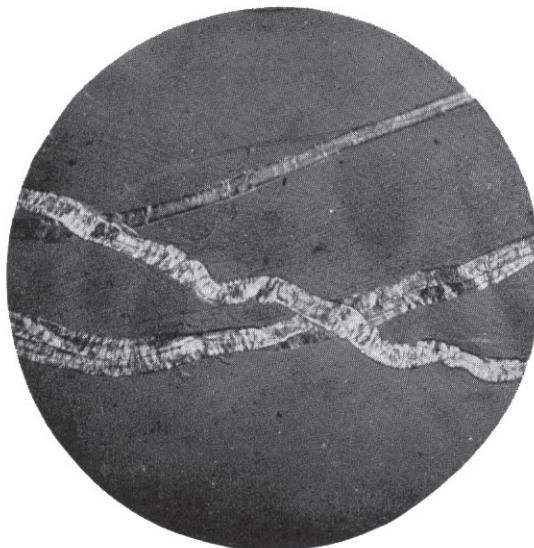


Fig. 5

chemical treatment, and sometimes, but rarely during growth, the connection between the parcels is weakened, they appear to the observer as cross lines, at first only in polarized light, but later as the distances between the parcels are enlarged, in ordinary light. The appearance of lines crossing each other at the displacements is purely

ing the weak places in the fiber, i.e., the displacements and the connections of parcels, as this lessens the value as well as the length of life.

The formation of the parcels in the fiber of *Linum Usitatissimum* mentioned above, was observed also in *Cannabis Sativa* and *Apocynum Sibiricum* fibers.