

The Apparent Twist in the Cotton Fibre an Optical Illusion.

By THOS. L. BANCROFT, M.B.

(Read before the Royal Society of Queensland, 31st May, 1926.)

Some years ago, whilst microscopically examining cotton to ascertain whether there was really any difference between annual and ratoon cotton, I became interested to find out how the cotton fibre twisted without engaging other fibres.

In the case of the awn of the spear-grass seed, which is twisted on its axis, it engages other awns in doing so and makes a tangled mass.

Cotton does not tangle; every fibre is free from its end up to the seed. I searched for an explanation, but most writers merely stated that the fibre is twisted.

Sir George Watt, in his book, "The Wild and Cultivated Cotton Plants of the World," says:—

"Cotton may be defined as a unicellular hair formed from the cuticle of the seed. If taken from a seed found within a pod that had not opened, the unicellular cotton tube is flattened lengthwise on itself, but if from a pod opened naturally in the process of ripening the cellular chamber may be observed to have become twisted on its own axis.

"It would seem probable, however, as pointed out by Monie, that spiral twisting normally commences at the top and works towards the base of the cell."

I made microscopical preparations of cotton, principally mounted in canada balsam, and upon examination with very high powers I could make out that almost all of the apparent twists were not twists but the edges of the flattened tube in close position.

I tried to induce the Microscopical Society of Victoria to investigate the matter, and supplied material. I have recently had a communication from the Honorary Secretary, in which he says:—

"The question requires lengthy and careful investigation by experts, which our members could not undertake. Some of our members, who examined the samples which you kindly sent down, came to the conclusion that the fibre is twisted."

I wish now to record the discovery, and let others confirm or refute what I have stated.

The cotton fibre in the green pod is a cylindrical tube filled with a watery protoplasm. When the pod dries the water evaporates from the cotton tubes, which collapse; they are then in the form of ribbons (Fig. 1). Under the best conditions of plant growth the ribbons become folded upon themselves (Fig. 2). This is the condition cotton spinners appreciate so much, a sample of cotton showing many regularly "twisted" fibres being more valuable than one with a few only.

Fig. 1

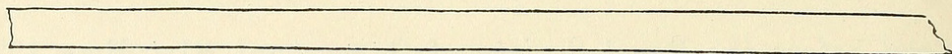


Fig. 2

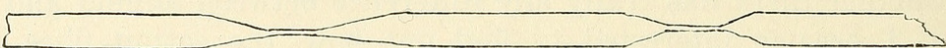


Fig. 3



Immature and otherwise defective fibres remain as ribbons.

Figure 3 represents the appearance of a mature, well-developed cotton fibre under the microscope.

An easy way to demonstrate that there are no twists is the following:—A few strands of cotton are pulled out straight and mounted on a slide with liquor potassae and a cover glass, and ten minutes at least is allowed for the action of the alkali. The fibres become softened and filled out with fluid, thus causing the disappearance of any folding or "twisting." A magnification of 50 diameters is sufficient.



Bancroft, Thomas L. 1927. "The Apparent Twist in the Cotton Fibre an Optical Illusion." *The Proceedings of the Royal Society of Queensland* 38, 55–56.

<https://doi.org/10.5962/p.351520>.

View This Item Online: <https://www.biodiversitylibrary.org/item/189520>

DOI: <https://doi.org/10.5962/p.351520>

Permalink: <https://www.biodiversitylibrary.org/partpdf/351520>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: In Copyright. Digitized with the permission of the rights holder

License: <http://creativecommons.org/licenses/by-nc/3.0/>

Rights: <https://www.biodiversitylibrary.org/permissions/>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at

<https://www.biodiversitylibrary.org>.