

## Topic 04 – “Fibers” & Humans

Chap 6 – Stems: 97-101 (wood uses), 94-95 (non-wood fibers),

<http://www.naturalfibres2009.org/>

## I. Intro to Fiber Materials Used by Humans

### A. Uses

1. Paper
2. Cordage
3. Textiles
4. Miscellaneous (doormats, etc.)

### B. Natural vs. Synthetic Fibers

e.g., fibers for textiles

<u>natural</u>	<u>synthetic</u>
hemp	polyester
cotton	nylon
flax	*Viscose / Rayon
wool (sheep)	
silk (larval cocoons of silkworm)	

### C. Technical vs. Vernacular Use of the Term “Fiber”



### C. Technical vs. Vernacular Use of the Term “Fiber”



### II. Paper

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#### A. Materials to make paper

Ancient: *Cyperus papyrus* (Cyperaceae)

Today: wood (mostly), cotton rags, etc.

### II. Paper

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#### B. Steps to make paper from wood

- maceration to generate “fibers”
- pulp
- framed screen
- drying (& pressing – optional)

#### Other options:

- sizing
- watermark

-maceration to generate “fibers”



-maceration



-how the paper industry changed gum.

***Picea rubens* (red spruce)**  
pronounced, pi-see-uh, roo-bens

Whereas most spruces are generally known for their prickly needles, the red spruce has softer, less pointy needles and is therefore the friendliest among the spruce Christmas trees. Like all spruces, however, needle retention suffers once the tree is cut and brought indoors.

**Other Uses.** Red spruce is the commonest of the eastern spruces used for lumber and makes up a large percentage of spruce pulpwood (for paper) produced in the northeast. It is also valued for use in sounding boards in musical instruments because of its resonance. Red spruce from the high elevations in the Appalachians and particularly the Adirondacks (here called Adirondack spruce) is the legendary wood used for the tops of Martin guitars throughout the golden years and still now for high-end acoustic guitars.

Amerindians traditionally chewed its resin for gum and this was adopted commercially in the US in 1848 as the world's first commercial chewing gum. Its life as a chewing gum ended by 1900, however, due to over harvesting of the tree for pulpwood.

**Ecology.** Red spruce provides cover for deer and its foliage is browsed by the spruce grouse, red squirrels, & here, porcupines eat the bark, and white-winged crossbills feed on its seeds.

The sticky resin from red spruce was the source of a traditional Amerindian chewing gum, as well as the world's first commercial chewing gum factory in Maine, USA.

Red spruce cones are pendulous and have a reddish tint.

Red spruce at 4,230 feet elevation in the Dolly Sods Wilderness in the mountains of West Virginia.

Under surface of a red spruce twig showing the woody peg-like stasis for each needle that is typical of spruces.

-how the paper industry changed gum.



### III. Textiles

- A. Flax was king
- B. Cotton is now king
- C. Pineapple

## A. Flax was king

Flax fiber used to make linen.



## A. Flax was king

Species: *Linum usitatissimum*

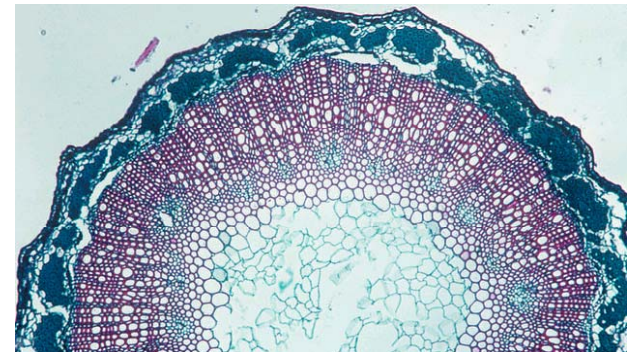
Nativity: E Mediterranean to India

Domestication: Fertile Crescent.

Type: Bast fibers.

Leading Producers:  
EU (122,000 tons / yr)  
China (25,000 tons / yr)

(metric ton = 1000 kg;  
US ton = 2000 lbs or  
0.91 metric tones)



## A. Flax was king

Extraction via retting.

## B. Cotton is king

Species: *Gossypium hirsutum*

Nativity: Mexico

Domestication: Mexico.

Type: Seed (surface) fibers.

Leading Producers:

China (32 million bales / yr)

India (23.5 million bales)

USA (12.4 million bales)

Bale = 480 pounds

## B. Cotton is king



## B. Cotton is king



## B. Cotton is king

Extraction via ginning.



## C. Pineapple fiber

Species: *Ananas comosus*

Nativity: Brazil, Paraguay.

Domestication: South America, Central America, West Indies.

Type: Leaf fibers.

Leading Producers:  
Philippines (?)

## C. Pineapple fiber



## C. Pineapple fiber



### **C. Pineapple fiber**

**Extraction via decortication.**