



# Flax & Bamboo

## Pt. 2: The Soft Sell


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### Lofty Ambition

Bamboo is the fastest growing woody plant on earth.  
91cm/day (1mm every 90s) for some species.

Grasses of the subfamily Bambusoideae  
Multiple genera and species.

Some species can grow to 35m.



### Lofty Ambition

Primarily a timber crop.

Canes used for construction.

Weight-for-weight it is stronger than steel.

Used to make chopping boards, chopsticks, baskets, mats, etc.

### Lofty Ambition

Bamboo products




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### The Eco-Friendly Choice

Bamboo used for fibre production mainly Moso bamboo (*Phyllostachys edulis*).

Tropical species native to China and Japan.

Grows to 29 m tall.

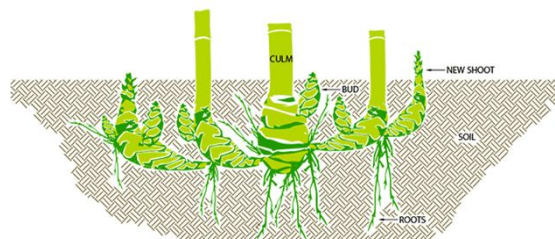
30 t/ha fibre yield.



### The Eco-Friendly Choice

Perennial, clump-forming species.

Good for stabilizing soil. Grows on poor land unsuited to trees.



### The Eco-Friendly Choice



Very low fertiliser requirements.

70 kg/ha N  
60 kg/ha P  
80 kg/ha K

Water consumption similar to flax.  
No pesticides needed.

Source: Lessard and Choinard, 1980

### The Recycled Fibre

Bamboo fibre can be retted and scotched like flax ('bamboo linen').

Not very common – extraction is hard work.

Most bamboo fibre is prepared as rayon.



### The Recycled Fibre



Rayon is a semi-synthetic fibre of reconstituted cellulose.

Also called viscose, modal, lyocell, and previously acetate.

Invented in the late 19<sup>th</sup> Century.

### The Recycled Fibre

Rayon was originally invented to make clothing fibre from wood .



Synthetic Fibers: Nylon and Rayon (1949)

## The Precycled Fibre

Plant fibre is pulped, then dissolved in solvents.

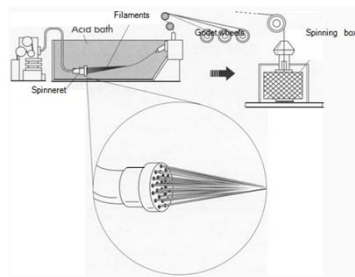
Originally tetraamminecopper(II) hydroxide (Schweizer's reagent).

When added to acid, the cellulose precipitates, forming fibres.



## The Precycled Fibre

Modern production uses sodium hydroxide ( $\text{Na}_2\text{O}$ ) and carbon disulphide ( $\text{CS}_2$ ). Fibres precipitate in sulphuric acid ( $\text{H}_2\text{SO}_4$ )



## The Eco-Friendly Choice?

Schweizer's reagent creates copper pollution for streams and rivers.

Caustic soda and sulphuric acid also pollute water.



## The Eco-Friendly Choice?

Carbon disulphide is damaging to factory workers' health.

In the 1930s, 30% of USA rayon workers had health problems.

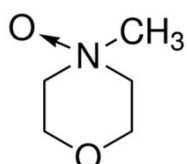
Modern figures from China and India unknown.

### Health effect-1

- Acute and subacute poisoning appear due to exposure to carbon disulfide concentrations of 500-3000 mg/m<sup>3</sup>
- characterized by predominantly neurological and psychiatric symptoms, "encephalopathia sulfoarbonica" such as irritability, anger, mood changes, manic delirium and hallucinations, paranoid ideas, loss of appetite, gastrointestinal disturbances and sexual disorders

## The Eco-Friendly Choice?

The viscose method uses N-Methylmorpholine N-oxide as the solvent, and is safer.



 Viscose®

**Which would you choose to buy?**

**Which would you choose to invest in?**

**End**