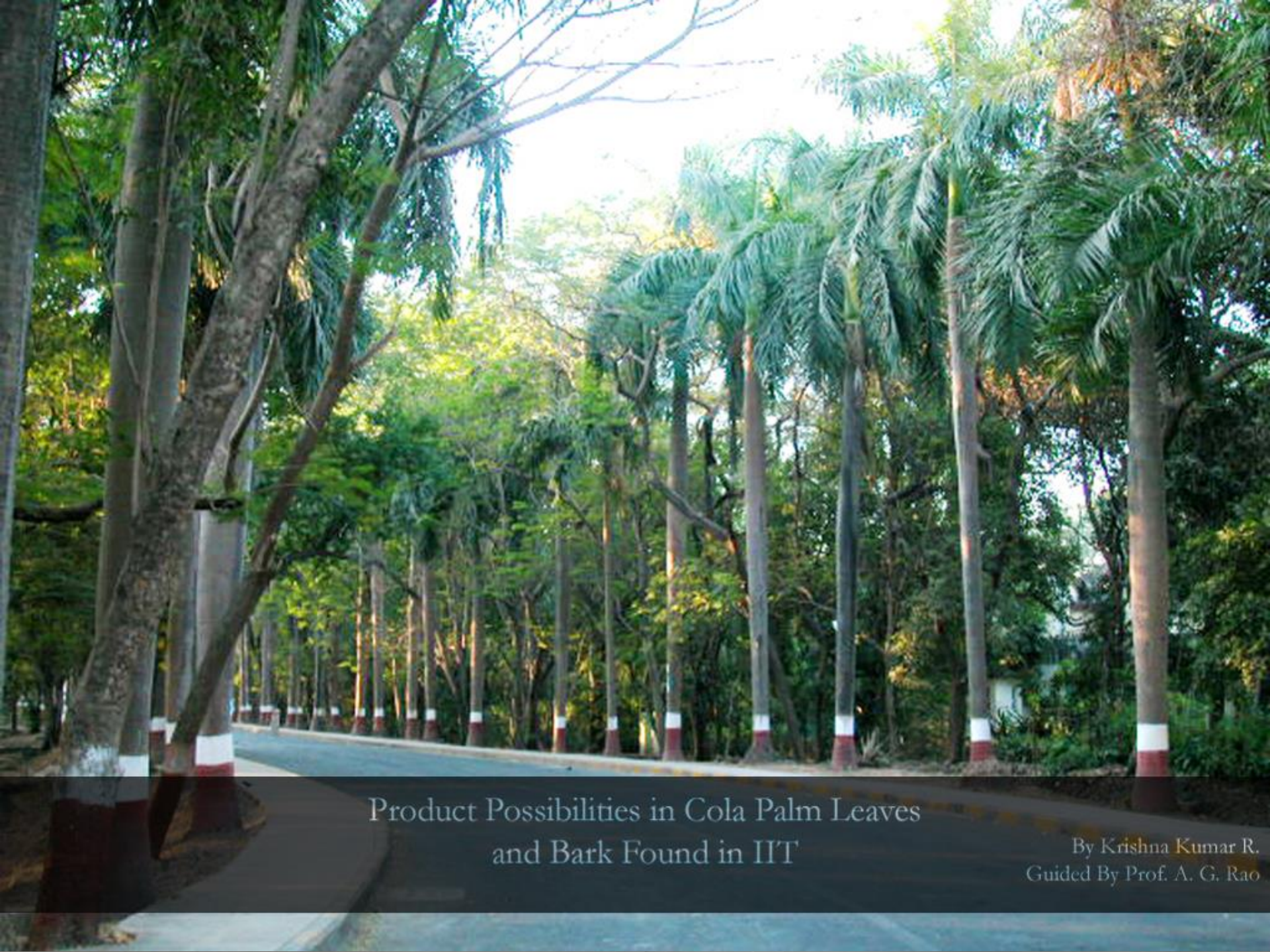
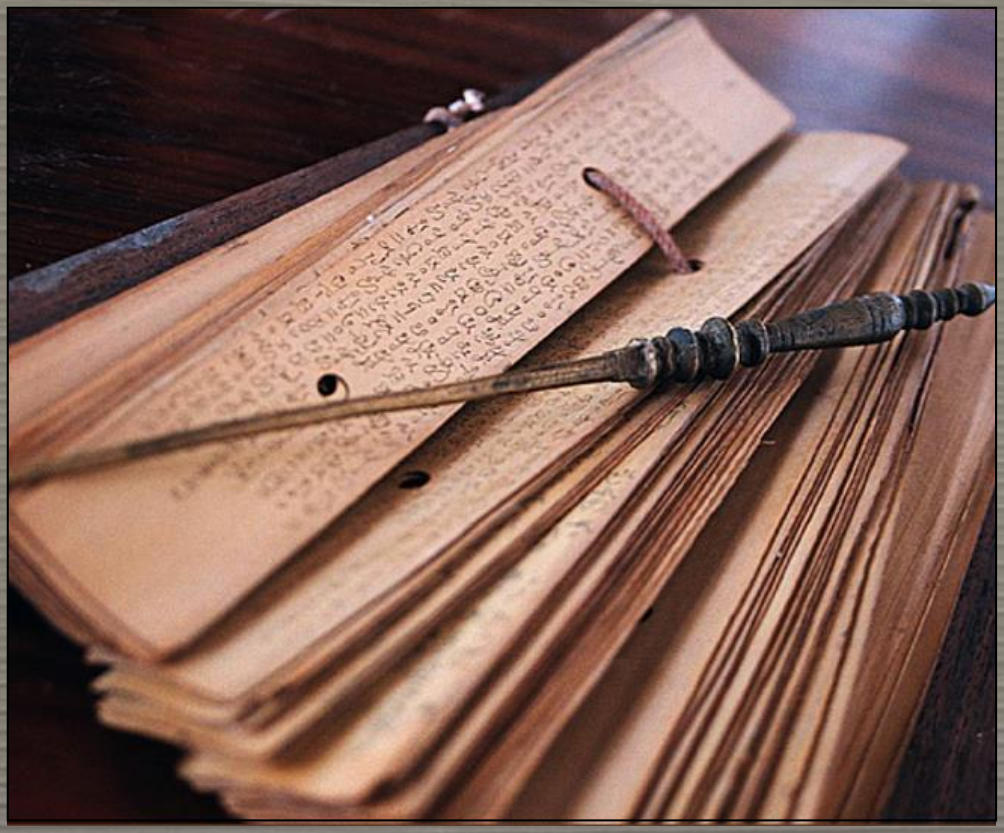
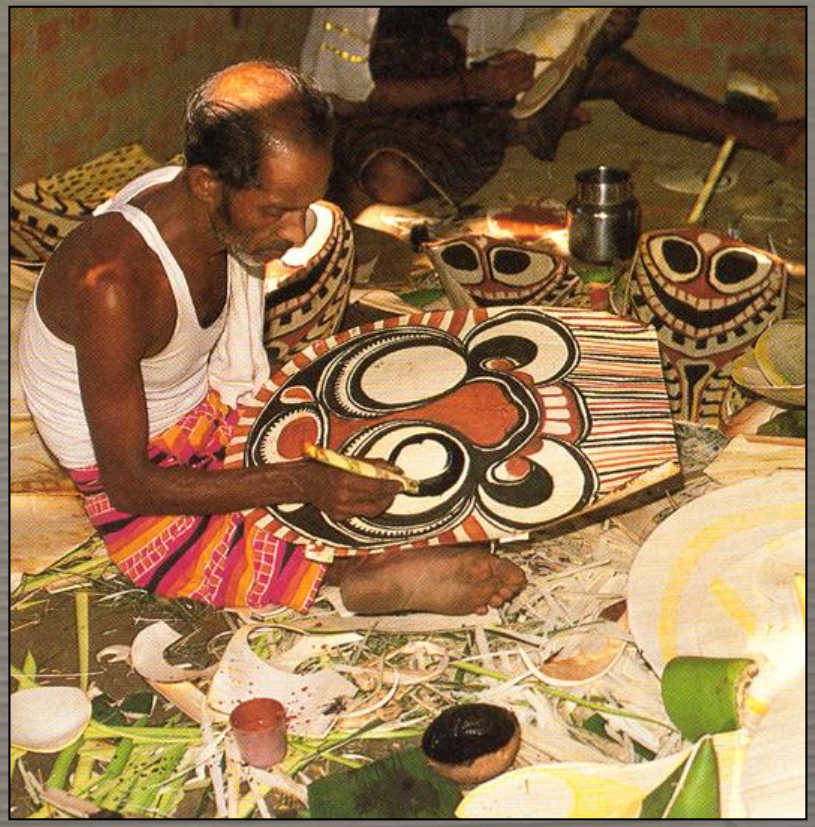


Product Possibilities in Cola Palm Leaves and Bark Found in IIT

By Krishna Kumar R.
Guided By Prof. A. G. Rao

products from palm leaf





methodology

Preparing the leaf

- Soaking and Cleaning
- Flattening and Drying of Leaves

Treatments

- Chemical Treatment
- Surface Coating
- Natural Dyes

Machining

- Cutting
- Punching
- Drilling

Surface Finishing

- Hot Stamping
- Embossing
- Letter Punching
- Pyrographic Tool

Joinery

- Rivetting
- Glueing

bottle palm

Scientific Name: ***Hyophorbe lagenicaulis***
Origin: Round Island and Mauritius Island (Mascarene Islands).

Trunk: Green crownshaft, bottle shaped, grey with visible ring scars, 2 feet in diameter.

About 210 full grown, 10 dead and 10 newly planted palms in campus.

palm leaf

Average leaf fall: 1-1.5 tractor load per week in IIT campus. Average dimensions of the bark: 3 feet by 5 feet. The leaf has an uneven cross section varying from 1mm in the periphery to 9 mm in the centre.

The leaf has a hard and fibrous outer surface and a smooth inner surface which has a cuticle layer.

preparation

The leaves can be flattened by soaking it in cold (normal) water.

Thin section takes about half an hour to get completely soaked and an hour (newly fallen wet leaves) to an hour and a half (dry leaves) for the thicker (middle of the bark) sections.

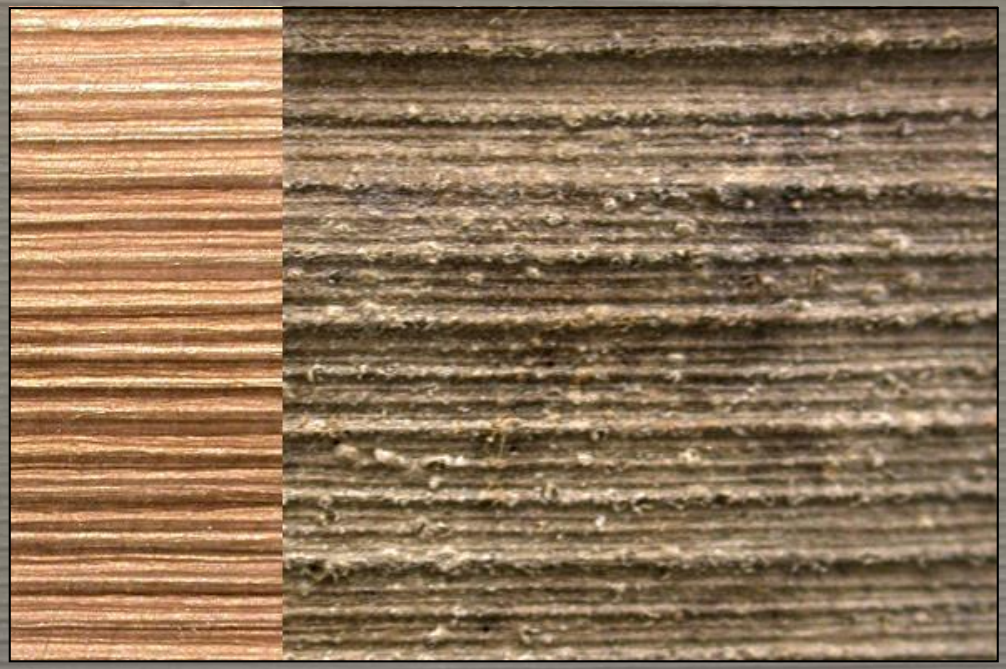
The leaves are cleaned with a cloth to remove the dirt and fungal growth.

drying

Due to the uneven thickness of the leaf, drying in the sun causes warping of leaves.

Precaution:
the leaves can be dried in the shade under pressure.

A fly press or a hydraulic press can be used for pressing the leaves.



The leaves are prone to fungal attack if not dried properly, so they need to be treated against it through chemicals or through surface coatings.

Alum treatment

10% alum in hot water for half an hour can be used for the thicker section.

A 5% solution can be used for thinner sections for half an hour to avoid blisters on the surface.

#not tested in a humidator.

Alum treatment makes the bark more rigid and brittle.

Dyeing of Colours

Dyeing with different natural colours that are used for bamboo.

Surface coat

A thin layer of clear lacquer/ melamine given to save against fungal attacks.

cutting

The bark can be cut by hacksaw, band saw, circular saw, fret saw, paper cutter, scissors etc.

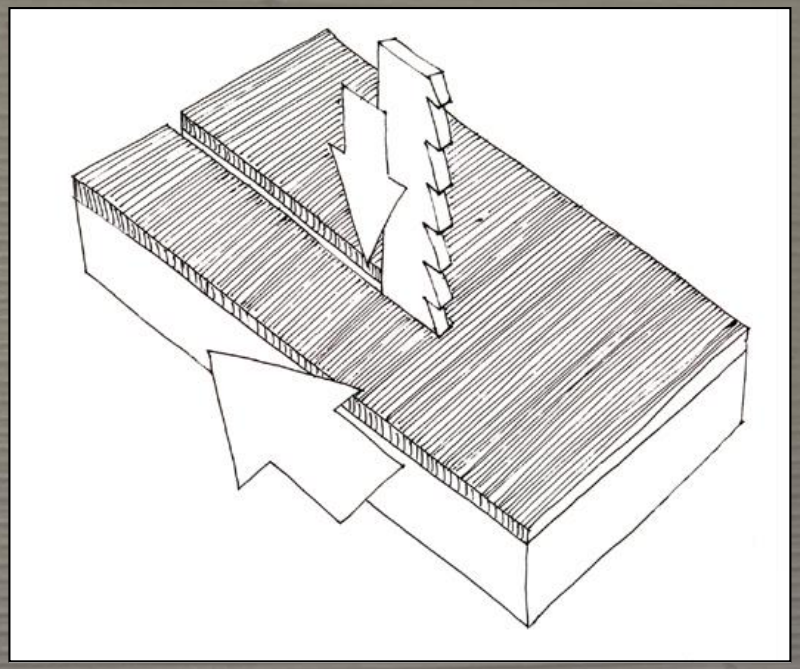
Caution:

While using any saw care should be taken that the outer surface (hard one) comes first in the direction of cut otherwise the fibers start coming out.

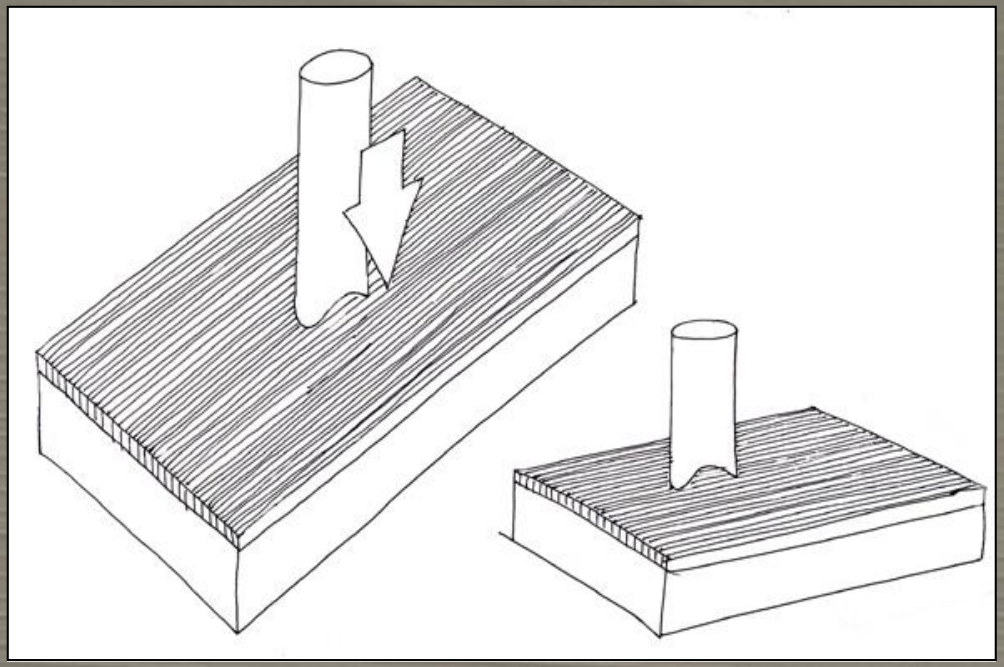
A scissor can cut up to 3mm thick leaf without spoiling either sides of the leaf.

A paper cutter gives a fine and smooth edge.

A dry edge can be sanded to give a smooth finish.



punching and drilling



The bark can be punched with a paper punch (for up to 3 mm thick sections).

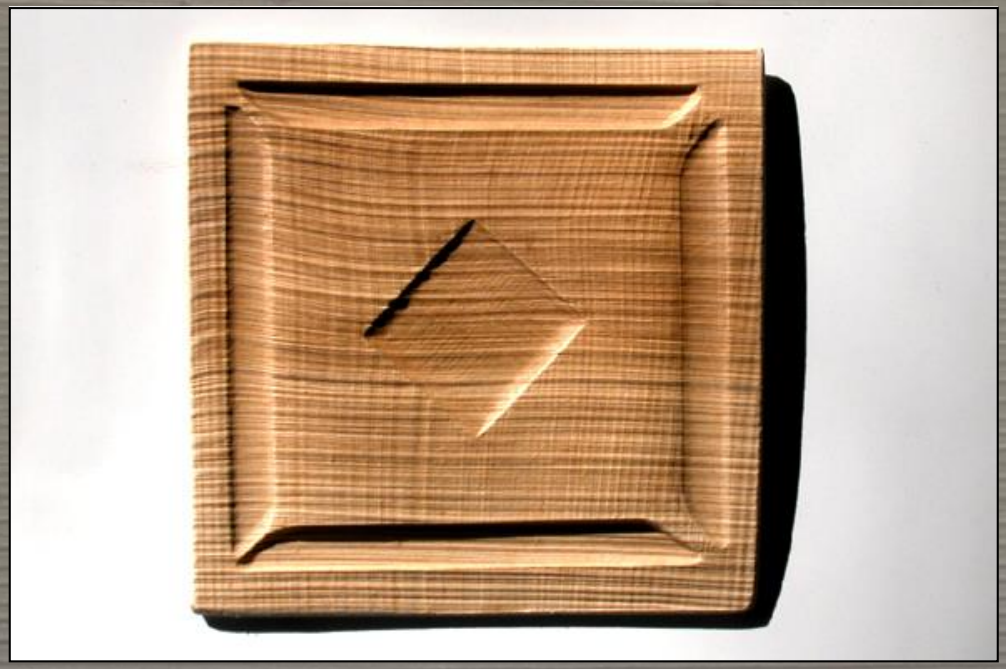
caution:
The direction of punch should be parallel to the fiber structure.

Use of paper/ photo cutting plate causes the peeling off of the softer side of the bark from the fibrous outer surface.

Drilling is possible on dry leaves.

Hot stamping

Hot pressing on wet leaves give a better effect and gradation of colour. Films can also be used but the colour spreads because of the fibrous nature of the material.

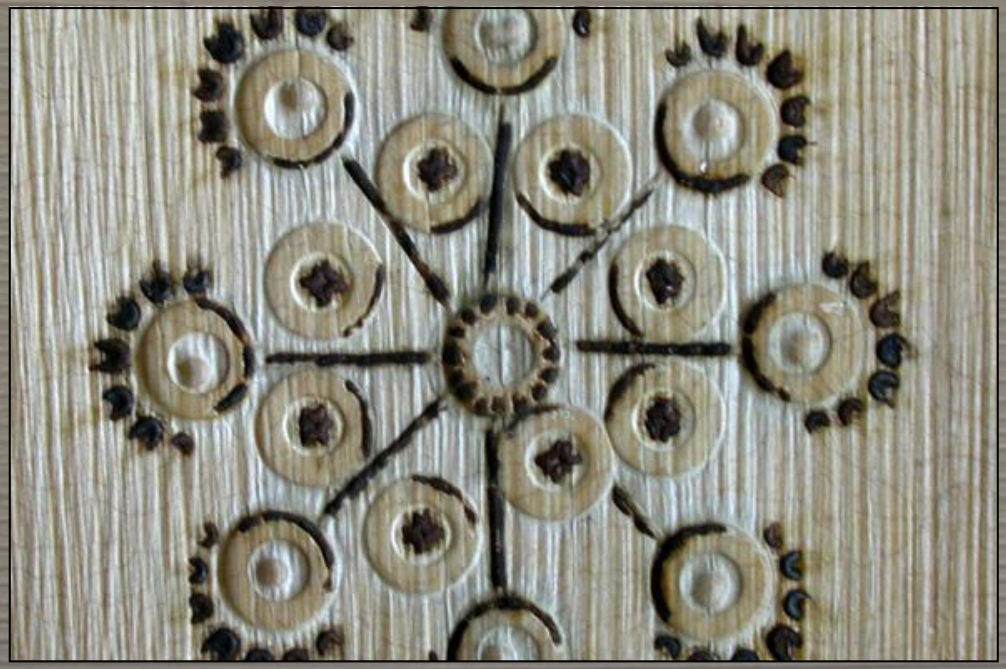


Embossing

The design is pressed on to the wet bark for about 30 minutes at 20 tons in a hydraulic press.

Letter punching

Letters punched on wet leaves fade away once the leaf gets dry.
Punching on dry leaves gives a permanent impression.



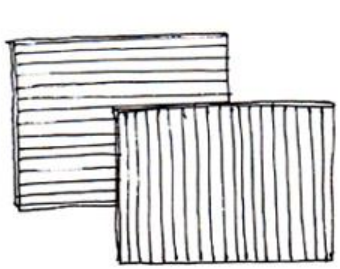
Pyrographic tool

Rivetting

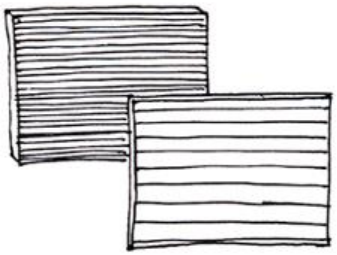
Rivetting can be used for joinery or as a hinge.

Glueing

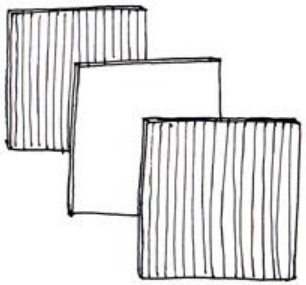
Fevicol
Araldite
Rubber solution



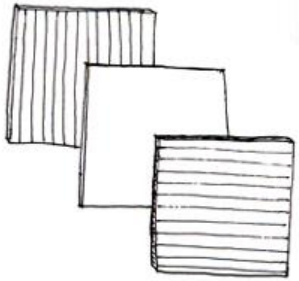
Two sheets with fibre in opposite directions



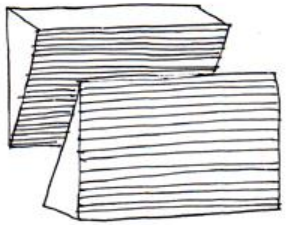
Two sheets with fibre in same direction



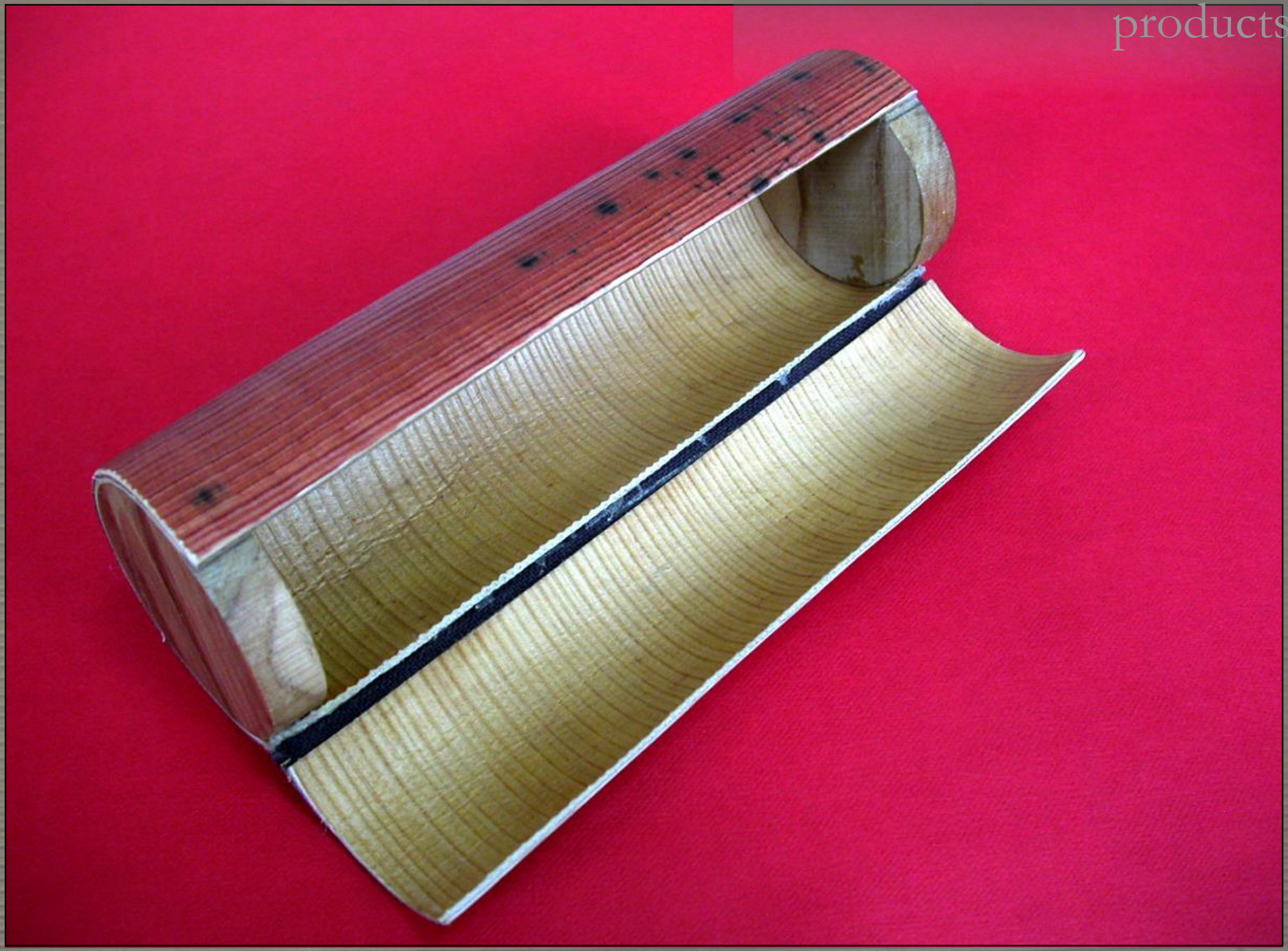
Two sheets with fibre in same directions with paper in between



Two sheets with fibre in opposite directions with paper in between



Two sheets of uneven thickness



further possibilities

Use of wood plasticizers.

Trials with other chemicals for treatments.

Hot forming.

Printing on the surface.

thank you