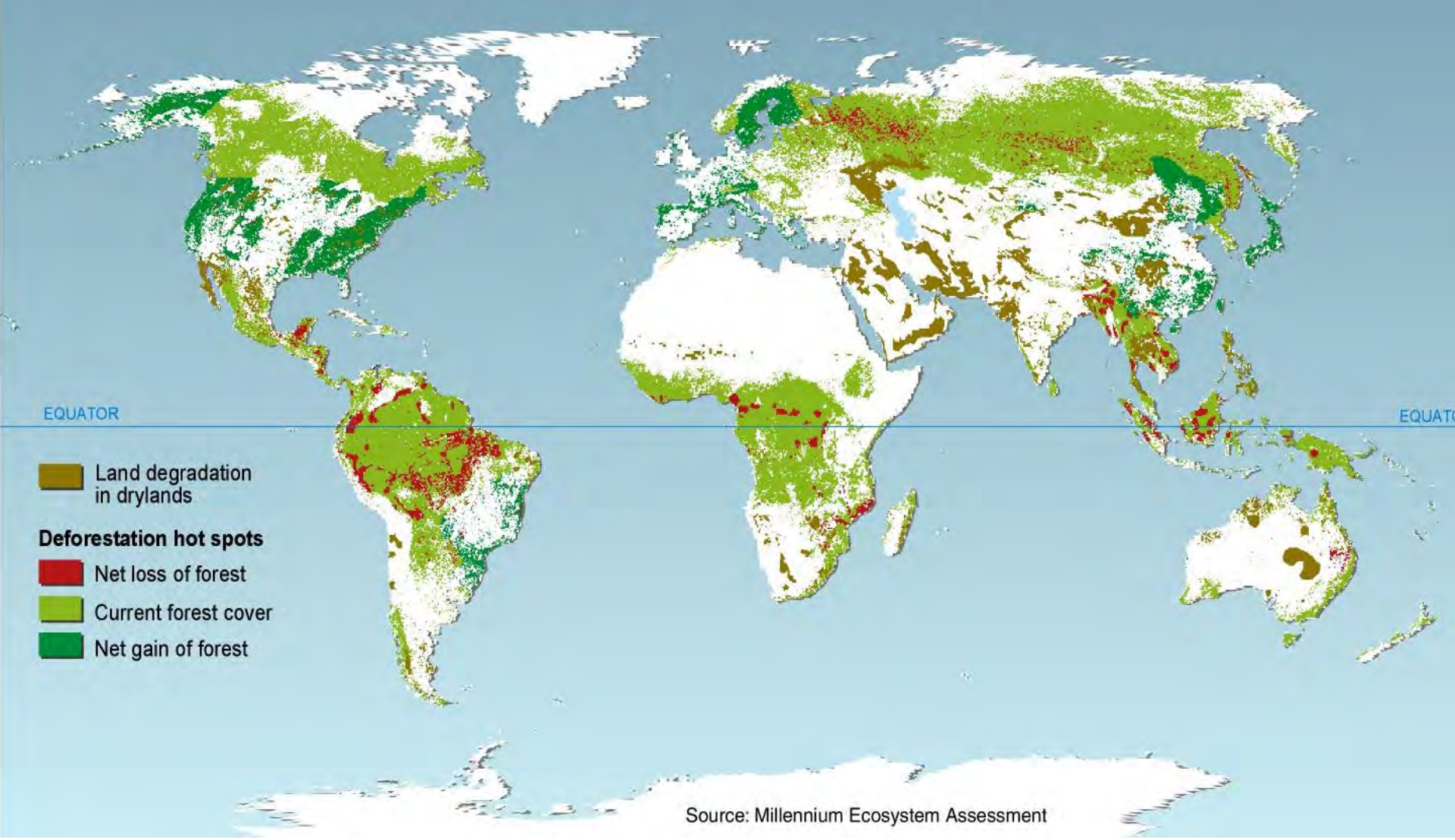
from the Woods to the Wood and from the Wood to the Furniture

This lesson will be presented in 3 parts.

The first part explores forests and processes and operations that involve harvesting and transporting trees in the woods to the mill for making wooden products for the market (i.e., lumber, veneer, laminated or composite boards).

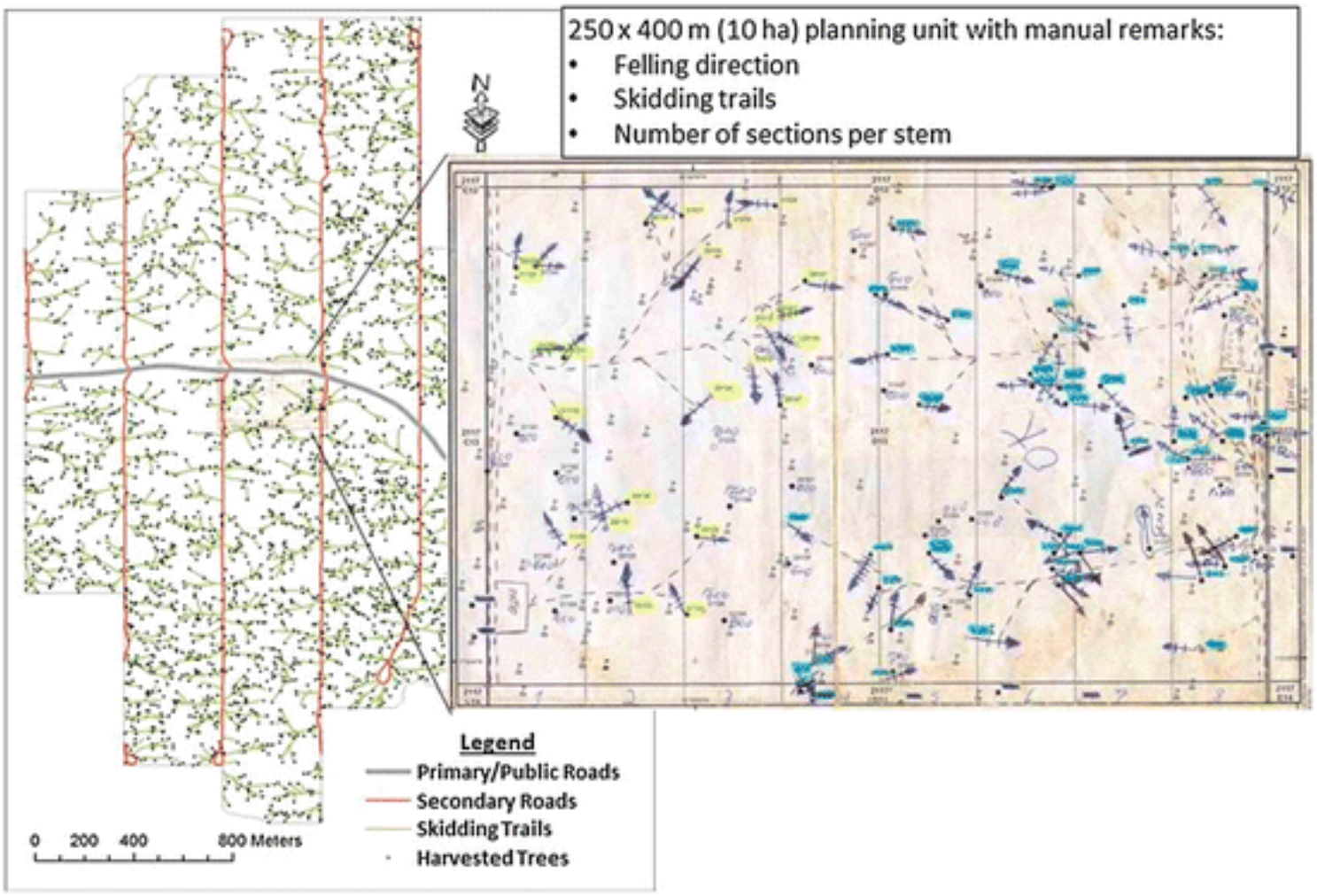


Largest Wood Producing Countries by Products (percentage of global production **2018**) United States of America (18%); Russian Federation (11%); China (9%); Brazil (8%); Canada (7%); Indonesia (4%); Sweden (3%); Finland (3%); Germany (3%); India (3%).

Today, most forest harvesting is carried out using mechanized harvesters while manual felling or chainsaw felling is used less than in the past. These machines comprise a base machine with a harvesting head mounted on a hydraulic arm that can fell a tree, remove the branches and section the stem into the desired lengths in less than a minute.

Operational planning of felling and skidding of the trees

Source: Leif Nutto, Forest and Climate Change Fund.



Planning for Harvesting Processes

Thematic map for microscale planning, containing all details like restricted area, water bodies, forest roads, contour lines, landing zones for wood piles, slope of roads, and terrain. Source: Cenibra.br

Processes and operations that involve transporting lumber from the woods to the mill for making wooden products (i.e., lumber, veneer, laminated or composite boards).

Soil Volume
Soil volume is one of the most important contributors to root and overall tree health. The average life span of a forest-grown tree can be 100+ years, while a tree on an urban street setting with limited root area may only be 15 years.

Organic Matter
Organic matter helps retain moisture and is packed with the nutrients that roots need. The top layers of the soil (including the organic matter) have more water and nutrients than lower subsoil sections of soil.

Porosity
Porosity is a key indicator of soil health which is the space between soil particles. More space means more available capacity for both oxygen and water - both critical to healthy roots.

from the Woods to the Wood and from the Wood to the Furniture

This second part highlights the anatomy of a tree and presents some descriptive terms and characteristics of lumber, veneer, laminated and composite boards.

TREE TERMS:
HARDWOOD / DECIDUOUS
SOFTWOOD / CONIFEROUS

BARK
CAMBIUM LAYER
GROWTH RINGS
SAPWOOD
HEARTWOOD
MEDULLARY RAYS
PITH

ROOT TYPES
Tap Root
Lateral Roots
CROWN
TRUNK
BRANCHES

WOOD TERMS:
AWI STANDARDS
MOISTURE CONTENT

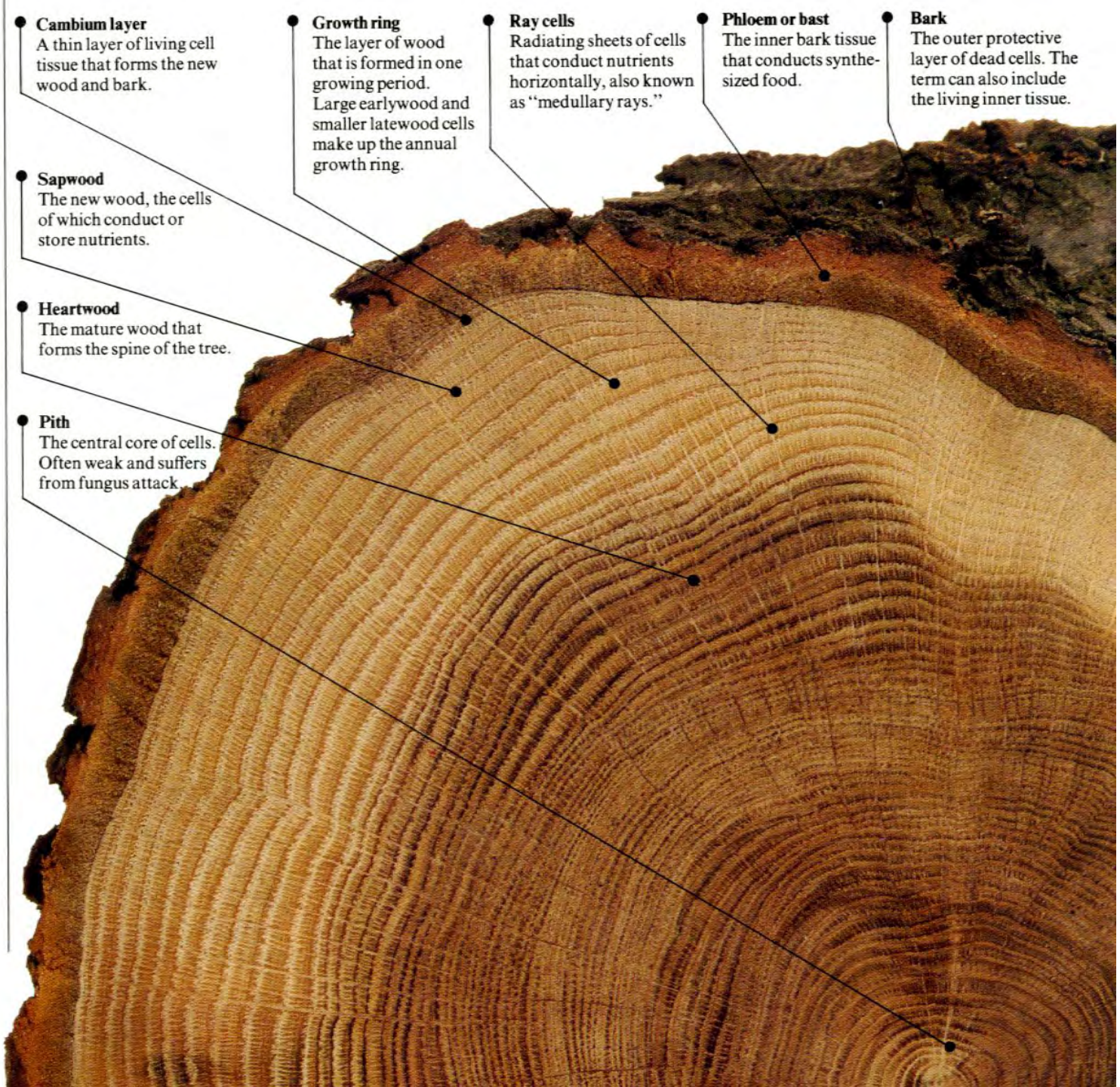
VENEER
Rotary Sliced, Plain Sliced, Slipped
FLITCH
Center book
Book match
BURL WOOD

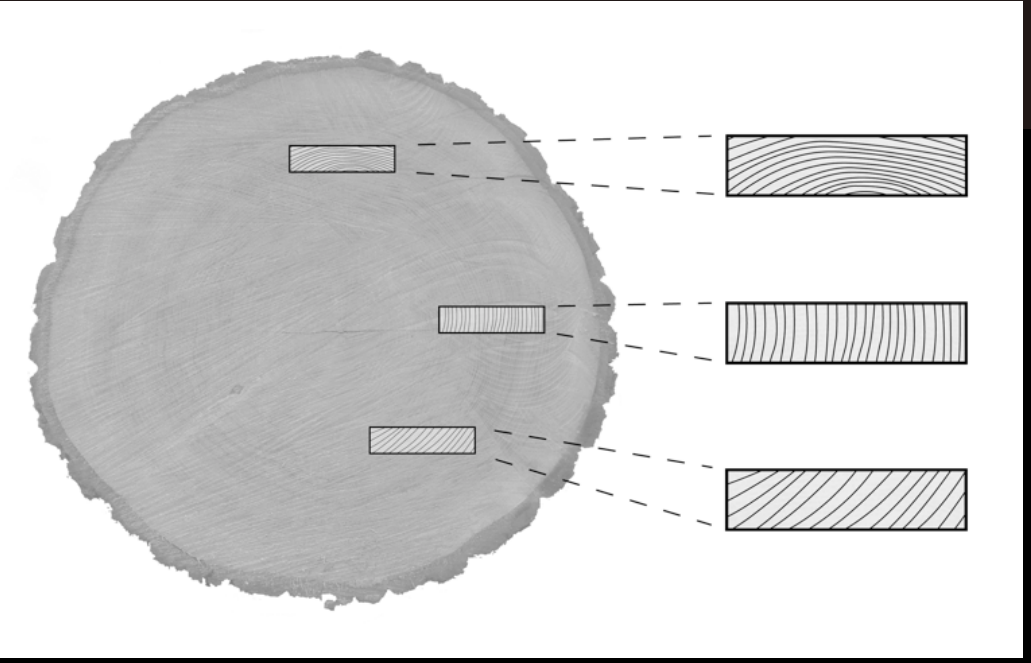
NOMINAL / ACTUAL DIMENSION
DIMENSIONED S4S
Knots

BOULE
GRAIN / CROSS / END GRAIN
PLAIN SAWN
QUARTER SAWN
RIFT SAWN
COMPOSITE BOARDS

The below-ground roots of trees are critical to the success of all trees. Unfortunately, since roots are not viewable from above the ground, their importance to the health of a tree is often ignored. Roots provided numerous important functions for trees. Anchorage and stability in the soil, energy (in the form of sugars) storage, and water and nutrient uptake. A strong root system will help the tree flourish and create a vibrant canopy of leaves above ground.

Even with mature trees, most of the roots are within the first couple feet of the soil horizon. Most of the available water, nutrients and organic matter are contained within these first couple feet. Ensuring that the root zone in this soil area is healthy is crucial to a happy and healthy tree.

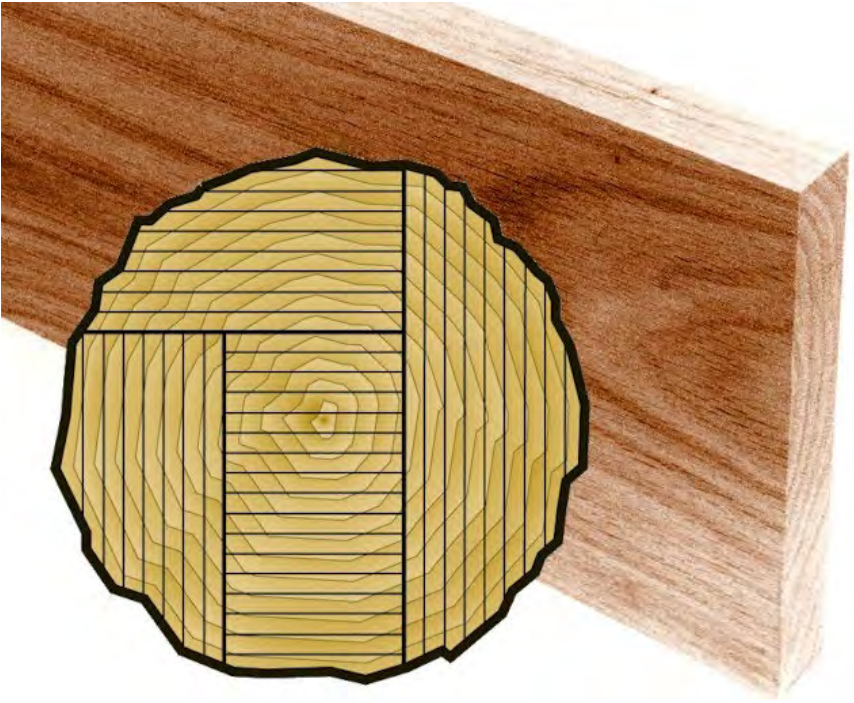

Cambium layer
A thin layer of living cell tissue that forms the new wood and bark.
Growth ring
The layer of wood that is formed in one growing period. Large earlywood and smaller latewood cells make up the annual growth ring.
Ray cells
Radiating sheets of cells that conduct nutrients horizontally, also known as "medullary rays."
Phloem or bast
The inner bark tissue that conducts synthesized food.
Bark
The outer protective layer of dead cells. The term can also include the living inner tissue.
Sapwood
The new wood, the cells of which conduct or store nutrients.
Heartwood
The mature wood that forms the spine of the tree.
Pith
The central core of cells. Often weak and suffers from fungus attack.

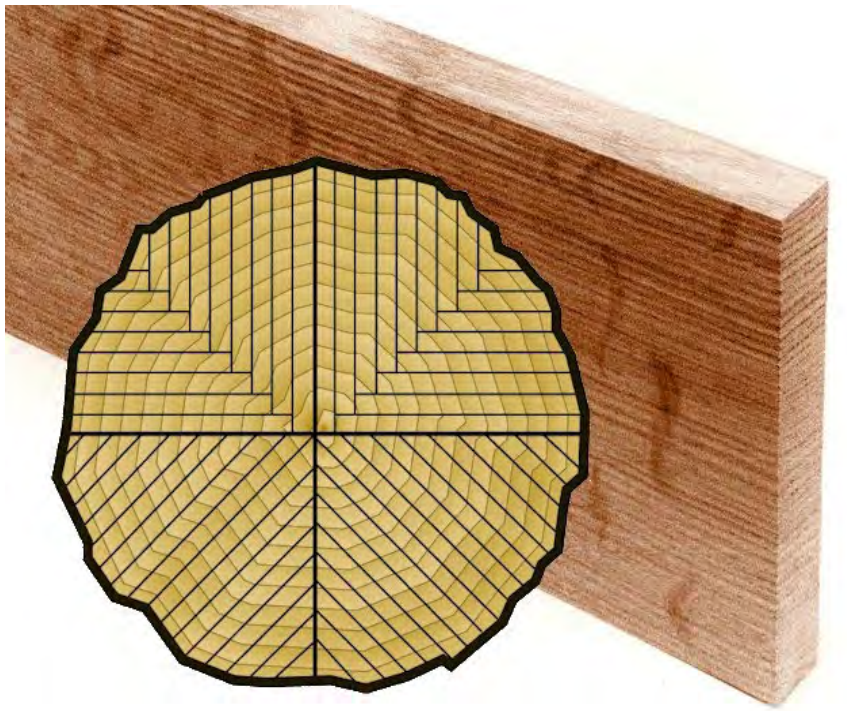


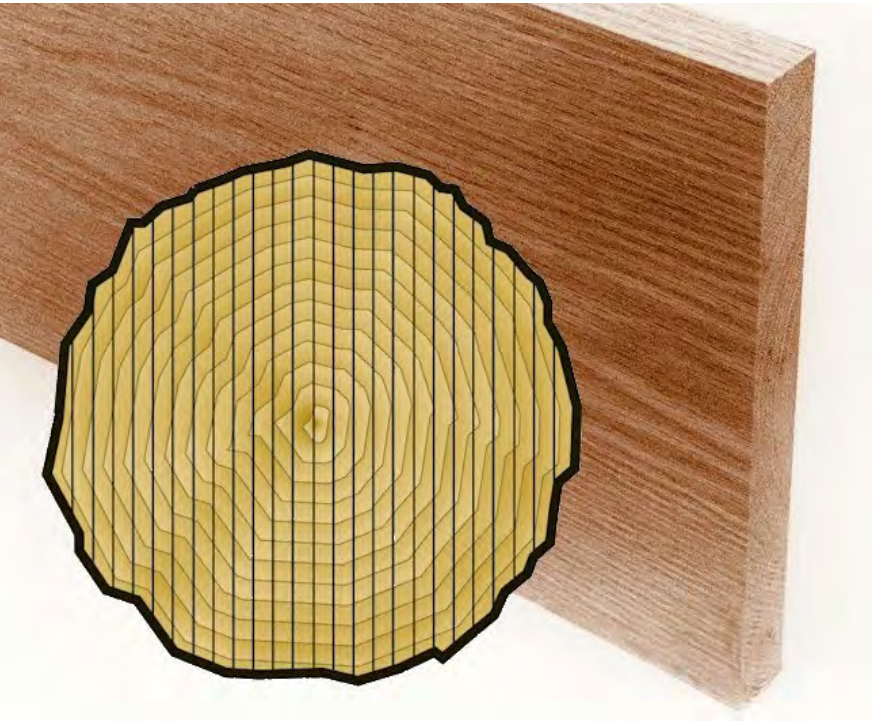
DIMENSIONAL MOVEMENT

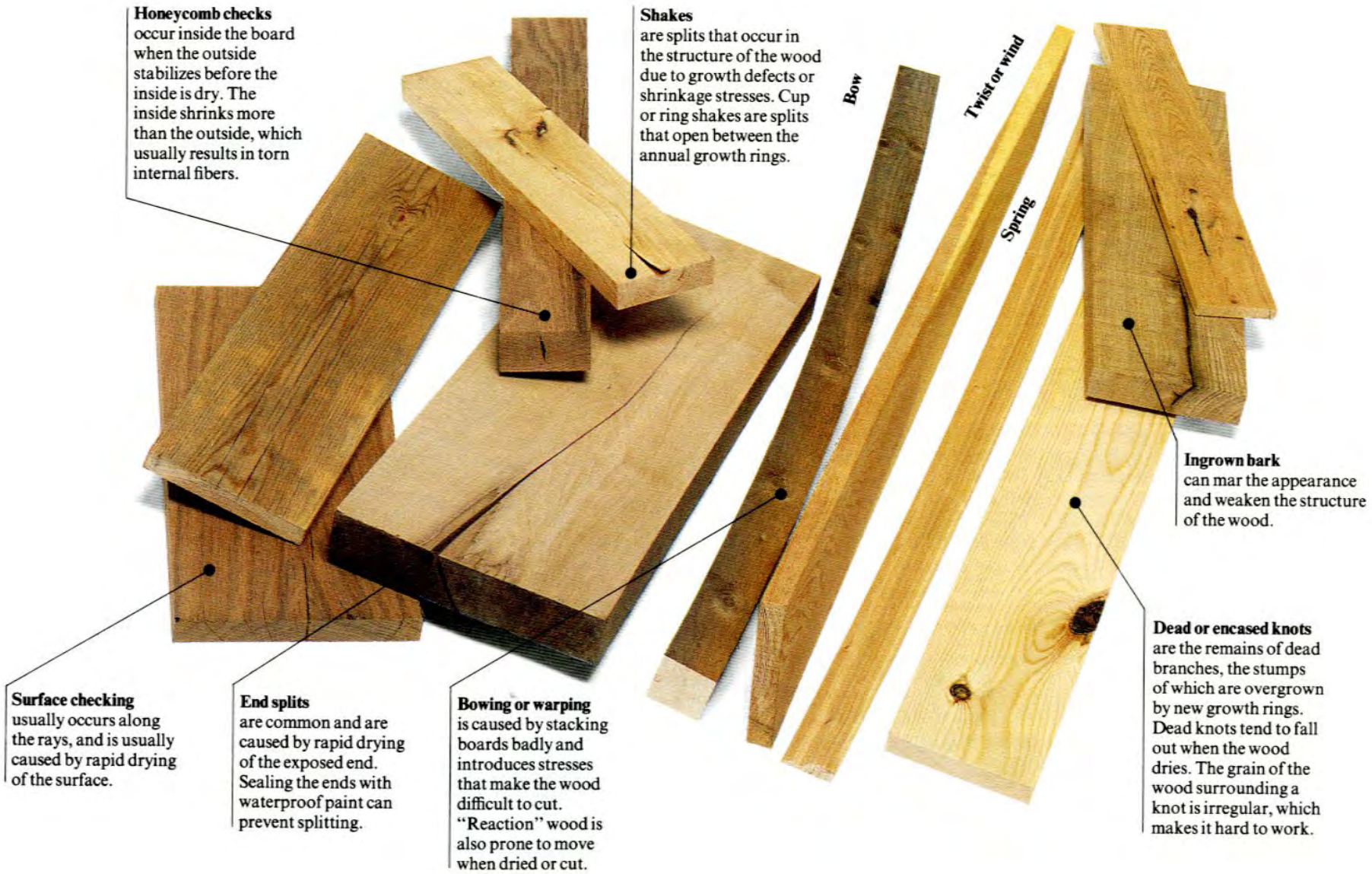
Cross section through a deciduous tree trunk, showing plainsawn, quartersawn, and rift-sawn lumber and the end grain of these boards.

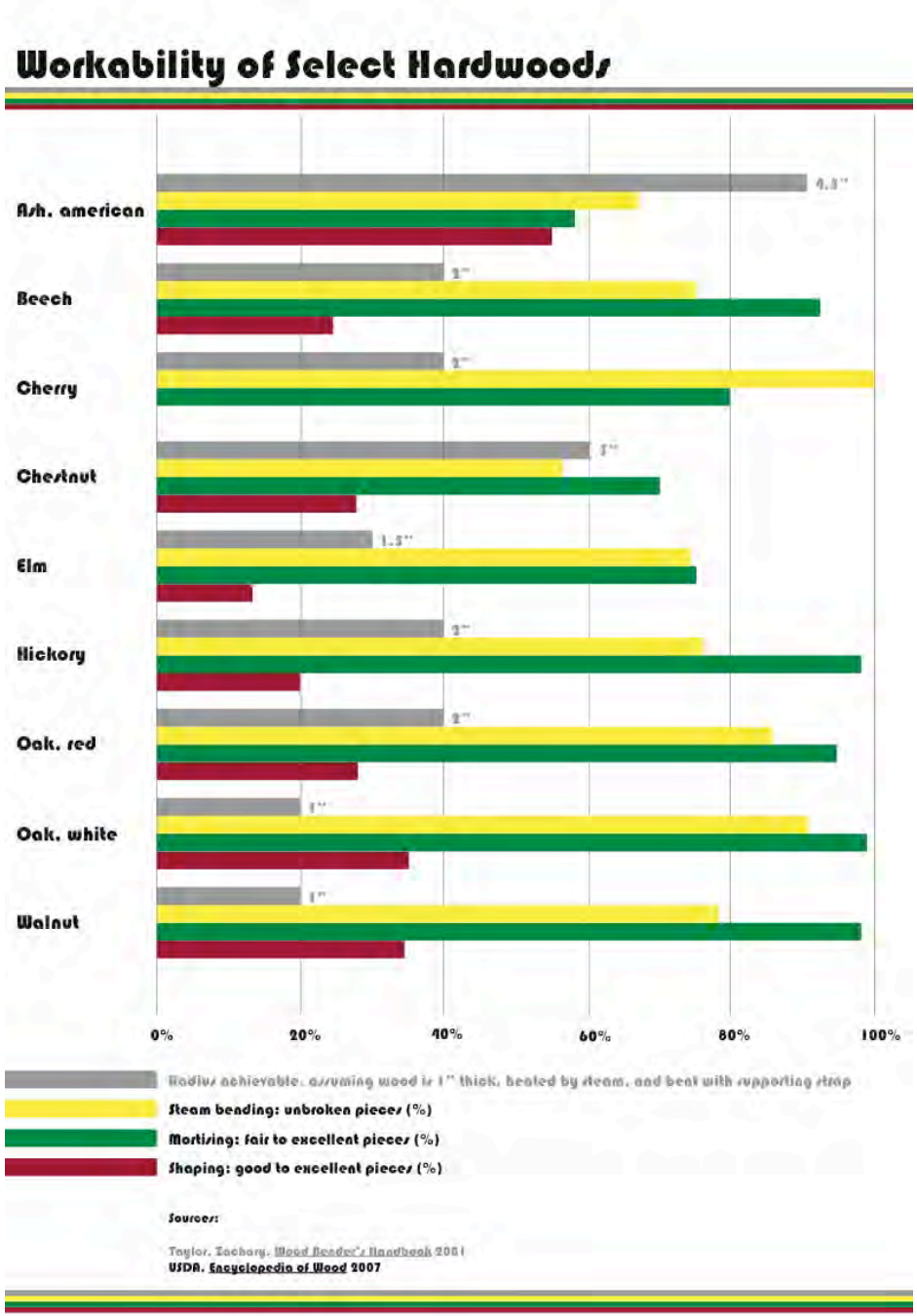
Plainsawn Brazilian mahogany boule log in storage at Rud Rasmussen, Copenhagen, Denmark.





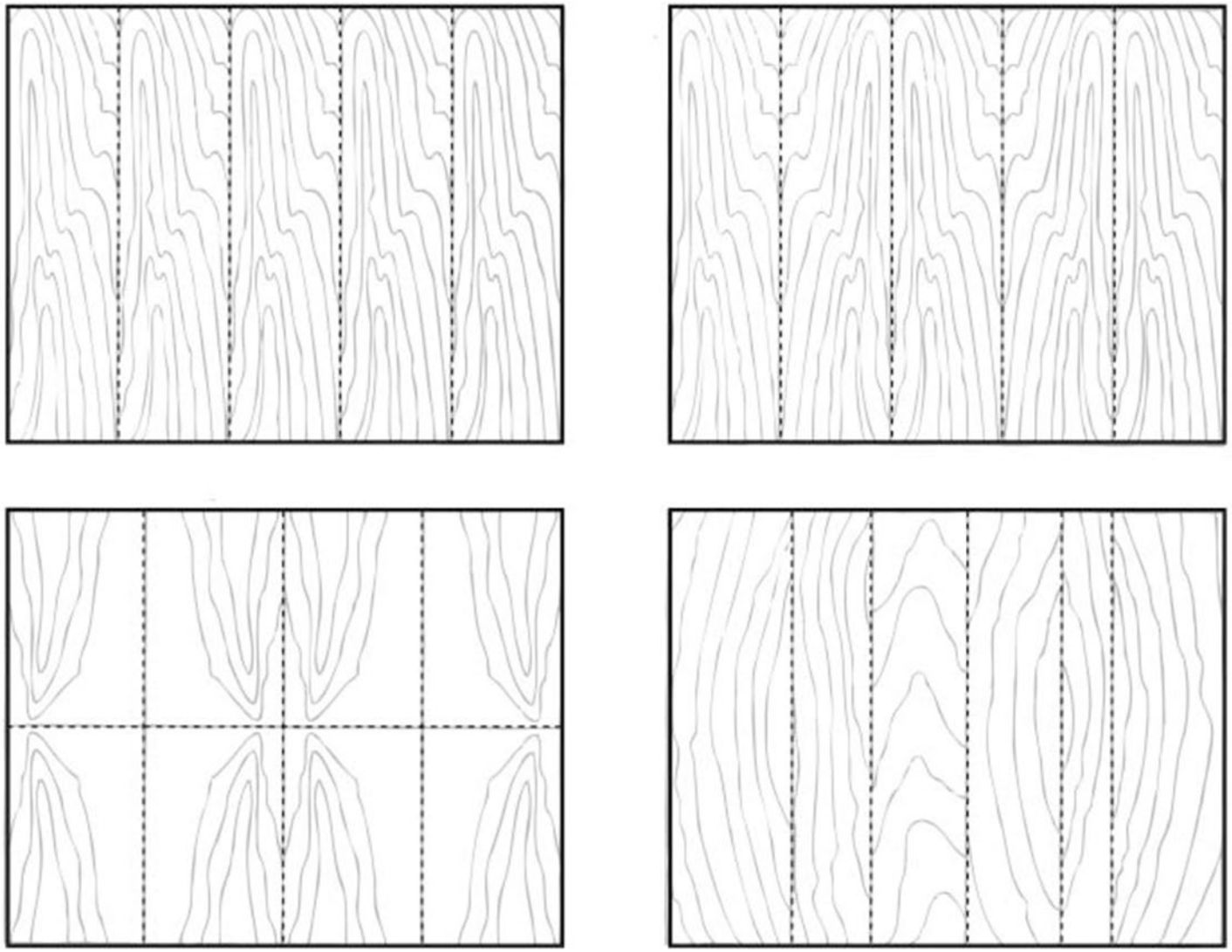



Honeycomb checks occur inside the board when the outside stabilizes before the inside is dry. The inside shrinks more than the outside, which usually results in torn internal fibers.
Shakes are splits that occur in the structure of the wood due to growth defects or shrinkage stresses. Cup or ring shakes are splits that open between the annual growth rings.
Bow
Twist or wind
Spring
Ingrown bark can mar the appearance and weaken the structure of the wood.
Surface checking usually occurs along the rays, and is usually caused by rapid drying of the surface.
End splits are common and are caused by rapid drying of the exposed end. Sealing the ends with waterproof paint can prevent splitting.
Bowing or warping is caused by stacking boards badly and introduces stresses that make the wood difficult to cut. "Reaction" wood is also prone to move when dried or cut.
Dead or encased knots are the remains of dead branches, the stumps of which are overgrown by new growth rings. Dead knots tend to fall out when the wood dries. The grain of the wood surrounding a knot is irregular, which makes it hard to work.

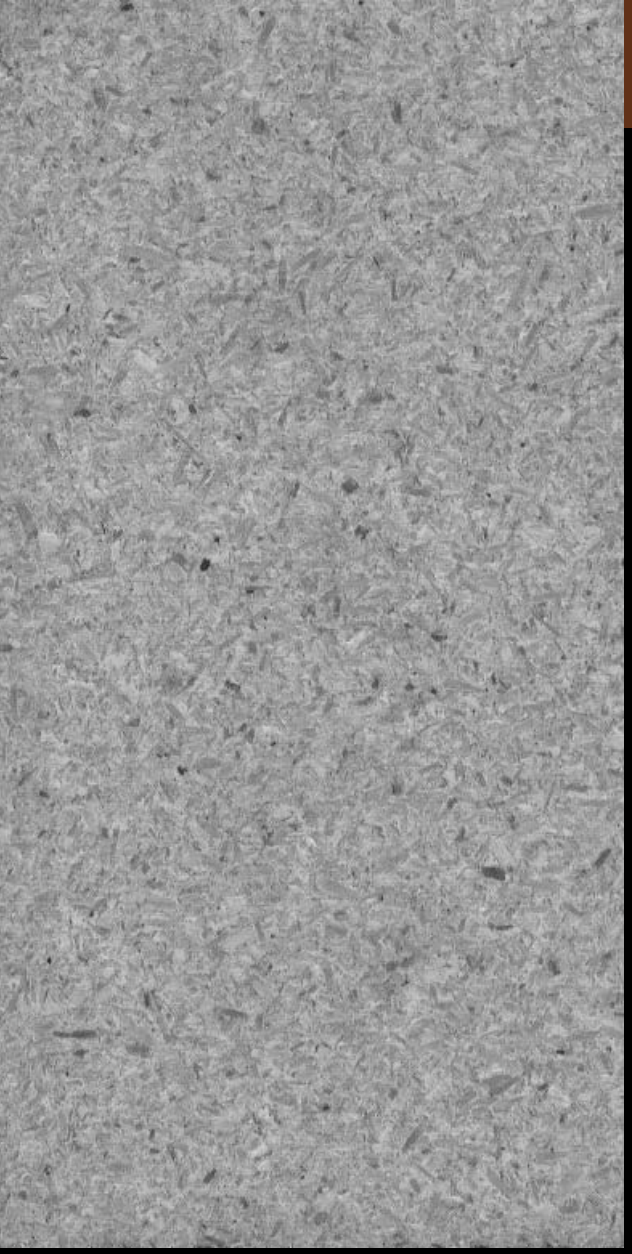


Source:
Encyclopedia of
Wood 1997

Wood veneer flitches ready
to be applied
over a stable substrate.



View of four types of veneering.
Top: 1) matching and 2) book matching:
Bottom: 3) end matching and 4) random matching.



surface of particleboard.

surface of oriented strand board.

from the Woods to the Wood and from the Wood to the Furniture

This third part presents interior and furniture projects designed to present a range of ideas and uses, while weaving content from the first two parts of the lesson.

Aalto, birch & laminated birch components of stool 60 and stool 65

Formwork for the curved and birch leg laminated - Stool 60

Flat-pack – Stool 60
Artek showroom,
Helsinki, Finland

Cork is a rapidly renewable material – and can be harvested from Spanish oak trees every nine years

Respect

Wellness

Health

Safety

Welfare

JASPER MORRISON CORKS

Soren Pedersen at PP Mobler, where he explains pre-compressed lumber to the students

Circle chair
(1946)

Designed by
Hans J. Wegner

Fabricated by
PP Mobler

Pre-compressed wood can be obtained basically from any type of wood, through a method that forms it 3-dimensionally, giving furniture designers new possibilities.

The wood is prepared for further processing in two stages. First, the wood's fibers are mollified by means of steam, rendering the wood plastic. Then, a compression process folds the fibers like an accordion and shortens the wood (20%). After the compression, the wood is extremely flexible and recontracts to 95% of its original length.

At this stage, the wood is easy to form during several hours, with the use of simple or even no tools at all. When fixed in a form, the wood can be dried, re-establishing its former strength, impact resistance and flexibility.

Sauna stool designed by Antti Nurmesniemi, 1952

Reclaimed wood chips and recycled plastic were both used to create this IKEA chair, designed 2017 by Swedish studio **Form Us With Love**.
Called **Odger**, the chair is the result of a three-year-long project exploring how a sustainable composite material could be used to create an affordable seat.

It is made through a process of injection molding, using a mixture that is 70% polypropylene and 30% wood chips. The wood chips all come from reclaimed wood, while recycled plastic is favored over so-called "virgin" plastic.

Vestre

Who are they? Based in Oslo, Norway, Vestre is one of Scandinavia's leading manufacturers of sustainable furniture for urban, outdoor public spaces since 1947.

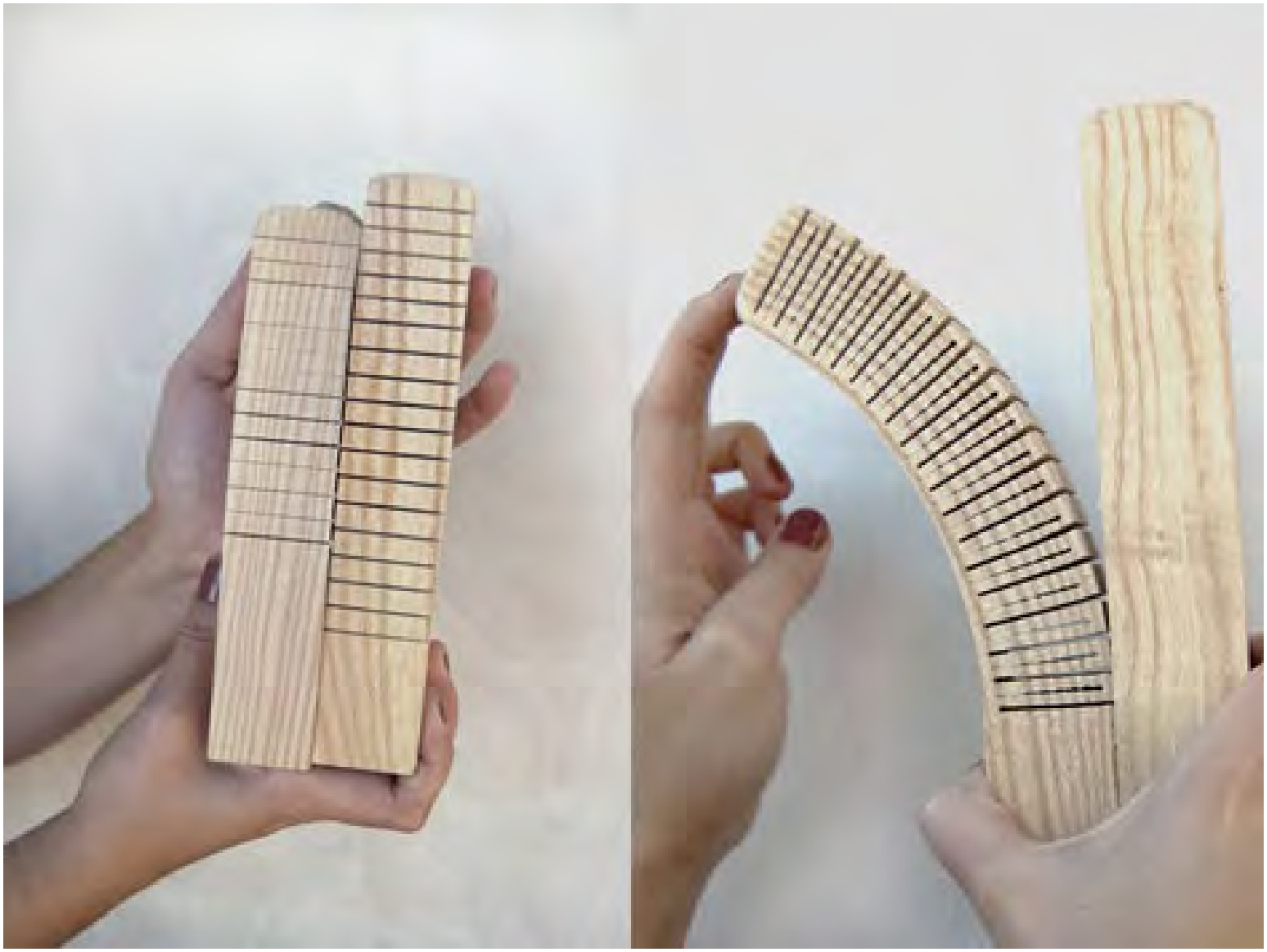
What environmental policies do they have? Vestre's goal is to be recognized as "the most sustainable furniture brand in the world", and in doing so has integrated nine of the 17 United Nations sustainability goals into its business model.
All of Vestre's manufacturing is done in Scandinavia, where it is based. Its factory in Oslo runs on renewable energy, with solar panels on the roof that produce energy to power the plant in the summer.

Its steel has 30% less emissions compared to the world average, and it sources its pine from the forests of Scandinavia. All of its products also come with a lifetime guarantee and warranty.

In addition to this, Vestre donates at least 10% of its annual profits every year to sustainable projects worldwide.

Vestre products include the Folk range of outdoor furniture, designed by Front and launched at Stockholm Design Week in February 2019. www.vestre.com

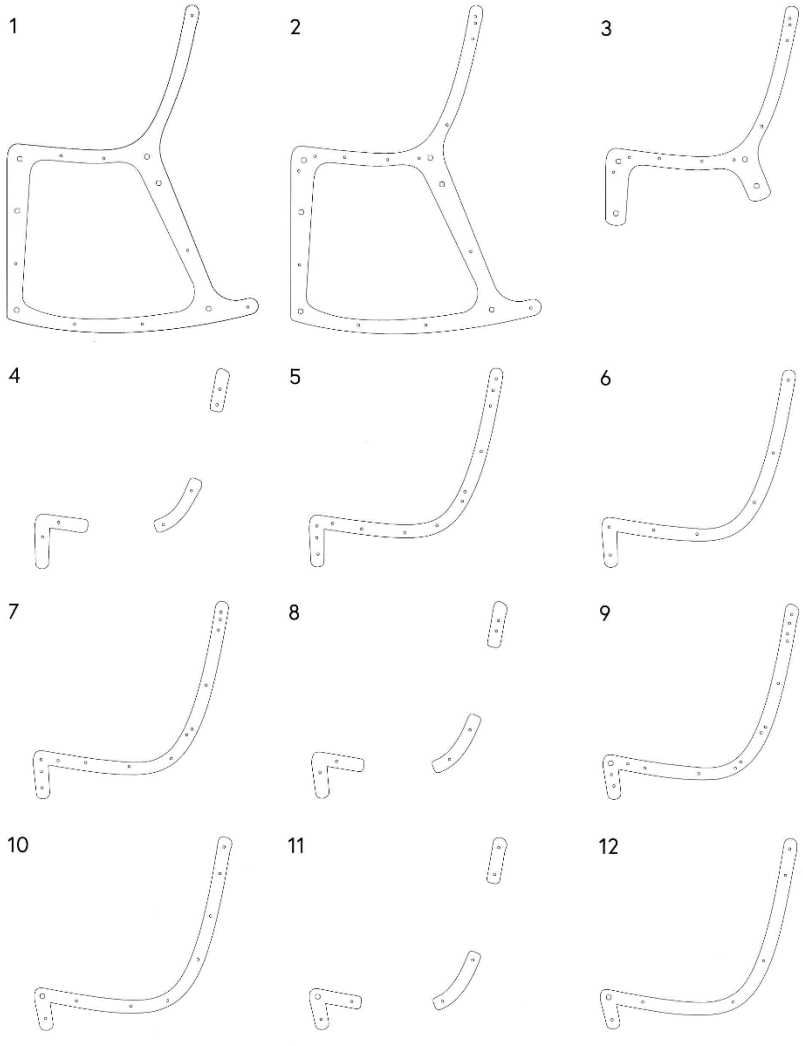

Benvenuti
Vestre



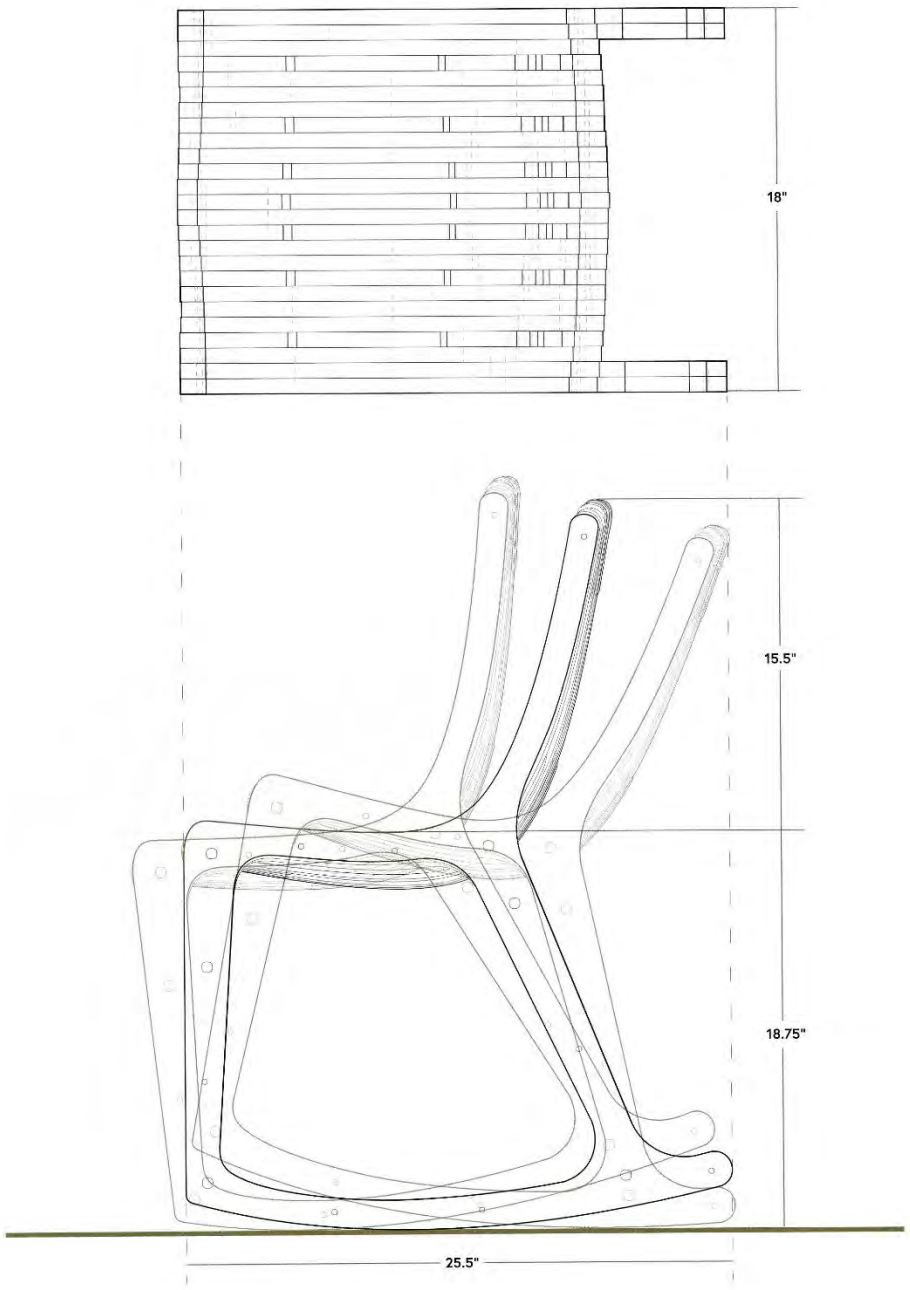
The prototype is an ideal way to test something that cannot be seen by drawing
student Mary Dickerson, Furniture Seminar, Oxford, Ohio, 2009

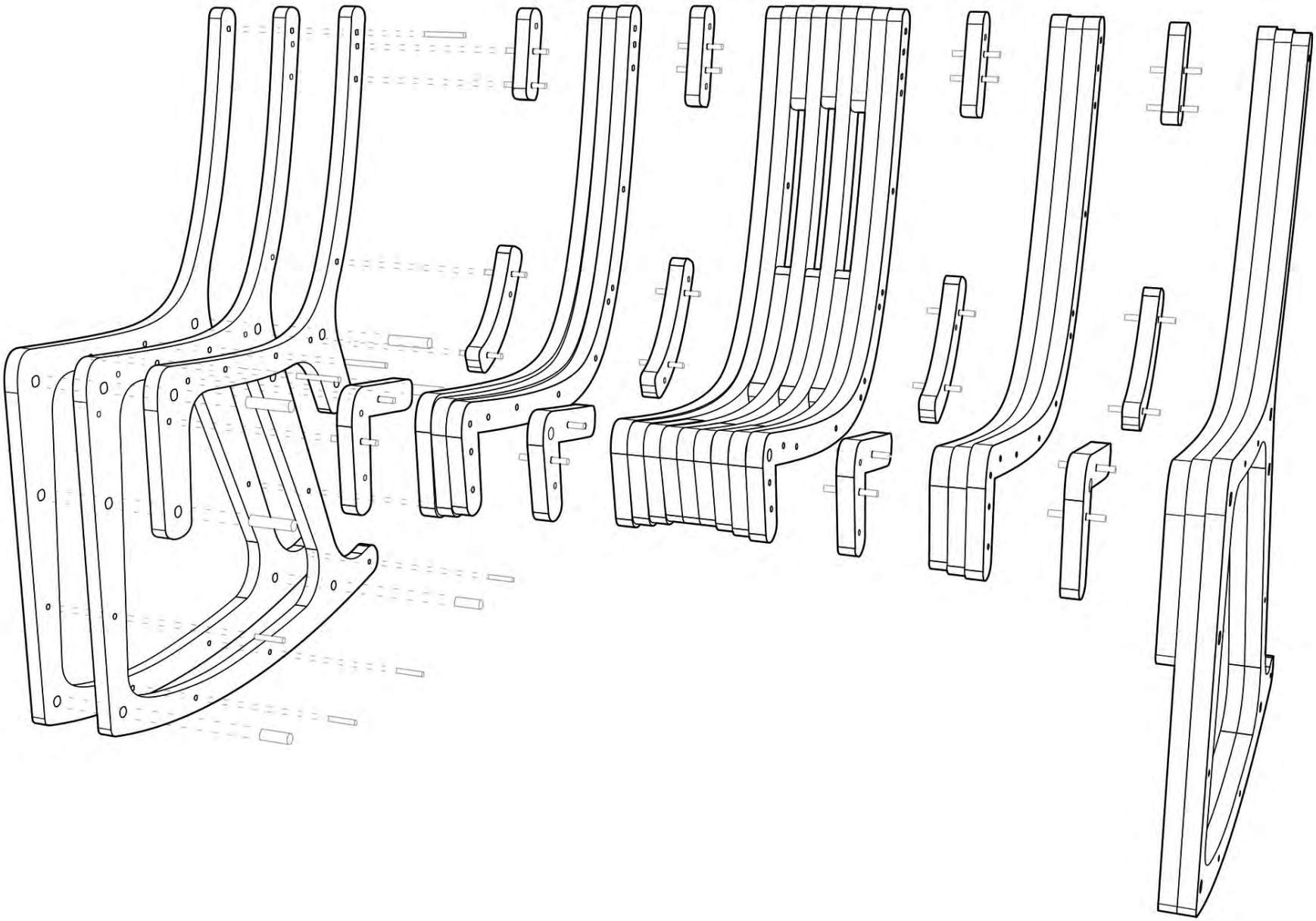
Furniture Design is, first and foremost, a process by which we can experience the world and our engagement with it as meaningful. (Wenger, 1998, p. 51)

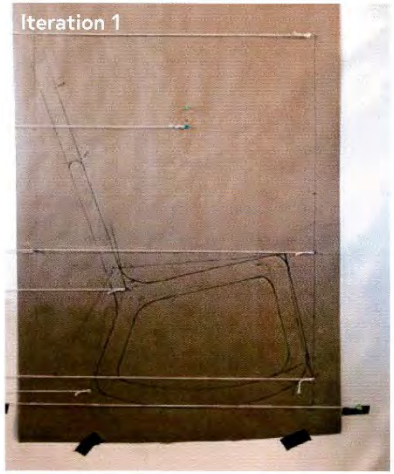
The on-line Merriam-Webster Dictionary defines the word prototype as: “a first full-scale and usually functional form of a new type or design of a construction” and, additionally, “a prototype is something that serves as a model or inspiration for those that come later” (“Prototype | Definition of Prototype by Merriam-Webster,” n.d.).



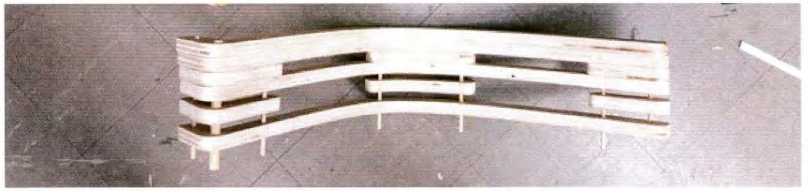
1/4" x 1 1/2"	**x14**
1/2" x 1 1/2"	**x4**
1/4" x 2 1/8"	**x44**
1/2" x 2 1/8"	**x8**
1/4" x 6 1/2"	**x6**
1/2" x 6 1/2"	**x1**



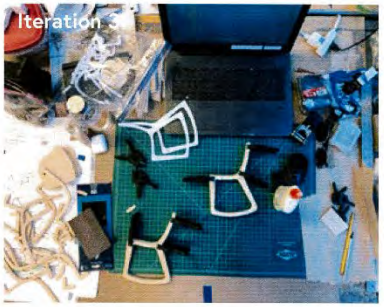



Iteration 1


Iteration 1




Iteration 2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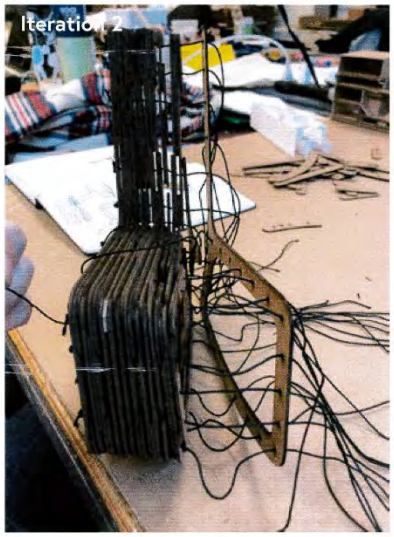
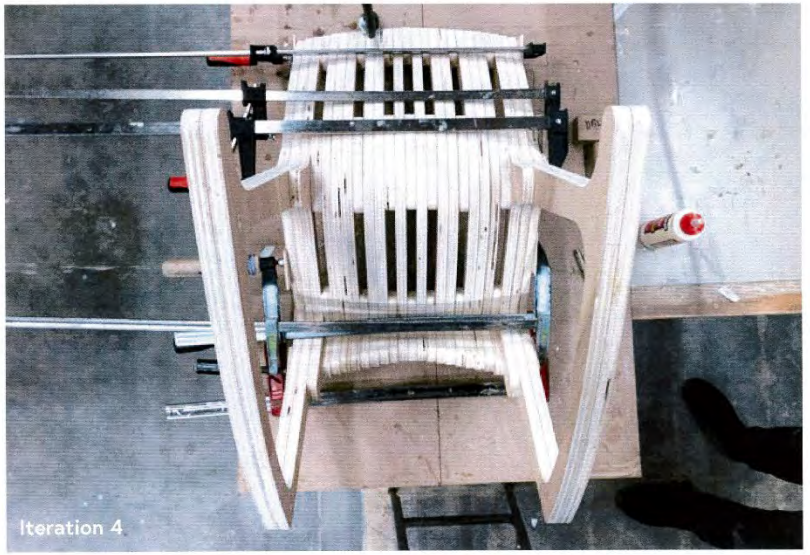

Iteration 2


Iteration 3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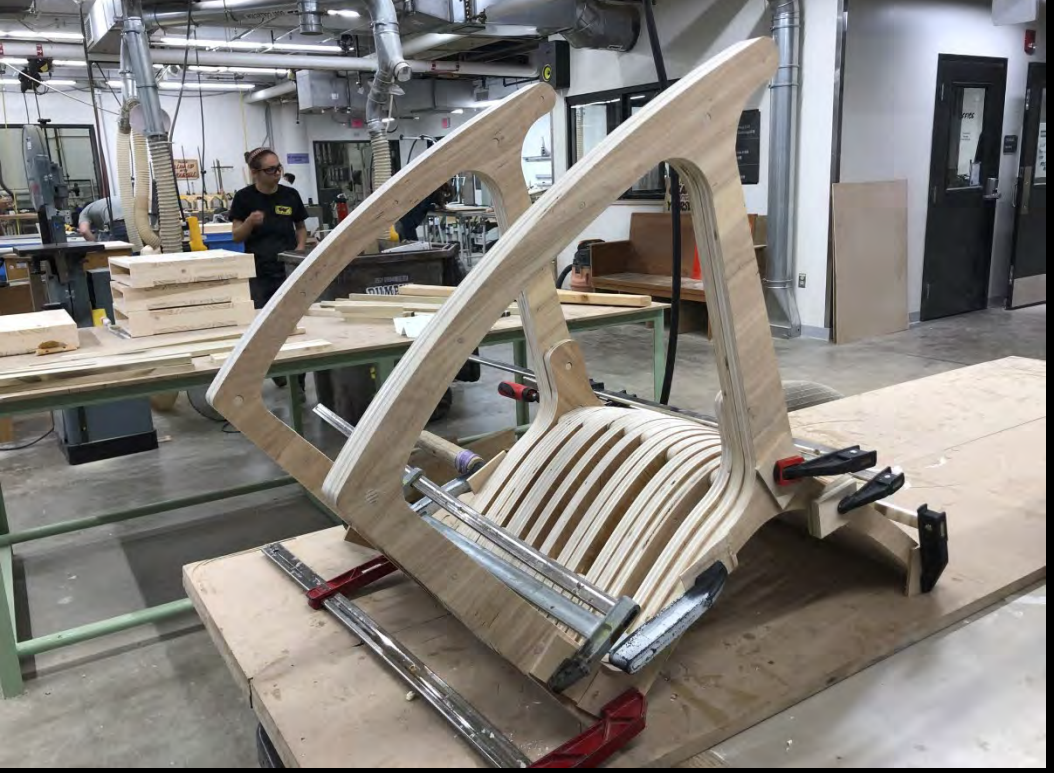
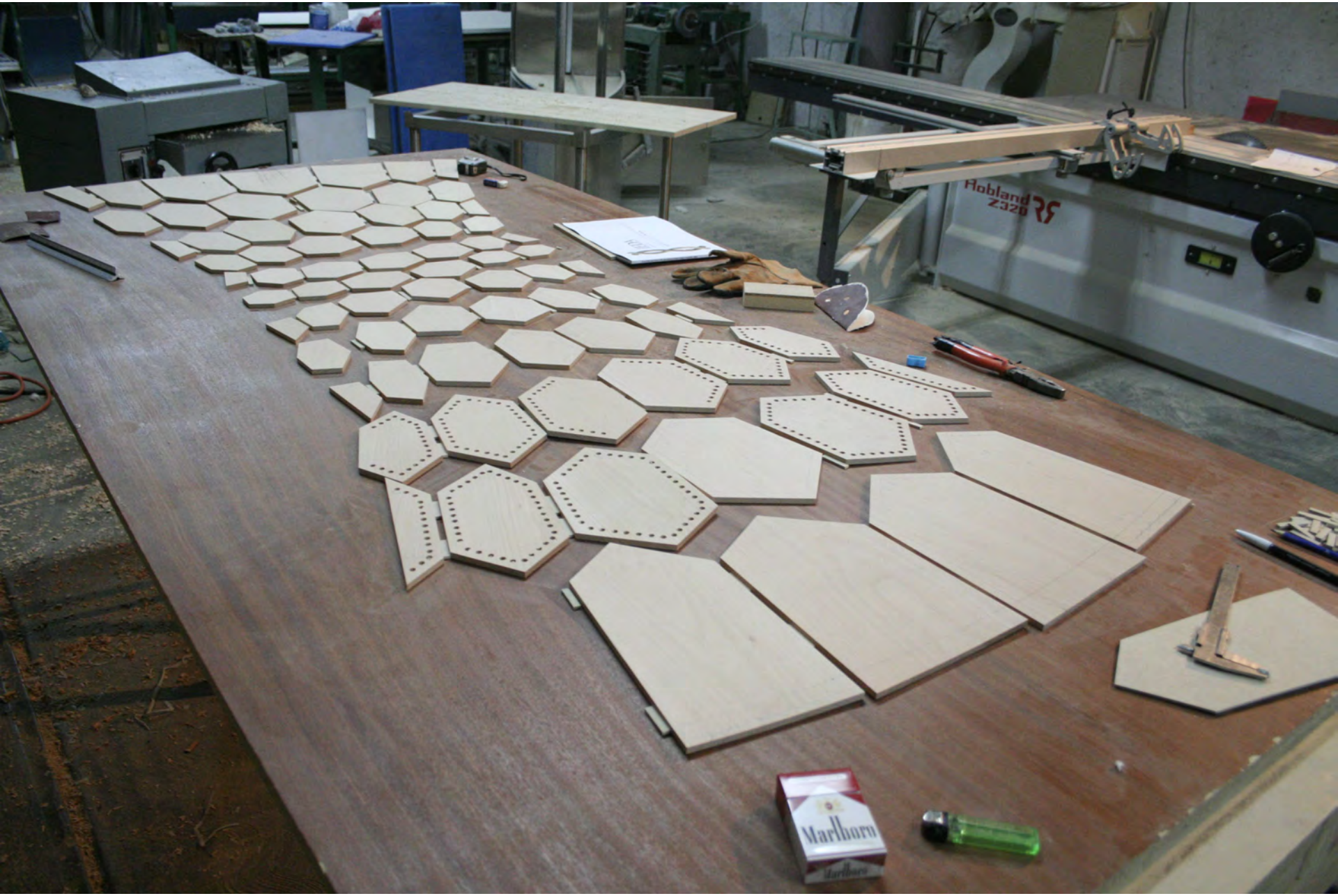


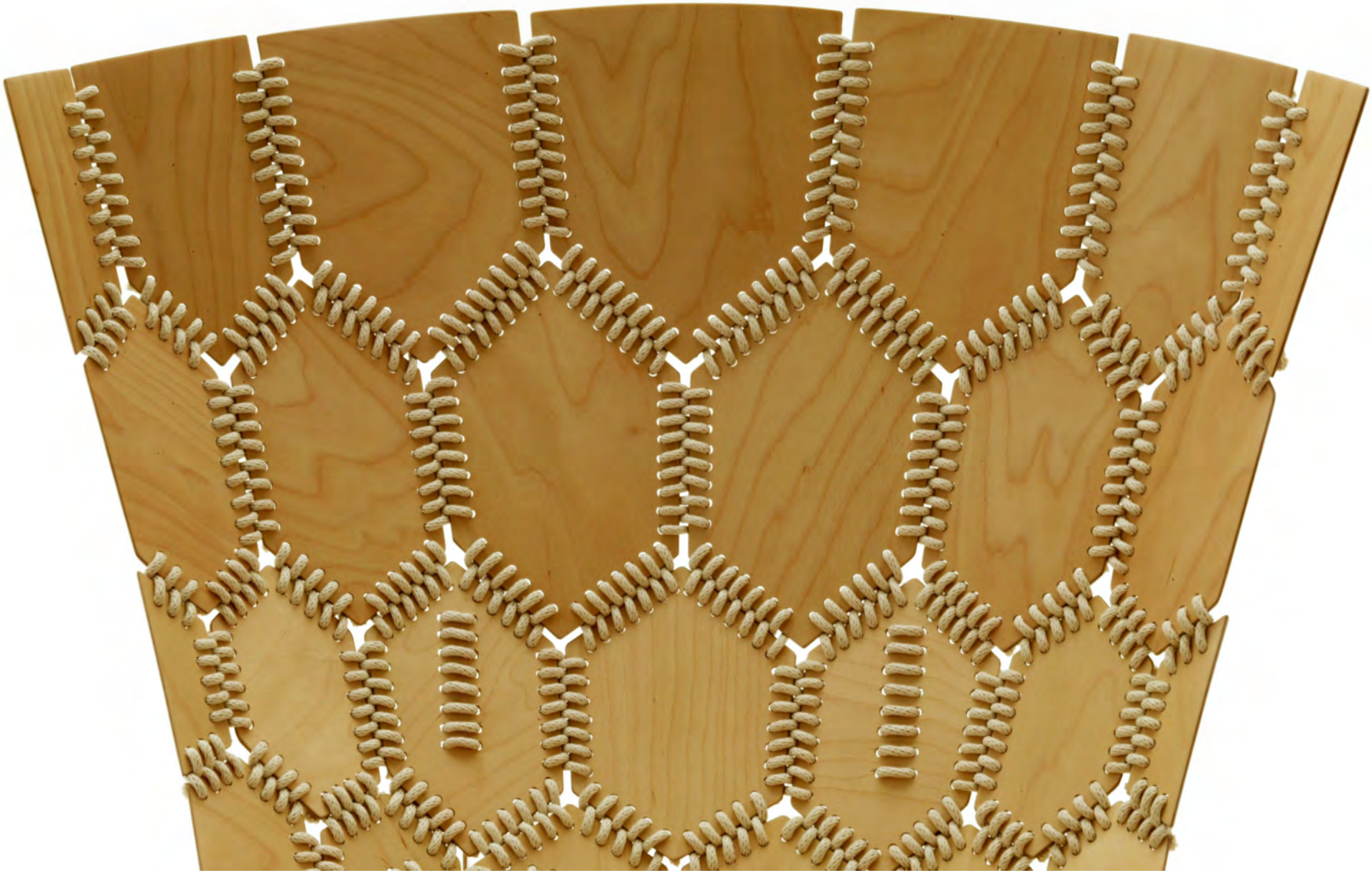
In the course of learning about designing with wood, fabricating a full-size working prototype is best done in tandem with sketching, drawing, writing, and modeling, (in order to better *see* and understand the whole), underscoring a principle in Gestalt psychology: there are properties of the whole that exist independently of their components.

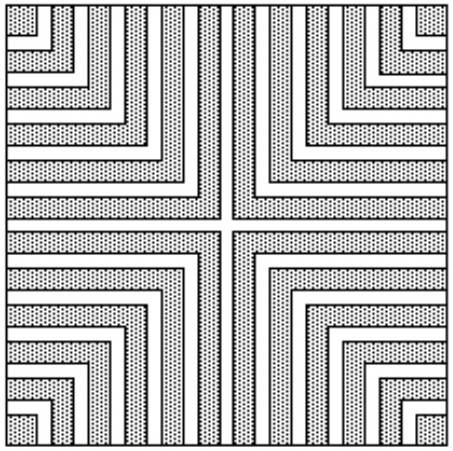
Assignments A and B; Prototyping and Modeling Ideas (as an initial sketch)

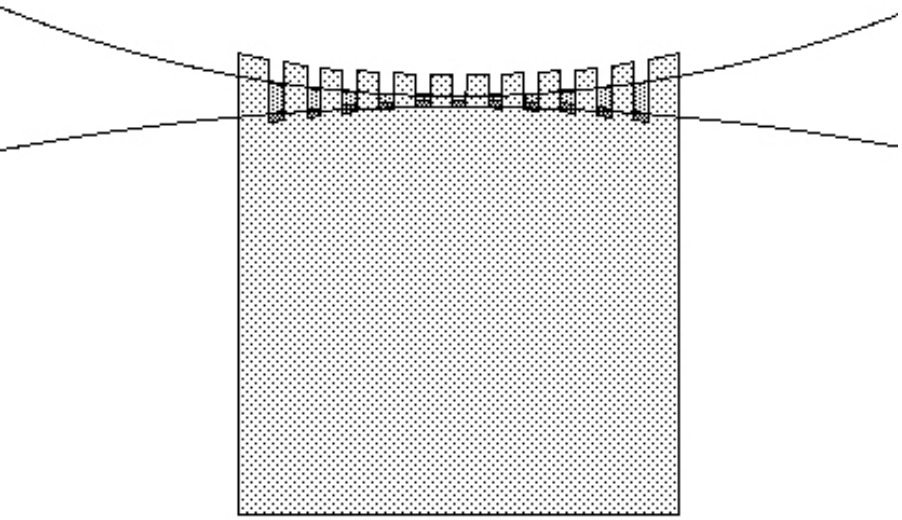
“Constructing prototypes is a time and resource consuming process, which makes it difficult for students to really evaluate the importance of this tool in relation to the efforts it requires.”

(Lim et al. 2008)


Hobland
Z320
Marlboro







An example with a touching story:

Block stool,
designed by Erik Skoven (1999)

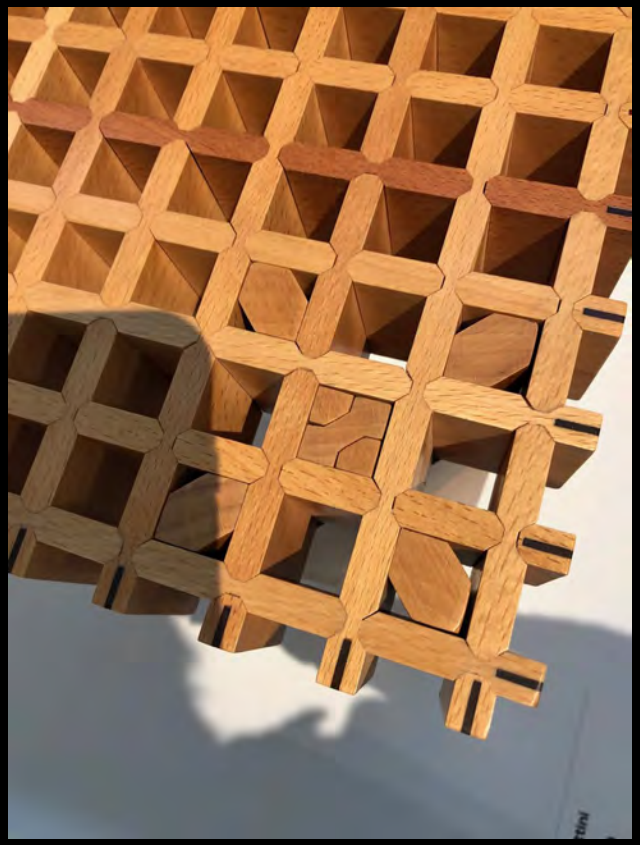
Block, designed by Erik Skoven

The Block – outdoor stool in context, (1999)

Bottega di Pierluigi Ghianda – custom woodworking shop, Brianza, Italy 1989

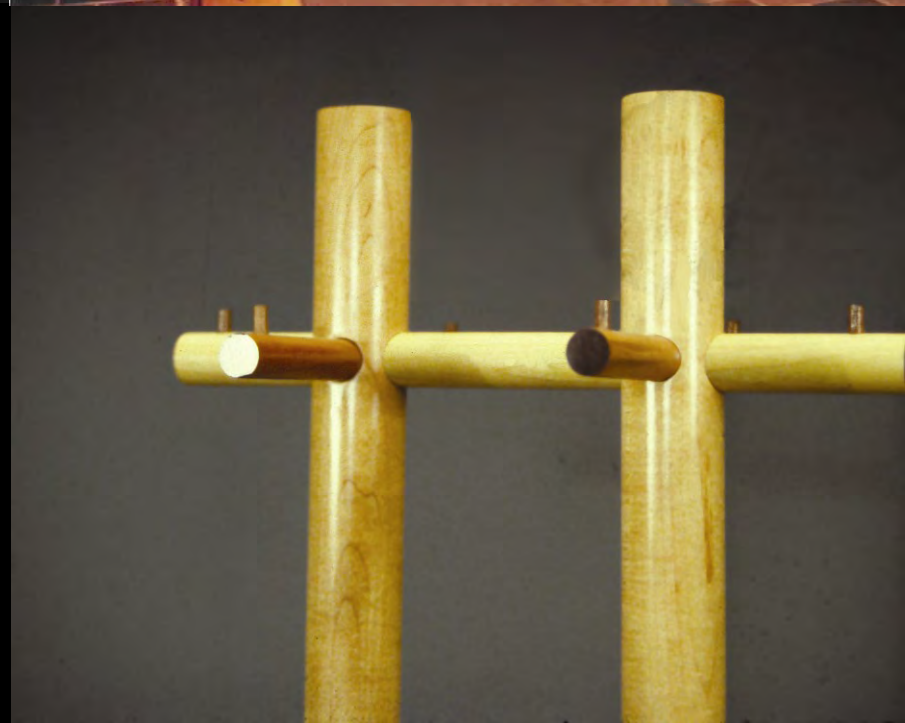
Crafting Wood

Gianfranco Frattini, Kyoto, 1974 - Pierluigi Ghianda



yesterday, ... 1974, 1990, 1992-2000


MAKING FURNITURE
For A New Domestic Landscape



frontiers

your guide to hot home & garden trends, products and ideas

mod squad

In the dining room of a 100-year-old house in Clifton, this curved, modular buffet puts a new twist on an old home renovation. With full-extension drawers for linens and silverware, its bending birch plywood curves serve as a lesson in form meeting function. The work of University of Cincinnati's Jim Postell and architecture students Janet Flory, Steve Wetherington and Matt Cornell, the buffet shows how modern design sensibilities can complement an existing home's character. *—Elissa Sonnenberg*

For more information about Postell's furniture design, contact Postell, a *Cincinnati Magazine* Interior Design Award winner, at 513-861-9136.

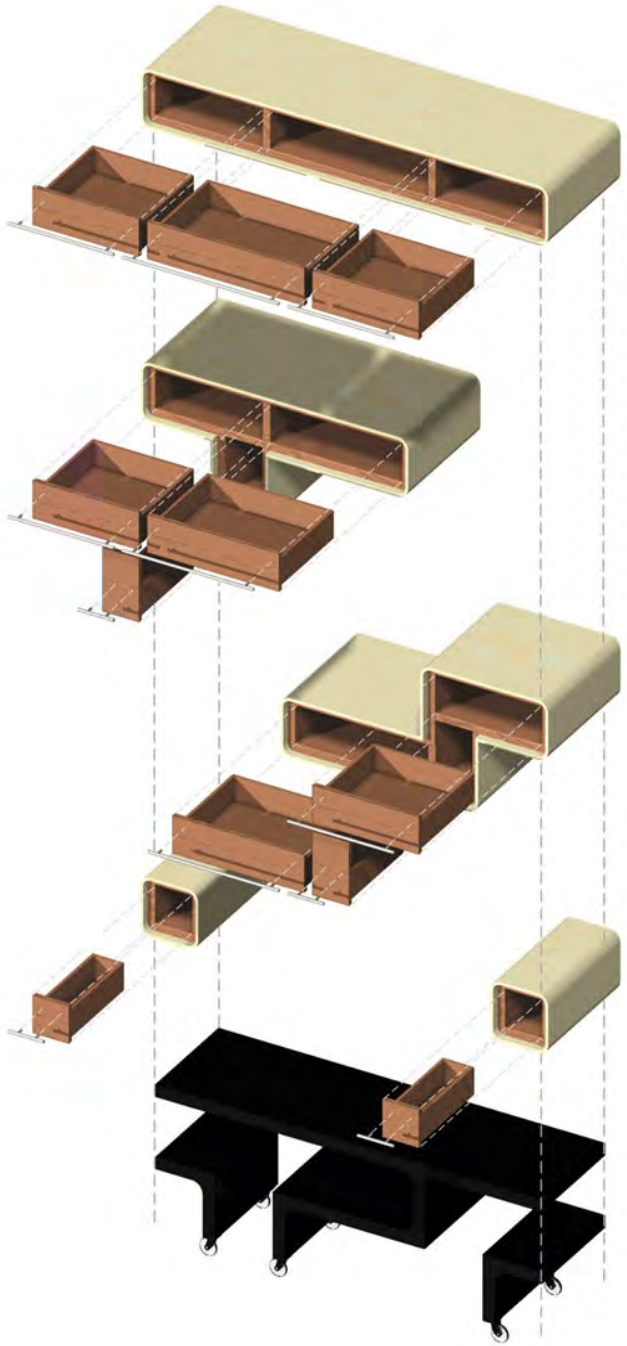
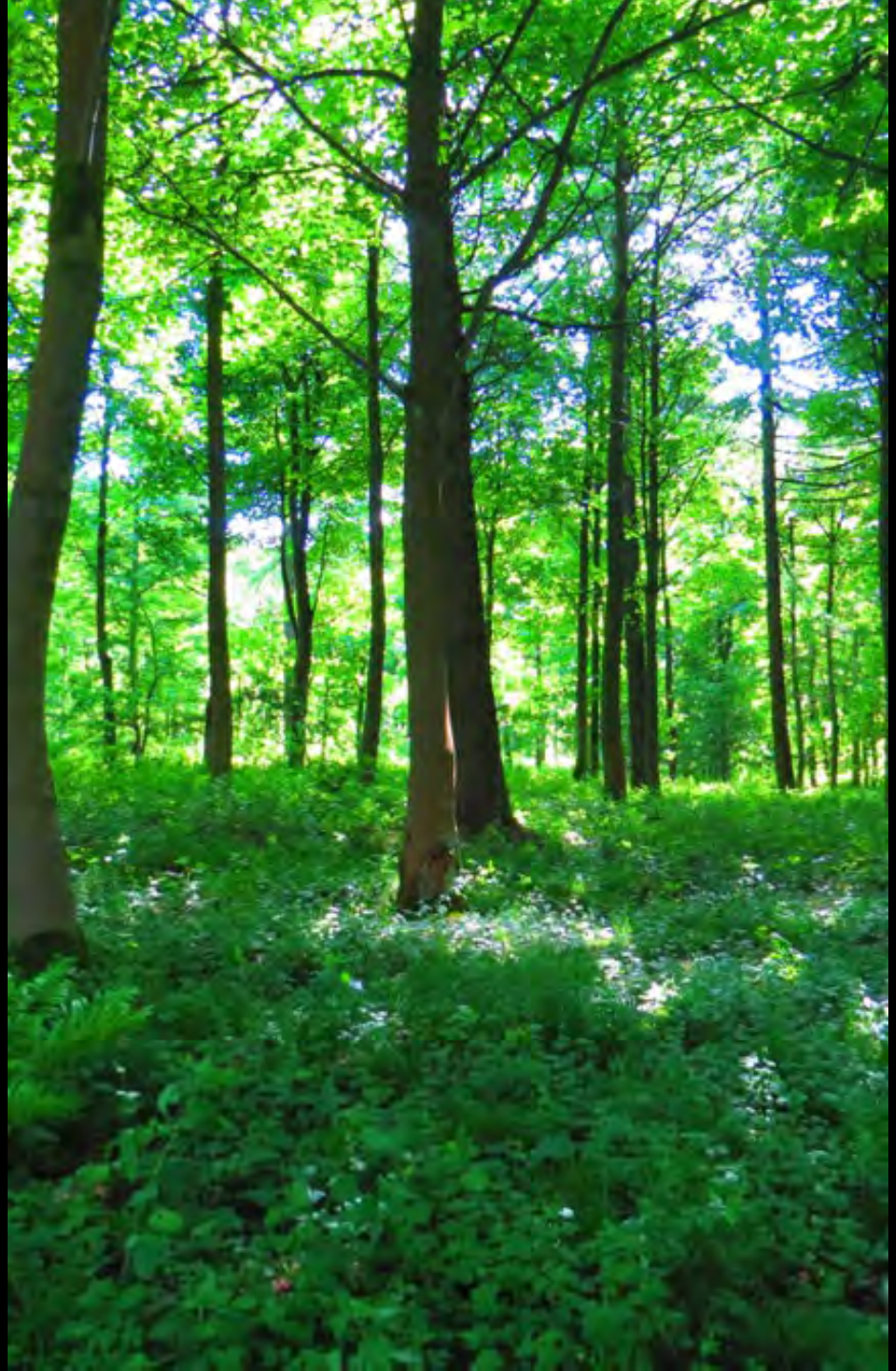
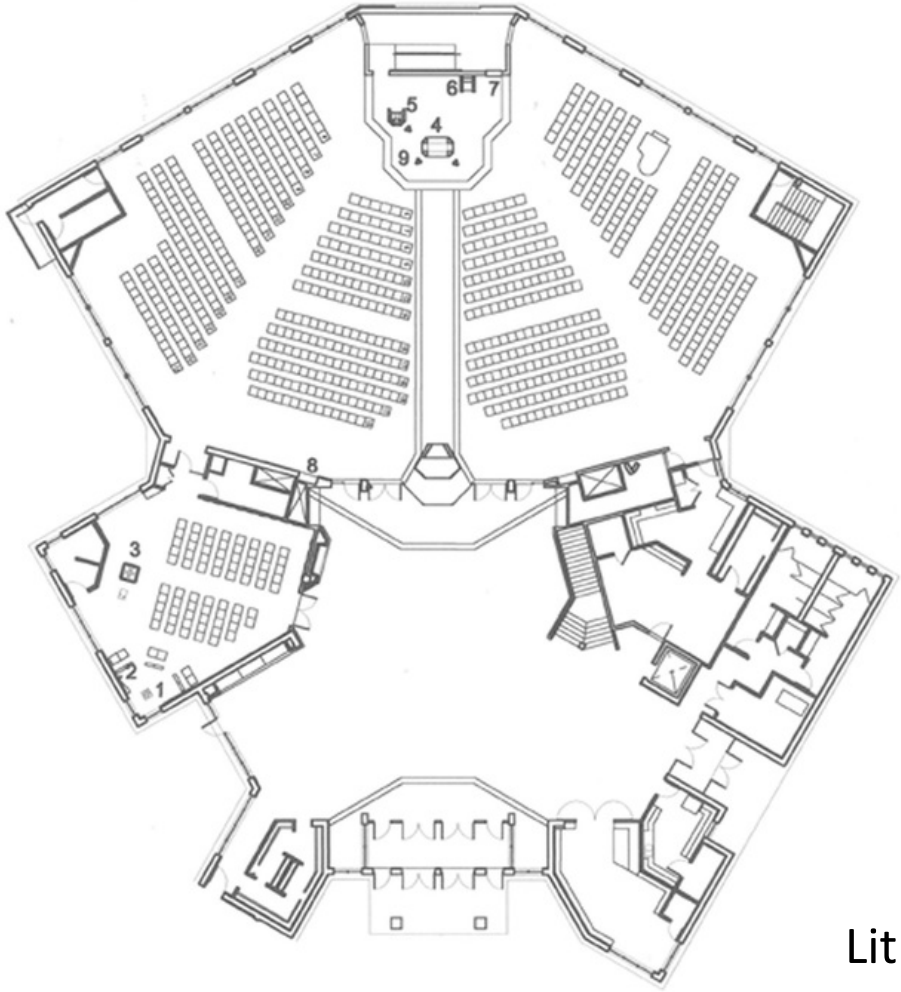


PHOTO BY GARY KESSLER

Isaac M. Wise Chapel, Cincinnati, Ohio, 2006



Chagrin Falls, Ohio

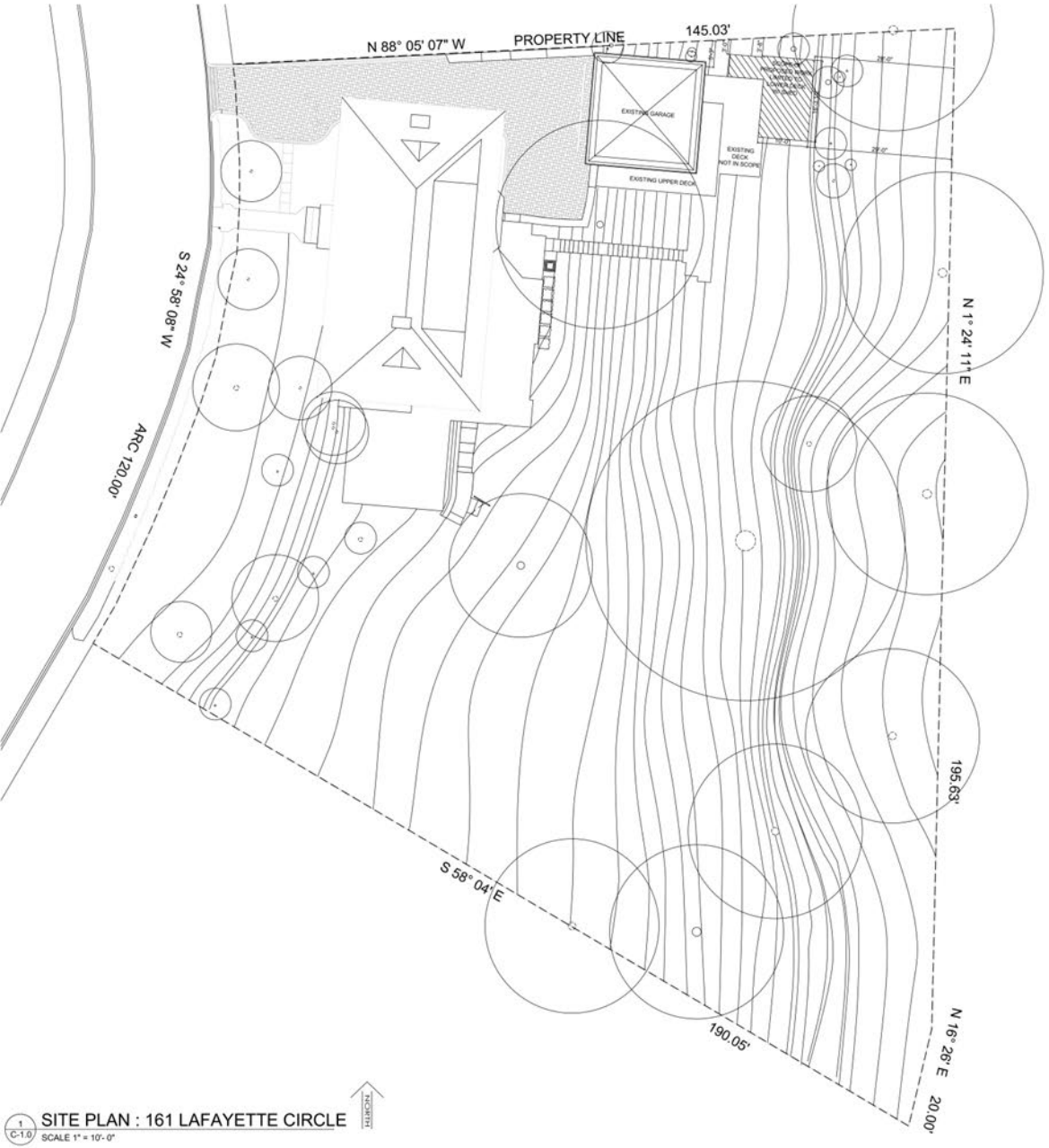


LITURGICAL FURNISHINGS FOR A NEW CATHOLIC CHURCH

1 TABERNACLE
2 SANCTUARY LAMP
3 DAY CHAPEL ALTAR
4 MAIN ALTAR
5 AMBO
6 PRESIDER'S CHAIR
7 PROCESSIONAL CROSS
8 AMBRY
9 LITURGICAL CANDLE HOLDERS

Above: Ambry
Holy Angels Church, Chagrin Falls, Ohio
Liturgical Furniture Design by Postell (2001)

All the liturgical furnishing for Holy Angels were made from lumber from trees that were on the site before construction began



1 C-1.0 SITE PLAN : 161 LAFAYETTE CIRCLE
SCALE 1" = 10'- 0"

INDEX OF DRAWINGS

GENERAL NOTES

STRUCTURAL DESIGN CRITERIA

APPLICABLE BUILDING CODE: OBC

DESIGN LOADS:
MINIMUM SNOW LOAD: 25 PSF

BASIC LOAD Pg = 25 PSF
EXPOSURE FACTOR Ce = 0.7
IMPORTANCE FACTOR I = 1.0

MINIMUM WIND LOADS: 20 PSF
BASIC WIND SPEED 90 MPH
EXPOSURE B
IMPORTANCE FACTOR I = 1.0
WIND DESIGN PRESSURE (MWRS) P = 20.7 PSF

FLOOR LIVE LOADS:

DECK 60 PSF

DEFLECTION CRITERIA:
L/360 LIVE ONLY L/240 DEAD + LIVE

SOIL CAPACITIES:
ALLOWABLE 2000 PSF

WOOD FRAMING: PRESSURE TREATED LUMBER W/ IPE DECKING

ALL BEAMS & JOISTS: NO. 2 SOUTHERN PINE OR BETTER

METAL FASTENERS: G185 GALVANIZED

ALL FOOTINGS: CAST IN PLACE CONCRETE W/ 3000 PSI COMPRESSIVE STRENGTH

SCOPE OF WORK

PROJECT SCOPE IS LIMITED TO PROPOSED LOWER DECK ADDITION WITH RESIDENTIAL GARDEN SHED

- 194 TOTAL SQ. FT: INCLUDING 163 SQUARE FEET OF NEW IPE DECKING AND IPE RAILS WITH PRESSURE TREATED PINE COLUMNS, BEAMS, AND JOISTS; WITH A 32 SQUARE FOOT RESIDENTIAL GARDEN SHED

BOOK PLAT PARCEL

218-0A58-0038-00

001 RESIDENTIAL

PROPERTY DESCRIPTION

IRR LOTS 38 & 44 GREEN HILL
OF JAS MORRISON EST
SUB PARS 38 & 44 CONSOLIDATED

CONSTRUCTION

Whitney Hamaker, Jim Postell

REFERENCES

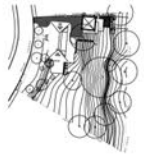
existing house designed & constructed in 1911

SCOPE OF WORK LIMITED TO PROPOSED LOWER DECK ADDITION WITH GARDEN SHED

CONSULTANT

G. Thomas Bible, P.E.
Structural Engineer & Consultant
315 Bryant Ave.
Cincinnati, Ohio 45220
Ph. # (513) 961-3697

03-11-2013: ISSUE FOR BUILDING PERMIT



POSTELL RESIDENCE
161 LAFAYETTE CIRCLE
CINCINNATI, OHIO 45220
(513) 861-9136

COVER SHEET, INDEX & SITE PLAN

james postell architect
161 LAFAYETTE CIRCLE CINCINNATI, OHIO 45220
PHONE 513 - 861 - 9136
FAX 513 - 861 - 9136
E-MAIL jim.postell@uc.edu

C-1.0

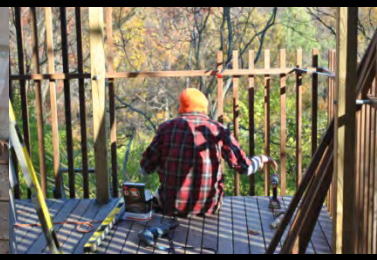
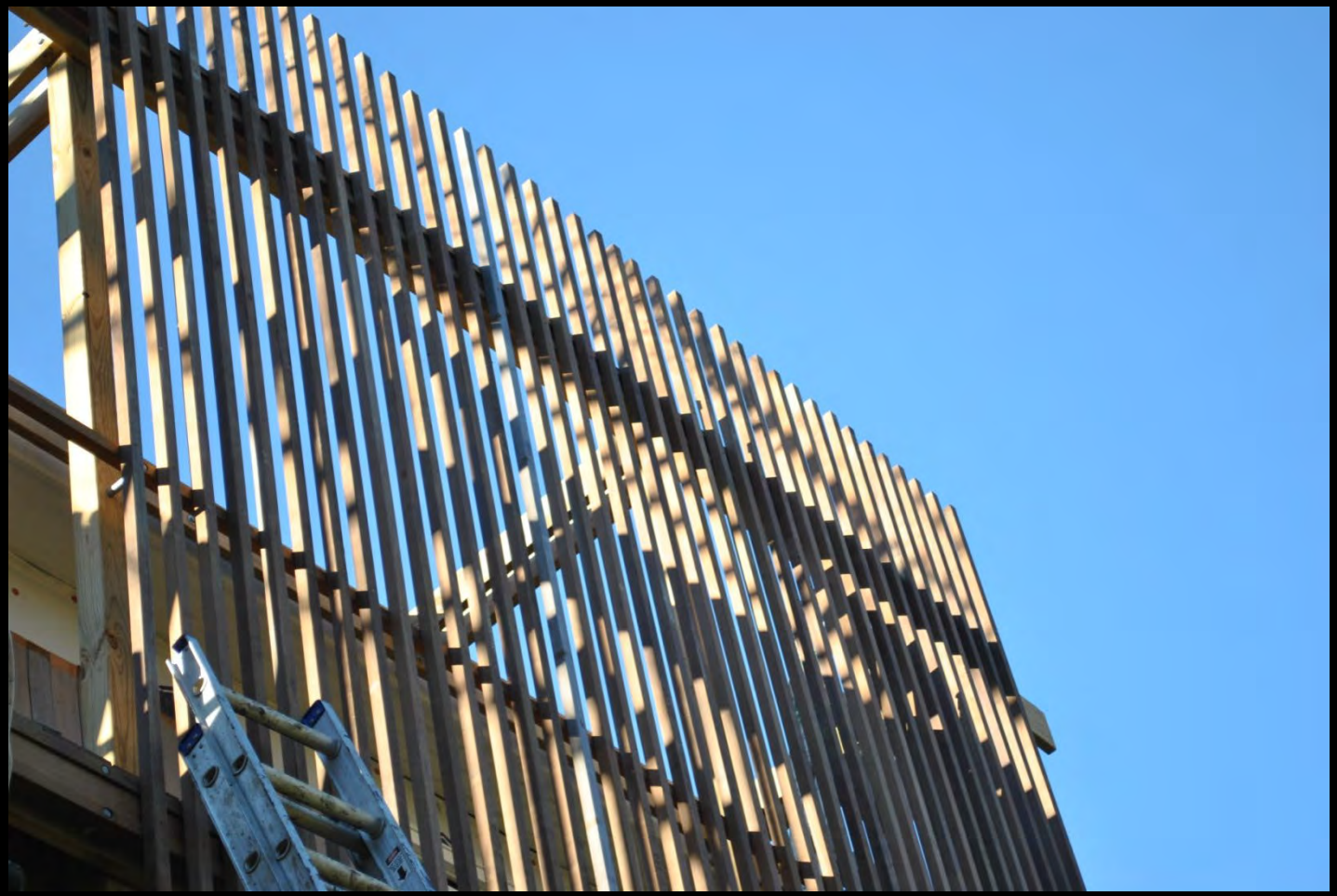
1" = 10'-0" 03/11/2013


Cincinnati, Ohio 2012


city of
CINNATI
RECYCLES





GRAZIE