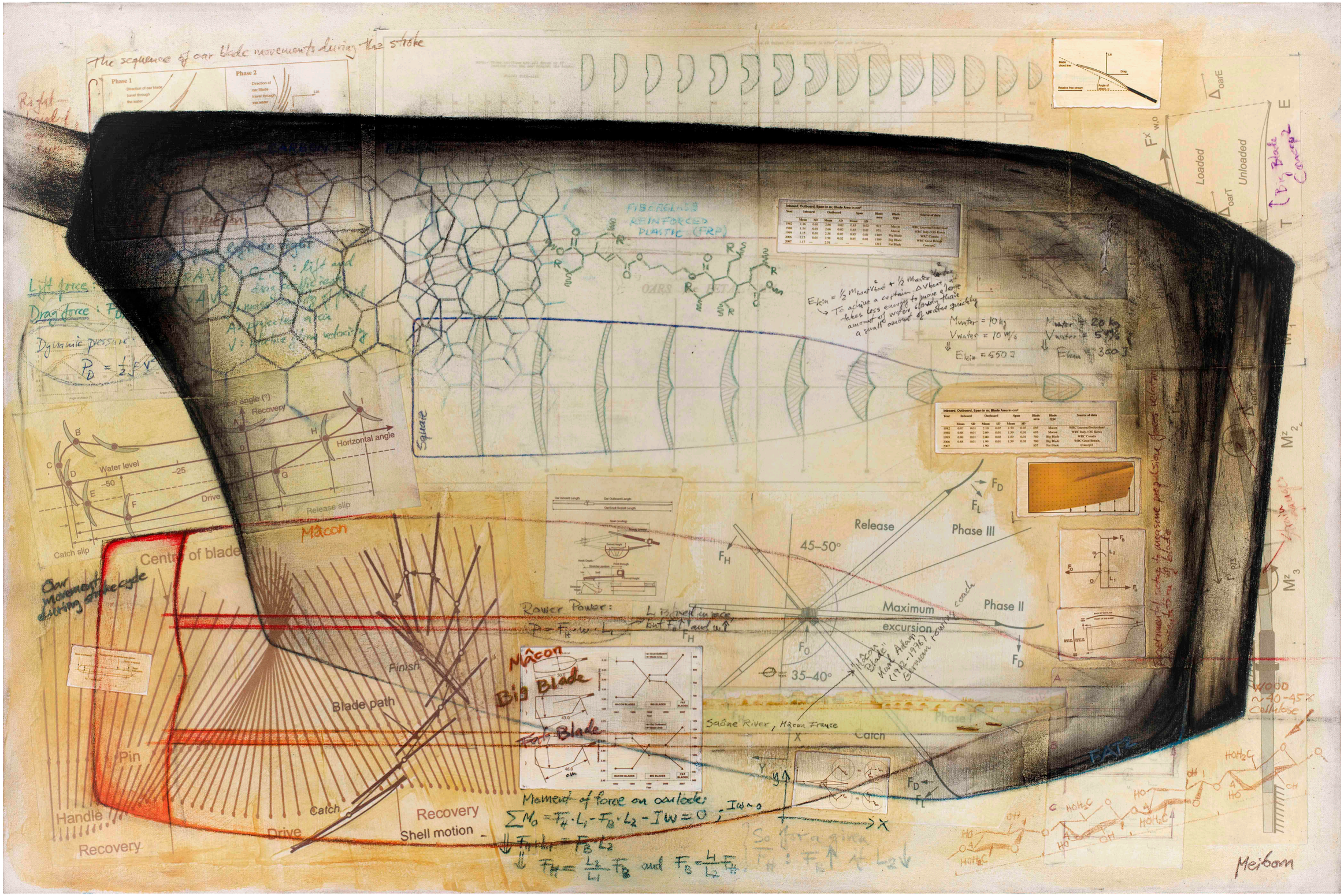
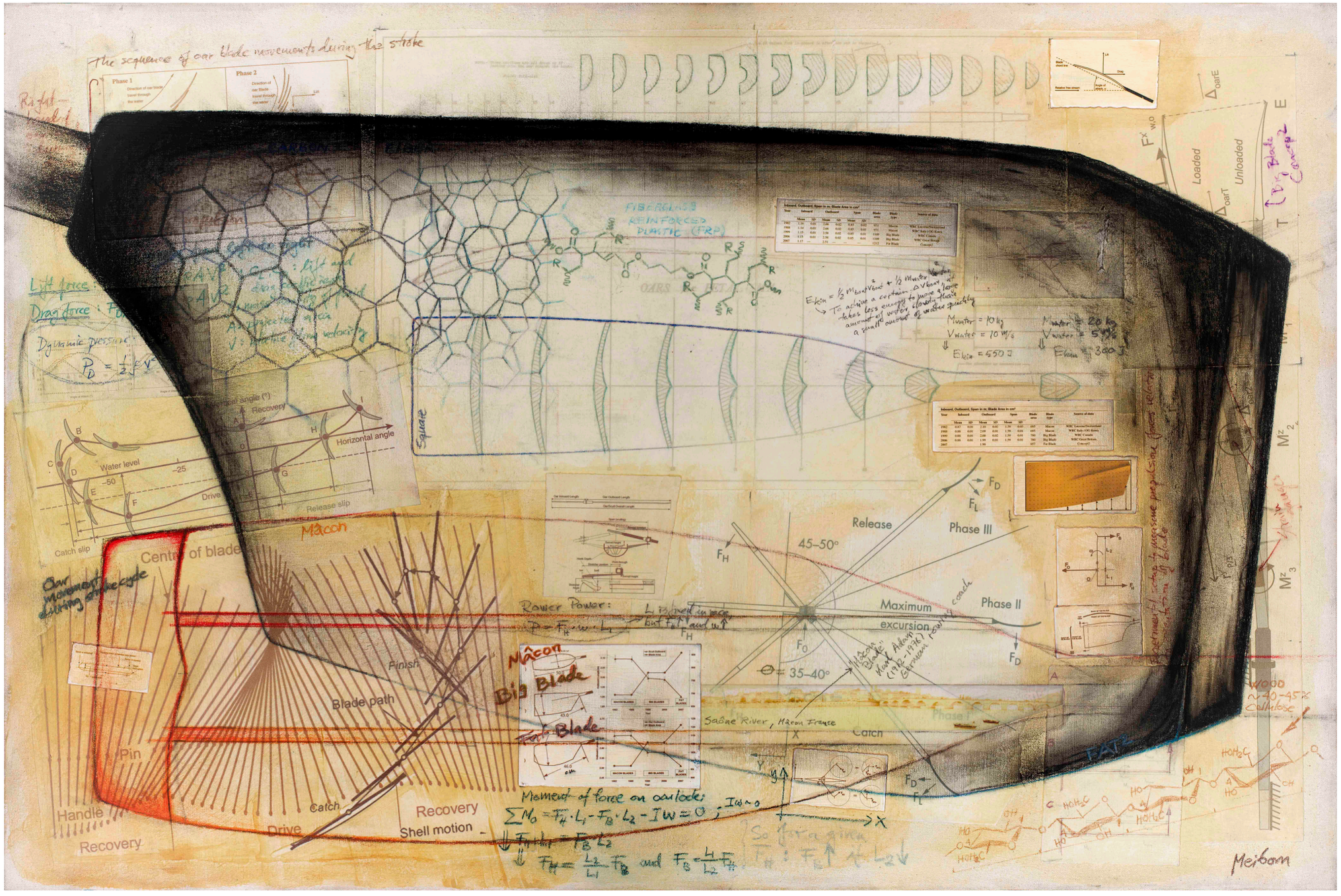
Content guide for *Blade*





Blade tells the story of the evolution in the shape, size, and material of the competitive oar blade, from its early symmetrical forms in wood to the modern asymmetrical form in carbon fiber. It displays the beautiful form of the oar blade and combines scientific formulas, imagery, diagrams, data tables, and text to illustrate the physics of propulsion and the movement of the blade through the water. The original artwork is mixed-media on canvas and measures 76cm x 51cm (30” x 20”).

Diagrams showing a detailed view of the movement of a right-handed oar blade during the drive-phase of the rowing stroke with the shell moving from left to right. The approximate directions of the drag and lift forces are indicated.

Diagram of the rower's cockpit with definitions and labels for components, distances, etc.

Cross-sectional view of the old "Square" classic wooden oars shaft and oar blade, showing the hollow shaft and blade profile

Force-diagram of the oar in the different phases of the stroke from catch through release

Chemical structure formula for Fiberglass Reinforced Plastic (FRP) used in the construction of modern oars, oar blade, and rowing shells

Outline showing the shape of the old(est) "square" oar blade

Outline (black) of the Fat Blade used by elite competitive rowers today

Illustration of the regular hexagonal molecular structure of the carbon fiber used in modern rowing oar blade, oar, and shell construction

Data tables demonstrating the evolution in "inbound" and "outbound" oar span in parallel with the change in oar blade design (shape) and surface area. The trend has been for slightly shorter outbound span with increasing blade area from the Macon to the Fat Blade.

Expressions for the lift force, drag force, and dynamic pressure on the oar blade in the water

Expression for the kinetic energy of the rower-shell system, demonstrating that it requires less energy to move a large amount of water slowly, than a small amount of water quickly - thus making the case for the larger modern "Fat Blades" that can move more water.

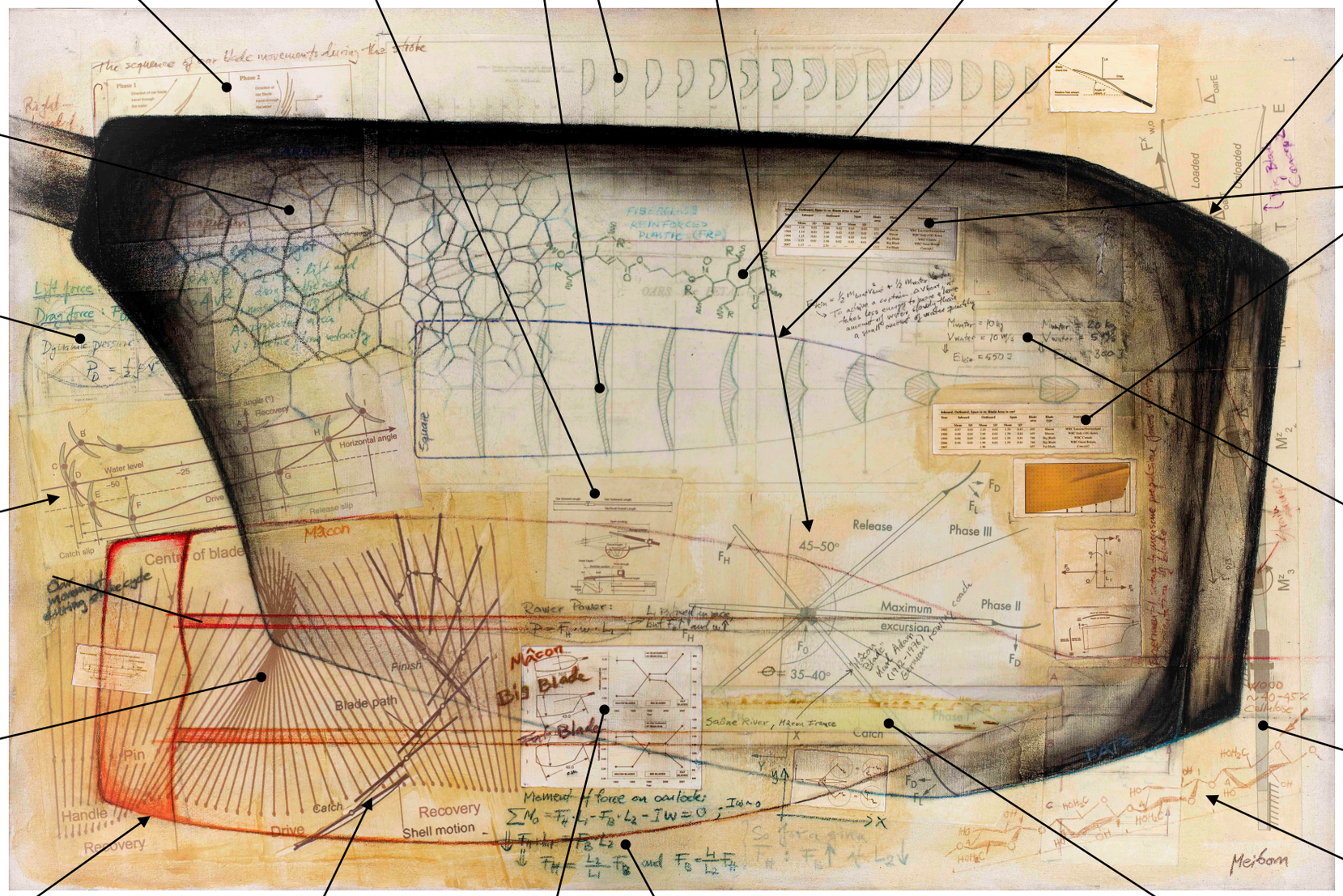


Diagram showing sideview of oar blade's ideal path and angles through the water and air over the stroke cycle

The path of the oar through the water and the air during the "drive" and "recovery" cycles of the rower's stroke cycle

An experimental setup to measure forces on modern oar and blade system

Chemical formula for cellulose which is the primary component of wood used for the old Square and Mâcon oar blades

Outline of the Mâcon blade, named afterthe french city Mâcon in which the bladewon popularity when used by winning german crews when racing on the Saône river

A closer look at the oar blade's movement during the stroke. clearly illustrating the "slip" and "back-watering" near the finish

Equations for the moment of force at the oarlock, and expression for the relations between handle force and force on the oar blade

Diagram showing the evolution in oar blade shape and surface area (increase), and the corresponding change in "outbound" oar length (decrease) to optimize propulsion

Picture of the Saône river in Mâcon, France, where West Germany won nearly all competitions at the 1959 European Championship using the tulip-shaped Mâcon blades