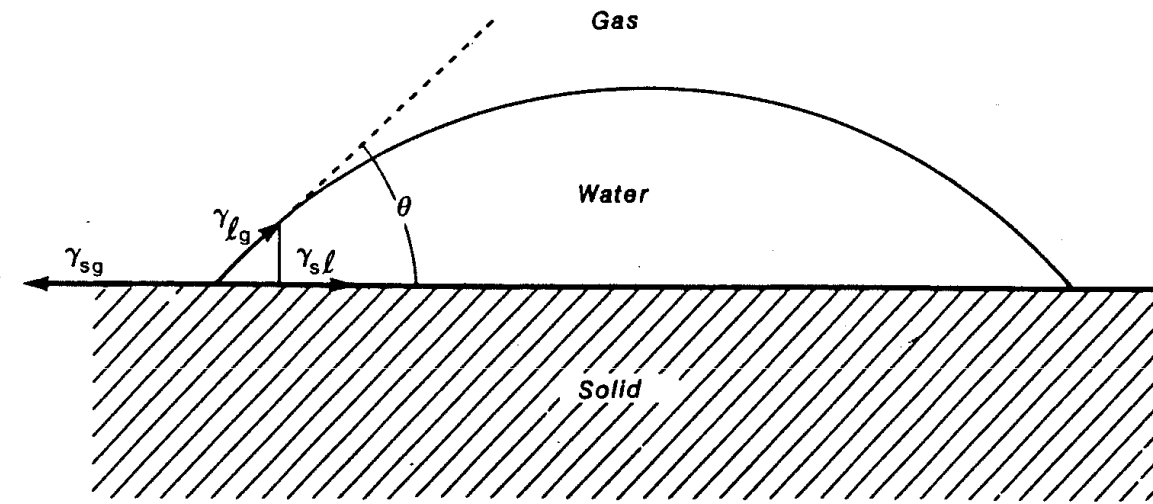


Solid Surfaces

What happens when we add a solid surface?



There are 3 interfaces

1. γ_{sl} solid - liquid
2. γ_{sg} solid - gas
3. γ_{lg} liquid - gas

each interface behaves like an elastic membrane

Horizontal Force Balance (Young's Equation)

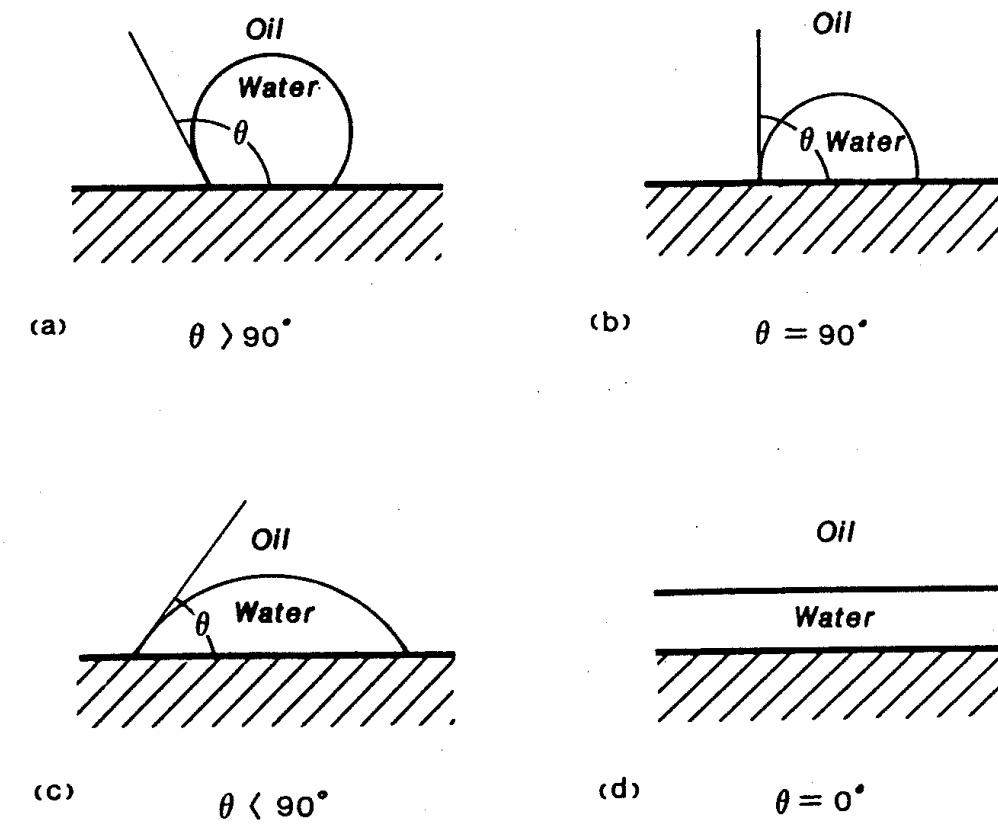
$$\gamma_{sl} + \gamma_{lg} \cos \theta = \gamma_{sg}$$

Wettability

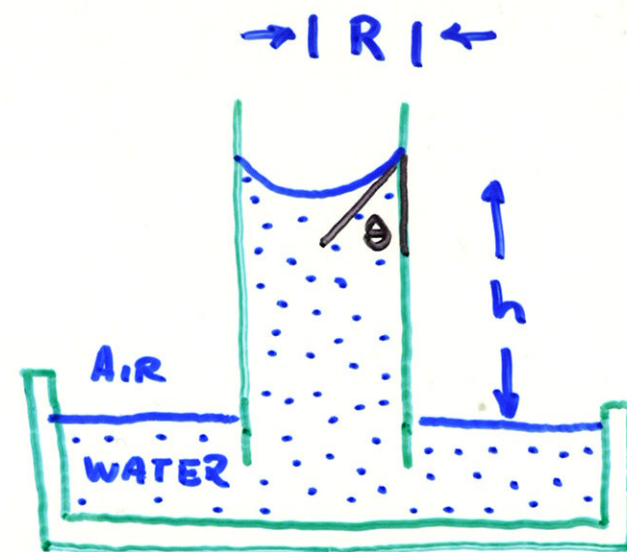
The behaviour of the liquid on the solid depends on the wetting angle θ

Wetting Fluid: $\theta < 90^\circ$

Nowetting Fluid: $\theta > 90^\circ$



Capillary Pressure



Wetting Angle: θ

Radius of Curvature: $\frac{R}{\cos \theta}$

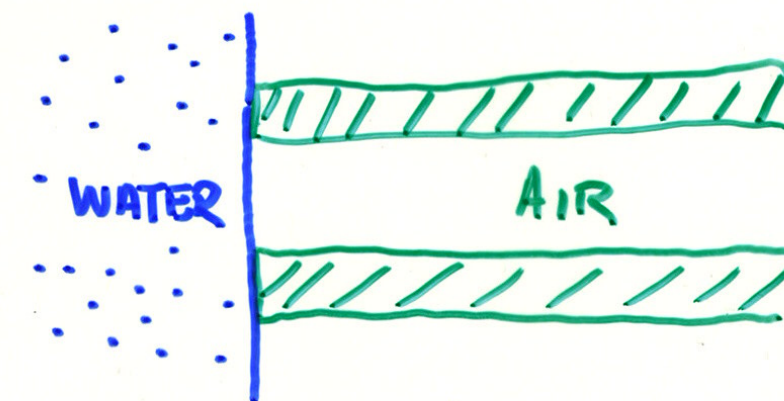
$$\therefore P_{\text{AIR}} - P_{\text{WATER}} = \frac{2\sigma \cos \theta}{R}$$

How high is water drawn?

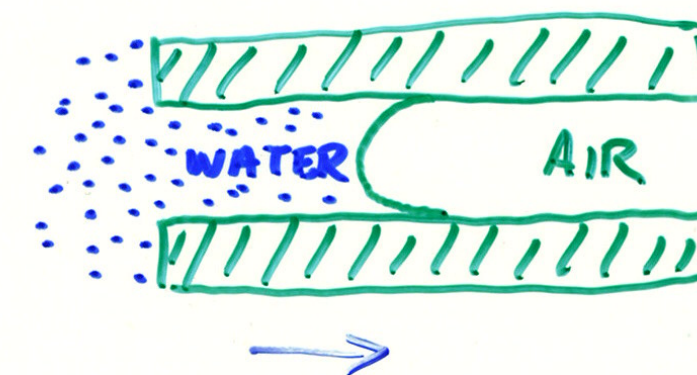
Capillary Imbibition

displacement of non wetting fluid by wetting fluid

Initial Time



LATER



water moves into cylinder (capillary)
why?