

Fluids

TABLE 9.3

Densities of Some Common Substances

Substance	$\rho(\text{kg}/\text{m}^3)^a$	Substance	$\rho(\text{kg}/\text{m}^3)^a$
Ice	0.917×10^3	Water	1.00×10^3
Aluminum	2.70×10^3	Glycerin	1.26×10^3
Iron	7.86×10^3	Ethyl alcohol	0.806×10^3
Copper	8.92×10^3	Benzene	0.879×10^3
Silver	10.5×10^3	Mercury	13.6×10^3
Lead	11.3×10^3	Air	1.29
Gold	19.3×10^3	Oxygen	1.43
Platinum	21.4×10^3	Hydrogen	8.99×10^{-2}
Uranium	18.7×10^3	Helium	1.79×10^{-1}

^aAll values are at standard atmospheric temperature and pressure (STP), defined as 0°C (273 K) and 1 atm (1.013×10^5 Pa). To convert to grams per cubic centimeter, multiply by 10^{-3} .



11.5 km deep

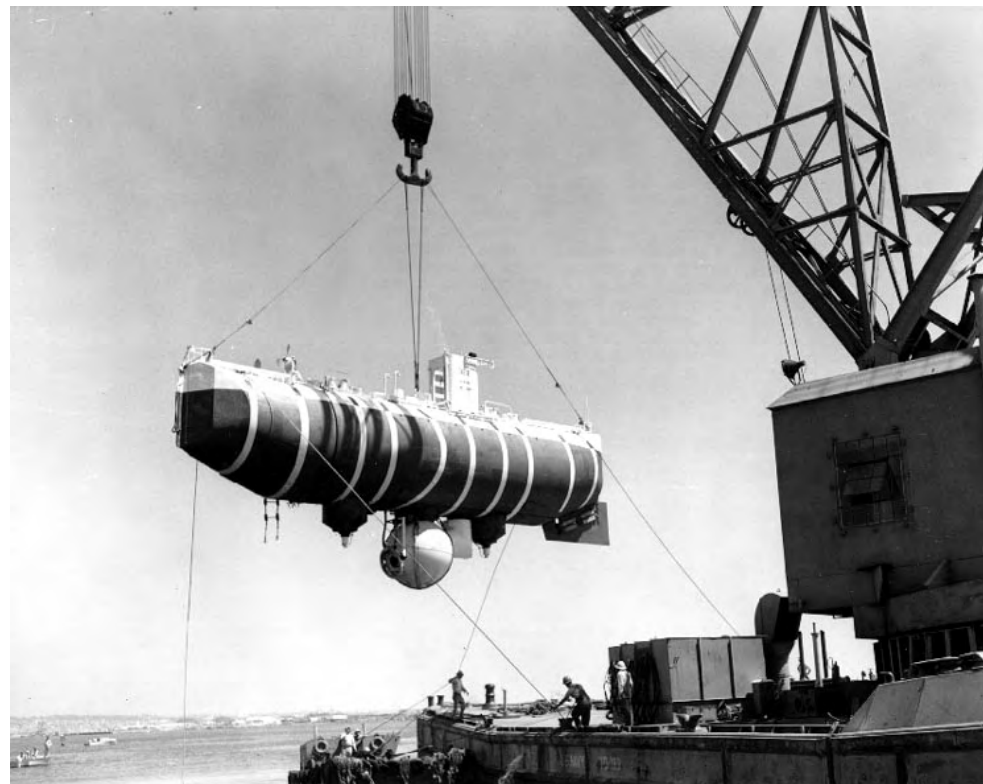


Photo # NH 96799 Trieste preparing for mid-Pacific operations, 1959

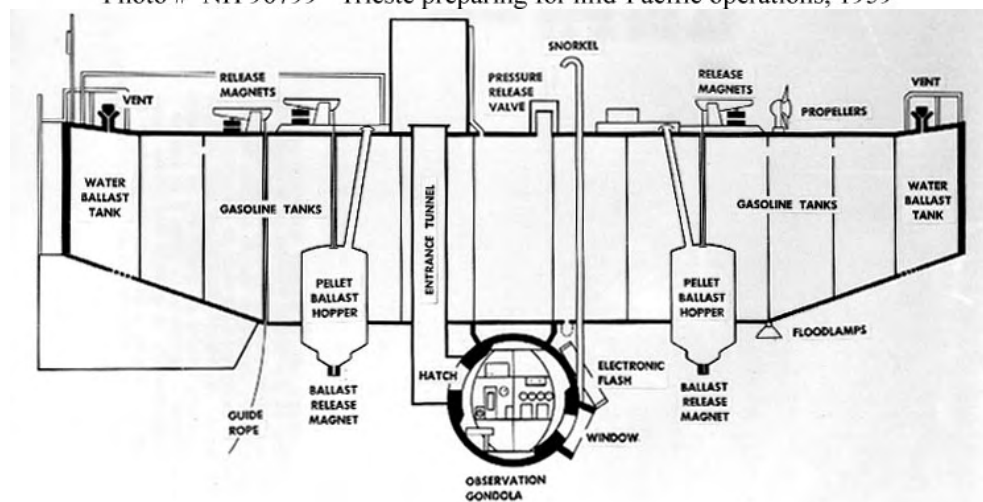
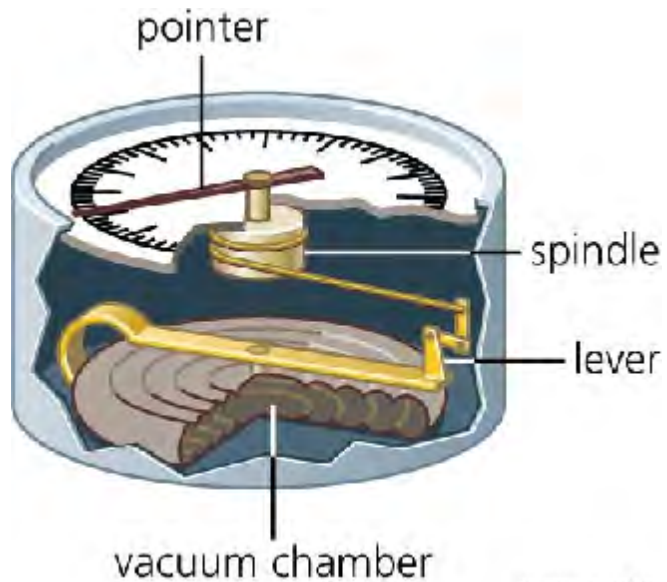


Photo # NH 96807 General arrangement drawing of Trieste, ca. 1959

Readings in
millibar (935-1065)
mmHg (range: 27.5-31.5)



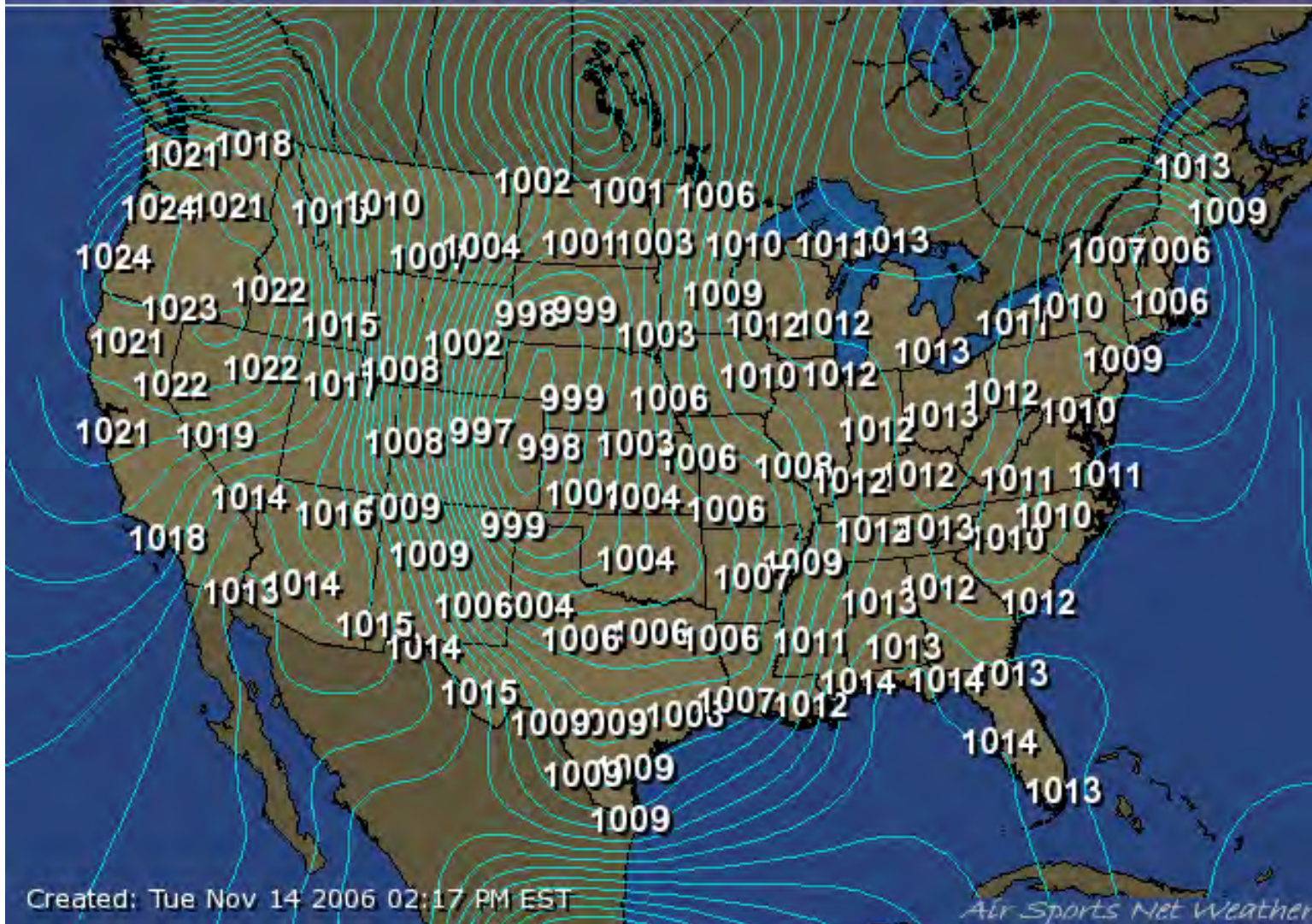
vacuum chamber

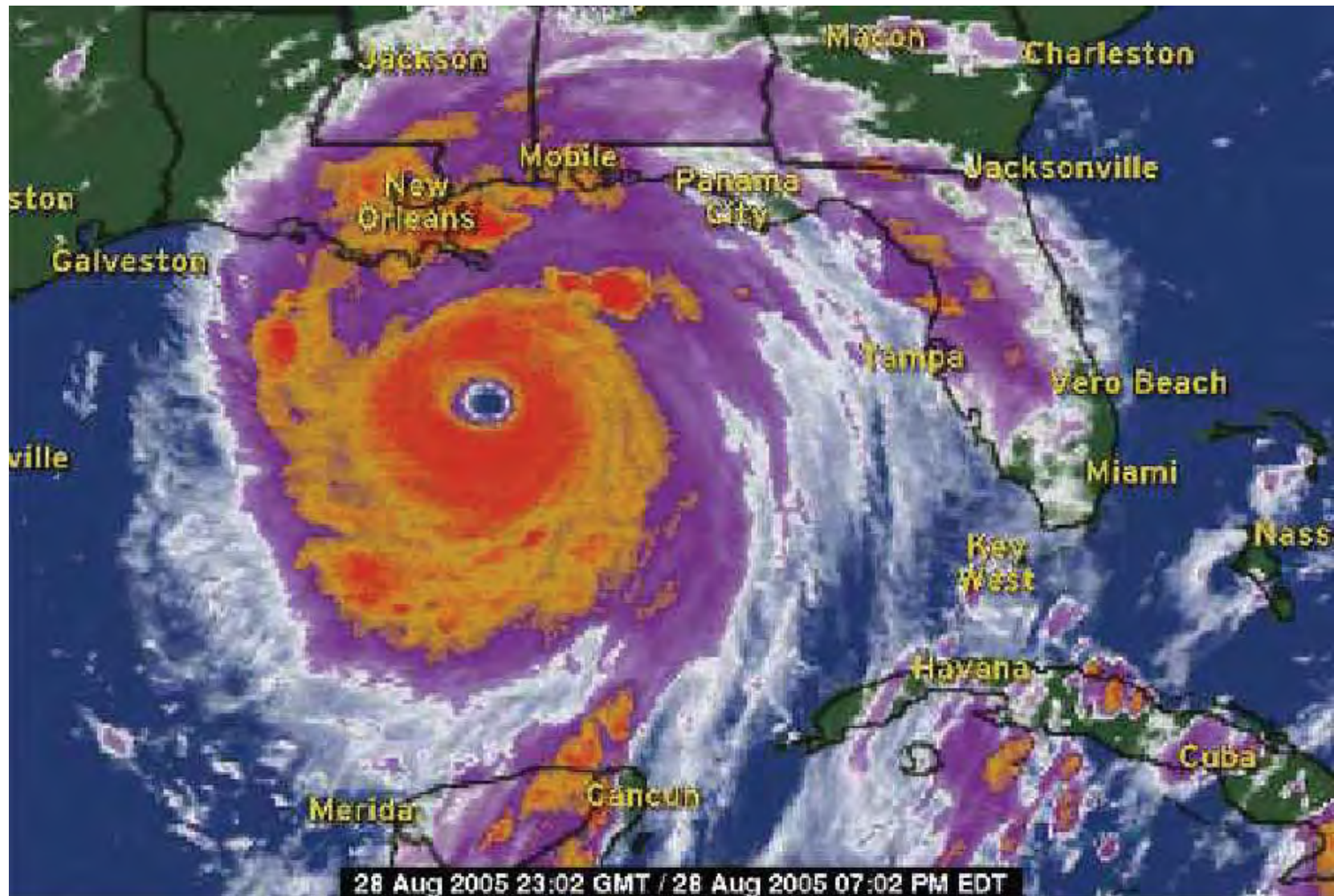
Precision Graphics

Aneroid Barometer

Current Pressure

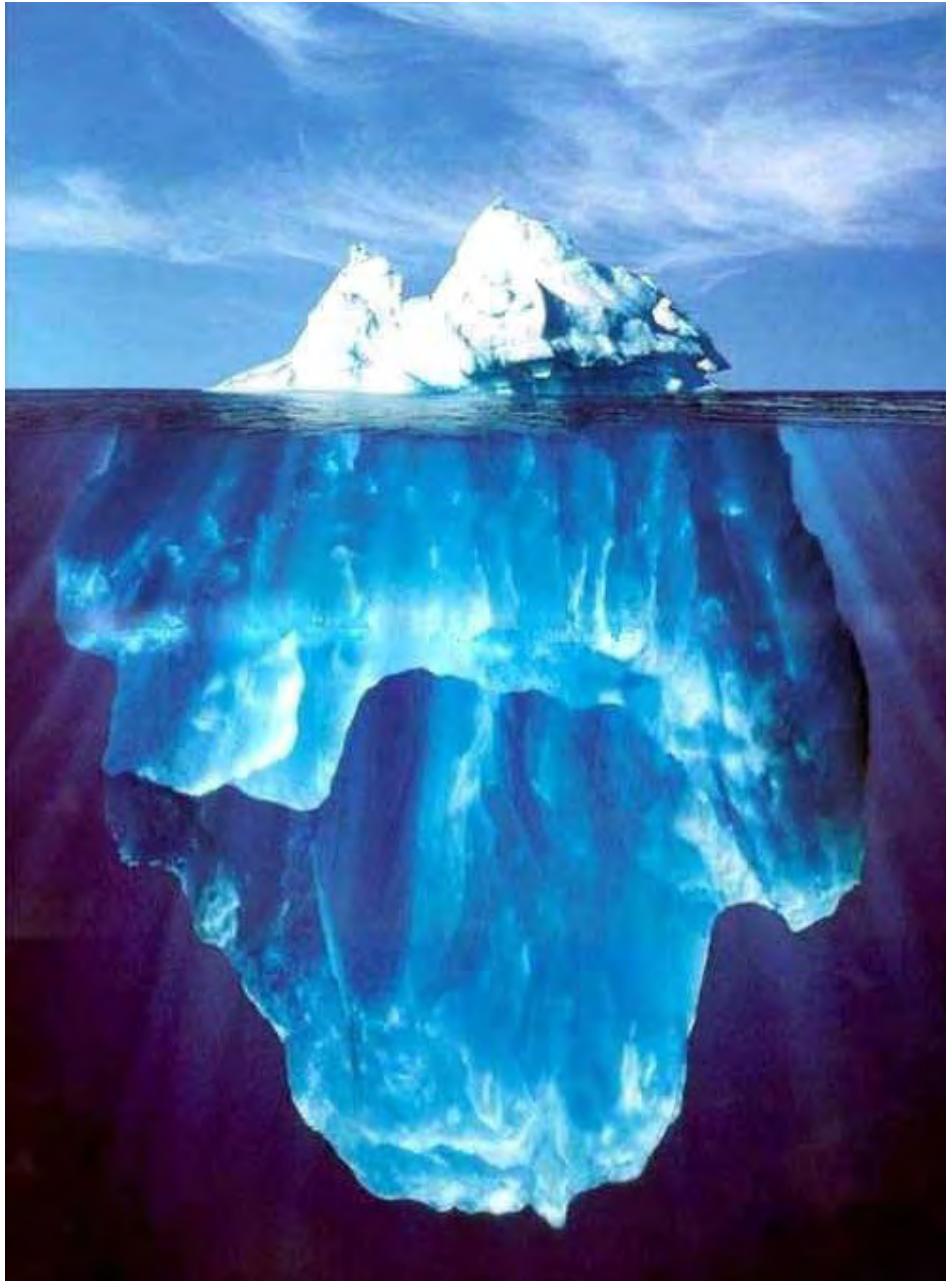
Air Sports Net Weather





Hurricane Katrina

LOCATION	26.9N 89.0W	TIME	4 PM CDT
150 Mi S of the Mouth of the Mississippi River			
WINDS	165 mph	MOVING	NW 13 mph
PRESSURE	26.70 in/904 mb		

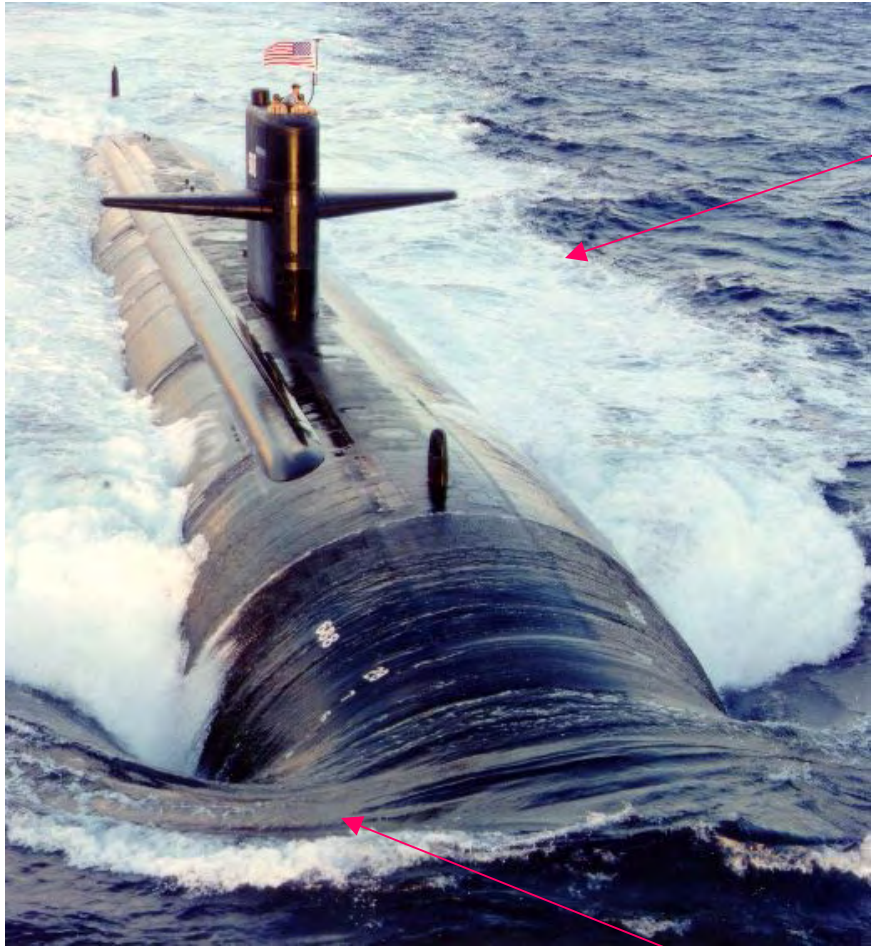


The Essence of Imagination

"What we can easily see is only a small percentage of what is possible.
Imagination is having the vision to see what is just below the surface;
to picture that which is essential, but invisible to the eye."

(motivational poster, "Successories")

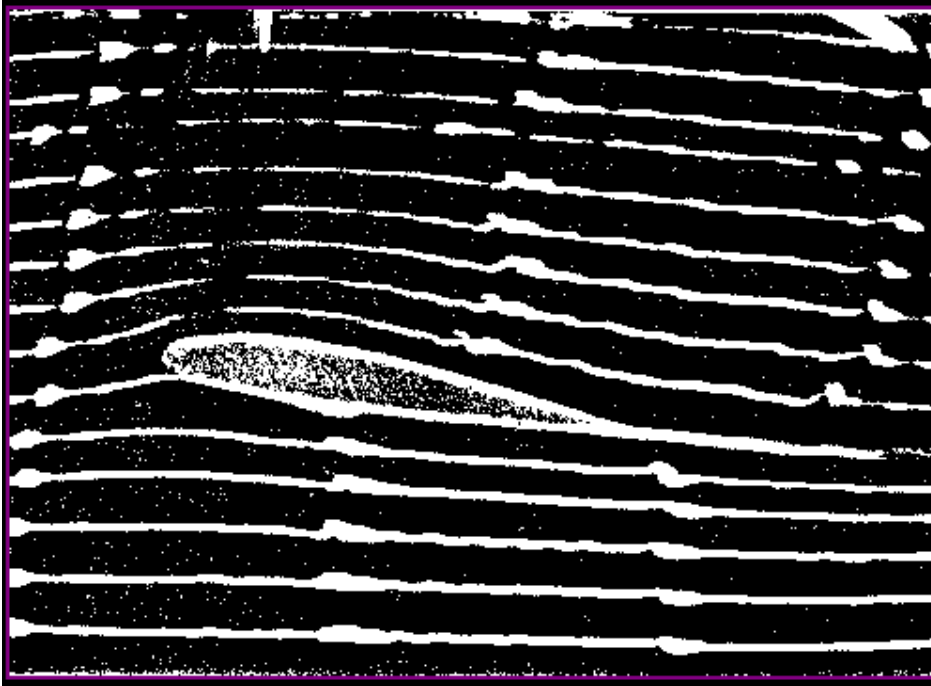
Composite photograph... not a single real image!
<http://www.snopes.com/photos/natural/iceberg.asp>



turbulent flow

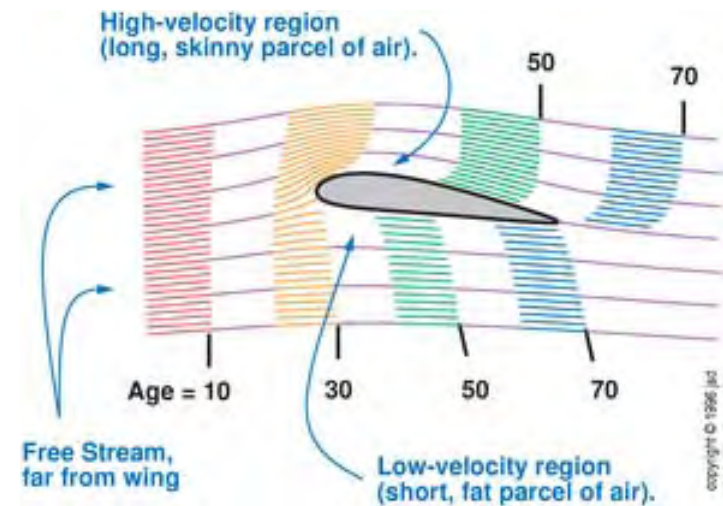


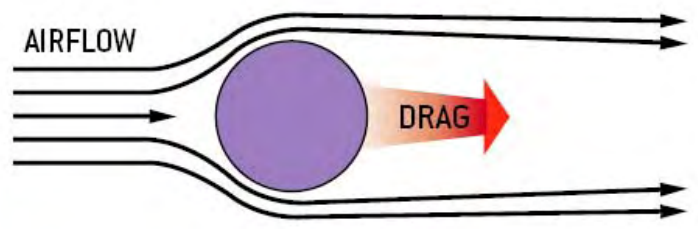
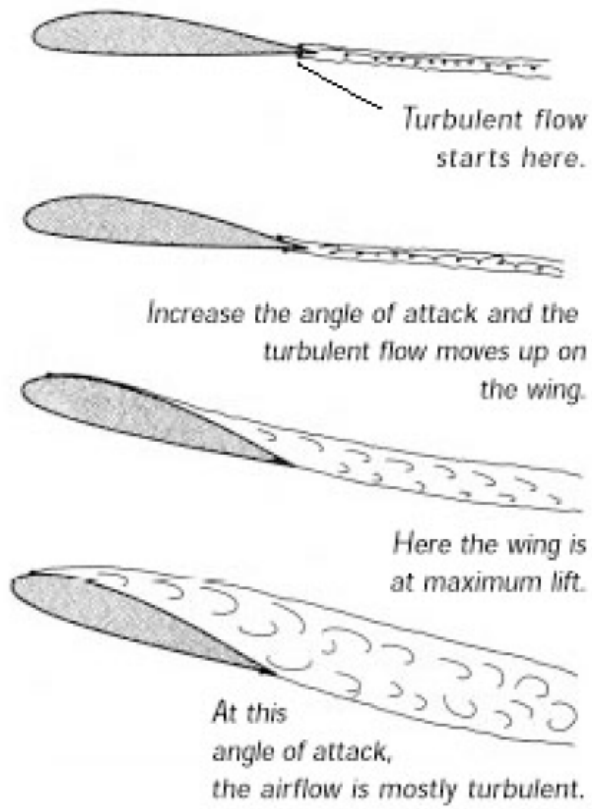
Laminar flow



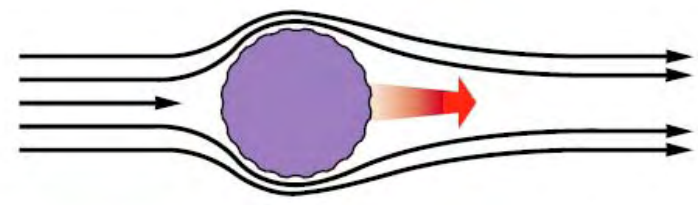
Wind tunnel: pulsed smoke streams

Note: the pulses do not line up after they leave the trailing edge of the wing - it is a misconception that the streams recombine

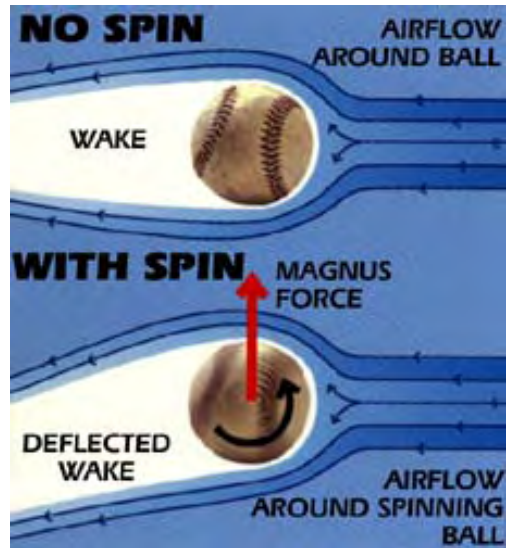
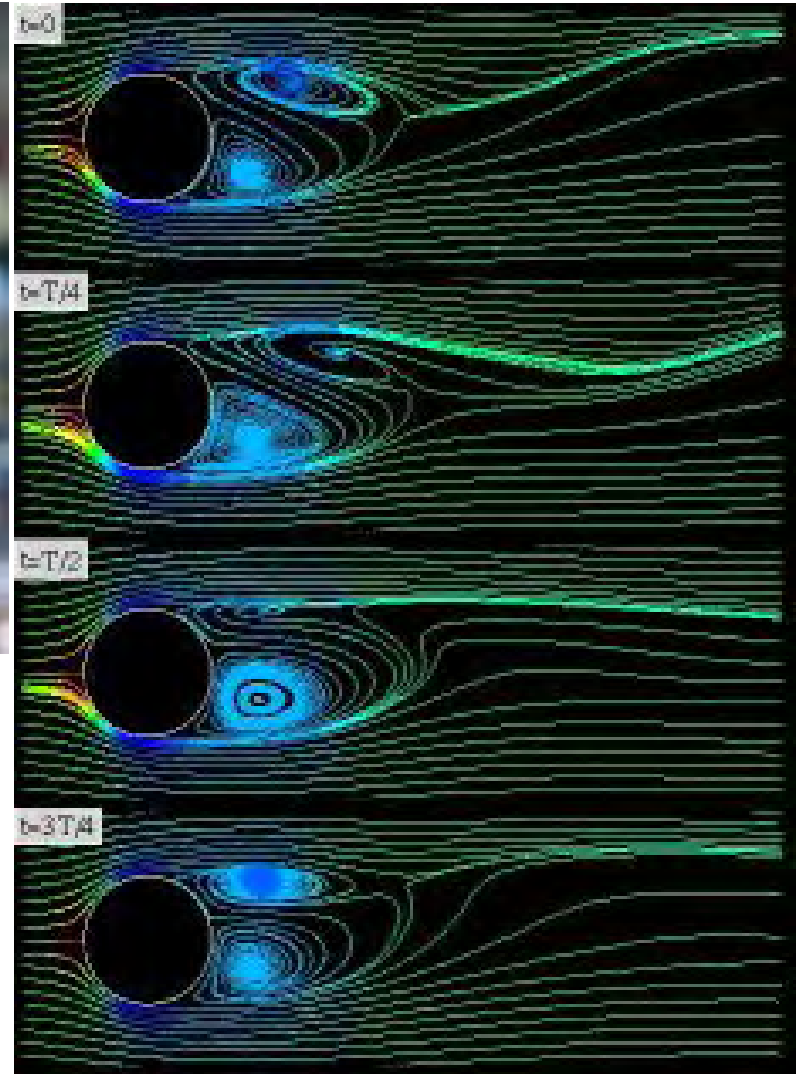


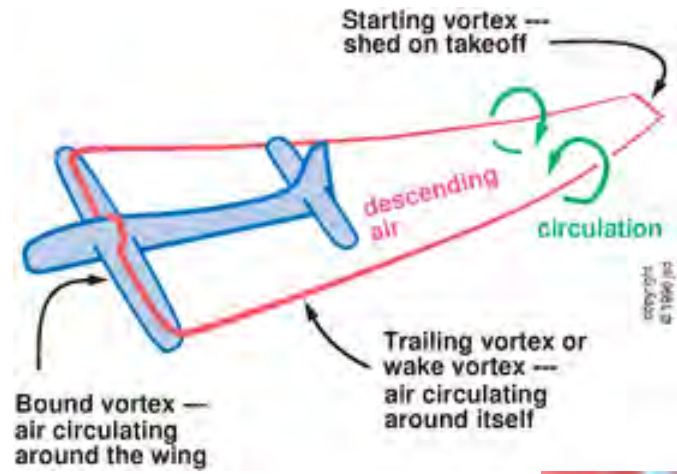



DRAG on a smooth, soaring golf ball is created by the difference between high air pressure against the front of the ball and low pressure behind it, the latter caused by the laminar separation of airflow.



DIMPLES cause turbulence in the thin layer of air against the ball, which reduces airflow separation, creating more back pressure and thereby reducing drag.





 Wake Vortex Study at Wallops Island
 NASA Langley Research Center 5/4/1990 Image # EL-1996-00130

