

PM

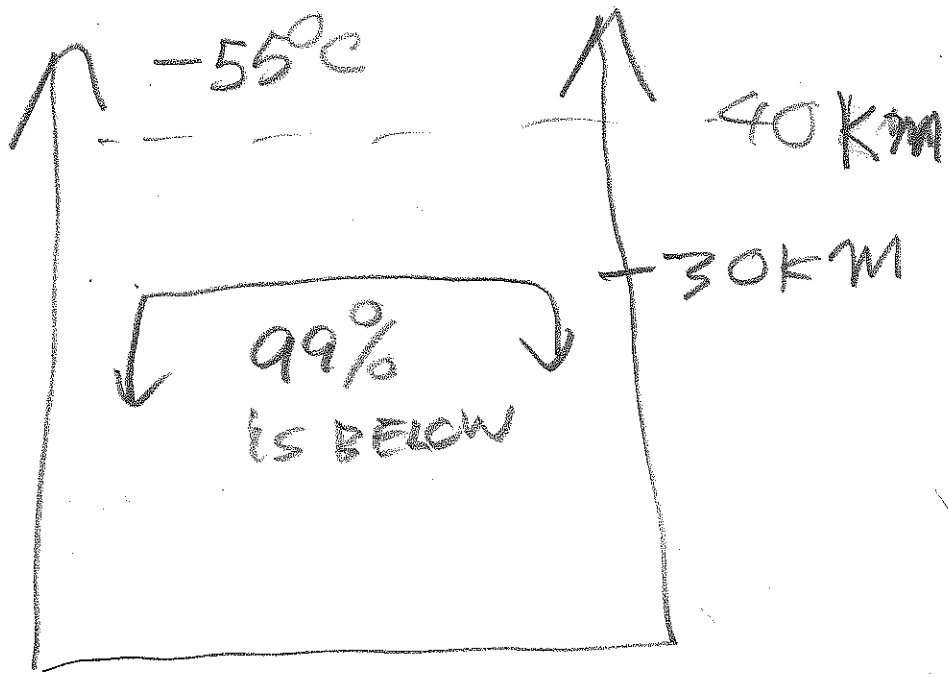
CH₄

10-15-13

55 below freezing

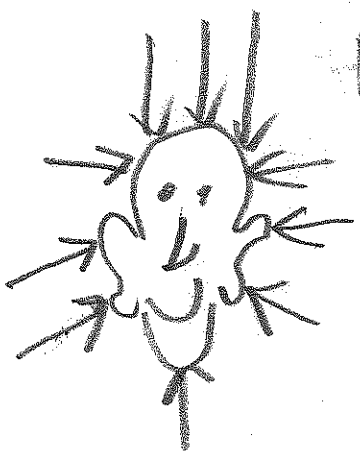
fig 14.1

Density of air DECREASES UPWARD



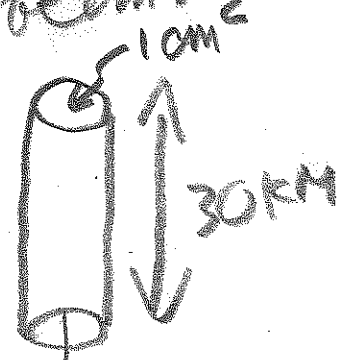
ATMOSPHERIC PRESSURE

P_{ATM} = weight of AIR ABOVE YOU.



HOMWORK PROBLEM: 2 PAGE 249.

pole

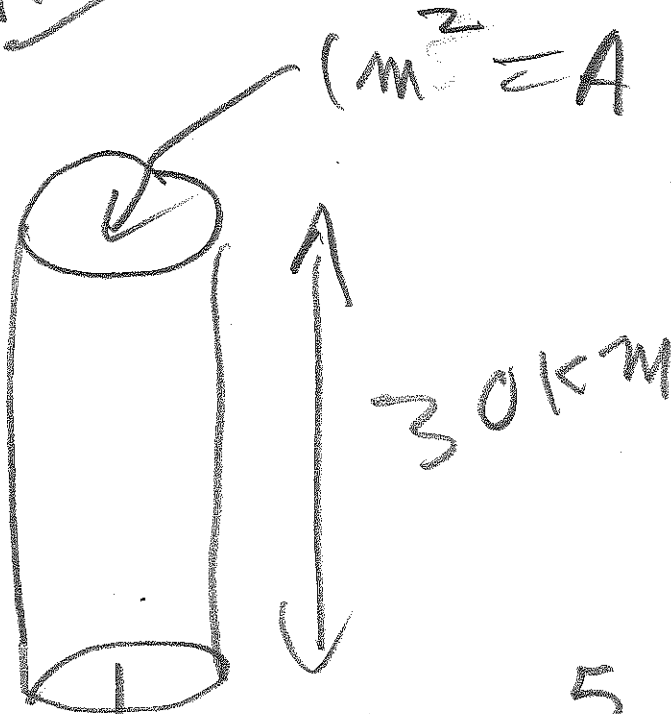


2.2 lbs \approx weight = 10^5 (N)

CH19

12

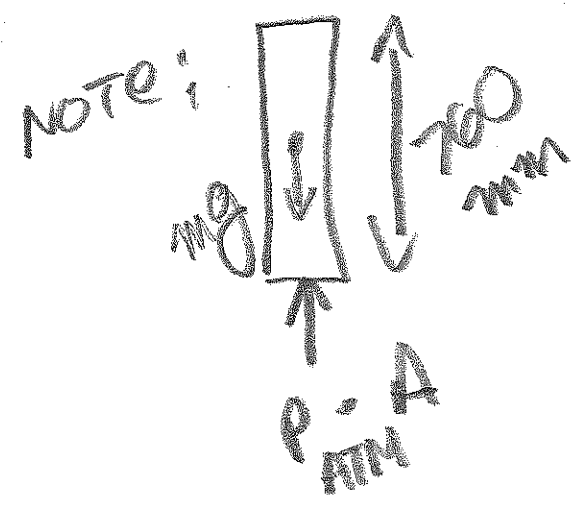
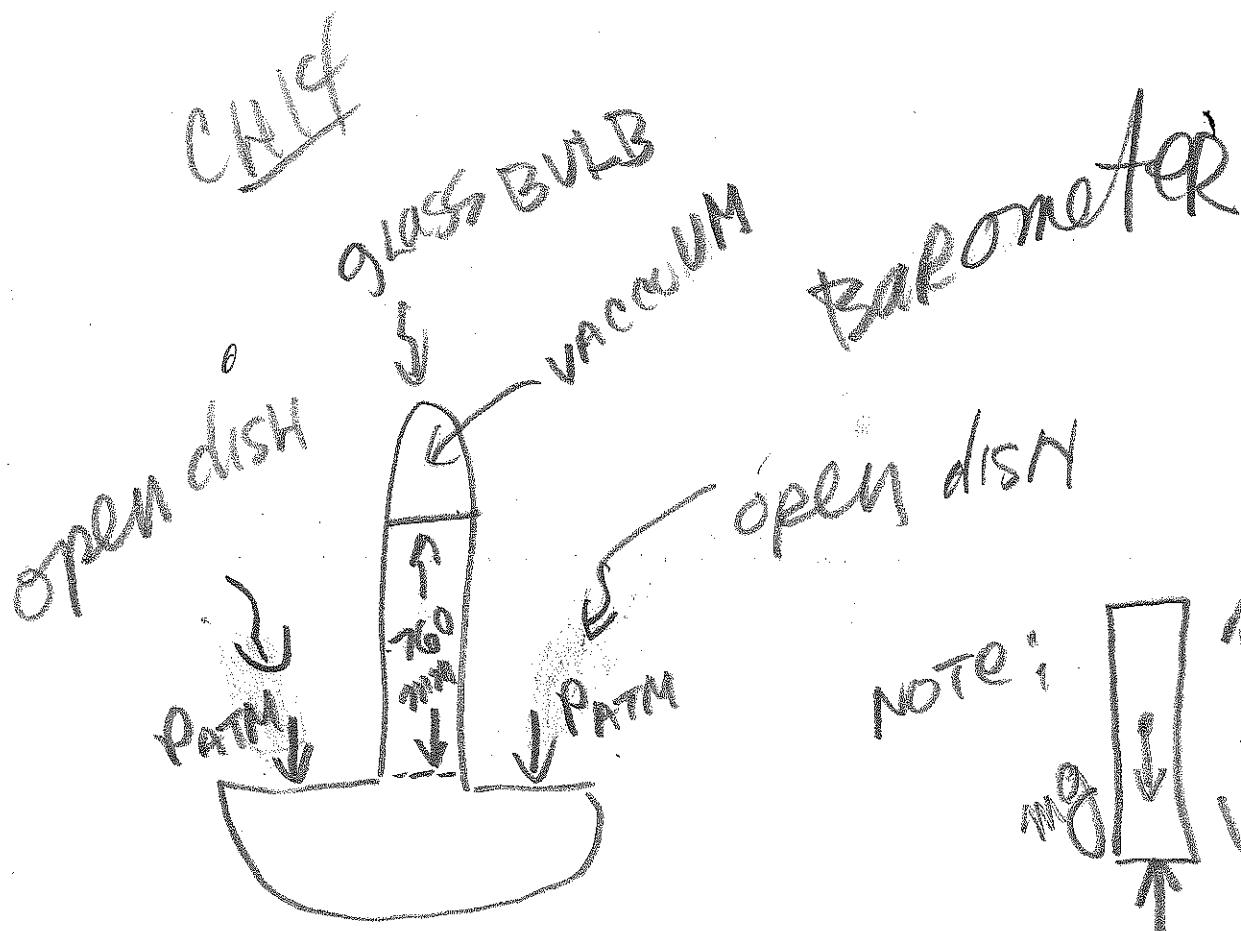
Wider
Bamboo
pole



weight = $10^5 \text{ (N)} \approx$

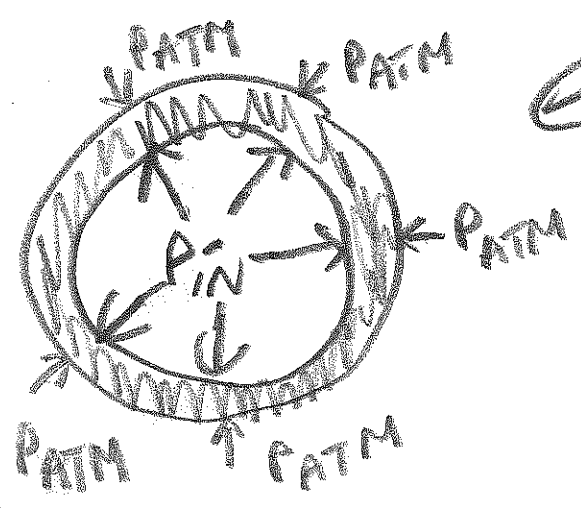
$\approx 22000 \text{ lbs}$
 $= 22000 \text{ lbs}$

Pressure $\frac{10^5 \text{ N}}{\text{area}} = \frac{10^5 \text{ N}}{1 \text{ m}^2}$
 $= 10^5 \frac{\text{N}}{\text{m}^2}$
 $= P_{\text{ATM}}$



BOYLES LAW

NOTE:
 $P_{ATM} < P_{IN}$
 because
 of TIRQ.
 FORCE
 (POINTS INWARD)



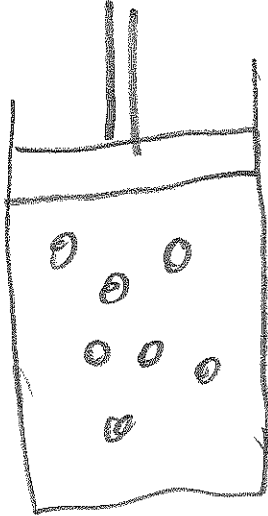
TIRQ

CH19

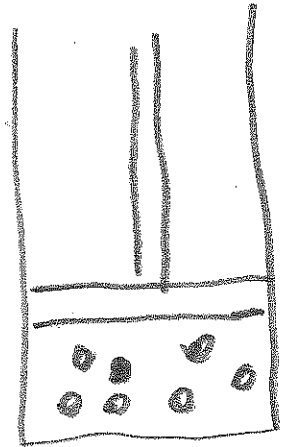
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fig 14.13

LARGE
V



SMALL
P



SMALL
V

LARGE
P

$$P = \frac{F}{\text{LARGE } A}$$

$$P = \frac{F}{\text{SMALL } A}$$

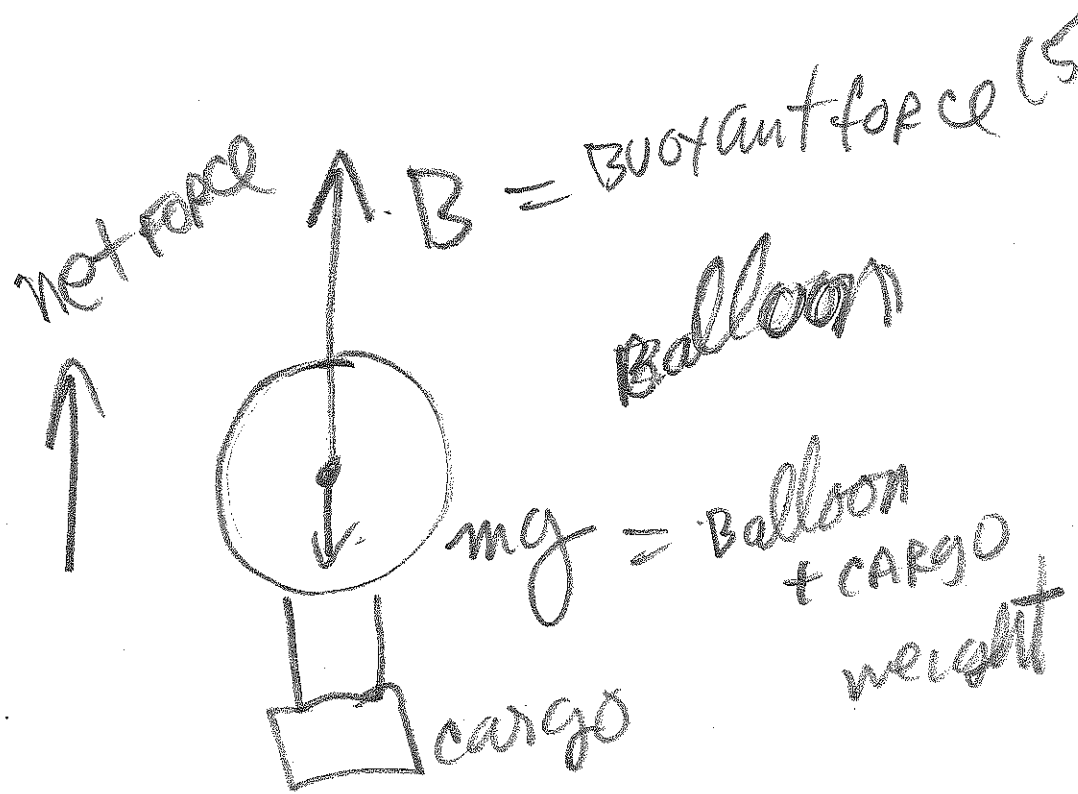
BOYLES' LAW

$$P \cdot V = P \cdot V$$

$$P_1 \cdot V_1 = P_2 \cdot V_2$$

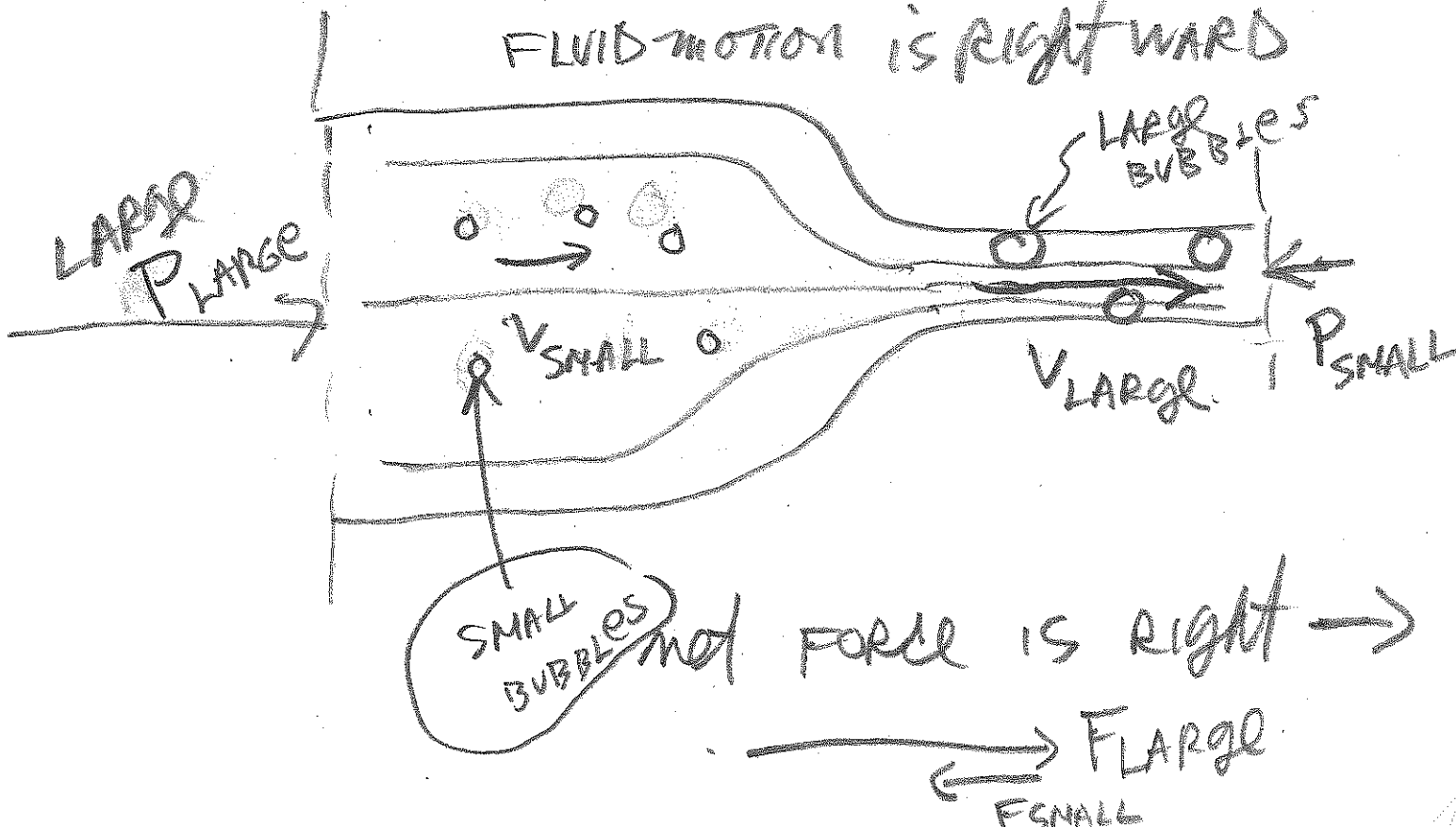
ch 14

Rises



BERNOULLI'S LAW

FLUID MOTION IS RIGHT WARD



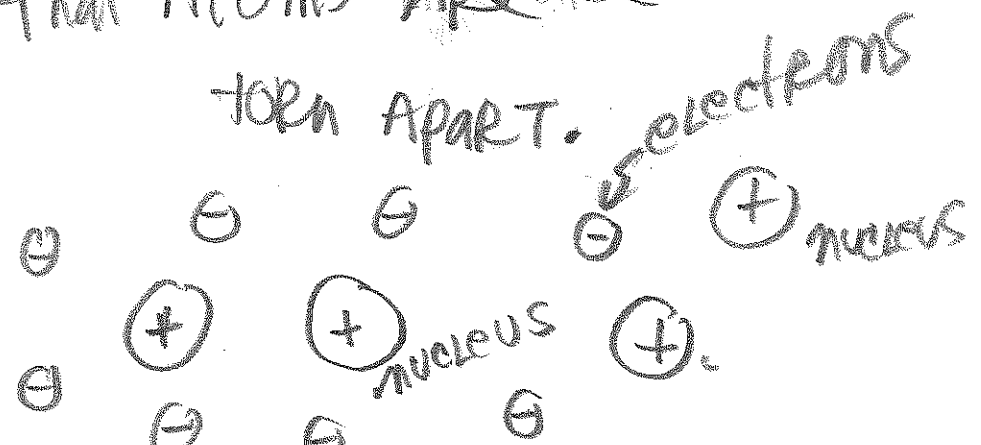
CH 14

66

LINES OF FLOW ARE
CLOSE TOGETHER, FLUID
SPEED IS HIGH.

BERNOULLI'S EXPLAINS
AIRCRAFT LIFT
CURVE BALLS

PLASMA: VERY HOT SO
THAT ATOMS ARE
TORN APART.

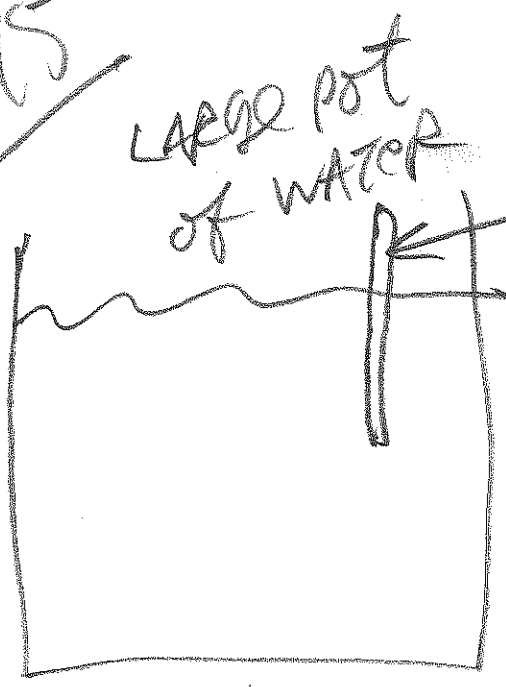


The diagram illustrates a plasma state where atoms are torn apart. It shows several small circles with a minus sign (\ominus) representing electrons, and larger circles with a plus sign (\oplus) representing nuclei. The labels "electrons" and "nucleus" are written next to their respective symbols. The particles are scattered, indicating they are no longer bound together in atoms.

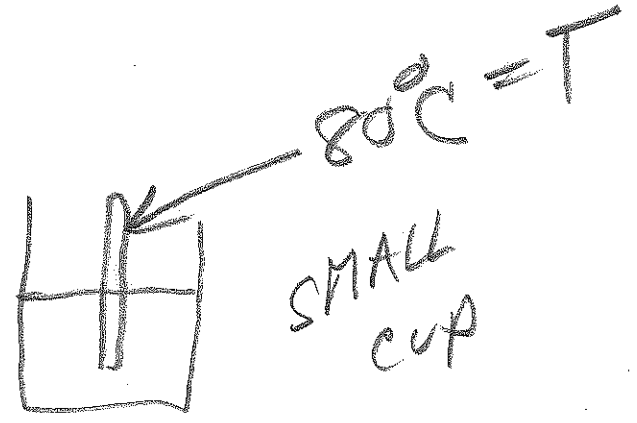
10-17-13

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CH 15



80°C = T



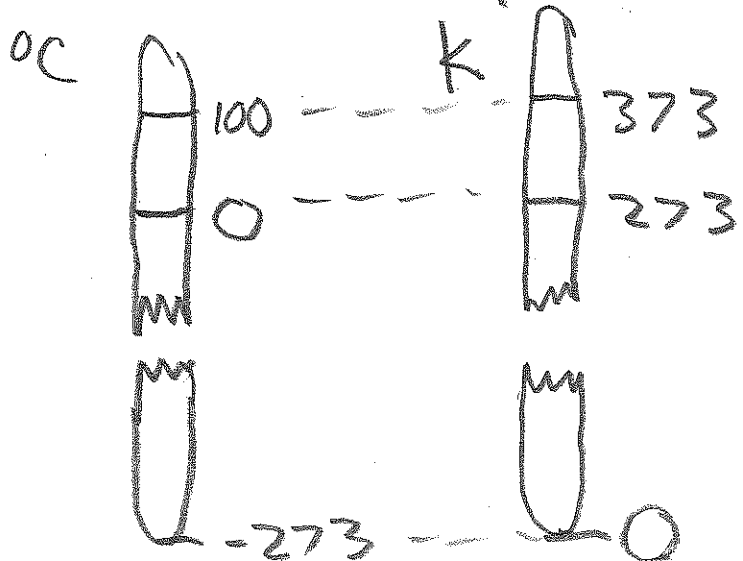
80°C = T
SMALL CUP

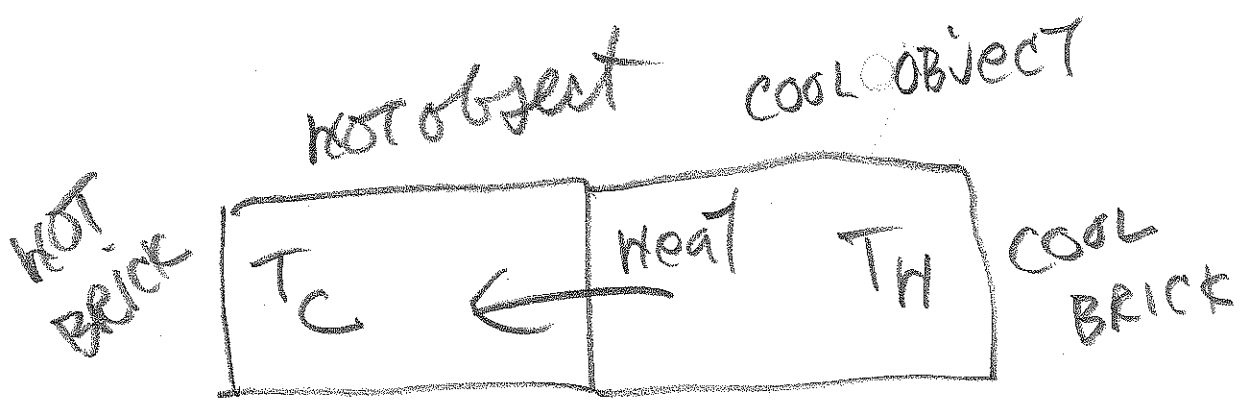
T = temperature

Temperature does not depend on volume.

T ∝ AVERAGE KINETIC ENERGY of molecules

T-scales





Internal energy of a gas =
 TOTAL KINETIC ENERGY if molecules
 are monoatomic and gas is
 ideal.

Helium ATOM

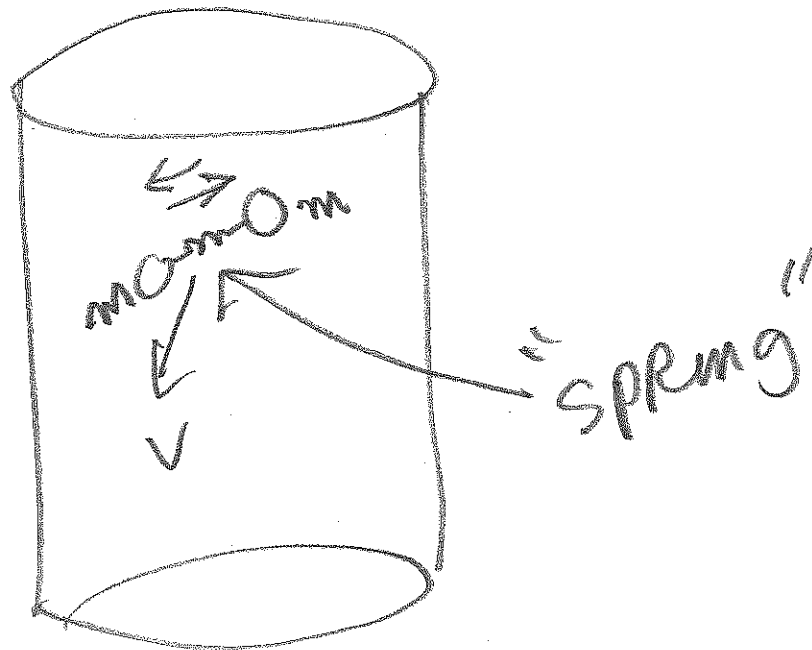
$m = \text{atom mass}$
 $v = \text{atom speed}$
 He (gas)

EACH ATOM
 HAS $\frac{1}{2}mv^2$

11 ATOMS:

Internal energy
 = $11 \cdot \frac{1}{2}mv^2$

IF gas is diatomic (O_2)



$$\text{Molecule Energy} = \frac{1}{2} (2m) v^2 + \text{spring energy}$$

internal energy includes
spring energy

Heat capacity

Rank from highest to
lowest in heat capacity

LIST 1

LIST 2

Filling (Apple)

Water

Crust

Sand

Copper

Filling cools
down and
heats up
slower

Water cools
and heats up
slower

(11)

Specific heat capacity of
water is $C = \frac{1 \text{ cal}}{\text{g} \cdot ^\circ\text{C}}$

cal = calorie = 4.184 Joules

$$\text{Heat} = m \cdot C \cdot \Delta T$$

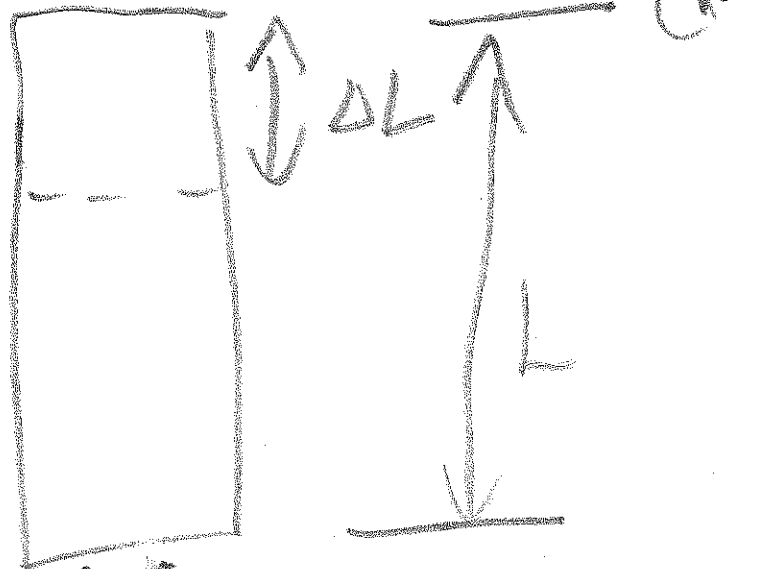
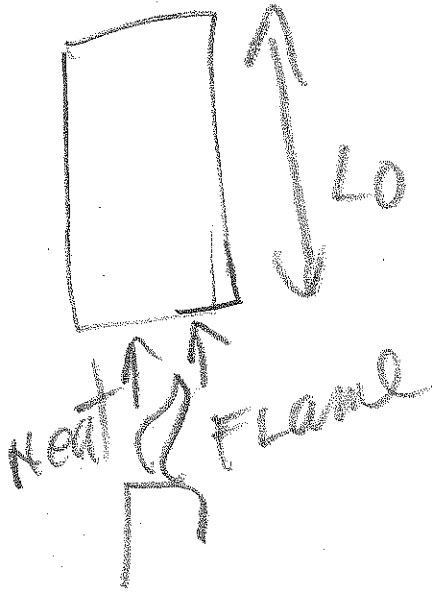
1g of water.

How much heat raises

temperature by 6°C ?

$$\begin{aligned} \text{Heat} &= (1 \text{ g}) \cdot \left(\frac{1 \text{ cal}}{\text{g} \cdot ^\circ\text{C}}\right) \cdot (6^\circ\text{C}) \\ &= 6 \text{ cal} \end{aligned}$$

METAL ROD



$$L = L_0 + \Delta L$$

ROD EXPANDS
(LARGE THERMAL
VIBRATIONS
OF MOLECULES)

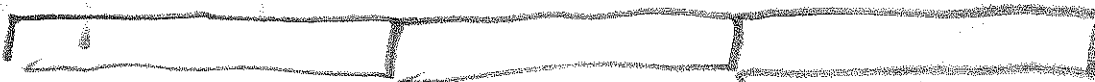
Fig 15.14

3,39 FT. segments.

WINTER



SUMMER (EXPANSION)



TOO MUCH EXPANSION CAUSES BUCKLING.

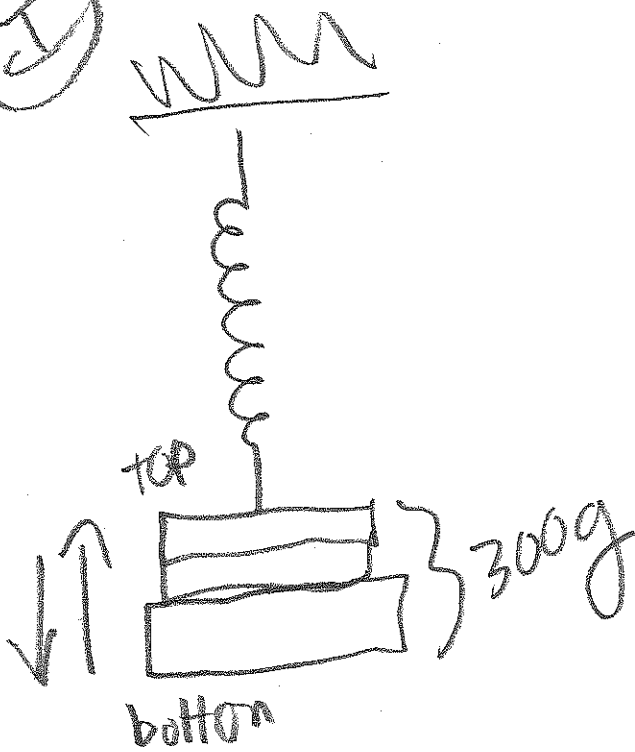
Lab on springs:

(13)

measure k , m , period = T_{ex}

Lab : 2 parts:

(I)



measure

period = time = T_{ex}

to go from bottom to

top and back to bottom.

(II)

measure k and

compute:

$$T_{TH} = 2\pi \sqrt{\frac{m}{k}}$$

$$m = \left(0.300 + \frac{ms}{3}\right) \text{ kg}$$

where $ms =$

spring mass