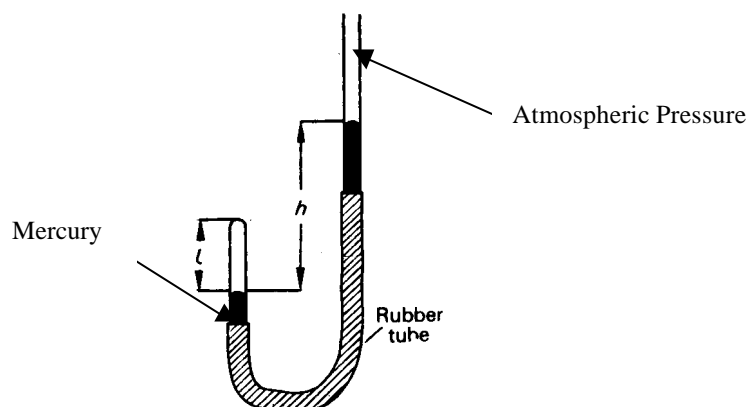


Boyle's Law (J-Tube)



Using the above apparatus set the open limb at various heights above and below the closed limb and measure the difference in level, h , of the mercury. At each value of h measure the corresponding length l of air in the closed tube.

To find the pressure of the air we add the difference in level h to the height of the barometer, H ; their sum gives the pressure of the air in the closed limb.

$$p = rg(H+h) \quad \dots \quad \text{i.e.} \quad p \propto (H+h)$$

The volume of air in the closed limb, $V = \pi r^2 l \quad \dots \quad \text{i.e.} \quad V \propto l$ (Hence $1/V \propto 1/l$)

If a plot of $(H+h)$ is made against $1/l$ we get a straight through the origin, and therefore

$$H+h \propto 1/l$$

Since $(H+h) \propto p$ and $1/l \propto 1/V$, this gives

$$P \propto 1/V$$

Hence Boyle's law is verified.