

Sensitivity.

When the balance is in equilibrium in air a change of 1 mm. pressure causes a change in scale reading of 3 mms. One mm. change in pressure alters the density of air by .0017 mg. per c.c., therefore a change in density of .0006 mg. per c.c. can be detected. The manometer used, however, cannot be read to less than .5 mm., therefore .00085 mg. per c.c. change of density is the limit of accuracy. One per cent of air or nitrogen alters the density of pure C gas by .01 mg. per c.c., therefore the presence of at least 1/10 per cent of either of these impurities is readily determined.

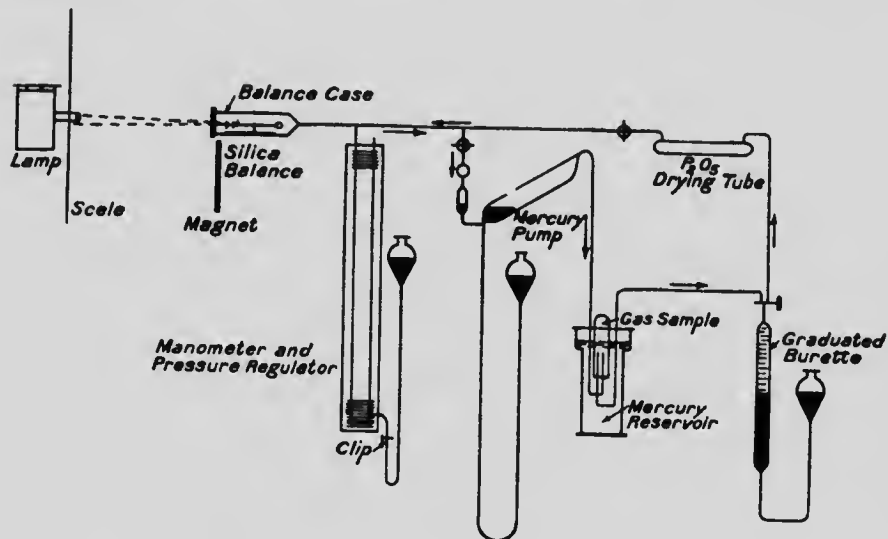


FIG. 20. Gas density balance. (Diagrammatic Sketch.)

Example of method of calculation.

Density of sample of C gas, purified by passage through coconut charcoal cooled in liquid air.

Scale reading.	Corresponding pressure of C gas.	Corresponding pressure of air.	Ratio.	Density of sample grm. per litre N.T.P.
25.0.....	mm. 346	mm. 48	.1385	.1792
22.6.....	386	53.5	.1383	.1791
20.0.....	428	59.5	.1387	.1795
			Mean ..	.1794

The density of pure C gas, according to the latest determination* is .1785 grm. per litre. One per cent of nitrogen or of air in C gas increases its density by .01 grm. per litre, therefore the purified sample of density .1794 grm. per litre contains less than 1/10 per cent impurity, assuming the impurity to be nitrogen or air.

* The Density of Helium. T. S. Taylor. Phys. Rev., Vol. 10, pp. 653-60. 1917.